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70

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Saving for College with 529 Plans and Other Options: An Update

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The Economic Growth and Tax Reconciliation Act of 2001, signed into law in June 2001, made substantial changes to the rules governing 529 plans and the Education IRA (renamed Coverdell Education Savings Account). In this article, we provide an updated comparison of 529 plans with other options. In addition to taking into account the new tax law changes, we discuss in detail the impact of saving on financial aid eligibility. We also use a "Monte Carlo" approach to simulate asset accumulations in a 529 plan, balanced mutual funds, Coverdell Education Savings Accounts, and Series-I savings bonds. Results show that 529 plans have definite advantages over other investment strategies with similar risk characteristics.

in this issue

INTRODUCTION

College tuition inflation in the past thirty years has averaged approximately 2 to 3 percentage points higher than general price inflation and is showing no sign of slowing down. For the 2001-2002 academic year, the average tuition and fees at four-year public colleges and universities is $3,754, a 7.7 percent increase from a year ago. For the same year, the average tuition and fees at four-year private colleges and universities is $17,123, a 5.5 percent increase from a year ago.[1]

Paying for college is one of the most significant financial burdens families bear. For parents who anticipate paying a substantial portion of college expenses with savings, it is important that they start college planning as early as possible and choose the right savings option based on their own situations. In a previous issue of *Research Dialogue* (Ma and Fore, Issue no. 67, March 2001), we discussed the features of 529 plans and compared these plans with several other college-saving options. In that issue, we also presented numerical calculations comparing asset accumulations in a 529 plan with those in balanced mutual funds and Series-I bonds.

The calculations and information provided in that article were based on the laws and regulations that were in effect as of March 2001. The Economic Growth and Tax Relief Reconciliation Act of 2001 (the "2001 Tax Act"), signed into law in June 2001, made substantial changes to the rules governing 529 plans and the recently renamed Coverdell Education Savings Account (ESA). Among its provisions, the new tax law provides that earnings included in qualified withdrawals from a 529 plan are exempt from federal income tax, starting in 2002. The new tax law also raises the annual contribution limit for the Coverdell ESA from $500 to $2,000 per beneficiary.

In this article, we update our analysis of saving with 529 plans and several other options to reflect the tax law changes. We also discuss in detail the impact of saving on financial aid eligibility. In addition, we use a Monte Carlo approach to simulate asset accumulations for each saving option. Rather than assuming fixed rates of return into the future, the Monte Carlo approach allows for random asset returns in simulating possible future outcomes.

The remainder of the paper is structured as follows. In Section 1, we describe the tax law changes related to 529 plans. In Section 2, we discuss the tax law changes related to the Coverdell ESA. In Section 3, we discuss the impact of saving on financial aid. In Section 4, we describe the Monte Carlo approach for the numerical simulations and present updated comparisons of 529 plans with mutual funds, Coverdell ESAs and Series-I bonds. We provide some concluding remarks in Section 5. We include detailed assumptions for our simulations in the Appendices.

529 PLANS: WHAT'S NEW?

Named after the section of the Internal Revenue Code that created them, 529 plans are qualified tuition programs designed to help families save for college expenses. Two basic types of 529 plans are available: savings and prepaid. Prepaid plans allow families to prepay future tuition at today's prices. Savings plans are investment programs that offer a variable rate of return.

Although the first prepaid tuition plan (Michigan Education Trust) was introduced in 1988, it was not until 1996 that Section 529 was added to the Internal Revenue Code (IRC) to clarify the federal tax treatment of state-sponsored tuition plans. Contributions to 529 plans are not deductible for federal income tax purposes, but earnings grow tax-free until withdrawal. Many states provide additional state income tax benefits in the form of state tax deduction for contributions or state tax exemption on earnings, or both.

The 2001 Tax Act made 529 plans more appealing, as the earnings of qualified withdrawals from state-sponsored plans are made exempt from federal income tax, starting January 1, 2002. States that currently do not exempt earnings from state income taxes may follow suit and exempt earnings from state taxes. To illustrate the significance of this tax law change, consider a case where parents saving on behalf of a newborn child contribute $200 a month to a 529 plan over the next 18 years. Assuming an 8 percent annual rate of return, they would have $96,657 available to pay for college under the new tax law. Under the old tax law, they would have $88,639 after paying 15 percent federal income tax on earnings.

Note that all provisions of the 2001 Tax Act are scheduled to expire on December 31, 2010. Were this to occur (and given no other changes in the interim), the federal tax treatment of 529 plans would revert to its status prior to January 1, 2002. However, given that the relevant provisions of the 2001 Tax Act are explicitly designed to facilitate long-term saving for college, it is possible that the enhanced federal tax status of 529 plans will continue after 2010. In our simulations, therefore, *we assume that the relevant provisions of the 2001 Tax Act will be extended beyond 2010*. Individuals should nevertheless be aware that there is an explicit risk that federal tax policy toward 529 plans may change after 2010—and that there is always a risk that federal tax policies will change in the future.

Even before the tax law changes, 529 plans were very flexible. Anyone, regardless of income, can contribute to a 529 plan. Withdrawals may be used to pay for tuition, fees, room and board, books, supplies, and equipment at almost any postsecondary institution. Although most prepaid plans are open to state residents only, most savings plans allow anyone from any state to open an account. Most 529 savings plans allow the beneficiary to be anyone, even oneself. 529 plans offer generous saving limits. Most prepaid plans allow purchasers to purchase up to four years' worth of future tuition credits at certain in-state schools. For savings plans, a lifetime limit on contributions per beneficiary is imposed based on account balances (the sum of contributions and earnings less fees and expenses) and in some cases gross contributions. Lifetime contribution limits vary widely across states. Currently, the lowest limit on gross contributions is $100,000 and the highest is $251,000. The lowest limit on account balances is $122,484 and the highest is $265,620.[2]

Before the tax law changes, if an account owner decided to transfer assets from one 529 plan to another, they could do so only by changing the beneficiary. The 2001 Tax Act permits the rollover of an account from one 529 plan to another once every twelve months without changing the beneficiary. The 2001 Tax Act also ties the limits on qualified room and board expenses for 529 plans more closely to actual costs and allows the transfer of account between cousins, which is particularly important since it allows grandparents to transfer funds among their grandchildren.

The earnings portion of non-qualified withdrawals from 529 plans is subject to income tax at the distributee's rate and an additional 10 percent tax.[3] However, the account owner may make a penalty-free, tax-free rollover by designating another "member of the family" as the new beneficiary.

As of June 2001, there were approximately 1.9 million accounts with a total asset value of $10.8 billion across all 529 plans (including both savings and prepaid types), an increase of 40 percent compared to August 2000. As of December 2001, forty states had 529 savings plans in operation. The rest of the states had 529 savings plans under development. Twenty-two states had 529 prepaid plans either in operation or under development.[4] Summary tables describing the features of existing savings and prepaid plans can be found in the data section of www.tiaa-crefinstitute.org.

Investment Choices for 529 Plans

One potential drawback for 529 plans is that the federal law requires that investors may not make direct investment decisions. Before 2002, investors were only allowed to choose from an array of investment options available from the plan when establishing an account. Investors were also allowed to change the percentage of new contributions going into each investment option. However, investors were not allowed to move existing assets between investment options.

Most 529 savings plans offer an age-based option, which invests heavily in stocks when the beneficiary is young and shifts away from stocks and towards fixed-income and money market securities as the beneficiary gets closer to college age. Some states offer multiple age-based portfolios representing different levels of risk. Many states have also introduced other investment options including all equity, all fixed-income, and guaranteed options.

The expansion of investment options has certainly provided more choices for investors. In fact, investors can now obtain almost any asset allocation they desire by using a combination of investment options and allocating new contributions accordingly. Starting in 2002, investors are allowed to change the investment strategy for existing assets in a 529 account once per calendar

year and upon a change in the designated beneficiary of the account.

When choosing investment option(s), households need to consider many factors, including the age of the beneficiary, their own risk tolerance, and their overall financial situation. Households may find some options more suited to their savings needs than others. Higher equity allocations may appeal to those investors who are willing to take more investment risk and volatility for potentially higher returns, while a guaranteed option may appeal to those investors who are more concerned about preserving principal.

TAX LAW CHANGES RELATED TO THE COVERDELL ESA

The 2001 Tax Act also made substantial changes to the Coverdell ESA, formerly known as the Education IRA. The Coverdell ESA was introduced as part of the Taxpayer Relief Act of 1997. Although contributions to Coverdell ESAs were not tax-deductible, earnings were exempt from income tax if withdrawals were used to pay qualified higher education expenses.

Despite its tax benefits, the Coverdell ESA has not been a popular option for saving for college mainly because of its low $500 annual contribution limit. The 2001 Tax Act raises the annual contribution limit per beneficiary to $2,000, starting in 2002. This increase in contribution limit has made the Coverdell ESA a viable option for many families.

However, there is an income restriction for the Coverdell ESA. For 2001, the income phase-out range was between $95,000 and $110,000 for single taxpayers and between $150,000 and $160,000 for married couples filing a joint tax return. In 2002, more families are eligible for the Coverdell ESA, as the 2001 Tax Act raises the income phase-out range for married couples to between $190,000 and $220,000.

Starting in 2002, qualified expenses for the Coverdell ESA include elementary and secondary school expenses at public, private, or religious schools.[5] This is a boon for families who plan to send their children to private elementary and/or secondary schools.

The earnings portion of non-qualified withdrawals from the Coverdell ESA is subject to income tax at the distributee's rate in addition to a 10 percent penalty.[6] Before 2002, an excise tax was imposed if individuals contributed to both a 529 plan and a Coverdell ESA on behalf of the same beneficiary in the same year. The new law provides that the excise tax no longer applies. However, the same education expenses are not allowed to support tax-free distributions from both a 529 plan and a Coverdell ESA.

Table 1 provides a comparison chart that summarizes the main features of several ways to save for college, reflecting the recent tax law changes.

SAVING AND FINANCIAL AID

Funds in a 529 plan may affect the amount of financial aid a student is eligible for, especially federal financial aid. The interaction of saving in general and financial aid eligibility is a very complex issue. Put simply, a student's financial need is determined by the difference between the cost of attendance at a school and the student's Expected Family Contribution (EFC). A student's EFC can be considered as the amount of college expenses the student and his/her family are expected to contribute towards his/her college costs. The cost of attendance is the estimated sum of tuition and fees, room and board, books and supplies, transportation, and miscellaneous expenses. For any given level of cost of attendance, the larger the EFC, the smaller the student's need—and thus the lower amount of aid for which the student is eligible.

In calculating a dependent student's EFC, up to 5.64 percent of parents' assets, 35 percent of the student's assets, and 50 percent of the student's income are considered available to pay for college expenses. Therefore, assets held in the student's name will reduce the student's financial need much more than assets held in a parent's name will.

Depending on the source of financial aid, either the Federal Methodology (FM) or the Institutional Methodology (IM) may be used to determine a student's EFC. Established by the U.S. Congress and administered by the U.S. Department of Education, the FM is used to determine a student's EFC for federal financial aid purposes. The IM is used by many colleges and universities to calculate a student's EFC for non-federal financial aid purposes.

Table 1: A Comparison of Several Ways to Save for College

	(1) Section 529 Plans	(2) Mutual Funds	(3) Coverdell Education Savings Account	(4) Series-I Savings Bonds
Tax Benefits	Earnings federal and state income tax deferred and federal income tax free, if withdrawals are used for qualified higher education expenses.	No special tax benefits. Earnings are taxed in the year realized.	Earnings income tax free, if used for qualified elementary, secondary and higher education expenses.	Earnings state and local income tax free, federal income tax deferred. For qualified taxpayers, earnings fully or partially excludable from federal income tax, if used for qualified higher education expenses.
Is the Value of the Account *Excluded* from the Owner's Taxable Estate?	Yes.	No.	Yes.	No.
How Much Can be Invested?	Varies by state. Some states alow lifetime account balances as high as $265,620.	No limit.	Up to $2,000 per year.	Up to $30,000 per year.
Qualified Higher Education Expenses	Tuition, fees, books, supplies, room and board, and equipment.	Any expense.	Same as (1). Elementary and secondary education expenses also qualify.	Tuition and fees only.
Financial Aid Treatment	Savings plans: parents' assets; prepaid plans may reduce aid dollar-for-dollar.	Parents' assets.	Student's assets.	Parents' assets if education expenses are for a child. Student's assets if education expenses are for oneself.
Who Makes Investment decision?	State sponsor with input from program manager.	Owner.	Owner.	Guaranteed returns.
Income Restriction	No.	No.	Yes.	No restriction on purchases. However, there is income restriction for excluding earnings from federal income tax.
Impact on Hope or Lifetime Tax Credits	Education expenses used to support tax-free distributions from a 529 plan may not be used to claim a Hope or Lifetime Learning credit.	No.	Education expenses used to support tax-free distributions from a Coverdell ESA may not be used to claim a Hope or Lifetime Learning credit.	Education expenses used to support tax-free redemption on I bonds may not be used to claim a Hope or Lifetime Learning credit.
Flexibility	Earnings on non-qualified withdrawals taxed at distributee's rate plus an additional 10% tax.	Money can be withdrawn anytime for any purpose.	Earnings on non-qualified withdrawals taxed at distributee's rate plus an additional 10% tax.	Can be redeemed after 6 months. A 3-month earnings penalty applies to redemption within 5 years of issuance.

Note: The information provided in this table reflects the 2001 tax law changes.

Since federal financial aid makes up the majority of total student financial aid, we discuss in detail the FM for the calculation of EFC and present a table that illustrates the estimated EFC at various levels of family income and assets for dependent students. The major difference between the FM and IM is that the IM takes into consideration home equity while the FM does not.

The Federal Methodology for the Calculation of Expected Family Contribution

Most federal financial aid programs require that students fill out a Free Application for Federal Student Aid (FAFSA). The FAFSA collects information on a student's and parents' income and assets, family size, etc. After the FAFSA is submitted, the Central Processing System at the Department of Education applies the FM formula to determine a student's EFC and confirms some of the eligibility requirements through computer matches with other agencies.

Based on a student's dependency status, one of three EFC formulas is applied to calculate the student's EFC. These three formulas are for dependent students, independent students without dependents other than a spouse, and independent students with dependents other than a spouse, respectively. We focus on the formula used for dependent students.

A dependent student's EFC comes from the student's contribution from income and assets and parents' contribution from income and assets, calculated in steps as follows (illustrated in Figure 1).

Parents' contribution from income and assets:

1. Start from the parents' adjusted gross income (AGI) as reported on the tax return.
2. Add back some tax-exempt income such as earned income tax credit and contributions to a retirement plan.
3. Subtract several allowances including income protection allowance (to cover living expenses), federal and state income tax allowance, social security tax allowance, and employment protection allowance. The result is called Available Income (AI).
4. Parents' discretionary net worth is calculated by summing up parents' financial assets excluding home equity and subtracting an asset protection allowance.
5. Twelve percent of parents' discretionary net worth is added to parents' AI to get parents' Adjusted Available Income (AAI).
6. The parental contribution from income and assets is then determined by applying a progressive schedule to the AAI. As the table in Figure 1 shows, for 2001-2002, the annual marginal rate used by the FM ranges from 22 percent to 47 percent. Therefore, for families facing the maximum 47 percent rate, 5.64 percent (12% x 47%) of parents' assets above the asset protection allowance are considered available to pay for college expenses.

Please note:

- After subtracting various allowances, parents' AI is usually much lower than their AGI.
- Parents' retirement assets are excluded in calculating their discretionary net worth.
- The asset protection allowance is to provide parents for retirement. Therefore, the allowance increases with the age of the older parent. For 2001-2002 school year, the asset protection allowance ranges from zero to $75,100. For a two-parent family with the older parent being 45, the allowance is $42,400.
- Parents' contribution is divided by the number of dependent college students in the household.

Student's contribution from income and assets:

1. Start from the student's AGI as reported on the income tax return.
2. Add back some tax-exempt income and benefits.
3. Subtract several allowances including federal and state income tax allowance, social security tax allowance, and income protection allowance.
4. The result is called Available Income (AI). Fifty percent of the student's AI is considered available to pay for college expenses.
5. Thirty-five percent of the student's assets is considered available to pay for college expenses.

Assets in a 529 savings plan held in a parent's name are considered as parents' assets for financial aid purposes

Figure 1: The Calculation of the Expected Family Contribution

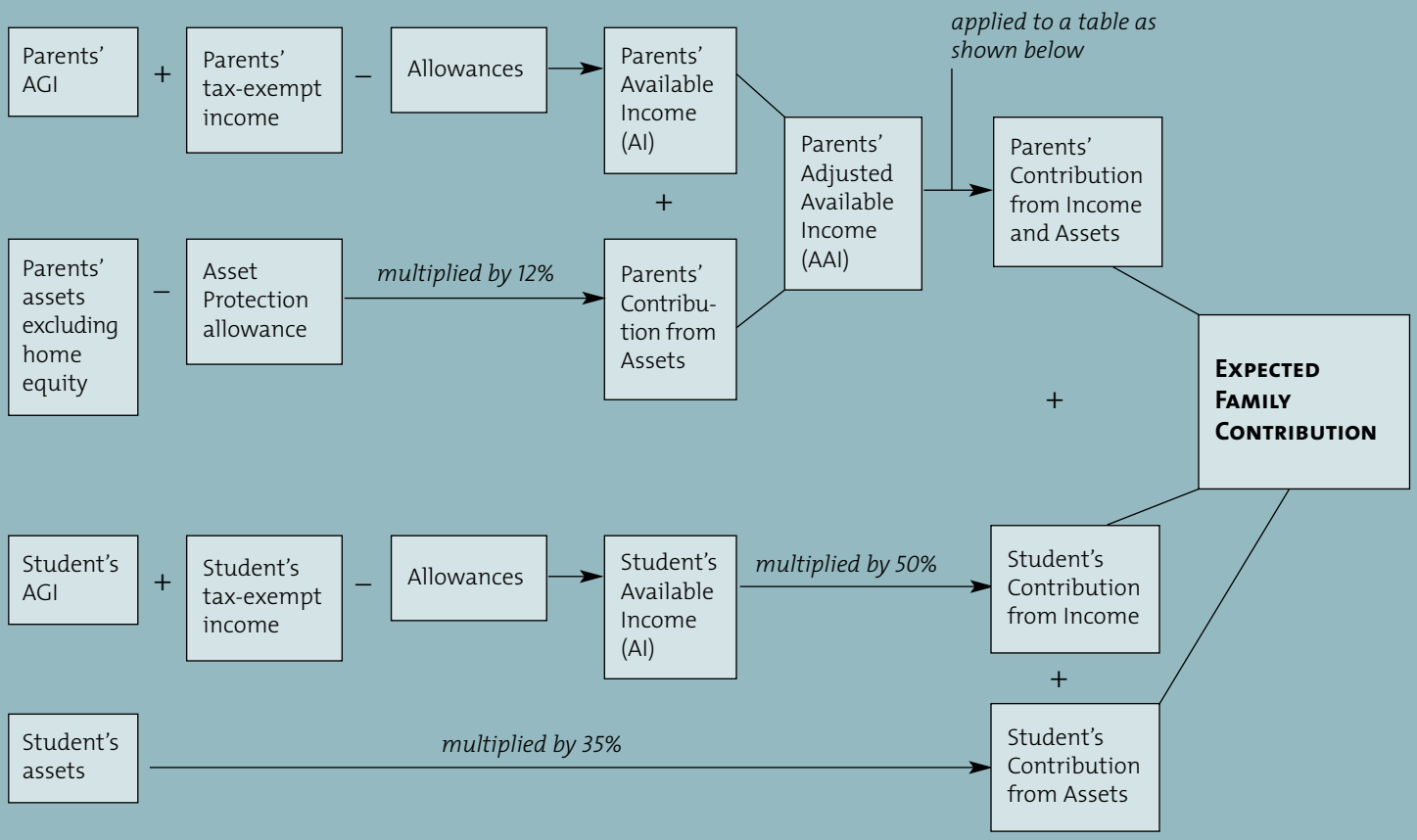


Table: Parents' Contribution from AAI for 2001-2002 Academic Year

If parents' AAI is	The parents' expected contribution from AAI is
-$3,410 or less	-$750
-$3,409 to $11,400	22% of AAI
$11,401 to $14,300	$2,508 + 25% of AAI over $11,400
$14,301 to $17,200	$3,233 + 29% of AAI over $14,300
$17,201 to $20,100	$4,074 + 34% of AAI over $17,200
$20,101 to $23,000	$5,060 + 40% of AAI over $20,100
$23,001 or more	$6,220 + 47% of AAI over $23,000

and thus assessed at a 5.64 percent rate in the EFC calculation. Assets in a 529 prepaid contract usually reduce a student's cost of attendance by the value of the contract and thus reduce a student's aid on a dollar-for-dollar basis.

The financial aid treatment of various saving options is included in Table 1. As Table 1 shows, assets in Coverdell ESAs are considered as students' assets in the EFC calculation and assessed at a 35 percent rate.

Table 2 illustrates the calculated parental contribution for various levels of family income and parental assets.

To Save or Not to Save?

Although saving in general may affect the amount of financial aid a student is eligible for, in most cases it is the amount of loans that will be affected since only students with very low EFCs are eligible for grants. Colleges and universities usually try to meet students' financial need with aid packages that consist of grants, loans, and work study. As Figure 2 shows, an estimated $74.4 billion student aid was available to help students pay for postsecondary education in the 2000-2001 academic year. Of this amount, $50.8 billion was provided by the federal government with $37.1 billion in the form of federal loans.[7] Unlike grants, loans must be repaid. The more families save for college, the less they will need to borrow.

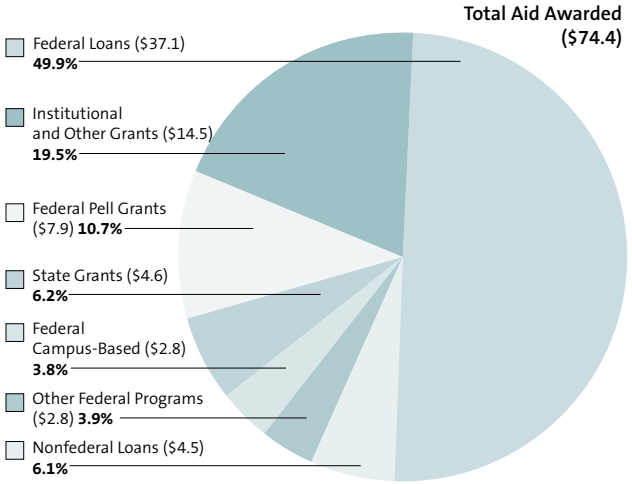
It is also worth noting that a student may qualify for a simplified EFC formula if his family income level falls below a certain level (currently $50,000) and neither the student nor the parents were required to file an IRS Form 1040 for the previous tax year. Because the simplified formula does not take assets into consideration in the EFC calculation, saving in this case will not affect the amount of financial aid the student is eligible for at all. Students with family income below $13,000 are automatically eligible for a zero EFC.

SIMULATED ACCUMULATIONS USING DIFFERENT SAVINGS VEHICLES – A MONTE CARLO APPROACH

In *Research Dialogue* Issue 67, we presented a series of numerical calculations to illustrate potential asset accumulations in various savings options. For those calculations, we used historical average returns to project asset accumulations. In other words, we assumed that the historical average annual return for each asset class would prevail, with certainty, for each year going forward. Although this approach has the appeal of being simple and straightforward, it does not allow for the possible risk and volatility associated with each asset class.

In this article, we use a Monte Carlo approach to simulate asset accumulations in a 529 plan, Coverdell ESAs, mutual funds, and Series-I savings bonds. The Monte Carlo approach is based on trials. In each trial, the computer generates random asset returns and inflation rates (based on historical data) for each year going forward and records the outcome. Thus, each trial will result in an asset accumulation based on the randomly drawn asset returns. In our analysis, we conduct 10,000 trials and report the distribution as well as the average asset accumulations of these 10,000 trials. In generating random asset returns and inflation rates, we preserve the contemporaneous correlations between these series. For a detailed discussion of the assumptions for Monte Carlo simulations, see Appendix A.

Figure 2: Estimated Student Aid by Source for Academic Year 2000-2001 (Current Dollars in Billions)



Source: *Trends in Student Aid 2001*, The College Board.

Table 2: Estimated Parental Contribution by Parental Income and Assets for 2001-2002 academic year, Using Federal Methodology (FM)

Parents' Before-Tax Income	Net Assets (Excluding Primary Residence and Family Farm) $20,000	$40,000	$50,000	$75,000	$100,000
$20,000	$0	$0	$0	$0	$139
$30,000	$100	$100	$301	$961	$1,621
$40,000	$1,582	$1,582	$1,782	$2,442	$3,183
$50,000	$3,139	$3,139	$3,388	$4,290	$5,354
$60,000	$5,284	$5,284	$5,648	$6,958	$8,368
$70,000	$7,818	$7,818	$8,248	$9,658	$11,068
$80,000	$10,373	$10,373	$10,802	$12,212	$13,622
$90,000	$12,927	$12,927	$13,356	$14,766	$16,176

Assumptions:
1) A two-parent family with two dependent children. 2) The older parent is 45 and both parents are employed. 3) Income is from employment. 4) Parents were required to file an IRS Form 1040 tax return for 2000. 5) The family used the standard deduction. 6) Only one child is enrolled in college. 7) Parents are residents of New York state.

529 Plans and Mutual Funds

Three time horizons are used: six, twelve, and eighteen years. These time horizons can be considered as representing the time periods available for saving for college for parents (and grandparents) of children beginning middle school, elementary school, or infants, respectively. For each time horizon, annual contributions are assumed deposited at the beginning of the year. Asset allocation strategies are those of New York's 529 plan Managed Allocation Option for the year 2001 (see Appendix B). In the simulations, mutual fund investors are assumed to mimic this strategy exactly.

Given the structure of the simulations, the comparisons are invariant with respect to the amount contributed. Annual contributions of $2,000 were chosen, primarily because this is the annual contribution limit in the new Coverdell ESA. The relative amounts accumulated would be the same, however, regardless of whether savers make annual contributions of $1,000, $2,000, or $5,000. Table 3 presents the results of the simulations. The top panel of the table presents the scenario where fees are equalized between the 529 plan and a mutual fund employing the same asset allocation strategy. The bottom panel shows the scenario where the mutual fund charges fees representing the industry average. The table shows mean accumulations generated by the Monte Carlo simulations. Hence $2,000 invested annually in the 529 plan would on average grow to $15,138 after six years, to $39,506 after twelve years, and to $81,392 after eighteen years.

Table 3 shows that accumulations in the 529 plan are consistently much greater than in comparable mutual funds employing the same asset allocation strategy. Furthermore, the simulations clearly show that the advantages of saving for college using the 529 plan grow over time. Consider first the scenario where fees are equalized between the 529 plan and the comparable mutual fund. At a six-year time horizon, the advantage of saving with the 529 plan varies between 7.6 and 10.0 percent, depending on the tax bracket. At a

Table 3: Accumulations in a 529 Plan and Rebalanced Mutual Funds: Two Hypothetical Scenarios

Scenario A

529 plan expense ratio: 65 basis points (bps); mutual funds expense ratio: 65 bps
Mutual funds earnings distributed as 25% short-term capital gains and 25% long-term capital gains

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$81,392	$39,506	$15,138
Mutual funds after-tax accumulation			
25% federal, 6.85% state	$64,250	$34,029	$14,062
35% federal, 6.85% state	$60,346	$32,646	$13,758
529 plan advantage over mutual funds			
25% federal, 6.85% state	26.7%	16.1%	7.6%
35% federal, 6.85% state	34.9%	21.0%	10.0%

Scenario B

529 plan expense ratio: 65 bps; mutual funds expense ratio: industry average
Mutual funds earnings distributed as 25% short-term capital gains and 25% long-term capital gains

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$81,392	$39,506	$15,138
Mutual funds after-tax accumulation			
25% federal, 6.85% state	$61,658	$33,239	$13,928
35% federal, 6.85% state	$58,064	$31,948	$13,638
529 plan advantage over mutual funds			
25% federal, 6.85% state	32.0%	18.9%	8.7%
35% federal, 6.85% state	40.2%	23.7%	11.0%

twelve-year time horizon, the advantage varies between 16.1 and 21.0 percent. At an eighteen-year time horizon, the advantage ranges from a low of 26.7 percent to a high of 34.9 percent. In the second scenario, the mutual fund charges the industry average fees of 124, 113, and 46 basis points for stocks, bonds, and money market, respectively. In this scenario, the advantage of saving for college using the 529 plan becomes even more significant. At a six-year time horizon, the advantage of saving with the 529 plan ranges from 8.7 to 11.0 percent. At a twelve-year time horizon, the advantage varies between 18.9 and 23.7 percent. At an eighteen-year time horizon, the advantage ranges from a low of 32.0 percent to a high of 40.2 percent.

What is driving the results? Several broad themes emerge from the simulations. The first is that the relative advantage of saving using a 529 plan increases as a household's tax bracket increases. The second is that the fees charged as investment expenses matter more than the taxation of investment returns. This is perhaps surprising, but makes sense upon further scrutiny. In Scenario B shown in Table 3, the difference in fees is not trivial. This has a large impact on the total accumulation. The reason why the fairly generous tax treatment

Table 4: Accumulations in a 529 Plan and Rebalanced Mutual funds: Two Hypothetical Scenarios, Reflecting the Value of State Tax Deduction on Contributions for 529 plan

Scenario A

529 plan expense ratio: 65 bps; mutual funds expense ratio: 65 bps
Mutual funds earnings distributed as 25% short-term capital gains and 25% long-term capital gains

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$85,140	$41,683	$16,091
Mutual funds after-tax accumulation			
25% federal, 6.85% state	$64,250	$34,029	$14,062
35% federal, 6.85% state	$60,346	$32,646	$13,758
529 plan advantage over mutual funds			
25% federal, 6.85% state	32.5%	22.5%	14.4%
35% federal, 6.85% state	41.1%	27.7%	17.0%

Scenario B

529 plan expense ratio: 65 bps; mutual funds expense ratio: industry average
Mutual funds earnings distributed as 25% short-term capital gains and 25% long-term capital gains

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$85,140	$41,683	$16,091
Mutual funds after-tax accumulation			
25% federal, 6.85% state	$61,658	$33,239	$13,928
35% federal, 6.85% state	$58,064	$31,948	$13,638
529 plan advantage over mutual funds			
25% federal, 6.85% state	38.1%	25.4%	15.5%
35% federal, 6.85% state	46.6%	30.5%	18.0%

accorded capital gains in the simulations is relatively unimportant in terms of the results is linked to the reason why 529 plans increase in attractiveness as a household's tax bracket increases. Rebalancing plays a major role. As the time horizon shortens, more and more of the total portfolio is invested in fixed-income securities. Hence capital gains on equity returns become relatively less important, and the taxation of interest income becomes relatively more important. Finally, the most important factor behind the superiority of 529 plans as a college savings vehicle is the exemption from federal taxation. The federal tax exemption places 529 plans in an unassailably favorable position when it comes to saving for college.

Another consideration in any comparison of 529 plans and mutual funds is the value of the state tax deduction, if any. New York's College Saving Program enables New York taxpayers to deduct up to $5,000 of contributions per taxpayer from their state income taxes. The discounted future value of this tax deduction enhances the relative appeal of the 529 plan (for New York resident taxpayers). The value of this tax deduction is quite significant. Assuming annual contributions (deductions) of $2,000, a state income tax rate of 6.85 percent,

Table 5: Accumulations in a 529 Plan and Coverdell ESA: Two Hypothetical Scenarios

Not reflecting the value of the state tax deduction for 529 plan

Scenario A

529 plan expense ratio: 65 bps; Coverdell ESA expense ratio: 65 bps

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$81,392	$39,506	$15,138
Coverdell ESA accumulation	$81,392	$39,506	$15,138
529 plan advantage	0.0%	0.0%	0.0%

Scenario B

529 plan expense ratio: 65 bps; Coverdell ESA expense ratio: industry average

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$81,392	$39,506	$15,138
Coverdell ESA accumulation	$77,299	$38,339	$14,952
529 plan advantage	5.3%	3.0%	1.2%

Reflecting the value of the state tax deduction for 529 plan

Scenario A

529 plan expense ratio: 65 bps; Coverdell ESA expense ratio: 65 bps

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$85,140	$41,683	$16,091
Coverdell ESA accumulation	$81,392	$39,506	$15,138
529 plan advantage	4.6%	5.5%	6.3%

Scenario B

529 plan expense ratio: 65 bps; Coverdell ESA expense ratio: industry average

	18-year horizon	12-year horizon	6-year horizon
529 plan accumulation	$85,140	$41,683	$16,091
Coverdell ESA accumulation	$77,299	$38,339	$14,952
529 plan advantage	10.1%	8.7%	7.6%

and the discount rate used is the yield on municipal bonds (the historical average is 4.25 percent), the discounted value of the tax deduction grows to $953 at a time horizon of six years, to $2,177 at twelve years, and to $3,748 at 18 years.

Adding these sums into the accumulation totals calculated in the simulations for New York's College Saving Program further enhances the attractiveness of the program. This is shown in Table 4. At a six-year time horizon, the advantage of the 529 plan ranges from 14.4 to 18.0 percent, depending on fees charged and the tax bracket. At a twelve-year time horizon, 529 plans outperform mutual funds from 22.5 to 30.5 percent. At an eighteen-year time horizon, the relative advantage of the 529 plan is as much as 46.6 percent. In the most favorable scenario for mutual funds, the advantage of the 529 plan is still 32.5 percent.

529 Plans and Coverdell Education Savings Accounts

The new tax law transformed the all but worthless Education IRA, with an annual contribution limit of only $500, into the worthwhile Coverdell ESA, with an annual contribution limit of $2,000. The Coverdell ESA can also be used to save for education expenses at private elementary and secondary schools. Furthermore, the account owner retains complete flexibility with respect to asset allocation, making this an attractive saving vehicle for many households. Given the similar federal tax treatment of 529 plans and Coverdell ESAs, a comparison of the two savings vehicles reduces to a comparison of fees and the impact of state tax deductions, if any, on 529 plans. Table 5 presents this comparison. In the top half of the table, scenario A shows the case where fees are equalized between the two savings vehicles. In this case the simulated accumulations are identical. In scenario B, the Coverdell ESA is assumed to be invested in a mutual fund with industry-average annual expense charges. In this case the 529 plan has a slight advantage, ranging from 1.2 percent at a six-year time horizon to 3.0 percent at a twelve-year time horizon and 5.3 percent at an eighteen-year time horizon.

The bottom half of the table reflects the impact of a (New York) state tax deduction on the comparison. In scenario A, where fees are equalized, the presence of a state tax deduction results in an advantage for the 529 plan ranging from 4.6 percent at an eighteen-year time horizon to 5.5 percent at a twelve-year time horizon and 6.3 percent at a six-year time horizon. The reason why the advantage for the 529 plan falls as the time horizon lengthens is a product of the discount rate used to value the state tax deduction. The discount rate, 4.25 percent, is large relative to the average return at the six-year time horizon, because at this time horizon returns are dominated by money market securities. Conversely, at longer time horizons the discount rate is small relative to the average returns for the 529 plan, due to the heavier equity weighting in the asset allocation strategy at longer time horizons.

In scenario B the 529 plan enjoys the dual advantages of the state tax deduction and lower fees. This results in an advantage for the 529 plan ranging from 7.6 percent at a six-year time horizon to 8.7 percent at a twelve-year time horizon and 10.1 percent at an eighteen-year time horizon. In this scenario the advantage for the 529 plan grows as the time horizon lengthens due to the disparity in fees.

In sum, Table 5 shows that Coverdell ESAs are an attractive vehicle for household's saving for college. Two additional features of Coverdell ESAs merit mention. In terms of annual investment fees, it is certainly possible for investors to select mutual funds with expense charges lower than 65 basis points, making Coverdell ESAs slightly superior to 529 plans, assuming hypothetical equal returns. Coverdell ESAs are still only a partial answer to the problem of saving for college, however, due to their annual contribution limit of $2,000.

Implications of the Simulations

The above comparisons did not show the full range of outcomes generated by the simulations, only the mean results. The value of the Monte Carlo approach, however, lies in the use of historical data to provide an understanding of the range of uncertainty that future investment returns might take. For the 529 plan at a six-year time horizon, the simulations generated a range of outcomes from $12,927 at the 10 percent level to $17,510 at the 90 percent level. This means that while on average the accumulation was $15,138 after six years, only 10 percent of the simulations generated accumulations of less than $12,927, and in 90 percent of the simulations the accumulation was no greater than $17,510. Figure 3 shows this comparison for the case of the 529 plan, a

Figure 3. Range of Accumulations in Alternative Saving Vehicles: 6-Year Time Horizon, Scenario A

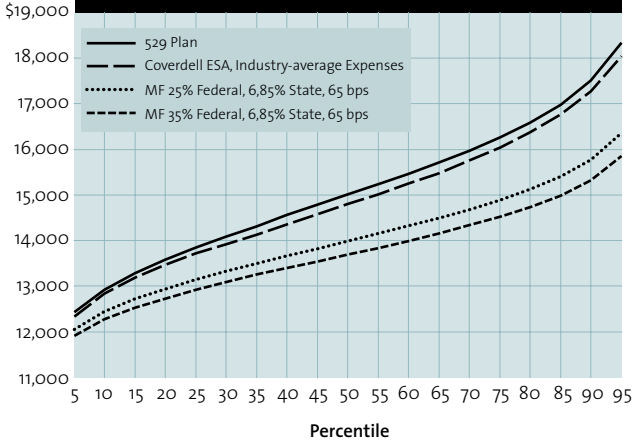


Figure 4. Range of Accumulations in Alternative Saving Vehicles: 6-Year Time Horizon, Scenario B

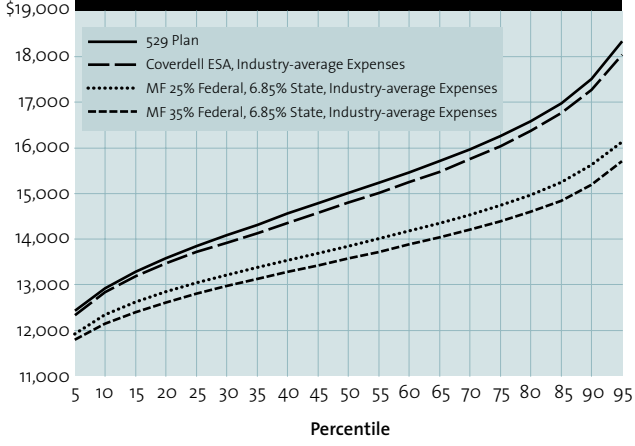


Figure 5. Range of Accumulations in Alternative Saving Vehicles: 12-Year Time Horizon, Scenario A

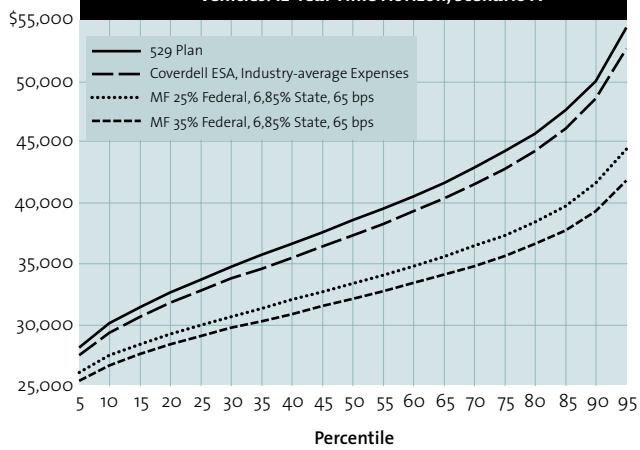


Figure 6. Range of Accumulations in Alternative Saving Vehicles: 12-Year Time Horizon, Scenario B

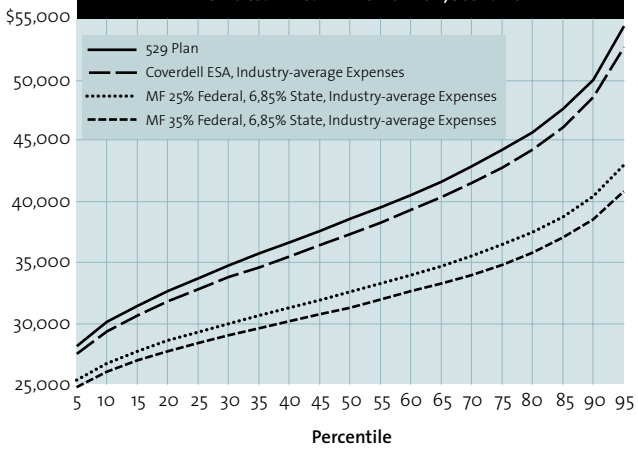


Figure 7. Range of Accumulations in Alternative Saving Vehicles: 18-Year Time Horizon, Scenario A

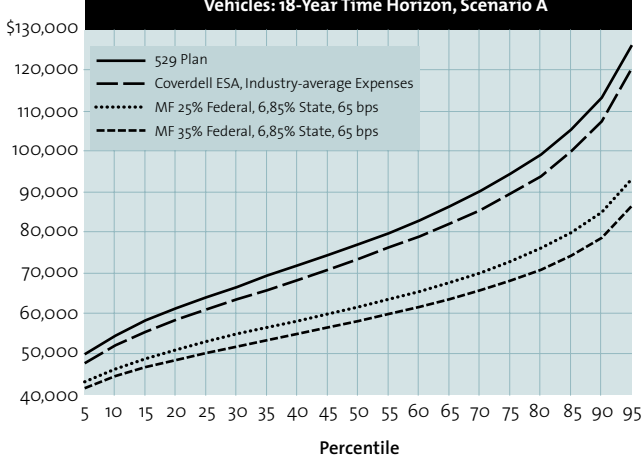
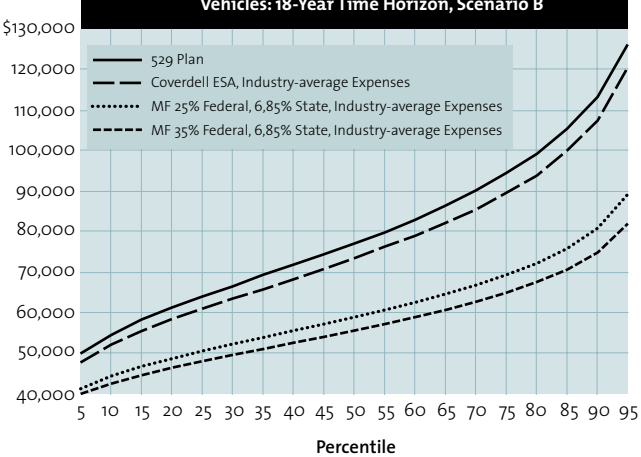


Figure 8. Range of Accumulations in Alternative Saving Vehicles: 18-Year Time Horizon, Scenario B



Coverdell ESA with industry average expenses, and mutual funds in two different tax brackets and expense charges of 65 basis points. Figure 4 repeats this comparison at a six-year time horizon, except that the mutual funds have industry average expenses. Figures 3 and 4 make two basic points. The first point is that the 529 plan has larger accumulations than any of the alternative saving vehicles throughout the range of simulations, from the 5th percentile to the 95th percentile. The second point is that the comparative advantage of the 529 plan vis-à-vis the mutual funds becomes larger at the higher ranges of the simulations. For example, the accumulation in the 529 plan at the 25th percentile of the simulations was $13,844, versus $12,809 for the mutual fund investor in the top tax bracket with a fund charging industry average annual fees. At the 75th percentile, however, the accumulation in the 529 plan was $16,255, versus $14,394 for the mutual fund. Hence the disparity in accumulations grows as the accumulation results become progressively more favorable in each saving vehicle. In other words, the good news increases on the upside.

Similar comparisons are shown at the twelve-year time horizon in Figures 5 and 6. Once again the same pattern holds. At the 5th percentile the accumulation is $28,097 in the 529 plan, $27,449 for the Coverdell ESA with industry average expense charges, $26,049 for a mutual fund investor in the 25 percent federal tax bracket, with a state tax bracket of 6.85 percent and an annual expense charge of 65 basis points, and $25,348 for a mutual fund investor in the top federal tax bracket, with a state tax bracket of 6.85 percent and an annual expense charge of 65 basis points. Thus when the outcomes are bad the 529 plan still results in higher accumulations, but the difference is small. At the 95th percentile, however, the differences are substantial. Figure 5 shows that in this case the relative accumulations are $54,408 in the 529 plan, $52,649 in the Coverdell ESA, and $44,402 and $41,856 in the mutual funds, depending on the federal tax bracket. Figure 6 shows that the disparities in the accumulations become still greater when the mutual fund investor chooses a fund with industry-average expense charges.

The range of accumulations at the eighteen-year time horizon are shown in Figures 7 and 8. The figures show that as the time horizon lengthens the difference in accumulations between the alternative savings vehicles grows as well. At the 50th percentile, Figure 7 shows that the median accumulation was $77,062 in the 529 plan, $73,379 in the Coverdell ESA when the expense charge was the industry average, and $61,678 and $58,197 in the mutual funds with the two different federal tax brackets and common expense charges of 65 basis points. At the 75th percentile, however, the accumulations were $94,371, $89,510, $72,888, and $68,132 respectively. At the 95th percentile, the accumulations were $126,200, $120,521, $93,116, and $86,583 respectively. Hence at the 75th percentile the difference between the accumulation in the 529 plan and the high-federal-tax-bracket mutual fund was 39 percent, and rose to 46 percent at the 95th percentile.

529 Plans and Series I Bonds

An additional comparison is between 529 plans and Series I bonds. The interest rate on Series I bonds is inflation-indexed and includes two parts: (1) a predetermined real interest rate that applies throughout the life span of the bonds, and (2) the inflation rate, which is announced semiannually to reflect the most recent Consumer Price Index. In our simulations, the inflation rate is randomly generated (see Appendix A) and the real rate of the return for Series I bonds is assumed to remain at the current rate of 2.0 percent.

Where interest on Series I bonds is fully excluded from federal taxation, 529 plans outperform Series I bonds by 4.5 percent at a six-year time horizon, by 14.7 percent at a twelve-year time horizon, and by 31.5 percent at an eighteen-year time horizon. In an alternative scenario, the interest of Series I bonds is subject to federal taxation at a rate of 25 percent. In this scenario, 529 plans outperform Series I bonds by 9.2 percent at a six-year time horizon, by 24.1 percent at a twelve-year time horizon, and by 46.9 percent at an eighteen-year time horizon.

We also consider two additional scenarios for the comparison of 529 plans and Series I bonds, this time reflecting the value of a state tax deduction for 529 plans. The first scenario presents the case where interest on Series I bonds is fully excluded from federal taxation; and the second presents the case where interest on Series I bonds is subject to federal taxation at a rate of 25 percent. In the first scenario 529 plans outperform Series I bonds by 11 percent at a six-year time horizon, by 21 percent at a twelve-year time horizon, and by 37.6 percent at an eighteen-year time hori-

zon. In the second scenario 529 plans outperform Series I bonds by 16 percent at a six-year time horizon, by 31 percent at a twelve-year time horizon, and by 53.7 percent at an eighteen-year time horizon. The simulations show that under all circumstances investing in a 529 plan results in significantly greater accumulations than can be obtained by purchasing Series I bonds. This is true whether or not investors are able to take advantage of the federal tax exclusion, and whether or not the 529 plan enjoys a state tax deduction. These results would only be overturned, it appears, if future inflation were to rise to levels substantially above those modeled here or if the real interest rate were much higher than the current 2.0 percent. Hence only investors who are extremely risk averse, or who anticipate sharply higher future inflation, could expect to gain in relative terms by saving for college using Series I bonds.

CONCLUDING REMARKS

A college education is perhaps the most important investment parents can make in a child's future. The economic benefits of a college education have increased as the wage gap between high school and college graduates widened in the past few decades. According to the Census Bureau, college graduates earned on average 83 percent more than high school graduates in 2000.[8] However, a college education does not come cheap. That is why it is important that parents start saving as early as possible.

Although there are many savings options available, many parents find themselves overwhelmed when it comes to choosing the right option for their family. In this article, we present an updated analysis of saving with 529 plans and other options. We show that 529 plans are now even more appealing thanks to the recent tax law changes. With qualified withdrawals from 529 plans now completely exempt from federal taxation, 529 plans are an extremely attractive investment vehicle for college savings. Although 529 plans are not guaranteed to outperform other investments, they have definite advantages over other investment strategies with similar risk characteristics. A majority of states now offer 529 savings plans, and few states have residency requirements. Households shopping for a 529 plan should first investigate whether or not their state plan offers a state tax deduction. Households should also consider the available investment alternatives of individual 529 plans. Most 529 plans offer a variety of asset allocation options, allowing households to tailor their investments to their risk preferences. In addition, households should especially investigate the expense charges of 529 plans. As we demonstrated in the simulation analysis, fees matter a great deal.

Levels of risk tolerance and preference for direct investment control vary, and households may prefer some saving strategies to others. In making their savings decisions, households should take into account their own financial situations and savings goals and evaluate the advantages and disadvantages of each strategy to find the best way to meet their own college saving needs.

This article was prepared by Jennifer Ma, research economist, and Douglas Fore, assistant director, TIAA-CREF Institute. The TIAA-CREF Institute, part of the TIAA-CREF group of companies, was established to foster research and education to support the lifelong financial security of individuals and their families. The Institute conducts research, provides research grants and awards to independent scholars, and develops educational programs in several fields of study, including: pensions and retirement; health, life and long-term care insurance; investment products and strategies; endowments and planned giving; higher education financing and trends; corporate governance, and financial literacy. Other companies in the TIAA-CREF group offer or manage Classic and Roth IRAs, Education IRAs, Section 529 Plans, Mutual Funds, and other securities products. For more information on these products, including charges and expenses, call 1 800 842 1924 for prospectuses or a program disclosure booklet; read them carefully before you invest.

APPENDIX A: DETAILED ASSUMPTIONS FOR SIMULATIONS

Asset Returns

In each period, the gross returns ($1+R_t$) for stocks, bonds, and money market are assumed to be distributed as lognormal, i.e., $\log(1+R_t) = r_t$, where r_t is normally distributed. In the Monte Carlo simulations, the return for each asset class in each year is randomly drawn from a lognormal distribution. Based on the 1926-2000 historical data, the mean and standard deviation for the annual net return (R_t) for each asset class are as follows:

Net Return (R_t)	*Stocks*	*Bonds*	*Money Market*
Mean	13.12%	6.03%	3.86%
Standard deviation	21.98%	8.32%	3.15%

Inflation

Since the nominal interest rate on Series-I bonds is the sum of a pre-determined real interest rate and the inflation rate, we need to simulate future inflation rates. We assume that inflation follows the process described below:

$$\text{Inflation}_t = \alpha + \beta * \text{Inflation}_{t-1} + \epsilon_t \quad \text{(A1)}$$

$$\epsilon_t = \rho^* \epsilon_{t-1} + \mu_t \quad \text{(A2)}$$

Where μ_t is i.i.d. normally distributed with a zero mean and variance σ^2. In other words, the inflation rate in each year is determined by three factors: (1) a constant rate α, (2) the inflation rate in the previous period, and (3) a random stochastic term ϵ_t. Furthermore, the random stochastic term in each period is correlated with the stochastic term in the previous period. The parameter estimates from historical data are as follows:

α	0.017
β	0.484
ρ	0.249
σ^2	0.001

For each year into the future, a random μ_t term is generated, which is then used to calculate the ϵ_t term using equation A2. The ϵ_t term is in turn used to calculate the inflation rate using equation A1. In generating random returns for stocks, bonds, and money market, and the μ_t component of inflation, the rank correlations between these series are preserved. The rank correlation matrix for these series obtained from historical data is as follows:

	Stocks	*Bonds*	*Cash*	*Inflation*
Stocks	1.00	0.22	-0.03	-0.14
Bonds	0.22	1.00	0.09	-0.20
Cash	-0.03	0.09	1.00	0.48
Inflation	-0.14	-0.20	0.48	1.00

Taxes

Two different tax brackets are used for mutual funds. The low tax bracket is a federal tax bracket of 27 percent for 2002 (reduced to 25 percent by 2006) and a state income tax of 6.85 percent. The high tax bracket is a federal tax bracket of 38.6 percent for 2002 (reduced to 35 percent by 2006) and a state income tax of 6.85 percent. The state income tax rates correspond to those of New York. We assume that the tax rates scheduled to come into effect in 2006 remain in effect indefinitely.

For mutual funds, stock returns are assumed to consist of a dividend payment at a fixed annual yield rate of 1.5 percent, regardless of the stock return being positive. This dividend income reduces the annual random stock return by 150 basis points. Of the remaining stock return, 25 percent of all positive returns are assumed to be short-term realized capital gains and 25 percent long-term realized capital gains. Thus, 50 percent are unrealized capital gains. If the after-dividend stock return is negative, then no capital gains are realized. Accumulated unrealized capital gains are taxed at the end of the investment horizon. Returns on bonds and money market are assumed to consist entirely of dividends and thus taxed as regular income.

We also consider the tax consequences of rebalancing for mutual funds. If rebalancing results in a sale of stocks, then a portion of the unrealized capital gains is realized and taxed as long-term capital gains. This portion is calculated on a pro-rata basis.

Fees

The 529 plan was assumed to have annual expense charges of 65 basis points, corresponding to New York's 529 Plan. Two different scenarios were used for the fees charged by mutual funds and Coverdell ESAs. In one scenario, expense charges of 65 basis points were assumed. In a second scenario, annual expense charges of 123, 114, and 46 basis points were assumed for stocks, bonds, and money market, respectively. These annual expense charges correspond to the industry average expense charges of each of these asset classes. For stocks and bonds, the expense data were as of October 31, 2001. (Source: Morningstar, Inc.) For money market, the expense data were as of the end of the third quarter of 2001. (Source: iMoneyNet, Inc.) Furthermore, no front or back loads or 12b-1 fees were assumed in the simulations.

Appendix B: New York State 529 Plan 2001 Managed Asset Allocation

Beneficiary's Year of Birth	Projected Years to Enrollment	Equities	Bonds	Money Market
2000 or 2001	18 years	75%	25%	0%
1998 or 1999	16-17 years	65%	35%	0%
1996 or 1997	14-15 years	60%	40%	0%
1994 or 1995	12-13 years	55%	45%	0%
1992 or 1993	10-11 years	50%	50%	0%
1990 or 1991	8-9 years	45%	55%	0%
1988 or 1989	6-7 years	40%	60%	0%
1986 or 1987	4-5 years	30%	70%	0%
1984 or 1985	2-3 years	20%	70%	10%
Pre-1984	1 year	15%	40%	45%

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FOOTNOTES

[1] Source: *Trends in College Pricing 2001*, The College Board.

[2] Among the forty existing savings plans, thirty-two states have account balance limits and eight have contribution limits. See Ma, Warshawsky, Ameriks, and Blohm (2001) for a study of using an economic approach to setting the contribution limits for 529 plans. In practice, limits are set by states according to broad considerations set forth in the IRC and regulations.

[3] The additional 10% tax does not apply in the event of the beneficiary's death or becoming disabled. If the beneficiary receives tax-free scholarship, educational assistance allowance, or other tax-free educational benefits, then the distributions are not subject to the additional 10% tax to the extent that the distribution is not more than the amount of the scholarship, educational allowances, or other benefits.

[4] Source: College Savings Plan Network, Lexington, Kentucky.

[5] Allowable expenses include tuition, fees, academic tutoring, books, supplies, other equipment, "special needs services," room and board, uniforms, transportation and "supplementary items and services."

[6] Same exceptions exist as those for 529 plans.

[7] Source: *Trends in Student Aid 2001*, The College Board.

[8] Reflects all wage and salary workers aged 25 to 64. Source: Current Population Survey, March Supplement, U.S. Census Bureau, 2001.

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