ESTIMATING THE FINANCIAL RETURN ON INVESTMENT FROM A LIBERAL ARTS COLLEGE EDUCATION

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Introduction

Liberal arts education is often criticized today as too costly. Critics say liberal arts graduates pay too much for their education compared to the ultimate salary they can earn—in short, that they earn a poor return on their investment.

Higher education certainly is about building a foundation for a fulfilling life, but its economic dimensions are inescapable. Private higher education in the United States has become increasingly expensive, and as a result, many families question its worth as an *economic* investment.

This report presents new evidence to show that, strictly from the perspective of that financial investment, an education at a small private liberal arts college can and commonly does have an attractive financial rate of return on investment (FROI). This return is highly competitive as compared to other forms of financial investment. While the focus of this paper is the most elite group of small private liberal arts colleges, the methodology can be extended to other sectors of higher education.

Executive Summary

- Seven of the 36 studied institutions in the top 50 liberal arts colleges showed a financial return on investment of less than 0.
- The remaining 29 institutions showed an estimated positive annual rate of return above inflation; their FROI ranged from 0.79 percent to 5.3 percent.

Financial Return on Investment		
1st to 4th	Carleton, Colgate, Harvey Mudd, Washington & Lee	5.05 to 5.30%
5th to 14th	Bucknell, Franklin & Marshall, Gettysburg, Holy Cross, Kenyon, Lafayette, Occidental, Swarthmore, Whitman, Williams	3.56 to 4.22%
15th to 20th	Denison, Macalester, Middlebury, Oberlin, Richmond, Skidmore	2.50 to 2.98%
21st to 25th	Colby, Davidson, Hamilton, Smith, Wesleyan	1.95 to 2.03%
26th to 29th	Barnard, Bates, Claremont McKenna, Pomona	.03 to 1.50%
30th to 36th	Bryn Mawr, Colorado, Connecticut, Grinnell, Mount Holyoke, Trinity, Wellesley	Less Than 0%

- The four institutions with the highest returns, ranging from 5.05 to 5.30 percent, should be considered as having effectively the same rate of return, given all the elements of uncertainty and approximation included in our model. A similar analysis is applicable for the cluster from 3.56 to 4.22 percent, the one from 2.50 to 2.98 percent, and the one from 1.95 to 2.03 percent.
- The clear majority of these top institutions have financial rates of return of about 2 percent or more *above the rate of inflation* per year.

Conceptual Framework

At the simplest level, the economic aspects of higher education as a financial investment are based on paying a certain amount of money (the "investment") to attend college and then receiving a higher sequence of annual earnings than one otherwise would have attained (the "return") in the best alternative. If, for example, this rate of return is X% per year, we then compare X to the rate of return on other investments and make a decision as to whether to choose attending the college in question, attending another college, or going to work and investing the money in some alternative way.

It is important to note that this is not a comparison of an earnings stream after attending a particular institution as compared to not attending college and beginning work after high school. We take it as clear that, at least on average, this return on investment is substantial and highly attractive.[1] Rather, in terms of the return on investment to attending a particular private liberal arts college, we must compare one's earnings stream to an estimate of the earnings one would have received after attending an alternative institution. We then look at this difference and how it relates to the differential costs of attendance to determine the financial return on investment.

This is a nuanced problem. Let's suppose that we are considering the possibility of attending Prestige College, a small private liberal arts college that is expensive. Our alternative is to attend Benchmark College, an average institution that is inexpensive; perhaps it is the local branch of the state university. It is important to note that we do not simply compare the earnings of Prestige's graduates to those of Benchmark's, as this would ignore all the factors affecting earnings – native talent, quality of high school attended, gender, ethnicity, etc. – that are likely different between Prestige and Benchmark students. If we did not take differences in these factors into account, we would be combining the effects of these factors with the "value added" of Prestige – the contribution to earnings of an education at Prestige as compared to Benchmark for individuals with the same characteristics. This would then lead to an over-estimate of the financial return on investment to Prestige. And this does not take into account the cost difference between Prestige and Benchmark; this absence contributes more to the over-estimate of the financial return on investment to Prestige. Such comparisons are invited by data sources such as the federal government's College Scorecard and PayScale's publicly available data on earnings.

In a recent study (Carnevale et al., 2019) cost differences are taken into account in comparing earnings of graduates by college attended, but a value added calculation is not attempted.

In a study from the Brookings Institution (Rothwell and Kulkarni, 2015), the value-added for individual institutions is estimated based on the difference between median alumni earnings and an estimate of what an individual with the same characteristics would earn after attending a hypothetical average institution with the

same programs. To put this into the framework presented above, what is the difference in earnings for the typical Prestige alumnus/alumna after attending Prestige as compared to the hypothetical of what they would have been after attending Benchmark? These estimates are presented for a large number of institutions, including about three-quarters of the top 50 national liberal arts colleges as determined by the *U.S. News* rankings.

This value-added measure uses mid-career and pre-tax salary. It does not, however, take into account cost differences among institutions, and as a result, it does not lead to a financial return on investment calculation. To move to a financial return on investment calculation, we must take into account costs as well as have a model of how earnings change from entry into the labor market to mid-career and then on to retirement. In this paper, we present a novel approach to this challenge.

The Brookings study provides median mid-career earnings for those with a Bachelor's degree only; we use this to avoid the complications associated with trying to separate the value-added from undergraduate and graduate/professional school education. It presents the value-added in percentage terms, implying a value of median mid-career earnings for someone with the same characteristics who attended the base or benchmark institution. Let's assume that mid-career alumni are 45 years of age, i.e. 23 years after their (1991) graduation. For starting salaries, we used PayScale's Early Career Pay for individual colleges in 2014 dollars, and we presumed this was the same for the class of 1991 as for present early career graduates. Assuming this was measured for their third post-graduation years, there were 20 years from the early career salary to mid-career. The implicit average annual growth rate from early- to mid-career was then projected backward three years from early-career to achieve a presumed starting salary. The same rate of growth of wages was presumed for both the institution being investigated and the benchmark, and this was assumed to continue from mid-career to retirement at age 68. Note that this method implicitly assumes no economy-wide real wage growth in starting or mid-career salaries over time; one's salary goes up only due to life cycle effects.[2]

Based on these assumptions, we estimated the lifetime value of earnings in constant 2014 dollars for institutions with the needed data from the US News top 50 national liberal arts colleges. In the first analysis, we presume that the individual receives no financial aid and pays for tuition and fees from accumulated money for all four years at Prestige. We do not use the actual tuition that was faced in 1987-1991; instead, in recognition of escalating costs, we use the total amount a 2014 graduate of the institution would have paid all adjusted to 2014 dollars. Benchmark, the base institution, is presumed to have tuition and fees of zero.

Had the individual attended Benchmark, with the four years of tuition and fees invested in year one – the first year after graduation – and allowed to increase each year per some real (inflation adjusted) rate of return, the individual is implementing the alternative option to spending from the initial endowment for tuition and fees at F&M.

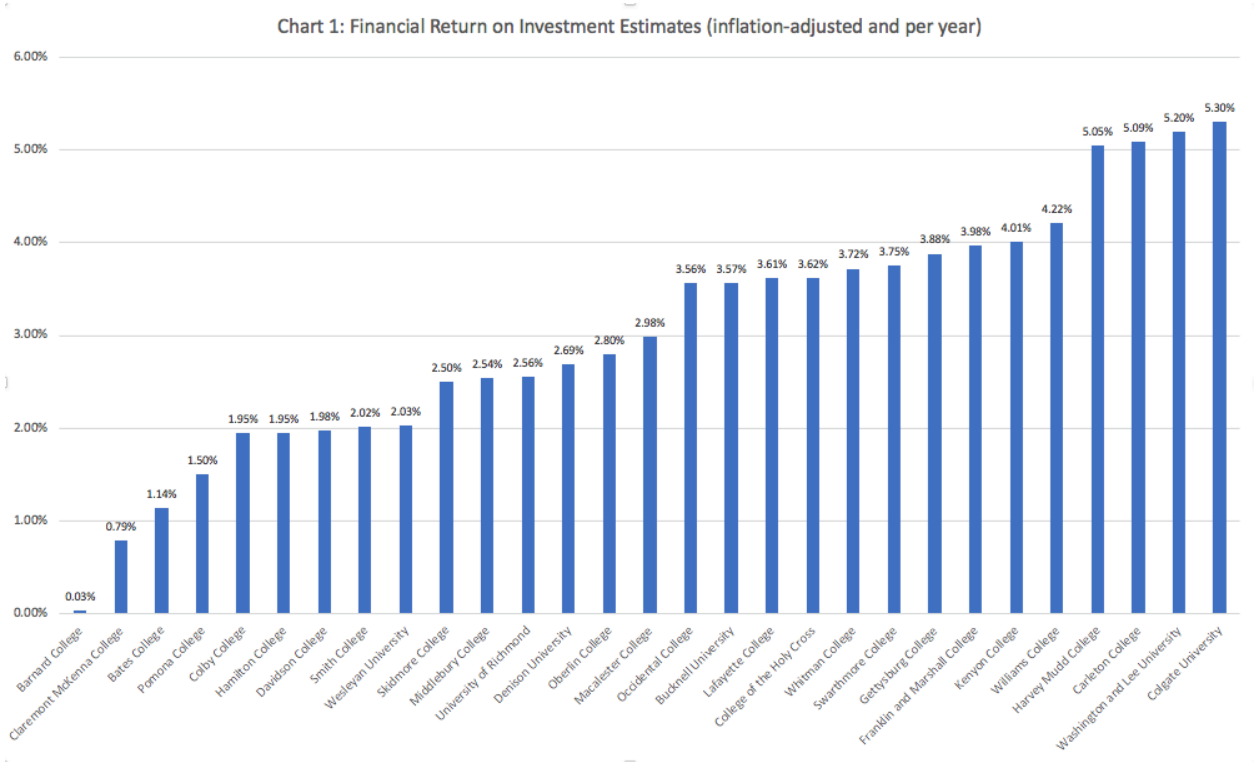
There is some annual constant rate of return – call this R – on this hypothetical alternative investment which provides the individual with the same accumulation of earnings, above that which would have been received at the benchmark institution, at age 68 as if s/he had attended F&M. The value of R is then the financial return on investment to attending F&M as opposed to the base institution. Note again that R is a real (inflation adjusted) rate of return.[3]

Results

The Brookings study provides value-added information for 36 of the 50 institutions that comprised the top 50 National Liberal Arts Colleges in the *U.S. News* 2019 rankings, published in September 2018. Three of the top 50 are the United States Military, Naval, and Air Force Academies, and the remaining 11 institutions without a Brookings measure were Amherst, Bowdoin, Centre, Haverford, Pitzer, Scripps, Sewanee – University of the South, Soka University of America, Thomas Aquinas, Union (NY), and Vassar.

For seven of the 36 institutions, the return on investment was less than zero, and as the algorithm used does not offer a precise solution for such cases, we simply list these seven institutions as having a negative return on investment: Bryn Mawr, Colorado College, Connecticut College, Grinnell, Mount Holyoke, Trinity (CT), and Wellesley.

For the 29 institutions with an estimated positive annual rate of return above inflation, here are our findings.



There is clear variability in this measure of the financial return on investment among this group of elite liberal arts colleges. Obviously, the purely financial case is much easier to make for an institution with 3% or higher return than one with a return less than 1% or negative. We hasten to point out that this return on investment is purely financial, and it is a return above inflation, but the variation is undeniable.

The second noteworthy observation refers to clustering. The four institutions with the highest returns, ranging from 5.05% to 5.30%, should be considered as having effectively the same rate of return given all the elements of uncertainty and

approximation included in our model. A similar comment seems applicable for the 3.56% to 4.22% cluster, the 2.50% to 2.98% cluster, and the 1.95% to 2.03% cluster.

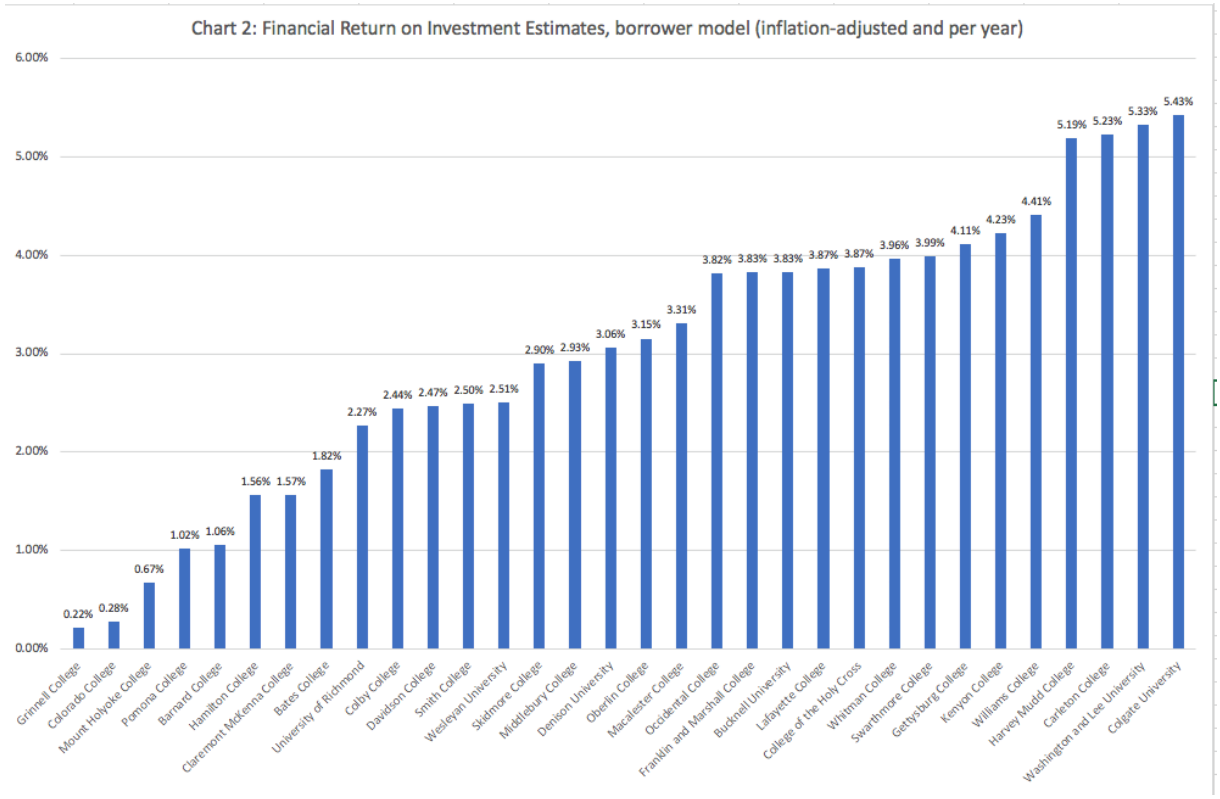
It is also important to note that variation in the rate of return for the median alumna/us might be associated with a variety of factors that we would not view as associated with educational quality. Two obvious possibilities are (1) The proportion of alumni in the appropriate cohort that are women, since the earnings of women are on average less than the earnings of men in the U.S. and (2) The mix of completed majors between the humanities, social sciences, and natural sciences, in accordance with hypotheses regarding the relationship between earnings and major, such as "majors in STEM fields out-earn those in other fields." Using the information for the institutions with a positive financial return on investment, there is a negative and statistically significant correlation between the percent of 1991 graduates that are women and the financial return on investment suggested by our research. In addition, three of the seven institutions with a negative return are women's colleges. Regarding the second hypothesis, there is a positive and statistically significant correlation between the percent of majors in STEM fields (Psychology excluded) and the financial return on investment. However, if we do a multivariate analysis (using multiple regression) of the financial return on investment and these two variables – percent women and percent STEM – together, we find that the negative and statistically significant correlation between percent women and the financial return on investment continues to be present, now holding the percent in STEM fields constant. However, the positive correlation between the percent in STEM fields and financial return is now not statistically significant, holding the percent who are women constant. We do not mean to suggest that these results are determinative, but they are illustrative of the types of questions that are suggested by these findings regarding the financial return on investment.

Sensitivity Analysis

Of course, the above analysis is limited to the case of individuals (or families) able to pay the entire tuition costs from savings or current earnings. Let's suppose the other extreme, that the entire amount must be borrowed. I presume this loan is at 7%, accrual begins at graduation, and the loan is paid off over 10 years. The earnings above those at the benchmark institution are used first to pay off the loans. Above this, they represent a return; note there is no investment corpus available for an alternative stream of funds and calculation of a rate of return.

To determine the financial rate of return, then, the lifetime gain was calculated and then divided by the value of the initial loan. This is a cumulative rate of return over a 46-year period. This is then annualized to a yearly rate of return. Note that this is a return above and beyond inflation.

In this case, three institutions move from negative to positive returns (Colorado College, Grinnell, and Mount Holyoke) and are included in the chart. Nevertheless, the results are quite similar to those resulting from the above framework.



Since the results here are not markedly different from the nonborrower model, we will confine our analysis to the nonborrower context. The borrower model is an extreme one – it is unusual that the entire family contribution would be borrowed – but is useful as a touchstone to demonstrate that the issue of borrowing does not fundamentally change the analysis.

The bigger issue is not so much how borrowing affects the rate of return – after all, in the nonborrower framework, we essentially model the nonborrowers as "borrowing" from themselves – but whether there is reasonable access to the amounts of funds that must be borrowed. While this is not universally the case, access to borrowable funds is high; the student debt crisis is illustrative of this.

What about the financial return on investment for graduates earning below, or above, the median for their institution?

As discussed above, there are several clusters of return rates for those not borrowing to pay their tuition and fees. Let's call these clusters A (0.03% to 1.50%), B (1.95% to 2.03%), C (2.50% to 2.98%), D (3.56% to 4.22%), and E (5.05% to 5.30%). Sample institutions for these clusters were chosen for this analysis: Bates for A, Davidson for B, Richmond for C, Franklin & Marshall for D, and Washington and Lee for E. How does the return on investment calculation change for a graduate earning 75% of the median? 125% of the median?

Table 1:	Financial Return On Investment, Annual Above Inflation For Alumna/us Earning This Proportion of Institutional Median		
Institution	75%	100%	125%
Bates	0.03%	1.14%	1.88%
Davidson	1.02%	1.98%	2.65%
Richmond	1.92%	2.56%	3.06%
Franklin & Marshall	3.33%	3.98%	4.48%
Washington & Lee	4.47%	5.20%	5.75%

For the sake of space, we do not present the 75% and 100% figures for all institutions, but there is a rather regular relationship between the 75, 100, and 125 percent benchmarks across the entire range of financial rates of return.

Financial Aid

The above analysis assumes an alumna/us who received no financial aid toward the cost of tuition and fees. For those receiving financial aid, what must be paid for tuition and fees is lower than the sticker price, and we can recalculate the financial return on investment for someone with the median earnings but paying a price discounted by financial aid.

Using the same five institutions as above, and presuming a nonborrower with median mid-career earnings:

Table 2:	Financial Return on Investment, Annual Above Infllation For Alumna/us With Median Earnings and Financial Aid Equaling This Proportion of Tuition and Fees				
Institution	0%	25%	50%	75%	95%
Bates	1.14%	2.08%	3.26%	5.07%	9.00%
Davidson	1.98%	2.83%	3.94%	5.71%	9.61%
Richmond	2.56%	3.21%	4.12%	5.70%	9.47%
Franklin & Marshall	3.98%	4.63%	5.56%	7.16%	10.98%
Washington and Lee	5.20%	5.91%	6.91%	8.58%	12.49%

It is worth noting how this connects to the problem of undermatching that Hoxby and Avery (2013), and others, have studied. For lower income and highly aided students, the rates of return to elite private education are very high, as what they have to pay themselves is comparatively low. However, due to undermatching these students avail themselves of these returns with far less frequency than do those from other socioeconomic backgrounds. Associated with this is an interesting question: How do the future earnings of students from lower income backgrounds compare to those from higher income backgrounds? In the above, we have assumed that the median for all backgrounds is the same at a given college. How realistic is this?

In ongoing work by Raj Chetty and his colleagues[4] at the Opportunity Insights project (now located at Harvard), data from federal tax returns is used to look at

earnings distributions of alumni of various colleges approximately 15 years after graduation and to compare it to their parents income when they began college. [The data cited here are available on line at https://opportunityinsights.org/data/ under Mobility Report Cards: The Role of Colleges in Intergenerational Mobility – Baseline Longitudinal Estimates of Child and Parent Income Distributions by College and Child's Cohort.]

For the US News top 50 national liberal arts colleges (the 2019 rankings published in September 2018), excluding the three service academies, Soka, Thomas Aquinas, and Pitzer, for which data are missing, we looked at the proportion of alumni with income in the top 40% in the income distribution in their mid thirties for those who came from a family in the highest quintile of the income distribution as compared to those who came from a family in the lowest quintile. If, for College X, 60% of students from families in the top 20% of the income distribution, and 50% of students from families with incomes in the bottom 20% of the income distribution, have incomes in the top 40% when they are in their mid 30s, the "high income family premium" is 10 percentage points. If we calculate this premium for the 44 institutions with available data, the mean is 6 percentage points and the median 8 percentage points. At the average institution, 51% of students from the top quintile are earning in the top 40%, and 45% of students from the bottom quintile are earning at that level. Note that these may be affected by those in careers with long training periods or those who are spending substantial time in nonmarket activities (e.g. child rearing), but it is noteworthy how small the high income family premium is on average. In fact, at 14 institutions, this value is negative, i.e. in their mid-thirties students from families in the bottom quintile are *more* likely to be in the top 40% than are students from families in the top quintile. We should therefore not overstate the potential for the assumption of equal medians by financial aid status to be invalid.

Concluding Remarks

Among the top national liberal arts colleges, there is material variation in the financial return on investment. Some of this is likely related to characteristics of the student body, such as the percent who are women and perhaps the percent majoring in STEM fields, that we would not associate with quality differences. Nevertheless, there is substantial variation unexplained by such variables – in our multivariate analysis, 30% of the variation in financial return on investment was correlated with the percent women and the percent in STEM fields – to make these results important. The clear majority of these top institutions have financial rates of return of about 2% or more *above inflation* per year, a financial return that seems at least reasonable in most circumstances.

Of course, there are returns on the investment that are not financial having to do with learning, quality of life, and the like. Nevertheless, these results should be seen as offering at least a partial answer to questions that are posed as to whether education at a small private liberal arts college is worth the cost.

ENDNOTES

[1] In one recent estimate (Carnevale, 2016), the addition to lifetime earnings from being a college as opposed to high school graduate is on the order of $1 million. Bureau of Labor Statistics data for 2017 show the median usual weekly earnings of those with a bachelor's (but no graduate) degree to be $1173 as compared to $712 for those with a high school diploma but no college (Torpey, 2018).

[2] In most cases, assumptions were chosen so as to bias downward the estimate of a financial rate of return, and this assumption is consistent with this pattern. This pattern also is consistent with the relative stagnation of real wages in the U.S. over the past two decades.

[3] This calculation is made using face value without present value discounting. As we are comparing two streams and focusing on the accumulated value at their ending, we do not consider this to be a major issue.

[4] See, for example, Chetty et al. (2017).

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