



FEDERAL  
RESERVE  
BANK  
*of* ATLANTA

---

**Asset Allocation and Section 529 Plans**

Ramon P. DeGennaro

Working Paper 2003-1  
January 2003

---

Working Paper Series

Federal Reserve Bank of Atlanta  
Working Paper 2003-1  
January 2003

## Asset Allocation and Section 529 Plans

Ramon P. DeGennaro, Visiting Scholar, Federal Reserve Bank of Atlanta

**Abstract:** Previous research has concluded that prespecified asset allocations used by many Section 529 college savings plans are suboptimal. We extend this research to show that though it may be true, it is true for reasons other than those asserted in previous research. In addition, it tends to deflect attention from other investment options and strategies.

JEL classification: G11, G20, G29

Key words: asset, allocation, college, savings, taxes

---

The author thanks Dale Domian and Deborah Murphy for helpful comments and Ernie Evangelista, T. Shawn Strother, and Annie Tilden for excellent research assistance. He also gratefully acknowledges the support of a University of Tennessee Finance Department Summer Faculty Research Award and a College of Business Scholarly Research Grant. The views expressed here are the author's and not necessarily those of the Federal Reserve Bank of Atlanta or the Federal Reserve System. Any remaining errors are the author's responsibility.

Please address questions regarding content to Ramon P. DeGennaro, Visiting Scholar, Federal Reserve Bank of Atlanta, 1000 Peachtree Street, NE, Atlanta, Georgia 30309-4470, 865-974-1726, rdegenna@utk.edu.

The full text of Federal Reserve Bank of Atlanta working papers, including revised versions, is available on the Atlanta Fed's Web site at <http://www.frbatlanta.org>. Click on the "Publications" link and then "Working Papers." To receive notification about new papers, please use the on-line publications order form, or contact the Public Affairs Department, Federal Reserve Bank of Atlanta, 1000 Peachtree Street, N.E., Atlanta, Georgia 30309-4470, 404-498-8020.

# Asset Allocation and Section 529 Plans

## 1. Introduction

Recent changes in the United States' tax code have raised Section 529 plans to the forefront of investment vehicles for college savings. Legislation has increased both the investment limits and tax benefits of these plans. Not surprisingly, the number of investors using Section 529 plans and the amounts invested in them have grown rapidly. Block and Waggoner (2002) report that about \$25 billion flowed to such plans in 2002, and the figure is expected to balloon to \$200 billion by 2007.

Spitzer and Singh (2001, hereafter, SS) compare Section 529 plans with predetermined asset allocations with comparable investments held outside a tax-preferred vehicle. They provide a concise review of the theory of asset allocation and a brief introduction to the essentials of Section 529 plans. Their concern is that the tax advantages of a 529 plan might be negated by the reduced return resulting from mandated asset allocations. They conduct simulations based on historical returns and interpret the results as demonstrating that this may well be the case, especially for investors in low marginal tax brackets and for those who delay investing until the child is nearly ready for college.

My paper extends SS's work by distinguishing between two issues. The first is prespecifying asset allocations. The second is the tax advantages of 529 plans (though the essential points of SS and this article also apply to most other tax-advantaged investment vehicles). SS correctly question the wisdom of prespecifying asset allocations, then proceed by considering a small number of specific preallocations. They compare New York's College Savings Program (NYCSP) with an unrestricted, fully taxable investment. While this approach may have some merit, I contend that the conclusions drawn from that study are potentially

misleading. Separating the analysis of the general *class* of predetermined asset allocations from the *specific* allocation of the NYCSP resolves these issues. Put somewhat differently, the decision to allocate funds *to* a 529 plan is essentially independent of the allocation *within* the plan. For example, SS state all of the following:

“... adherence to prespecified asset allocation for low tax bracket investors often results in return loss that overshadows the tax benefit.” (p. 101).

“This evidence strongly suggests that for families in the ‘low’ income category, which have a long term college savings goal, the [529 plan] is likely to be an inferior alternative to a plan which aggressively contributes to a 100% equity plan.” (p. 111).

“Buying into the [529 plan] when the child is near college is shown to be a poor strategy.” (p. 114).

“Investors in lower income groups who are considering these plans would be well advised to consider ... exercising investment options that are equity aggressive, ...” (p. 115).

Though all of these representative statements are potentially true, I argue that they risk misleading investors. First, conclusions drawn by analyzing a *specific* predetermined asset allocation may not extend to the general *class* of predetermined asset allocations. Second,

allocating funds *to* a 529 plan is a prior decision that is essentially unrelated to the portfolio choice *within* the plan. Third, investors can invest in 529 plans outside of their states of residence, providing a much wider range of investment options. Finally, investors base their investment decisions considering risk as well as expected or average return. Although SS surely realize this, their interpretations of their simulation results tend to deflect attention from it.

Section 2 explains what SS call the fallacy of cookie cutter asset allocation and clarifies my paper's primary contribution, which is how the important distinction between asset allocation *to* an investment and *within* the investment changes the analysis. Section 3 discusses the implications of risk on the investment decision, and Section 4 describes the impact of Section 529 plans in a portfolio context. Section 5 contains the summary and investment implications.

## **2. The Fallacy**

Other researchers are surely correct in noting that Section 529 plans such as New York's have flaws. One investment option within New York's plan (as well as many others) has a fixed asset allocation (among stocks and bonds) depending on the age of the child. The younger the child, the higher the proportion of stocks. The idea behind such a strategy is that if the child is young, he should hold predominantly stocks because stocks tend to return more. But as the child ages, the story goes, he should shift to bonds so that he reduces the risk of losing his nest egg. Proponents apparently believe that the market may not have time to rally if it crashes near his withdrawal date. SS correctly identify the weakness of this reasoning. But even setting aside individual risk preferences, an age-dependent allocation has little or no economic support. It relies on mean reversion in stock prices and ignores path dependence: if an investor in a plan with a prespecified portfolio mix loses a good portion of his investment early and is far short of his needs with just a few years remaining, he must still switch to bonds, again presumably because the

market may not have time to recover. In fact, though, if the investor is well short of his target with little time remaining, he might very well want to gamble. A prespecified asset allocation precludes this.

Prespecifying asset allocations also precludes adjusting to changes in the tax code, expected tuition, scholarships, external support such as gifts from relatives, etc. It is also a poor choice for those who delay college -- at a minimum, the time until the funds are needed is a better measure than age. Indeed, Gunthorpe and Levy (1994) find that the optimal portfolio composition changes drastically and systematically with changes in the holding period. Given the increasing numbers of nontraditional students, this design oversight becomes even more critical. Investors themselves are in a much better position to decide what proportion of their funds should be allocated to equities.

In fact, nothing prevents an investor from matching the allocation of the predetermined plan initially, while retaining the option to deviate from that allocation if he later desires. It is well known that an option is worth more alive than dead. Absent a compelling reason to do so, (perhaps large transactions costs), why would an investor destroy his option to reallocate his portfolio? The short answer is, he would not.

Thus, specifying the allocation based on age is an obvious fallacy. SS take a different tack. They essentially ask this question: Is it possible for the *ex post* return on one risky asset to exceed the *ex post* return on a different risky asset? Put that way, the answer is obviously yes. SS go further, exploring the likelihood that an *ex post* return from a risky asset exceeds the *ex post* return from another less-risky, but tax-preferred asset. One way to do this would be to derive or assume a distribution of returns and calculate the result analytically. Another approach, adopted by SS, is to conduct a Monte Carlo simulation. SS use historical returns and return variances for stocks and

bonds, run simulations for various holding periods, then compute the average returns for various portfolio allocations. Given the historical returns used, a portfolio allocated totally to stocks has the highest average return. This is no surprise because, on average, the historical return on stocks really *was* higher during the sample period. Thus, for a wide range of tax rates, a fully taxable all-equity portfolio may well return more than a tax-advantaged 529 plan with substantially less than 100% equities, *on average*, even though the 529 plan has a tax advantage.

Perhaps the complexity of the simulation blurs the issue, for SS conclude that the prespecified allocation is the problem. In fact, though, preallocation is not at all the cause of the result. An investor could prespecify 100% equities in the 529 plan and always beat the same portfolio held outside the plan, so long as total realized returns are positive. This is a mathematical certainty for positive tax rates and positive nominal returns. Being predetermined *within* a Section 529 plan is a matter entirely separate from allocating *between* a 529 plan and a fully taxable investment.

Some readers might see this better algebraically. Equation (1) gives the terminal value (per dollar) of a fully taxable portfolio returning an average of  $R_t$  before taxes, taxed at an annual rate  $t$ , over a period of  $N$  years. Equation (2) gives the terminal value (also per dollar) of a portfolio held within a 529 plan, exempt from taxes, and returning an average of  $R_{529}$  over that same period.

$$TV = [(1+(R_t \times (1-t)))]^N, \tag{1}$$

$$TV_{529} = (1 + R_{529})^N. \tag{2}$$

In principle, can the portfolio returning  $R_t$  provide a greater return than one returning  $R_{529}$ ? Certainly. Can that return be high enough to outweigh the tax penalty of  $t$ ? Again, the answer is yes. SS's simulation using historical returns demonstrates that for reasonable tax rates  $t$  and

holding periods  $N$ , this would have happened often if the taxable portfolio were invested fully in stocks while the 529 portfolio were invested according to the NYCSP's prespecified allocation.

Clearly, though, investors can learn another lesson. For *any* positive portfolio return and for *any* positive tax rate,  $TV_{529} > TV$  for *any* positive holding period, if the portfolio returns are equal; that is, if  $R_t = R_{529}$ . The only question is whether obtaining comparable portfolio returns is reasonable. And not only is it reasonable, but it is also available for the asking. Many states, including Michigan, Minnesota and Missouri, offer 100% equity funds. This portfolio, *predetermined* to be completely invested in stocks, is virtually indistinguishable from the one SS recommend. Although choosing a plan outside of one's state of residence foregoes any state tax advantage, it dominates a similar portfolio held outside the plan for any positive federal tax rate, so long as the nominal *ex post* return is positive. Even New York residents who wish to preserve their 529 plan's state tax advantage can choose what New York calls its High Equity Option. This investment choice invests between 75% and 100% in a domestic stock index mutual fund. As of December 2002, the allocation was 100% stocks (see [http://www.nysaves.org/piecharts\\_guar\\_highequity.html](http://www.nysaves.org/piecharts_guar_highequity.html)).

Some might call the distinction between allocation *to* a 529 plan from allocation *within* a 529 plan to be merely semantics, or needlessly precise. In fact, though, the portfolio that SS's simulation identifies as having the highest average return is also prespecified. The difference is *not* that the portfolio is prespecified, but rather that the portfolio is *riskier*. The riskier portfolio is prespecified to be 100% equities, while NY's prespecified portfolio comprises stocks, bonds and money funds. This is more than just semantics, because it deflects attention from investment strategies that many investors would find attractive.



### 3. Risk

Drawing investment advice based on realized mean returns from a Monte Carlo simulation is potentially misleading because it essentially ignores the risk of the portfolio. With risky assets, investors are unable to earn a guaranteed average return for any given holding period. That is because they only obtain a *single* realization from the return distribution. To see this, consider the choice between a sure 1% profit on a \$10,000 investment and the opportunity to bet \$10,000 on a single coin toss that pays \$21,000 if the coin lands heads and nothing if it lands tails. A simulation would recommend the coin toss because with *multiple* tosses, the bet returns an average of 5% per toss. Many investors, though, would rationally decline the single toss and choose the safer investment.

#### A Cautionary Note

SS use data from 1980 - 1999 in their simulation. They replicate their simulation using 1970-1999 and report that the results are “substantially similar.” Although they conclude that their results are independent of the sample period, investors would still do well to consider the risk of a 100% equity portfolio. Shiller (2000) reports that it took years for stocks to recover from the Great Depression. He writes that, “The real S&P Composite Index did not return to its September 1929 value until December 1958” (page 9). This does neglect dividends, but Shiller adds that, “The average real return in the stock market (including dividends) was -13.1% a year for the five years following September 1929, -1.4% a year for the next ten years, -0.5% a year for the next fifteen years, and 0.4% a year for the next twenty years” (page 9). Investors in the Japanese stock markets are currently experiencing a similarly trying period. Recent Nikkei averages hover at about the levels of 20 years ago, though dividends would at least make the 20-year nominal return

positive. Simulation results, by converging to the average realized return over that particular sample period, obscure these unpleasant possibilities.

#### **4. Portfolio Considerations**

My analysis matches SS in that it ignores the rest of a Section 529 plan participant's portfolio. Portfolio considerations, though, probably weigh against the argument for allocating the investment in a Section 529 plan to 100% equities. Several authors, notably Miller (1977), argue that a tax premium is probably embedded in the prices of assets; assets that are subject to higher taxes probably have higher before-tax returns. Tepper (1981) gives the implications of this for tax-sheltered investments: all else equal, investors should hold high-yield stocks or bonds in tax-preferred vehicles such as 529 plans, and hold low-yield stocks in other accounts. Intuitively, this strategy eliminates the largest tax liability.

This fits well with Reichenstein (1998). He illustrates the importance of considering the investor's entire balance sheet, including not only his financial assets but also, for example, his pension assets, life insurance and mortgage liabilities. Reichenstein's analysis would conclude that allocating Section 529 plan assets to 100% stocks would require offsetting investments in other assets held outside of the 529 plan. Even an extremely risk-tolerant investor, who prefers 100% equity investments, would do better to follow Domian and Racine (2002) and gain the additional equity exposure by leveraging his investments held outside the tax shelter. SS probably make the best recommendation of all when they cite Elton and Gruber (2000), who conclude that it might be impossible to judge the rationality of asset allocation recommendations.

#### **5. Summary and Conclusions**

Section 529 plans are not for everyone. Some investors may have no discretionary funds to save at all, or they may have no college-bound children. Other children may have their educations

already funded, perhaps via a relative's estate. The effects of 529 plans on financial aid might deter some investors, and some others might prefer that their children learn the lessons of working their own way through college.

Recent tax law changes, though, have magnified the importance of Section 529 plans. The appeal of these plans is now much greater. For most investors, they are fully tax-exempt at the federal level, and investment limits are typically an order of magnitude larger. Portfolio allocation -- both *to* and *within* Section 529 plans -- is sure to remain the focus of extensive research.

## References

- Block, Sandra and John Waggoner (2002). 529 college plan choices are all over the map, <http://www.usatoday.com/money/covers/2002-07-08-529-college-plans.htm>.
- Domian, Dale L. and Marie D. Racine. Wealth and risk from leveraged stock portfolios, *Financial Services Review* 11, (1), 2002, 33-46.
- Elton, E. J., and Gruber, M. J. (2000). The rationality of asset allocation recommendations, *Journal of Financial and Quantitative Analysis*. 35(1), 27-42.
- Gunthorpe, Deborah, and Haim Levy, (1994). "Portfolio Composition and the Investment Horizon," *Financial Analysts Journal*, January/February, 51-56.
- Miller, Merton H. (1977). Debt and Taxes, *Journal of Finance* 32, 261-275.
- Reichenstein, William. (1998). Calculating a family's asset mix, *Financial Services Review* 7, 195-206.
- Shiller, Robert J. (2000). *Irrational Exuberance*. Princeton University Press, Princeton, New Jersey.
- Spitzer, John J. and Sandeep Singh. (2001). The fallacy of cookie cutter asset allocation: some evidence from New York's college savings program, *Financial Services Review* 10, 101-116.
- Tepper, Irwin. (1981). Taxation and corporate pension policy, *Journal of Finance* 36, 1-13.