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Financial Planning and College Saving Recommendations: Let's Set Things Straight

Thomas H. Eyssell

Continuing increases in the cost of higher education, along with an ever-changing financial aid environment, suggest that financial planning is more important than ever for those seeking to send a child to college. One commonly used aid to the financial planner is the "college savings table," which is ubiquitous in both the popular press, as well as the literature geared toward financial planners. Although they are intended to simplify the planning process, some of these tables may lead to misallocation of family resources. The tables generally purport to show how much money parents must save monthly to fund four years of college at a specified future date. We demonstrate that these tables often employ flawed methodology. Upon correction (and given reasonable assumptions about investor behavior, growth rates in tuition costs, and investment yields), the monthly savings necessary to fund a given level of college expenses can be substantially less than those reported. Additionally, published tables typically provide the planner with a limited range of investment yield assumptions, suggesting a narrow range of portfolio possibilities. We provide a series of tables which allow the financial planner to estimate required savings for various combinations of investment yields and tuition growth rates.

"There are 135 billionaires on the [Forbes 400] list. The others have kids in college."—*Entertainment Weekly*, October 11, 1996.

I. INTRODUCTION

A primary concern of those planning family finances is the ability to fund a college education. Recent articles in both the popular and financial press, as well as in the academic literature, suggest that it is more important than ever to put in place an appropriate financial plan. The confluence of rising tuition costs, adverse changes in the amount and nature of student financial aid, and the perception of an increasing inability

Dr. Thomas H. Eyssell • School of Business, University of Missouri-St. Louis, 8001 Natural Bridge Road, St. Louis, MO 63121; *e-mail*: c1803@umslvma.umsl.edu.

of college graduates to find suitable employment undoubtedly cause many to question their willingness or ability to provide a college education for their children.

Unfortunately, financial planners may unwittingly exacerbate this problem by relying on published tables to guide the family saving/investment process. These tables typically purport to show how much money parents must save monthly to fund four years of college at some future date, and which invariably suggest values that would place a significant financial strain on the average family's budget. We demonstrate that these tables often employ flawed methodology. Upon correction (and given reasonable assumptions about investor behavior, growth rates in tuition costs, and investment yields), it is shown that the periodic savings necessary to fund a given level of college expenses can be substantially less than those reported.

II. THE CURRENT STATE OF EDUCATIONAL ECONOMICS

The field of educational economics is complex and largely beyond the scope of this paper; however, we identify three variables which highlight the importance of careful financial planning for the aspiring student—continued increases in tuition and fees, changes in the nature and availability of financial aid, and uncertainty about the returns to educational expenditure.

Given the amount of press the topic has received, it is, perhaps, not surprising that the rate of increase in student-borne college costs continues to outstrip that of the Consumer Price Index (CPI). A recent issue of *The Wall Street Journal* noted that "[t]he average tuition at a private university's four-year program . . . in 1993-1994 was 10 times" that for the 1964-1965 school year. And, according to the College Board, college tuition and fees for the 1995-1996 academic year "climbed about 5% for the fourth year in a row." (*The Wall Street Journal*, September 29, 1996, p. A2) Further, recent history suggests that little relief is in sight. Between 1975 and 1995, the annual increase in the Higher Education Price Index (HEPI) has been as low as 2.9 percent (1995) and as high as 10.7 percent (1981), with an average annual increase of 5.8 percent. In short, the rate of increase in tuition costs as measured by HEPI has risen substantially faster than the overall inflation rate over the last two decades. The implication for the financial planner is clear: rising education costs cannot be ignored, and must be carefully considered in any calculation.

The financial aid picture is less clear. On one hand, the College Board reports that total amount of financial aid distributed to students reached $50 billion in 1995, a real increase of approximately 4 percent over the previous year. However, a number of factors bear adversely on this picture.

First, the dominant form of financial aid is increasingly shifting from outright grants to interest-bearing loans. Fenske and Barberini suggest that this may reflect the fact that "[l]oan programs require fewer federal dollars than do grant programs to provide the same dollar support to students" (1994, p. 502). (The full impact of this shift on the saving process is open to debate; Feldstein, 1992, suggests that scholarship rules may provide a disincentive to those planning to save for higher education.)

Second, as repayment burdens have increased, so have the level of defaults, as well as the length of the repayment schedules. The Higher Education Amendments Act of 1986 has had the effect of lengthening the maximum amortization period on many student loans from 10 years to 25 years. And while this may make monthly payments easier to handle for many, it also suggests that the former college student will continue to be paying on college debt well into middle age. It should undoubtedly trouble the financial planner that few have attempted to evaluate the "impact of one generation not being able to retire its own student loan indebtedness before its sons and daughters enter college" (Fenske & Barberini, 1994, p. 503).

A final variable which suggests the need for careful financial planning is the uncertainty about the returns to investment in education. Traditional cost-benefit analysis suggests that one planning a substantial investment of resources must weigh the outlay against the expected returns. And uncertainty about the magnitudes of those returns increases the importance of careful planning of the investment.

While it is traditionally assumed that the substantial financial (and nonfinancial) benefits accrue to more highly educated individuals, the combination of accelerating tuition costs and shrinking job markets in some fields has contributed to the perception that the expense of higher education may not be "worth it." While it is beyond the scope of this paper to tackle this complex issue, we do note two important factors. First, the (financial) returns to education are unlikely to be constant over time. Cohn and Hughes (1994) estimate internal rates of return (IRRs) on college expenditures over the period 1969-1985 and conclude that the returns on investment declined from the late 1960s through the mid-1970s, increased temporarily, then levelled off in the mid-1980s.

It should be noted that some have argued that the mere possession of a degree *per se* is valuable. Hecker (1992) provides evidence on this *perceived* value of a college degree in terms of employability and earnings potential. The works of Arrow (1973), Heywood (1994), Spence (1974), and Wolpin (1977) suggest the existence of a different type of "sheepskin effect"—the mere possession of a college degree may serve as a signal of one's future productivity to potential employers. In any event, one could reasonably infer that the prudent planner will attempt to relate the cost of education to its expected benefits, and incorporate those values into the financial plan being prepared.

III. CURRENT PRACTICE

Given the complexities of this financial planning problem, as well as the fact that it impacts millions of people each year, it is no surprise that "one size fits all" tables designed to help one plan for meeting college expenses are ubiquitous. Among other places, they have appeared in such publications as *Money Magazine*, *USA Today*, various newspapers, reports distributed by brokerage firms, at various sites on the World Wide Web, as well as in professional publications whose audiences include professional financial planners. Tables 1 and 2 are examples prepared by the American Institute of Certified Public Accountants (AICPA) and the College Board, respectively.

Consider Table 1. Assuming one has a five year-old child, college costs $10,000 today and is expected to increase at 7 percent annually for the foreseeable future, the total cost of four years of college is predicted to be $106,996, according to column two. (This value represents the sum, at matriculation, of the four future values of the assumed initial cost. That is, $\$106{,}996 = \$10{,}000(1.07)^{13} + \$10{,}000(1.07)^{14} + \$10{,}000(1.07)^{15} + \$10{,}000(1.07)^{16}$.) Columns three, four, and five indicate the deposits necessary to accumulate this amount

TABLE 1
Projected Cost and Required Funding for Four Years of College

Child's Age	*Projected Four-Year College Cost*	*Required Funding*		
		Single Payment	*Annual*	*Monthly*
1	$140,250	$37,905	$3,848	$323
2	131,074	38,259	4,002	336
3	122,499	38,617	4,177	352
4	114,485	38,978	4,378	369
5	106,996	39,342	4,609	389
6	99,996	39,710	4,876	413
7	93,454	40,081	5,199	441
8	87,340	40,456	5,582	474
9	81,627	40,834	6,052	515
10	76,286	41,215	6,641	566
11	71,296	41,600	7,398	632
12	66,632	41,989	8,410	719
13	62,272	42,382	9,828	842
14	58,199	42,778	11,959	1,026
15	54,391	43,177	15,513	1,333
16	50,833	43,581	22,629	1,947
17	47,505	43,988	43,988	3,791

Source: AICPA Personal Financial Planning Manual.
Note: The exhibit assumes a 7% inflation rate for college costs, an 8% after-tax return on investments, and current college costs of $10,000 annually.

given (a) an eight percent after-tax return on funds invested, and (b) investment frequencies of one lump sum, annual payments, or monthly payments. According to the table, one would need to set aside $39,342 today to accumulate the necessary funds, or make thirteen annual deposits of $4,609 (assuming deposits begin one year from today), or make 156 (= 13 x 12) monthly deposits of $389 (assuming deposits begin one month from today). Similarly, the table distributed by the College Board compares the expected costs and required savings between public and private institutions (Table 2).

Given (a) the child's current age, (b) the current cost of four years of school, and (c) estimates of the growth rate of college costs and investment yields, the table indicates the monthly savings necessary to finance the child's college education. This table assumes that college costs will rise at a 6 percent annual rate and that invested funds will yield 8 percent per annum. Column 2 indicates the cost of four years of college from three to seventeen years from today; that is, it is useful for the child who will enter college at age eighteen and who is now as old as fifteen or as young as one. The columnar values indicate that the cost of four years of college at a public university will be $65,231 by the time a child who is five years old today enters school. (By extrapolation, we find that those who prepared this table used $6,991 as the assumed current cost of one year at a public university.)

TABLE 2
Monthly Saving Required to Fund a College Education

Age of Child	*Publicf College (4 years)*	*Required Monthly Saving*	*Private College (4 years)*	*Amount to Save Monthly*
1	$82,353	$191	$180,444	$418
2	77,691	201	170,230	440
3	73,294	212	160,594	464
4	69,145	224	151,504	492
5	65,231	239	142,928	524
6	61,539	256	134,834	561
7	58,056	276	127,206	604
8	54,769	299	120,005	656
9	51,669	328	113,213	719
10	48,745	364	106,804	798
11	45,985	410	100,759	899
12	43,382	471	95,055	1,033
13	40,927	557	89,675	1,220
14	38,610	685	84,599	1,501
15	36,425	899	79,810	1,969

Source: College Board.
Note: The exhibit assumes a 6% inflation rate for college costs, an 8% after-tax return on investments, and current college costs of $6,991 annually.

Funding the indicated $65,231 expenditure will, according to the table, require monthly savings of $239, assuming that one can invest to earn 8 percent per annum. The penalty for failing to plan ahead is apparent when one considers the indicated monthly savings requirement for a child who is now fifteen years old and for which no funds have previously been set aside: $899 per month. Few family budgets can absorb this expenditure without strain.

A closer examination of Table 2 reveals some rather questionable (but commonly employed) implicit assumptions: (a) that parents desire to have the entire amount needed for four years of schooling available at the time the child first enters school; (b) that no further deposits/investments will be made while the child is in school; and (c) that if the entire amount is on hand at the beginning of the freshman year, funds not used immediately will earn no yield over the remaining four years. (Table 1 employs similar assumptions.) It will be shown that the combined effect of these unrealistic assumptions is to substantially overstate the required savings figures.

IV. SETTING THINGS STRAIGHT

Each of the three assumptions above is restrictive; taken together, they can artificially inflate the required monthly savings figure by a sizable amount. Consider the following adjustments. First, we suggest that what is actually needed at the time of matriculation is enough money to meet the costs of the coming year, rather than for the entire college experience. (For the sake of simplicity, we have assumed annual tuition payments in our calculations. Adjusting for semi-annual or quarterly tuition payments does not materially affect the conclusions of this paper.)

At the second enrollment date, what is needed is enough money to cover the cost of the second year, and so on. The implied requirement to accumulate a lump sum upon the entry date inflates the required period saving/investment figure.

Second, by assuming that no deposits or investments will be made while the child is in school, thirty-six monthly savings opportunities are eliminated, which further increases the required monthly savings.

Finally, financial theory suggests that rational investors will act to ensure that unused funds will be invested to earn the going rate of return on investments consistent with the risk tolerance of the investor. The assumption that excess funds are held idle is inconsistent with investor rationality and adds to the magnitude of the required savings figures.

We suggest that a more realistic scenario is as follows. Assume that equal monthly deposits will be made beginning in one month and continuing until the child's last tuition payment is due; that is, just before s/he enters the fourth year of college. In other words, savings/investment inflows continue during the first three years of college, while cash outflows occur at the time of first enrollment, then one, two, and three years thereafter. The assumption that parents continue to make deposits while the child is in school is debatable, given that other college-related expenses often arise during this period. To the extent, however, that additional funding is necessary, we suggest that one is better off attempting to incorporate this into the planning process (perhaps by factoring up the "initial college cost" figure), and planning for the necessary deposits accordingly. Additionally, empirical evidence on family spending and savings patterns indicates that families are increasingly likely to fund college in a "pay-as-you-go" manner (Baum, 1994).

Assume also that any funds not used immediately will continue to earn the assumed investment rate. Under these more realistic assumptions, (and retaining the 6 and 8 percent inflation and investment rates, respectively, for comparison purposes) the required monthly savings figures fall dramatically. For example, the five-year old's parents need only make monthly deposits of $190 rather than $239 (a reduction of approximately one-fifth), and the parents of the 15-year-old need only make monthly payments of $445—*less than half the amount indicated in Table 2.* In other words, the assumptions made to construct the table cause the indicated saving values to be substantially overstated.

V. GENERALIZING THE MODEL

Of course, we are still operating under the twin assumptions of 8 percent after-tax yields and a 6 percent average annual growth in college expenses. Clearly, these assumptions are unlikely to be universally appropriate for all planners, all portfolios, and all educational institutions. As noted earlier, annual increases in the Higher Education Price Index (HEPI) have varied widely over the recent past.

The returns on financial assets have also been volatile over the last two decades. Since 1975 the annual returns on long-term U.S. Treasury bonds have ranged from -7.8 percent to 40.4 percent. And annual returns on common stocks (as proxied by the Standard and Poors 500 Index) have ranged from approximately -25 percent to 45 percent over the same period. (Ibbotson & Sinquefield, 1995) If nothing else, the historical variation in financial asset returns underscores both the need for understanding the risk and return characteristics of different asset classes, as well the need to construct a college savings portfolio consistent with one's funding requirements, risk tolerance, and overall financial situation.

In sum, what is needed is a computational method which gives one the ability to take his/her own estimates of current college costs, the growth rate in those costs, and the expected rate of return on invested funds, and use these parameters to obtain a monthly savings figure most appropriate to the situation at hand.

Our approach follows a two-step procedure. First, we construct a table of compounding factors which allows us to obtain an estimate of future college costs given a child's current age and the expected annual rate of increase in college costs. We then generate a series of tables which indicate the required monthly savings figures under various age, inflation, and investment return scenarios.

The values in Table 3 are compounding factors with which one can easily determine the total nominal cost of four years of college for children currently aged 0 to 18 years, assuming annual cost increases ranging from 0 to 10 percent.

To use the table, simply multiply the current annual cost at the target institution by the factor corresponding to the child's current age and estimated inflation rate. For example, assume that Mr. and Mrs. Jones, the parents of a 5-year-old and a 15-year-old, know that Anystate U. currently costs \$6,991 annually. Further, they believe that costs at this institution will increase at a 6 percent annual rate for the foreseeable future. Consistent with the previous example, the table indicates that, at the time of enrollment, the cost of four years of school for the 15-year-old will total \$36,425 (= \$6,991 x 5.2102). Similarly, the cost of the younger child's education will total \$65,231 (= \$6,991 x 9.3307).

The factors in Table 3 are obtained by summing future value interest factors appropriate for each tuition date. That is, each table factor equals

$$\sum_{\tau}^{\tau+3} \mathrm{FVIF}_{\tau,\, r}$$

where tau = 18 minus the child's current age.

As expected, the computed values mirror those found in Table 2. However, the real utility of this table is that one can determine immediately, and with a minimum of computation, analogous values for several realistic combinations of current cost, tuition inflation rate, and student age.

In the second step we provide the means by which one can determine the monthly savings requirement, given more realistic assumptions about savings behavior, and a wide range of possible investment yields and growth rates of college costs.

Consider the planner attempting to construct portfolios for clients with varying levels of risk tolerance. Those with little tolerance may feel more comfortable investing in intermediate or long-term certificates of deposit. Those with somewhat greater willingness and ability to tolerate risk may prefer portfolios which are weighted heavily to medium-grade corporate bonds and/or common stocks. The values in Tables 4 through 6 below are payment factors associated with expected investment yields of four, eight, and twelve percent,

TABLE 3
Compounding Factors for Determining the Total Cost of Four Years of College

		Tuition Growth Rate										
Age	*Years to Admission*	*0%*	*1%*	*2%*	*3%*	*4%*	*5%*	*6%*	*7%*	*8%*	*9%*	*10%*
18	0	4.000	4.0604	4.1216	4.1836	4.2465	4.3101	4.3746	4.4399	4.5061	4.5731	4.641
17	1	4.000	4.101	4.204	5.3091	4.4163	4.5256	4.6371	4.7507	4.8666	4.9847	5.1051
16	2	4.000	4.142	4.2881	4.4384	4.593	4.7519	4.9153	5.0833	5.2559	5.4333	5.6156
15	3	4.000	4.1834	4.3739	4.5716	4.7767	4.9895	5.2102	5.4391	5.6764	5.4333	5.6156
14	4	4.000	4.2253	4.4614	4.7087	4.9678	5.239	5.5229	5.8199	6.1305	6.4553	6.7949
13	5	4.000	4.2675	4.5506	4.85	5.1665	5.5009	5.8542	6.2272	6.621	7.0363	7.4744
12	6	4.000	4.3102	4.6416	4.9955	5.3731	5.776	6.2055	6.6632	7.1506	7.6696	8.2218
11	7	4.000	4.3533	4.7344	5.1453	5.5881	6.0648	6.5778	7.1296	7.7227	8.3599	9.044
10	8	4.000	4.3968	4.8291	5.2997	5.8116	6.368	6.9725	7.6286	8.3405	9.1122	9.9484
9	9	4.000	4.4408	4.9257	5.4587	6.044	6.6864	7.3908	8.1627	9.0077	9.9323	10.943
8	10	4.000	4.4852	5.0242	5.6224	6.2858	7.0207	7.8343	8.734	9.7284	10.826	12.038
7	11	4.000	4.5301	5.1247	5.7911	6.5372	7.3718	8.3043	9.3454	10.507	11.801	13.241
6	12	4.000	4.5754	5.2272	5.9649	6.7987	7.7404	8.8026	9.9996	11.347	12.863	14.565
5	13	4.000	4.6211	5.3317	6.1438	7.0707	8.1274	9.3307	10.7	12.255	14.02	16.022
4	14	4.000	4.6673	5.4384	6.3281	7.3535	8.5338	9.8906	11.449	13.235	15.282	17.624
3	15	4.000	4.714	5.5471	6.518	7.6476	8.9604	10.484	12.25	14.294	16.658	19.387
2	16	4.000	4.7611	5.6581	6.7135	7.9535	9.4085	11.113	13.107	15.438	18.157	21.325
1	17	4.000	4.8088	5.7712	6.9149	8.2717	9.8789	11.78	14.025	16.673	19.791	23.458
0	18	4.000	4.8568	5.8867	7.1223	8.6026	10.373	12.487	15.007	18.007	21.572	25.804

TABLE 4
Payment Factors for Various Yield and Growth Rate Scenarios Assumed Investment Yield = 4%

Age	*Years Until Entry*	*Tuition Growth Rates* 2%	4%	6%	8%	10%
18	0	0.114612	0.11797	0.121415	0.124978	0.128571
17	1	0.085905	0.090155	0.094572	0.099161	0.103926
16	2	0.068672	0.073483	0.078565	0.083931	0.089593
15	3	0.057175	0.06238	0.067978	0.073991	0.080445
14	4	0.048957	0.054461	0.060489	0.067082	0.074284
13	5	0.042788	0.048532	0.05494	0.062078	0.070015
12	6	0.037985	0.043928	0.050685	0.058351	0.067031
11	7	0.034137	0.040253	0.047338	0.055526	0.064966
10	8	0.030986	0.037254	0.044653	0.053364	0.063594
9	9	0.028356	0.03476	0.042465	0.051707	0.06276
8	10	0.026127	0.032656	0.040662	0.050446	0.062363
7	11	0.024214	0.030858	0.039162	0.049501	0.062329
6	12	0.022552	0.029304	0.037905	0.048817	0.062606
5	13	0.021096	0.027949	0.036848	0.048351	0.063156
4	14	0.019809	0.026758	0.035956	0.048071	0.063953
3	15	0.018662	0.025704	0.035203	0.047953	0.064977
2	16	0.017634	0.024764	0.034569	0.047976	0.066213
1	17	0.016707	0.023922	0.034035	0.048127	0.07651
0	18	0.015866	0.023163	0.033589	0.048393	0.069284

respectively, which many would consider reasonable expected returns for the portfolios described above.

To compute a required monthly savings figure, multiply the current annual cost at the target institution by the factor in the appropriate table. For example, Table 5 contains factors for an 8 percent investment yield, along with college cost growth rates ranging from 2 to 10 percent.

Assume that college costs are expected to increase at a 6 percent rate over the foreseeable future. The indicated monthly savings requirement for our hypothetical 5-year-old wishing to attend a public university thirteen years from today is $189.52 (= .027109 x $6,991). The analogous value for the 15-year-old from our previous example is $445.28 (= $6,991 x .063694). These values confirm those noted previously.

Finally, it should be noted that since the monthly savings requirement is a function of the relatively easily obtained current annual cost figure, obtaining the monthly savings figure is not particularly difficult. Additionally, the *percentage* difference between the base case value and the revised value is not affected by the magnitude of the current cost figure.

TABLE 5
Payment Factors for Various Yield and Growth Rate Scenarios Assumed Investment Yield = 8%

Age	Years Until Entry	Tuition Growth Rates 2%	4%	6%	8%	10%
18	0	0.114826	0.118076	0.121409	0.124826	0.128328
17	1	0.084253	0.088336	0.092576	0.096977	0.101545
16	2	0.065906	0.070455	0.075257	0.080322	0.085663
15	3	0.053675	0.058505	0.063694	0.069263	0.075236
14	4	0.044939	0.049943	0.055418	0.061401	0.067931
13	5	0.038388	0.0435	0.049197	0.055537	0.062581
12	6	0.033296	0.038469	0.044344	0.051003	0.058537
11	7	0.029225	0.034428	0.040449	0.047401	0.055409
10	8	0.025898	0.031106	0.037249	0.044475	0.052952
9	9	0.023129	0.028325	0.034571	0.042056	0.050999
8	10	0.020789	0.025959	0.032293	0.040026	0.049437
7	11	0.018789	0.023921	0.03033	0.038302	0.048183
6	12	0.017059	0.022145	0.028618	0.036821	0.047179
5	13	0.01555	0.020582	0.027109	0.035539	0.046378
4	14	0.014223	0.019195	0.025768	0.034419	0.045748
3	15	0.013048	0.017955	0.024567	0.033433	0.045261
2	16	0.012002	0.016839	0.023483	0.032561	0.044897
1	17	0.011065	0.015828	0.022499	0.031784	0.044638
0	18	0.010222	0.014909	0.021599	0.03109	0.044471

VI. FURTHER APPLICATIONS OF THE MODEL

It is relatively straightforward to show that the reported savings figures in Table 2 are overstated for every age category. We have already seen that the modified monthly savings requirements are substantially lower than the two "base case" values. But what about the remaining values? Returning to Table 2, the revised monthly savings amounts range from $157 for the child who is currently one-year-old (versus the $191 base figure—a 17.6 percent decrease), to the $445 (versus $899) for the fifteen-year-old noted earlier.

We believe that the tables presented in this paper will be useful in the portfolio planning process. Given that historical yields on different financial instruments vary in relation to their risk, another interesting application of Tables 4 through 6 is to use them to compare the monthly savings necessary to accomplish our goal, given the yields on different investment vehicles. At the time of this writing, passbook savings accounts yield between 4 and 5 percent, investment-grade intermediate-term corporate bonds are priced to yield between 7 and 8 percent, and the long-term return on the average common stock is just over 12 per-

TABLE 6
Payment Factors for Various Yield and Growth Rate Scenarios Assumed Investment Yield = 12%

		Tuition Growth Rates				
Age	*Years Until Entry*	*2%*	*4%*	*6%*	*8%*	*10%*
18	0	0.11513	0.118275	0.121499	0.124803	0.128188
17	1	0.08267	0.086549	0.090617	0.094838	0.099214
16	2	0.063179	0.067475	0.072006	0.076781	0.081812
15	3	0.050263	0.054733	0.059532	0.064677	0.070191
14	4	0.041082	0.045613	0.050566	0.055973	0.06187
13	5	0.034238	0.03876	0.043795	0.049393	0.055607
12	6	0.028955	0.033421	0.038489	0.044228	0.050714
11	7	0.024765	0.029145	0.03421	0.040053	0.046778
10	8	0.021371	0.025645	0.03068	0.036598	0.043534
9	9	0.018576	0.022728	0.027714	0.033683	0.040809
8	10	0.016242	0.020262	0.025182	0.031183	0.03848
7	11	0.014271	0.018152	0.022993	0.02901	0.036461
6	12	0.01259	0.016328	0.021081	0.027099	0.03469
5	13	0.011145	0.014738	0.019394	0.0254	0.033118
4	14	0.009895	0.013341	0.017894	0.023878	0.031709
3	15	0.008807	0.012107	0.016551	0.022503	0.030436
2	16	0.007856	0.011011	0.015341	0.021252	0.029277
1	17	0.00702	0.010032	0.014247	0.020108	0.028214
0	18	0.006283	0.009155	0.013251	0.019055	0.027232

cent. As such, we note that Tables 4, 5, and 6 have been prepared assuming investment returns of 4, 8, and 12 percent, respectively. The effect of portfolio choice on the required monthly savings figure is illustrated in the following example.

Assume that Mr. and Ms. Risk-Averse are more concerned with safety than with yield on their invested funds, and that they construct a low-risk portfolio expected to return 4 percent per annum. Mr. and Ms. Takachance, on the other hand, invest in a diversified portfolio of common stocks and hope to earn an average annually compounded return approximating 12 percent. Assuming a child aged five, current annual costs of $6,991, and 6 percent tuition inflation rate, the investors more concerned with safety set aside $257 (= $6,991 x .036848) per month. The parents who have invested in the riskier portfolio need only set aside $136 (= $6,991 x .019394) per month. In short, financial planners will note that it becomes a simple matter to demonstrate to clients the effect of one's risk tolerance on the monthly savings requirements.

VII. CONCLUSION

The goals of this paper are twofold. First, by replacing the commonly employed "one-size-fits-all" tables for college saving with those impounding several possible assumptions about inflation rates and investment yields, we seek to add greater precision and flexibility to the financial planning process. Additionally, by providing a simple two-step algorithm for determining the required saving amount, we hope to retain the simplicity of the tables currently in use. Given a single, easily obtainable input parameter (the current annual cost of college), we provide the means to estimate the total cost for a range of inflation assumptions, regardless of the child's current age. Further, we modify the unrealistic assumptions often made about how people save for college to better reflect economic behavior. Then we supply tables with which to compute the monthly savings required to fund the education, given today's annual cost and the estimated investment yield. These values are significantly lower than those appearing in many published tables. From the viewpoint of the financial planner, the information provided in this paper should serve to make the planning process easier and more accurate by reducing the monthly outlays required and by spelling out the assumptions embedded in traditional presentations.

REFERENCES

Arrow, K. (1973). Higher education as a filter. *Journal of Public Economics, 2*, 193-216.

Baum, S. (1994). Access, choice, and the middle class. *Journal of Student Financial Aid, 24*, 17-25.

College for Financial Planning. (1996). *Study guide—financial planning process and insurance.* National Endowment for Financial Education Press.

Cohn, E., & Hughes, W. (1994). A benefit-cost analysis of investment in college education in the United States: 1969-1985. *Economics of Education Review, 13*, 109-123.

Fenske, R., & Barberini, P. (1995). "Financial aid to students." *Encyclopedia of Educational Research.* New York: Macmillan Publishing.

Feldstein, M. (1992). College scholarship rules and private saving. Working paper 4032. Cambridge, MA: National Bureau of Economic Research.

Hecker, D. (1992) Reconciling conflicting data on jobs for college graduates. *Monthly Labor Review, July*, 3-12.

Heywood, J. (1994) How widespread are sheepskin returns to education in the U.S.? *Economics of Education Review, 13*, 227-234.

Ibbotson Associates. (1995). *Stocks, bonds, bills, & inflation—1995 yearbook.* Chicago, IL: Author.

Research Associates. (1995). *Inflation measures for schools, colleges, & libraries—1995 update.* Washington, DC: Author.

Spence, M. (1974). *Market signalling.* Cambridge, MA: Harvard Press.

Wolpin, K. (1977). Education and screening. *American Economic Review, 67*, 949-958.