Research Dialogue | Issue no. 130
March 2017

TIAA Institute

Organic Benchmarks for University Endowments*

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Executive Summary

University endowments evaluate their performance relative to that of their peers, which are typically defined as endowments of similar size. However, if endowments subject themselves to such ad hoc performance benchmarks, they may diverge from the objectives of their universities. This divergence can introduce frictions and detract the endowment from focusing on managing assets. In this work, I study the feasibility of using organic benchmarks, that is, returns indices created using peer university characteristics, as an alternative to size-based benchmarks. I find that organic benchmarks are beneficial especially to larger universities and that considering these benchmarks versus the traditional, asset size-based ones has a positive impact on a variety of university characteristics. The weak predictive power of tracking of organic benchmarks, corroborated with some ambiguity of the predicted effects, hint, however, to the conclusion that in creating a benchmark, a "one-size-fits-all" approach does not work and that instead good organic benchmarks should be university-specific. I further document that following asset-size benchmarks while ignoring organic benchmarks is detrimental to endowment investment performance and to a set of university characteristics. In a capital appreciation horse race, $1 invested in the portfolio of endowments outperforming an organic benchmark in the past appreciates more than $1 invested in those endowments which underperformed that organic benchmark. Similarly, $1 invested in a value-weighted portfolio of endowments with low tracking errors relative to an organic benchmark outperforms $1 invested in the value-weighted portfolio of endowments with high tracking errors relative to the same organic benchmark.

*This study has benefited greatly from the comments of David Richardson, Andrea Reed, Sam Solomon, Sheridan Titman and participants of the TIAA dinner at the NACUBO 2016 Montreal meetings. I am grateful for financial support from the TIAA Institute.

1. Introduction

University endowments manage nearly 500 billion dollars with the goal of assisting universities in achieving their objectives. Because universities highlight the performance of these pools of financial assets, especially to their donors, endowments are compelled to act competitively in support of their institutions. This competition gives rise to the question of appropriate measures and a set of peers to evaluate the relative performance of a university endowment. Peer universities widely used in current practice, such as those based on the size of the endowment, are unlikely to capture all possible university objectives.

The objective of this study is to tease out the utility function of a particular university endowment. While the economics literature proposes a variety of functional forms for utility functions—the reader may consult Eeckhoudt, Gollier and Schlesinger (2005) for a comprehensive reference of using utility functions in economics—anecdotal evidence does not appear to support the existence of a mathematical formula capturing the preferences of either the typical endowment or those of its affiliated university.

Moreover, although models such as those of Merton (1993), Hansmann (1990) or Hoxby (2012) view the university and its endowment as a monolithic structure, the organizational form of many endowments is that of a private nonprofit entity that is independent of the university. The fact that the university and the endowment are separate entities makes it more difficult for their utility functions to perfectly align, as decision-makers for the endowment may have different objectives compared to those of the university. This claim is supported by Brown and Tiu's (2015) empirical observation that the rule by which endowments contribute to their respective universities changes very often—around 20% of the endowment-year data points in our panel exhibit a change in the spending rule—suggesting the possibility of a misalignment between endowment and university objectives. If such a misalignment occurs then the endowment ideally adjusts dynamically to converge to the university goal.

Recent research attempts to explain why endowments are large relative to their universities' budgets and are simultaneously risky. Gilbert and Hrdlicka (2015), make the case for the existence of a rivalrous utility function according to which the university decision-makers attempt to maximize the production of a nonpublic good. Examples of such a nonpublic good include prestige, building grandiose buildings, luxurious facilities or gaining special access to university sports events, all of which do not contribute to the production of human capital that is widely considered the university's raison d'être. If university decision-makers, for example, value being credited for increasing the value of the assets of their institution, rather than generating human capital (which takes time to develop and cannot be easily credited to the current university administrators), then they may decide to simply increase the size of the endowment.

It may therefore come as no surprise that size of the endowment is one of the primary criteria consistently used in evaluating endowment performance. For example, the annual NACUBO-Commonfund Study of Endowments, typically begins by dividing institutions studied by endowment size. Further anecdotal evidence supporting the importance of size is furnished by most investment consultants to university endowments, who routinely include peer comparisons based on size in their performance reports. The relatively new endowment management model of an outsourced chief investment officer attempts to capitalize on this tendency, claiming that it can offer economies of scale to smaller endowments and thus construct investment portfolios that emulate those of larger institutions.

Besides serving as a proxy for university prestige, endowment size as a characteristic to construct performance benchmarks is further promoted, albeit indirectly, by the literature reporting that larger endowments tend to outperform smaller endowments. For example, Lerner, Schoar and Wang (2008) report that larger endowments have better access to venture capital and other private investments, and therefore exhibit superior performance. Brown, Garlappi and Tiu (2010) find that size and performance are positively related. Larger endowments, such as those of Yale or Harvard, promote diversified asset allocation models focused on alternative assets (such as that pioneered by Swensen (2009)) and other, smaller, university endowments seek to emulate this investment strategy. From this perspective, it is understandable that university endowments in turn seek to track or to outperform indices constructed using either large endowments, or containing endowments from an "aspiring size" category.

The dangers of such an investment approach are twofold. First, universities associated with similarly large endowments may be dissimilar in their goals. For example, a small liberal arts college with a large endowment is perceptibly different from a large public university, yet their

endowments may be similar in size. Second, as Tuo (2016) argues, larger endowments owe their higher returns partly to taking more risk. Tracking a portfolio of large endowments may therefore give rise to an increase in financial risk, and in turn, arguably cause frictions when the university associated with the endowment is not prepared to accept greater endowment volatility. For example, a university whose budget relies a great deal on payouts from the endowment may find itself lacking resources if excessive risk taking lead to sharp declines in endowment value.

Dimmock (2012) argues that background risk—that is, university-specific risk—plays a role in the investment process of endowments, and this research project attempts to model Dimmock's view in the endowment investment management process. Because the utility function of a university is difficult to estimate directly, in this study I propose the construction of performance benchmarks that are based on university characteristics. This approach. helps avoid implicitly assuming endowments follow ad hoc performance indices while focusing at the same time on the particularities of their institutions. Because such indices are representative of endowments associated with universities sharing similar objectives, an endowment following these benchmarks is more likely to align itself with its university's goals.

However, in order for this approach to be viable I need to make two assumptions. The first is that although endowment objectives may temporarily diverge from those of the university, in aggregate the former tends to be close to the latter. The second is that generating the right returns is sufficient to align the endowment's objectives to those of the university. It is fair to say that neither of these assumptions is trivial. With respect to the first assumption, if the endowment management profession and the donors are in agreement that size of the endowment is more important than what the endowment contributes to the generation of human capital, then endowment and university goals may diverge in perpetuity, with the endowment preoccupied to grow rather than to propel the university ahead of its peers. Regarding the second assumption, one can easily imagine some university characteristic that is difficult to infer from endowment returns alone. For example, a university may use resources from the endowment to increase its tuition discounts while another may use the funds as capital investments in buildings, and it would be difficult or even impossible to assess how the endowment payouts are spent (and implicitly what the university objectives are) by only observing endowment returns. Another constraint to my analysis is that the data is limited to financial assets and excludes quasi-endowments.[1]

Accepting the assumptions outlined above, I sort universities based on characteristics other than endowment size. Specifically, I consider (i) tuition discounts offered by the university (excluding federal or state funds), (ii) the endowment-per-student, (iii) the degree to which the university budget relies on endowment payouts, (iv) donations, and (v) total enrollment. I first explore whether endowments differ when their organic characteristics are different. I find that endowments belonging to different organic terciles (that is, terciles constructed by sorting the endowments based on organic characteristics) have different performance and asset allocations. One particular organic benchmark, the university budget contribution, produces the most consistent and statistically significant performance and asset allocation differences between these terciles.

I then proceed to explore whether tracking, or outperforming these organic benchmarks impacts endowment performance, risk taking and university characteristics subsequently. The results of these tests are mixed: for example, outperforming the organic benchmark based on enrollment subsequently reduces donations, while merely tracking it has the opposite subsequent effect. Given these mixed results one might argue that the effect of using organic benchmarks is ambiguous. However, I also show that using size-based benchmarks has similarly ambiguous effects on subsequent endowment performance, risk taking and university characteristics. Finally, even though adhering to certain organic benchmarks is shown to have ambiguous effects on the university or its endowment, in certain cases I show that using organic benchmarks may still be beneficial to larger endowments. For example, although using benchmarks based on budget contributions does not seem to be having a positive overall effect, I show that that for larger endowments the effects of using such benchmarks on the university and the endowment are more positive.

I then explore whether universities whose endowments compare favorably to a size-based benchmark, but unfavorably to an organic benchmark, experience

1. Ehrenberg (2009) makes the point that universities own financial as well as non-financial assets.

subsequent declines in certain characteristics. I find that for a large set of characteristics considered that the data support this hypothesis. Most notably, I find that for all organic criteria considered, endowments comparing favorably to size-based benchmarks while simultaneously comparing unfavorably to organic benchmarks experience a decline in endowment-per-student, pay less to the university in proportion to their size and their universities experience lower enrollment. Finally, I document that larger endowments which track organic benchmarks experience more growth.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 outlines the methodology. Section 4 describes the results of using traditional size-based benchmarks to evaluate endowment performance. Section 5 replicates the analysis of Section 4 for organic benchmarks. Section 6 compares using organic benchmarks to using size-based benchmarks, while Section 7 studies the growth of endowments comparing favorably to organic benchmarks. Section 8 concludes.

2. Data and descriptive statistics

The primary source of information on endowment characteristics comes from the National Association of College and University Business Officers (NACUBO), an organization founded in 1962 to represent higher education institutions and affiliated foundations throughout the United States, Canada and Puerto Rico. Since 1984, NACUBO has surveyed its members[2] on a variety of topics, from the performance and organization structure of their endowments to university-specific financial characteristics such as tuition discounts provided to students. Despite the fact that endowments self-report to these surveys, the database is free of survivorship biases (see Brown, Goetzmann, Ibbotson and Ross (1992)) as it includes endowments which had reported in the past but decided to no longer participate in the survey. Additionally, the data is not backfilled, as endowments reporting in one particular year are offered the choice to complete that year's survey but not to fill in the questionnaires for any of the years they did not participate. In order to minimize problems related to interpreting and merging data compiled by different administrators of the surveys, I utilize data from the annual study as compiled by NACUBO current study partner, the Commonfund. Therefore, the annual cross-sectional data starts in 2002 and continues through 2014.

The data from the NACUBO surveys is complemented with data on university characteristics as reported in the Integrated Post-Secondary Education Data System (IPEDS), available from the National Center for Education Statistics (NCES). I merge the NACUBO and the IPEDS datasets and construct a database containing information about a total of 898 universities, spanning the 2002–2014 period. While the IPEDS database focuses on universities' characteristics, the NACUBO surveys are centered on universities' endowments, and the correspondence between the two data sources is not always one-to-one. For example, when a university is associated with multiple endowment pools[3], I must first aggregate the different pools into a single portfolio, which I link to the respective university. When an endowment portfolio is linked to several universities,[4] I associate the flagship with the endowment. In this manner, one endowment pool corresponds to exactly one university in the final dataset.

A summary of the data can be found in Panel A of Table 1. The count of survey participants increased from 526 endowments and foundations, managing around $166 billion in 2002, to 806 endowments controlling nearly $500 billion in 2014. For all but two years, the total assets controlled by the endowments in the database increased, reflecting that the combination of donations and investment returns surpassed the aggregate payouts that endowments made to their universities over the 2002–2014 timespan.

Most of the variables used in this study either come directly, or are constructed from the NACUBO database. For example, total endowments assets, one-year investment returns,

2. Throughout the years, NACUBO has partnered with a number of institutions providing services to the higher education industry in order to administer its surveys. While currently the partner organization is the Commonfund, the surveys have been administered by TIAA-CREF (1988 to 1999), Cambridge Associates (2000–2008) and by the NACUBO Investment Committee (prior to 1988).

3. One example is that of the State University of New York at Buffalo, which until 2009 had one endowment managed locally in Buffalo and another managed centrally by the SUNY system in Albany. These pools merged into a foundation entirely managed in Buffalo in 2009.

4. For example, the University of Texas Investment Management Company manages the endowments of all the University of Texas System campuses, not just those of the flagship, the University of Texas at Austin.

payout rates, number of full-time equivalent students enrolled, and whether the university is a public or a private one are taken directly from the NACUBO database. The summary statistics for these variables are reported in Panel B of Table 1 and confirm what other authors (for example, Acharya and Dimson (2007); or Brown, Garlappi and Tiu (2010)) have reported. For example, the average size of an endowment is around $409 million while the median is about $84 million, suggestive of the presence of a few large endowments in the NACUBO sample. The summary statistics on donations suggest that, on average, around 2–3% of the endowment increase is due to new additions to the portfolio (e.g., median donations of $2.57 million is around 3% of the median endowment size of $84.58 million). This in turn indicates that most of the increase in the assets managed by endowments is due, at least in the sample period examined in this study, to investment returns. Such an intuition is confirmed by the statistics on investment returns: an average return of almost 7% over the entire sample, coupled with average donations of around 2%, would suffice to cover the average endowment payout of around 5% while also preserving or increasing the real purchasing power of an endowment. To see this, consider that inflation between 2002 and 2014 was, as measure by the Consumer Price Index, 2.3% per annum. In order to calculate endowment growth, adding donations (on average, 2.2%) and investment portfolio returns (on average, 6.8%), while subtracting payouts (on average, 4.6%) produces a net growth rate of 4.4%. Taking inflation into consideration, these rough estimations put the grand average of real endowment returns at 2.1%. While these numbers are simple panel averages, they nevertheless convey a certain degree of success of the endowment model.

By contrast to endowments' net growth, the increase in enrollment in the institutions reporting to NACUBO and presented in Panel A of Table 1 is smaller, with the number of full time-equivalent students growing from 6 million 2009 to 6.2 million in 2014 (a 3.3% increase over 5 years). Similarly, the endowment tuition discount—calculated using IPEDS data as the ratio between institutional grants applied to tuition to total tuition revenue—increased only slightly, from around 27% in 2002 to almost 31% in 2014. If we assume that the endowments' role is to help universities expand their educational offer and to provide deeper discounts on the cost of higher education, the relatively successful real rate of increase in endowment size of 2.1% cannot be readily mapped to the modest increases in both student enrollment and tuition discounts offered by universities.

3. Methodology

While constructing organic benchmarks is relatively straightforward,[5] my study has four distinct objectives. The first is to assess whether the different university characteristics I consider are related to endowment performance. Second, I seek to determine whether outperforming or tracking an organic benchmark predicts superior investment performance. Third, I investigate the changes in endowment performance, asset allocation and risk taking, as well as in university characteristics, for those endowments tracking or outperforming their organic benchmarks. Fourth, since asset size benchmarks are widely used but may incentivize the endowments using them to increase risk, I investigate the changes in endowment performance, asset allocation and risk taking, as well as changes in university characteristics for those endowments which track (outperform) a size-based benchmark but simultaneously have large tracking errors (or, respectively, underperform) an organic benchmark. I begin by describing the performance and risk-taking measures for university endowments and continue with the description of the formal tests performed.

A. Endowment performance and risk-taking measures

The first measure of performance I use in this study is the one-year return collected in every NACUBO survey. In order to measure risk-adjusted performance, I first calculate the returns of the policy portfolio. The surveys report asset allocation weights of the policy portfolio, but the definition of the asset classes included in the survey varies across the years the data was collected. I use the same asset classes as Brown, Garlappi and Tiu (2010) in order to achieve uniformity over the sample period. These asset classes are, respectively, U.S. Equity, Non-U.S. Equity, Fixed Income, Real Estate, Hedge Funds, Venture Capital, Private Equity, Natural Resources, Cash, and Other.

5. In my framework, a benchmarks is a portfolio of endowments weighted either by assets under management measured in the previous year or value weighted.

In order to calculate the returns of the policy portfolio, I use representative indices for each asset class. These returns indices are: CRSP Value Weighted (for U.S. Equity), MSCI World Ex-U.S. (for Non-U.S. Equity), Barclays Global Aggregate (for Fixed Income), NCREIF (for Real Estate), HFRI Composite (for Hedge Funds), Cambridge Associates VC (for Venture Capital), Cambridge Associates PE (for Private Equity), GSCI (for Natural Resources), and 30-day U.S. Treasury (for Cash). I then calculate the returns of the policy portfolio using the asset class weights and these indices' returns. Finally, I calculate the alpha of the endowment as the difference between the return of the endowment and the return of the policy portfolio.

In order to assess the risk taken by an endowment I calculate the volatility of the policy portfolio by using the current policy weights as reported in the survey and the historical covariance matrix of all asset classes. This does not fully capture the volatility of the endowment entirely but, according to Ibbotson and Kaplan (2000), it does capture most of it.

Finally, in order to calculate endowments' Sharpe ratios, I divide the excess return of the endowment relative to the risk-free rate by the volatility of the policy portfolio.

B. University characteristics and endowment asset allocation and performance

In order to analyze whether endowment performance, asset allocation and risk taking are related to university characteristics, I begin forming terciles by separately sorting universities based on each characteristic that I consider. I then calculate the allocation to alternative assets (defined as the sum of the allocations to Hedge Funds, Private Equity and Venture Capital), the alpha and the Sharpe ratio of each endowment and demean these variables, as well as endowment returns, separately each year. These performance statistics are useful to assess whether endowments added value differently if their universities shared different characteristics (As Dimmock (2012) documents, endowments are sensitive to their universities' background risk). The allocation to alternatives is useful to capture ways in which endowments intended to increase their performance in order to compete with their peers (as evidence presented by Goetzmann and Oster (2012) indicates). I then calculate the mean of the time-demeaned variables[6] for each tercile and the t-statistics of the differences between the averages of the highest, lowest, and the medium terciles. These results are reported in the Panels A of Tables 2 through 7.

C. Conforming and outperforming endowments and future performance

In order to assess the performance of endowments tracking or outperforming an organic benchmark I form, for every year t, organic terciles based on university characteristics. I then calculate the average returns of the endowments in each tercile. For an endowment belonging to an organic tercile (as determined by a certain university characteristic), I compare that endowment's return at time t with the average return of its tercile, as well as with the returns of the other terciles. If the endowment outperforms its own tercile, I assign the value 1 to an outperforming dummy, "outperform," while otherwise the dummy will take a value of 0.

If the endowment's return is closest, of the three tercile return averages, to the average of its own tercile (in other words, if the endowment tracks the returns of its own tercile the closest), I assign a value of 1 to a "conforming" dummy; otherwise the dummy takes a value of 0 at time t. I then form equally weighted or value-weighted portfolios of outperforming endowments (i.e., those with the "outperf" dummy equal to 1 at time t) as well as of underperforming endowments. Additionally, I construct equally weighted or value-weighted portfolios of conforming endowments (i.e., those endowments for which the conforming dummy is equal to 1 at time t) as well as portfolios of non-conforming endowments (with the conforming dummy equal to 0 at time t). I then calculate the returns of the outperforming/underperforming and conforming/no-conforming endowments; I compare the returns, alphas and Sharpe ratios of these portfolios, and report the results in the Panels B of Tables 2–7.

D. Conforming and outperforming endowments and changes in endowment performance and university characteristics

The portfolio analysis presented in Section 2C above offers an incomplete picture of a university that conforms or outperforms organic benchmarks because the tests are

6. The time-demeaned variable X is defined as $[X](n, t) := X(n, t) - \mathrm{E}[X(\cdot, t)]$ for each endowment n and time t.

focused on the aggregate performance of these universities rather than on an individual institution. In order to test the predictive relationship between an endowment conforming to, or outperforming an organic benchmark, on the one hand, and subsequent changes in endowment performance or risk taking, as well as changes in university characteristics, I regress changes in endowment performance, as well as changes in university characteristics, on the conforming and, respectively, outperforming dummies. Because certain endowment or university characteristics were shown to play an important role in determining subsequent endowment performance, and are naturally related to other university characteristics, I add a variety of controls to our test. For example, larger endowments may benefit from economies of scale, may have wealthier alumni networks to tap for investment advice and opportunities, or may attract the best investment managers as these investment funds desire large institutional clients. These considerations raise the need to control for the total assets managed by an endowment. Furthermore, investment beliefs differ among public and private endowments (Ang, Ayala and Goetzmann 2014), and consequently I control for whether the endowment is associated with a public or a private institution. Finally, endowments that spend more in payouts to their institutions may have a different risk appetite and consequently a different asset allocation, and consequently I also control for the payout rates. With these considerations, I run the following two panel regressions:

$$\Delta\ \text{Characteristic}_{t+1} = a_0 + a_1\ \text{conforming}_t + a_2\ \text{conforming}_t\ \text{x}\ \log(\text{AUM}_t) + a_3 \log(\text{AUM}_t) + a_4\ \text{Payout}_t$$
$$+ a_5\ \ \text{PublicDummy} + \text{fixed effects} + \varepsilon_{t+1} \qquad (1)$$

$$\Delta\ \text{Characteristic}_{t+1} = b_0 + b_1\ \text{outperf}_t + b_2\ \text{outperf}_t\ \text{x}\ \log(\text{AUM}_t) + b_3 \log(\text{AUM}_t) + b_4\ \text{Payout}_t$$
$$+ b_5\ \ \text{PublicDummy} + \text{fixed effects} + \varepsilon_{t+1}, \qquad (2)$$

where "Characteristic" represents either a measure of endowment performance or risk taking, AUM are the total assets managed by the endowment, Payout is the percentage of the endowment's assets paid to the university and PublicDummy is a dummy equal to 1 if the endowment is affiliated with a public university, and 0 otherwise. Conforming and outperf are the dummy variables constructed in Section 2C. In each of the regressions we control for year fixed effects. The results of these regressions are reported in the Panels C of Tables 2–7.

E. Organic versus size-based benchmarks, endowment performance and university characteristics

As university endowments currently use asset size-based benchmarks, I investigate the effect of following a size-based benchmark but at the same time diverging relative to an organic benchmark. In order to do so, for each organic characteristic I consider a set of university-specific characteristics: tuition discount, endowment-per-student, endowment's contributions to the university budget, donations and total enrollment. I create a dummy variable "misperform" that is equal to 1 if the endowment outperforms its size tercile while simultaneously underperforming its organic tercile, and is 0 otherwise. I also create a dummy variable "misconform" that is equal to 1 if the endowment tracks its size tercile but at the same time does not track its organic one. In order to test the effect that the endowment following the wrong benchmark has on the university and on the endowment, I regress changes in endowment alpha and volatility, endowment payouts to the university as well as changes in the characteristics of the university (donations, tuition discount offered by the endowment, enrollment and endowment-per-student) on the "misperform" and "misconform" dummies. I control for similar variables as described in Section 2D. The results of these tests are presented in Table 8. I continue by describing the results of these tests for each of the separately considered organic characteristics.

4. Base case: size-based benchmarks

This section presents the results of my analysis for size-based benchmarks. I start by dividing endowments in size terciles and analyzing the differences in performance between the endowments in the different size terciles. All measures presented are demeaned each year. The results of these comparisons are presented in Panel A of Table 2. As apparent from the table, after demeaning allocation to alternative assets by time, the differences between the largest and the smallest size terciles is almost a staggering 20%. These differences may however be biased, as they are calculated on contemporaneous terms. For example, if the alternative assets of larger endowments outperform those held by smaller endowments, our allocation difference may be explained by the weight of alternatives increasing in larger endowments as a consequence of expected investment performance and/or illiquidity (alternatives such as hedge funds may be difficult to rebalance frequently). This potential problem underlines the need of more sophisticated tests in order to differentiate among endowments of different sizes. Nevertheless, in these simple tests, asset allocations of large endowments appear to be significantly different from those of smaller endowments.

Panel A also shows that returns of larger endowments are greater than those of smaller endowments (the annually demeaned difference between size terciles is a highly significant[7] 1.37%); furthermore, alphas of the largest endowments tercile are, on average, 1.29% significantly higher than that of the of smallest endowments tercile. However, in confirmation of Tuo (2016), Sharpe ratio differences are insignificant, and even negative. This evidence—in particular the negative differences in Sharpe ratios—is consistent with larger endowments taking more risk but having their alphas increase relatively slower than the risk increase.

These simple summary statistics suggest that endowments of different sizes have different asset allocations and performance. The static tests however provide little insight into the effectiveness of using size as a criterion for building performance evaluation benchmarks. In order to address this concern, in Panel B I report results from portfolios formed based on whether an endowment outperforms its size tercile (or tracks it) at time (t-1). The performance of these portfolios is calculated and analyzed at time t. The length of the data (from 2002 to 2014—only 13 data points) makes it difficult to observe statistical significance, but we can assess the economic significance of the differences between the portfolio of endowments conforming to (and respectively outperforming) its size benchmark and the portfolio consisting of the endowments which do not. The right side of the panel—dedicated to differences between portfolios of endowments outperforming and, respectively, underperforming their size benchmark—reflects persistence in performance. For example, the value-weighted portfolio of endowments which outperform their size terciles will, on average, generate 1.73% more in returns (of which 1.20% come from alpha), and will have a Sharpe ratio 0.08 higher than those endowments which have underperformed their size tercile in the past year. Similar results are reported for the case when equally weighted portfolios are considered. In this case, the contemporaneous return differential between the endowments outperforming in the past year and those which underperformed is only 0.79% (of which 0.46% are alpha differences). This smaller difference for the equally weighted portfolios is consistent with larger endowments generating higher returns and alphas. However, consistent with the idea that larger endowments take greater investment risk, the differences between the Sharpe ratio of the equally weighted outperforming and the equally weighted underperforming portfolios is 0.16, which is double relative to the case of value-weighted portfolio.Measuring the differences between endowments tracking their size benchmarks and those which do not yields different results depending on whether portfolios are formed by equally weighting or by value weighting. As shown on the left side of the Panel B, the value-weighted portfolio of endowments that are "conforming"—that is, track their size benchmark—generate 1.89% more in returns (of which 1.37% is alpha) than the value-weighted portfolio of non-conforming endowments. Sharpe ratios are similarly 0.10 higher for the conforming endowments. However, when portfolios are formed by equal weighting, conforming endowments, while generating higher alphas, do not also generate higher returns or higher Sharpe ratios. This seems to indicate that endowments adhering to their size tercile benchmark subsequently tend to take more risk.

7. At a confidence level higher than 0.1%.

One possible explanation is that smaller endowments, which track but do not outperform their size-based benchmark, increase risk relatively more than large endowments in the following period.

A better look at the evolution of asset allocation, risk taking and performance, as well as that of university characteristics for conforming and outperforming endowments is highlighted by the analysis presented in panels C1 and C2 of Table 2. From Panel C1, it is apparent that conforming endowments increase their volatility (the average increase is 0.70%) and that this effect is attenuated as the size of the endowment grows. This can explain the apparently contradictory results of Panel B (between the equally weighted and value-weighted portfolios). I also observe that conformity is statistically significantly related to an increase in alpha, consistent with the fact than an endowment tracking its size benchmark may focus on investment management and generate abnormal performance. However, the magnitude of this effect is declining as the size of the endowment. I also observe that this generation of abnormal performance is not achieved by increasing the allocation to alternative assets. Indeed, conformity is associated with a decline in alternative allocations, with relatively larger conforming endowments having relatively smaller decreases to their alternative allocations.

The effects of conformity from university-specific characteristics are negative (with the exception of enrollment) and statistically insignificant (with the exception of the endowment-per-student). In each case, this effect is weaker for larger funds. For example, the effect of conformity on endowments-per-student is negative (and significant). This may be in part due to the fact that the effect of conformity on enrollment is positive (i.e., a conforming endowment's university will tend to enroll more students) and that simultaneously the effect of conformity on donations is negative (conforming endowments raise less money). Overall, this may cause the endowment-per-student to decline.

By contrast, the effects of outperforming a size benchmark (presented in Panel C2) are in certain ways opposite to those of conformity benchmarks. In particular, the alpha for outperforming endowments subsequently declines (the effect is strongly statistically significant), consistent with the idea of mean reversion in abnormal returns; however this decline is relatively less severe for larger funds. Donations to outperforming endowments increase (consistent with donors being influenced by the relative performance of the endowment), and the ability to offer tuition discounts, as well as, remarkably, enrollment and the endowment-per-student all increase. However these latter increases are statistically insignificant.

It is interesting to document that one of the organic characteristics—namely, the payout to the university as a proportion of the assets— declines after the endowment successfully tracked a size benchmark or after the endowments outperformed it. One explanation is that an outperforming endowment's management may negotiate a lower payout with their institution in order to alleviate the pressure to generate consistently high returns.

In summary, I find three main conclusions from the results of the section: (i) The performance of an endowment (as measured by its alpha) is relatively stronger if the endowment tracks a size benchmark rather than attempts to outperform it; (ii) the effect on university characteristics improves when an endowment outperforms a size benchmark rather than when the endowment merely adheres or tracks it and (iii) size-based benchmarks do not appear to be useful in predicting whether endowments following or outperforming the benchmark in the past will outperform subsequently, or that the effect on university characteristics will unambiguously improve. In other words, I do not find substantial support that endowments should subject themselves to performance evaluation based solely on the size of their assets under management. The popularity of size in current performance comparison practices may be due purely to convenience rather than any evidence that size benchmarks help push the university ahead of its peers.

5. Organic benchmarks

In this section I define performance benchmarks based on university characteristics and replicate the analysis performed for size to each of these different benchmarks. The goal is to compare the usefulness of these benchmarks to improve the endowment and the university. The university characteristics considered for the construction of organic benchmarks are, respectively, tuition discounts, the endowment-per-student, budget contributions, donations and enrollment.

A. Tuition discounts

Tuition discounts are offered to students with the objective of increasing college affordability. In a 2015 study of tuition discounting, NACUBO found that the average discount of 42.5% offered by the 401 surveyed institutions. About one-third of discounts came from institutions with large endowments (defined as those having endowments larger than $1 billion). Moreover the report shows a steady increase of tuition discounting over the past decade. Since these tuition discounts are generated in a relatively large proportion by endowments, and arguably contribute to the universities' success to recruit a strong mix of students, it makes sense to consider offering larger tuition discounts as an objective of the university and of the supporting endowment. As such, it is natural to compare endowments based on their ability to offer tuition discounts.

In this section I calculate tuition discounts using the IPEDS database, by dividing total institutional grants (that is grants funded and unfunded, excluding federal and state grants) by total tuition revenue. While this measure of tuition discount is imperfect (in the sense that we cannot measure perfectly the exact portion of the discount that comes from the endowment), the numbers calculated are comparable to those in the 2015 NACUBO report. For example, our average calculated 2014 tuition discount is about 31% whereas that for the NACUBO survey is almost 40%. I note, however, that a large part of the difference between my calculation and NACUBO's is that only the former eliminated state and federal grants from the amount used in calculating the tuition discount. This method helps isolate the endowment's contribution to tuition discounts.

When I compare summary statistics of performance and allocation to alternatives (as reported in Panel A of Table 3), we observe that institutions offering larger tuition discounts allocate significantly more to alternative assets than those institutions offering smaller tuition discounts. In addition, the performance of the former is statistically significantly higher than that of the latter (annually demeaned difference is equal to 0.24%). A similar difference is observed in alphas, but the relationship between Sharpe ratios, albeit insignificant, reverses. This is consistent with those endowments which offered larger tuition discounts taking more risk than those which offer lower discounts. This risk increase may be a response to increases in tuition discounting to levels that the latest NACUBO study on the subject deemed as "not sustainable:" institutions increased their expected returns in order to meet or exceed the ever-increasing discounting offers from their peers.

The results in Panel B of Table 3 support the premise that outperforming a benchmark based on tuition discounts does a good job in predicting outperformance. While the differences are statistically insignificant, however, the total returns, alphas and Sharpe ratios of portfolios of endowments which outperformed their organic tuition discount benchmark are higher than those of a portfolio of endowments which underperformed the tuition discount benchmark. When it comes to conformity, however, it appears that larger institutions benefit more from conforming to their organic benchmark than smaller institutions. As evident from the left side of Panel B, an equal-weighted portfolio of endowments conforming to their organic tuition benchmark will in fact have lower subsequent returns, as well as lower Sharpe ratios, than a portfolio of non-conforming institutions.

The regressions in Panel C1 provide a more coherent picture of the predictability of the conforming dummy. Conforming institutions enjoy a series of positive consequences post-conformity: their alphas increase (the increase is statistically significant but it flattens as the size of the fund goes up); the volatility of the endowment declines (although the decrease is not statistically significant); and most importantly, the university tends to increase the proportion of tuition discounting. However, both donations and endowment payouts to the university also tend to decline. Overall, the endowment-per-student decreases—and this decline is statistically significant (*p*-values lower than 1%). It is interesting that an increase in tuition discounting is associated with a decline in enrollment—an observation consistent with either the university increasing its admissions standard or with the university having to increase tuition discounts because enrollment is on the decline. Finally, Panel C2, which exhibits results on the predictability of the outperforming dummy, paints a similar picture. In particular, the endowment-per-student declines after the endowment outperformed the tuition discount-based organic benchmarks.

In summary, an endowment which conformed to a tuition discount organic benchmark experiences a larger increase in alpha, a decline in volatility and has the ability to continue to increase tuition discounting when compared to other endowments. Following a tuition discount benchmark allows the endowment to focus on investments (and generate higher alphas with lower volatility). However, the endowment-per-student for endowments conforming to their tuition discount benchmarks declines—therefore, using a tuition discount organic benchmark should be accompanied by a more sustained fund raising activity.

B. Benchmarks based on endowment-per-student

I next analyze how well using endowment-per-student works as a criterion to construct organic performance benchmarks. Endowment-per-student, a stock measure, is around $86,000 and, considering the flow measure, the average payout of 4.62% from endowments in the NACUBO sample is a slightly less than $4,000 per student per year. Since these payouts are not directly made to students, endowment-per-student is not a complete substitute for tuition discounts. and therefore I can analyze the two separately.

Panel A of Table 4 presents simple comparisons of alphas, returns, Sharpe ratios and allocations to alternatives for each endowment-per-student tercile. From the panel, it is apparent that institutions with larger endowments-per-student allocate more to alternative assets and generate higher alphas, but that they also have lower Sharpe ratios relative to institutions with smaller endowments-per-student. These observations are again consistent with the idea that larger endowments (which are more likely to have larger endowments-per-student) take more risk. They are also consistent with the idea that universities which are private and have fewer students—thus likely to have larger endowments-per-student, or simply just larger endowments in absolute terms—allocate more to alternative assets.

From Panel B of Table 4, it is apparent that larger endowments conforming to or outperforming their endowment-per-student benchmark generate higher returns and higher alphas subsequently, but also take more risk, rendering their Sharpe ratios smaller than those of the institutions not-conforming/underperforming. When I construct equally weighted portfolios, however, returns and alphas of conforming or outperforming endowments are also lower than those of the non-conforming/underperforming endowments. From the perspective of results presented in the panel, endowment-per-student does not appear to be a reliable predictor of improvement in university characteristics or of endowment performance.

Panels C1 and C2 of Table 4 confirm that endowment-per-student is not the ideal criterion for an organic benchmark. In particular, for endowments successfully tracking or outperforming their endowment-per-student benchmarks, the subsequent change in endowment-per-student is negative. That may mean, for example, that outperforming endowment-per-student peers translates subsequently into a smaller increase in endowments-per-student, while at the same time increasing the volatility of portfolio returns. Furthermore, although conforming endowments see an increase in alpha, endowments which outperform experience a sharp alpha reversal (the t-stat of alpha change in Panel C2 of Table 4 is –7.84!).

C. Budget contributions

Budget contributions naturally have a great influence on how an endowment is managed. This is because universities expect more stable payouts if their annual budget relies on increasing support from endowment payouts.

From Panel A of Table 5, I observe that endowments that contribute more to their university budgets have higher allocations to alternatives, and generate higher returns, alphas and Sharpe ratios. These observations are consistent with the fact that endowments contributing more to university budgets may need to generate superior performance, on an absolute as well as risk-adjusted basis. Going forward however, Panel B documents that universities conforming to or outperforming their organic budget contribution benchmark generate lower alphas (although, higher Sharpe ratios and higher returns; except for the case of equally weighted portfolios of conforming endowments). This result may be interpreted as endowments with greater budget contributions face pressures to better manage the portfolio risk.

From Panel B of Table 5 we observe, similar to the case of endowments-per-student, that the predictive power of budget contributions is weak, and the signs of the estimated coefficients are ambiguous. Moving onto Panels C1 and C2, we observe that conformity predicts an increase in donations, while it simultaneously strongly predicts a decline in alpha, as well as decline in endowment-per-student. I note, however, that for larger endowments conformity appears to help: the interaction between conformity and total assets under management predicts bigger increases

in alpha, declines in volatility, and greater increases in both enrollment as well as endowment-per-student. The bigger increases in endowment-per-students seem to be due mostly to the higher returns achieved by larger endowments, as the interaction dummy predicts lower donations changes. This suggests that larger endowments may benefit more from maintaining a lower tracking error relative to performance benchmarks based on budget contributions than smaller endowments. Finally, from Panel C2, I observe that the effects of outperformance on university characteristics are ambiguous, while statistically insignificant.

D. Donations

In this section I study the effects of using an organic benchmark based on donations to evaluate the performance of university endowments. Brown, Dimmock and Weisbenner (2015) find that donations to endowments are highly correlated with local factors, some of which may be related to other university characteristics. Donations are also positively related to endowment performance, as donors prefer funds investing and managing their gifts efficiently. Because university characteristics are correlated with the locale of the university, donations may turn out to be a useful criterion for the construction of a performance benchmark.

From Panel A of Table 6, we observe that endowments having higher donations also have lower allocations to alternatives, lower returns, alphas and lower Sharpe ratios, although the last difference is statistically insignificant. It thus appears that endowments with greater donations have poorer investment performance. Panel B of Table 6 however illustrates some (albeit weak) predictability of conformity and outperformance relative to donations. With the exception of equally weighted conforming portfolios of endowments, it is apparent from the panel that conformity and outperformance predict subsequent outperformance.

Panels C1 and C2 of Table 6, however, provide mixed evidence of the predictable power of conformity and outperformance relative to donations. A single prediction is consistent and statistically significant: both conformity and outperformance measures predict lower endowments-per-student. One prediction of conformity is also statistically significant: conformity predicts lower changes in donations. (By contrast, outperformance predicts a higher but insignificant change in donations.)

These mixed results, along with the strong negative relationship between donations and performance, as well as between donations and allocation to alternatives, caution against the use of donations as a criterion to build performance benchmarks.

E. Enrollment

The ambiguity encountered when enrollment-based benchmarks are used to evaluate the performance of university endowments is apparent from Table 7. In Panel A of the table, no significant differences between the performances of large and small enrollment universities can be detected. The only statistically significant difference is between allocations to alternatives. In Panel B, both conformity and outperformance are statistically insignificant in predicting performance forward, and the signs are ambiguous. Panels C1 and C2 are consistent in terms of conformity and outperformance predicting lower alpha changes and lower changes in the endowment-per-student. A conforming endowment is associated with larger donation increases while an outperforming endowment is linked to lower tuition discount changes. Similarly to the case of donations, the results presented in this section cast doubt on the viability of using enrollment as a criterion to build organic benchmarks.

6. Organic benchmarks versus a size benchmark

In this section I study the impact of an endowment following a size benchmark (as is the norm in the industry) while at the same time not following a specific organic benchmark. For organic benchmarks, I will consider each of the organic criteria of the previous section, namely tuition discounts, endowment-per-person, operating budget contributions from the endowment, donations and enrollment. For each such organic benchmark, I define a dummy that is equal to 1 if the endowment either conformed, or outperformed, respectively, its size benchmark but at the same time did not conform, or underperformed, its assigned organic benchmark. I then use these new dummy variables (there are 10 of them, two for each organic characteristic) in order to study the impact of tracking/outperforming a size benchmark but not tracking/underperforming a particular organic benchmark on changes in university or endowment characteristics. The results of these predictive panel regressions are presented in Table 8.

From the Panels A1 and A2 it can be observed that conforming to (outperforming) a size-based benchmark while simultaneously not conforming to (underperforming) an organic benchmark based on tuition discounts is detrimental to almost all of the characteristics considered. For example, as apparent from Panel A1, endowments conforming to a size benchmark but not conforming to a tuition discount benchmark will subsequently experience an increase in volatility (although small), a decline in payouts to their universities, a decline in donations, a statistically significant decline in tuition discounts (although this decline is small at 0.3%), a decline in enrollment and a statistically significant decline in endowment-per-student (this decline is also economically significant at $3,823 per student). One positive aspect (although statistically and economically insignificant) seems to be the average increase in the alpha of these endowments. From Panel A2 of Table 8, moreover, it is apparent that endowments outperforming a size-based benchmark while underperforming the organic benchmark based on tuition discounts will further experience a decline in alpha, in payouts, in donations, in tuition discounts, in enrollment as well as in endowments-per-student, although these changes are statistically insignificant. They appear to be economically significant, however: for example, the decline in donations is on average equal to $139,000 while the decline in endowment-per-student is $2,698.[8]

We observe similar results in the case of conformity-to-size/nonconformity-to-organic-benchmarks for the case of endowment-per-person and enrollment being used as criteria to construct organic benchmarks. However, against the argument that conforming to size but not to an enrollment benchmark is detrimental to the endowment, it appears that endowments conforming to size benchmarks but not to enrollment-based organic benchmarks experience a statistically and economically significant increase in donations.

Several university characteristics are negatively affected in nearly all the cases in which the endowment conforms to or outperforms a size-based benchmark but at the same time does not conform to or underperforms an organic benchmark. For example, endowment-per-student declines for all the organic criteria considered except for donations.

Even when donations are used as an organic benchmark, if an endowment conforms to a size benchmark but not to a benchmark based on donations, the endowment-per-student will subsequently decline. Only when endowments outperform size-based benchmarks while underperforming donations-based benchmarks do I observe a subsequent increase in endowment-per-student. Similarly, for nearly all organic criteria considered, I document that conforming to or outperforming a size-based benchmarks while not conforming to or underperforming an organic benchmark is associated with subsequent declines in enrollment and in the payout made by the endowment to the university.

Finally, I do not find strong evidence that an endowment conforming to others of similar size but not conforming to an organic criterion experiences negative alpha (except for when the criterion is budget contribution). I do find, however, consistent evidence that after an endowment outperforms a size-based benchmark while it underperforms an organic benchmark alphas decline.

7. Growth of endowments following organic benchmarks

Endowment donors are concerned with the performance of the funds managing their donations. From this perspective, a simple test of the validity of using organic benchmarks can be offered by tracking the performance of $1 invested in a portfolio of endowments which conform to or outperform a variety of benchmarks, and comparing that with the performance of the same amount invested in endowment which do not conform to or underperform those benchmarks.

Figure 1 illustrates the results of this test. First, in all cases considered, $1 invested in the value-weighted portfolio of endowments that either conformed or outperformed benchmarks (size-based or organic) surpasses $1 invested in the value-weighted portfolio of endowments that either did not conform to or underperformed the benchmarks considered. When equal weighting is used, however, only the portfolio of endowments which outperformed their benchmark appreciates more than the portfolio of endowments which underperformed, while the equally weighted portfolio of conforming endowments grows less

8. To assess the economic significance of these differences, it is useful to recall that the panel average donation is $9.13 million while the average endowment-per-student is $86,050.

than the portfolio of non-conforming endowments. These results suggest that larger endowments benefit more from using organic benchmarks (and as the baseline case shows, they also benefit from using size-based benchmarks).

Because I establish that outperforming organic benchmarks is a better determinant of further performance than conforming to them, I analyze the difference between the growth of $1 invested in 2004 in endowments outperforming either their organic or their size-based benchmark and the growth of the same amount invested in endowments which underperformed. I use 2004 as a starting point because I have data on all the relevant variables starting only in 2005, while before that some variables information is missing. The results of this analysis are presented in Table 9.

From Table 9, I can identify which benchmark was the most successful in predicting the outperformance of a portfolio constructed based on outperforming the benchmark in the past. I find that a benchmark based on enrollment furnishes the largest such difference when a value-weighted portfolio is considered. More precisely, I find that investing $1 in 2004 in the endowments which outperformed an enrollment-based benchmark generates 11.9 cents more at the end of 2014 than if the $1 was invested in the endowments underperforming their enrollment-based benchmark.

Similarly, for an equally weighted portfolio the highest difference is achieved when a budget contribution-based benchmark is used (and the difference is 7.69 cents).

8. Conclusions

University endowments look at their size peers in order to assess whether their performance is satisfactory. However, performance indices including the endowments of other universities sharing similar characteristics can also easily be constructed, and I showed in this paper that comparing favorably to these indices predicts more growth in the endowment. I also showed that having the endowment compare favorably with an organic benchmark can be helpful to certain university characteristics. Finally, I showed that if an endowment follows a size but ignores an organic benchmark, certain university characteristics may be negatively affected.

Since university characteristics are not independent, it is difficult to identify a single organic benchmark that is superior to any other benchmarks. In practice, an endowment looking for a performance yardstick may find it in a blend of organic benchmarks and classical benchmarks such as those based on size.

References

Acharya, Shanta and Elroy Dimson, 2007, *Endowment Asset Management*, New York: Oxford University Press.

Ang, Andrew, Andres Ayala and William N. Goetzmann, 2014, Investment Beliefs of Endowments, working paper, Columbia University and Yale University.

Brown, Jeffrey R., Stephen G. Dimmock, and Scott Weisbenner, 2015, The supply to and demand for charitable donations to higher education, in *How the Financial Crisis and Great Recession Affected Higher Education* (J. Brown and C. Hoxby, eds.), Cambridge, MA; NBER. 151–174.

Brown, Keith C., Lorenzo Garlappi, and Cristian Tiu, 2010, Asset allocation and portfolio performance: Evidence from university endowment funds, *Journal of Financial Markets* 13, 268–294.

Brown, Keith C. and Cristian Tiu, 2015, The Interaction of Spending Policies, Asset Allocation Strategies, and Investment Performance at University Endowments, in *How the Financial Crisis and Great Recession Affected Higher Education* (J. Brown and C. Hoxby, eds.), Cambridge, MA; NBER.

Brown, Stephen J., William Goetzmann, Roger G. Ibbotson, and Steven A. Ross, 1992, Survivorship bias in performance studies, *Review of Financial Studies* 5, 553–580.

Dimmock, Stephen G., 2012, Background risk and university endowment funds, *Review of Economics and Statistics* 94, 789–799.

Eeckhoudt, L., C. Gollier, and H. Schlesinger, 2005, *Economic and Financial Decisions under Risk*, Princeton University Press.

Ehrenberg, Ronald G., 2009, Demystifying Endowments, TIAA-CREF Institute Research Paper.

Gilbert, Thomas and Christopher M. Hrdlicka, 2015, Why are the university endowments large and risky? *Review of Financial Studies* 28(9), 2643–2686.

Goetzmann, William N. and Sharon Oster, 2012, Competition among university endowments, working paper, National Bureau of Economic Research.

Hansmann, Henry, 1990, Why do universities have endowments? *Journal of Legal Studies* 19, 3-42.

Hoxby, Caroline M., 2012, Financial rules for universities based on their objectives and constraints, working paper, National Bureau of Economic Research.

Ibbotson, Roger G. and Paul D. Kaplan, 2000, Does asset allocation policy explain 40, 90, or 100 percent of performance?, *Financial Analysts Journal* 56, 26–33.

Jobson, J. D. and Bob M. Korkie, 1981, Performancehypothesis testing with the Sharpe and Treynor measures. *The Journal of Finance* 36(4), 889–908.

Lerner, Josh, Antoinette Schoar, and Jialan Wang, 2008, Secrets of the academy: The drivers of university endowment success, *Journal of Economic Perspectives* 22, 207–222.

Memmel, Cristoph, 2003, Performance hypothesis testing with the Sharpe ratio, *Finance Letters* 1(1).

Merton, Robert C., 1993, Optimal Investment Strategies for University Endowment Funds, in Charles T. Clotfelter and Michael Rothschild, ed., *Studies of Supply and Demand in Higher Education*, Chicago, IL: University of Chicago Press.

Swensen, David F., 2009, *Pioneering Portfolio Management: An Unconventional Approach to Institutional Investment*, New York: Free Press, second edn.

Tuo, Chen, 2016, Do the rich know better?—University endowment return inequality revisited, *American Economic Journal: Economic Policy*, March 2016.

Walda, John D., and John S. Griswold, 2015, *2014 NACUBO-Commonfund Study of Endowments,* National Association of College and University Business Officers, Washington, DC.

Tables and figures

Table 1: Summary Statistics

The table presents summary statistics of the NACUBO surveys and the IPEDS tuition discounts. Panel A presents Assets Under Management (AUM), the number of full time-equivalent students (Enrollment), the tuition discount (Tuition disc.) calculated as the ratio between institutional grants applied to tuition (reported in IPEDS) to total tuition revenue, as well as the number of universities present in the data each year from 2002 to 2014. Panel B presents summary statistics of the main variables used in this study. The variable "Alternatives" represents the sum between allocations to Hedge Funds, Venture Capital, Private Equity and Private Real Estate. "Volatility" is the volatility of the policy portfolio, assuming the historical covariance matrix of the asset class indices calculated between 2002 and 2014. "Alpha" is the return of the endowment less the returns of the policy portfolio. "Tuition disc." represents the ratio of institutional grants, other than federal or state grants, that are allocated to tuition, to the total tuition revenue from IPEDS. "AUM" is the size of the endowment. "Enrollment" is the total number of full-time equivalent students. "Payout" is the payout rate. "EndPerStudent" is the endowment per student, calculated as AUM/Enrollment. "Donations" represent the total additions to endowment other than by investment returns. N is the number of endowments responding to the survey.

Panel A: Endowments

Year	AUM ($ bil.)	Enrollment (,000)	Tuition disc.	N
2002	166.503		27.06%	526
2003	166.669		27.10%	570
2004	192.151		27.66%	597
2005	202.844		27.45%	606
2006	231.247		27.13%	636
2007	254.891		27.14%	644
2008	250.982		27.50%	750
2009	265.607	6,070	27.58%	766
2010	301.186	6,359	27.78%	749
2011	354.527	6,294	28.84%	759
2012	350.494	6,249	28.75%	764
2013	385.591	5,991	29.76%	766
2014	440.338	6,224	30.73%	806
All sample				898

Panel B: Main variables

	Mean	P25	Median	P75
Alternatives	15.42%	0.00%	11.30%	25.10%
Volatility	9.77%	8.95%	9.89%	20.75%
Return	6.82%	0.00%	10.10%	15.28%
Alpha	1.25%	-1.73%	1.54%	4.24%
Tuition disc.	24.14%	16.74%	27.79%	37.51%
AUM ($ mil.)	409.80	36.86	84.58	247.40
Enrollment	8,486	1,791	3,505	10,500
Payout	4.62%	4.00%	4.79%	5.10%
Endowment-Per-Student ($ thousand)	86.05	8.27	24.08	65.45
Donations ($ mil.)	9.13	0.88	2.57	6.98
Budget contributions	9.55%	0.81%	3.60%	10.30%

Table 2: Size benchmarks and university characteristics

This table presents endowment and university characteristics differentiated by the size of the affiliated endowment. Panel A presents average allocations to alternatives (defined as the sum of Hedge Funds, Private Equity, Private Real Estate and Venture Capital portfolio weights), returns, alphas and Sharpe ratios averages across size terciles, as well as differences between terciles. The t-statistics of differences are reported in parentheses. Variables are demeaned annually. Panel B presents differences between the mean returns, alphas and Sharpe ratios of portfolios of endowments that are formed based on conformity or outperformance criteria. In order to characterize an endowment as conforming, at time (*t-1*) I divide endowments in size terciles and calculate the returns of each respective tercile. If the returns of the endowments are the closest to its respective size tercile, I classify the endowment as conforming. Similarly, an endowment is classified as outperforming if its returns are greater to or equal than those of its respective size tercile. Based on their classification and assets under management at (*t-1*), I form endowment portfolios and measure their performance at time *t*. The test statistics reported are t-statistics for a test of differences between mean alphas and mean returns, and Jobson and Korkie (1981) test statistics with Memmel (2003) corrections for the test of Sharpe ratio differences. Panels C1 and C2 explore the changes in university characteristics and endowment performance as related to whether the endowment follows a size-based benchmark. In Panel C1, we run the following regression:

$$\Delta\ \text{Characteristic}_{t+1} = a_0 + a_1\ \text{conforming}_t + a_2\ \text{conforming}_t\text{*log}(\text{AUM}_t) + a_3\ \text{log}(\text{AUM}_t) + a_4\ \text{Payout}_t + a_5\ \text{PublicDummy} + \varepsilon_{t+1},$$

where "Characteristic" is a university or endowment characteristic and the symbol Δ represents the change in that characteristic over the period from *t* to (*t+1*).).

In panel C2, we run the following panel regression:

$$\Delta\ \text{Characteristic}_{t+1} = b_0 + b_1\ \text{outperf}_t + b_2\ \text{outperf}_t\text{*log}(\text{AUM}_t) + b_3\ \text{log}(\text{AUM}_t) + b_4\ \text{Payout}_t + b_5\ \text{PublicDummy} + \varepsilon_{t+1}.$$

The characteristics considered are allocation to alternatives ("Alt"), the endowment alpha over the policy portfolio, the volatility of the policy portfolio, donations, tuition discounts offered by the endowment, enrollment and endowment per student. "conforming" is a dummy variable that is equal to one if the endowment's returns are closest to the returns of its size tercile at time *t*. "outperf" is a dummy variable equal to one if the endowment has outperformed its size benchmark.

Panel A: Endowment characteristics by size tercile

Size	Alternatives	Ret	Alpha	SR
Small	-8.86%	-0.66%	-0.66%	0.04
Medium	-2.25%	-0.14%	-0.04%	-0.06
Large	11.13%	0.71%	0.63%	0.02
Large – Small	19.99%	1.37%	1.29%	-0.02
t-stat	54.85	11.65	11.09	-0.16
Large – Medium	13.38%	0.85%	0.67%	0.08
t-stat	34.97	8.48	7.01	5.14

Panel B: Conforming vs. Non-Conforming and Outperforming vs. Underperforming endowment performance

	Conforming vs. Non-Conforming				Outperforming vs. Underperforming			
	Value-weighted		Equally weighted		Value-weighted		Equally weighted	
	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic
Returns	1.89%	0.40	-1.45%	-0.64	1.73%	0.37	0.79%	0.35
Alpha	1.37%	1.19	0.09%	0.07	1.20%	1.05	0.46%	0.34
Sharpe ratio	0.10	1.36	-0.12	-1.22	0.08	1.05	0.16	1.12

Panel C1: Changes in university and endowment characteristics for conforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
conforming	-0.022	0.205	0.007	-0.644	-5.032	-0.004	0.051	-38.669
t-stat	-0.94	11.14	1.81	-0.97	-0.66	-0.33	0.02	-2.00
conforming*aum	0.001	-0.011	-0.000	0.035	0.276	0.000	-0.009	1.982
t-stat	0.85	-11.12	-1.79	0.98	0.67	0.25	-0.05	1.92
aum	0.000	0.01	0.000	0.623	-1.148	0.004	1.293	46.480
t-stat	0.00	2.07	0.45	3.67	-0.52	1.23	0.82	4.87
Payout	-0.003	0.000	-0.000	0.877	0.134	0.000	-0.017	-0.075
t-stat	-4.90	0.85	-0.43	55.16	0.85	0.24	-0.18	-0.13
Public Dummy	0.005	0.000	0.000	-0.156	-2.263	-0.000	0.190	1.018
t-stat	1.76	0.03	0.02	-1.96	-2.08	-0.05	0.21	0.18
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	2.59%	47.22%	5.61%	28.96%	1.22%	1.12%	0.11%	3.76%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C2: Changes in university and endowment characteristics for outperforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
outperf	-0.003	-0.158	0.001	-0.396	2.658	0.010	2.555	27.672
t-stat	-0.14	-9.38	0.23	-0.62	0.35	0.79	0.86	1.53
outperf*aum	0.000	0.006	-0.000	0.023	-0.162	-0.001	-0.155	-1.449
t-stat	0.17	7.16	-0.42	0.66	-0.39	-0.80	-0.97	-1.50
aum	0.001	0.005	0	0.632	-1.643	0.004	1.492	47.925
t-stat	0.10	1.08	0.37	3.72	-0.71	1.26	0.94	5.01
Payout	-0.003	0.000	-0.000	0.877	0.144	0.000	-0.021	-0.079
t-stat	-4.88	0.06	-0.43	55.2	0.87	0.11	-0.22	-0.14
Public Dummy	0.005	-0.001	0.000	-0.157	-1.696	-0.000	0.209	1.340
t-stat	1.77	-0.54	0.04	-1.97	-1.48	-0.02	0.23	0.24
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	2.57%	51.96%	5.72%	28.97%	1.41%	1.12%	0.19%	3.70%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Table 3: Institutional tuition discounts benchmarks and university characteristics

The table presents endowment and university characteristics differentiated by the magnitude of the tuition discount offered by the endowment and its university. Panel A presents average allocations to alternatives ("Alt"; defined as the sum of Hedge Funds, Private Equity, Private Real Estate and Venture Capital portfolio weights), returns, alphas and Sharpe ratios averages across tuition discount terciles, as well as differences between terciles. The t-statistics of differences are reported in parentheses. Variables are demeaned annually. Panel B presents differences between the mean returns, alphas and Sharpe ratios of portfolios of endowments that are formed based on conformity or outperformance criteria. In order to characterize an endowment as conforming, at time (*t-1*) I divide endowments in tuition discount terciles and calculate the returns of each respective tercile. If the returns of the endowments are the closest to its respective tuition discount tercile, I classify the endowment as conforming. Similarly, an endowment is classified as outperforming if its returns are greater to or equal than those of its respective tuition discount tercile. Based on their classification and assets under management at (*t-1*), I form endowment portfolios and measure their performance at time *t*. The test statistics reported are t-statistics for a test of differences between mean alphas and mean returns, and Jobson and Korkie (1981) test statistics with Memmel (2003) corrections for the test of Sharpe ratio differences. Panels C1 and C2 explore the changes in university characteristics and endowment performance as related to whether the endowment follows a tuition discount-based benchmark. In Panel C1, we run the following regression:

$$\Delta\,\text{Characteristic}_{t+1} = a_0 + a_1\,\text{conforming}_t + a_2\,\text{conforming}_t{*}\log(\text{AUM}_t) + a_3\log(\text{AUM}_t) + a_4\,\text{Payout}_t + a_5\,\text{PublicDummy} + \varepsilon_{t+1},$$

where "Characteristic" is a university or endowment characteristic and the symbol Δ represents the change in that characteristic over the period from *t* to (*t+1*).

In panel C2, we run the following panel regression:

$$\Delta\,\text{Characteristic}_{t+1} = b_0 + b_1\,\text{outperf}_t + b_2\,\text{outperf}_t{*}\log(\text{AUM}_t) + b_3\log(\text{AUM}_t) + b_4\,\text{Payout}_t + b_5\,\text{PublicDummy} + \varepsilon_{t+1}.$$

The characteristics considered are allocations to alternatives ("Alt"), the endowment alpha over the policy portfolio, the volatility of the policy portfolio, donations, tuition discounts offered by the endowment, enrollment and endowment per student. "conforming" is a dummy variable that is equal to one if the endowment's returns are closest to the returns of its tuition discount tercile at time *t*. "outperf" is a dummy variable equal to one if the endowment has outperformed its tuition discount benchmark.

Panel A: Endowment characteristics by tuition discount tercile

	Alternatives	Ret	Alpha	SR
Small discount	-3.86%	-0.19%	-0.13%	0.09
Medium discount	1.91%	0.06%	-0.11%	-0.04
Large discount	2.22%	0.06%	0.04%	-0.04
Large – Small	6.08%	0.25%	0.17%	-0.13
t-stat	14.73	2.01	1.41	-1.27
Large – Medium	0.31%	-0.00%	0.15%	0.00
t-stat	0.73	-0.04	0.95	0.12

Panel B: Conforming vs. Non-Conforming and Outperforming vs. Underperforming endowment characteristics

	Conforming vs. Non-Conforming				Outperforming vs. Underperforming			
	Value-weighted		Equally weighted		Value-weighted		Equally weighted	
	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic
Returns	0.23%	0.05	-2.17%	-0.96	1.70%	0.36	1.18%	0.53
Alpha	-0.22%	-0.19	0.00%	0.01	1.09%	0.93	0.60%	0.44
Sharpe ratio	0.07	1.25	-0.19	-2.87	0.08	1.07	0.17	1.25

Panel C1: Changes in university and endowment characteristics for conforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
conforming	0.005	0.048	-0.003	-0.146	-6.510	0.029	-1.858	-84.329
t-stat	0.20	2.62	-0.72	-0.23	-0.84	0.56	-0.61	-4.62
conforming*aum	-0.000	-0.003	0.000	0.008	0.367	-0.001	0.10	4.688
t-stat	-0.32	-2.6	0.67	0.24	0.89	-0.53	0.61	4.79
aum	0.004	0.004	0.000	0.606	-1.932	0.015	1.282	47.500
t-stat	0.71	0.94	0.23	3.64	-0.84	1.19	0.81	5.00
Payout	-0.003	0	-0.000	0.875	0.15	0.000	-0.018	-0.124
t-stat	-4.81	0.86	-0.36	55.32	0.91	0.31	-0.19	-0.22
Public Dummy	0.005	-0.000	-0.000	-0.149	-1.68	-0.001	0.179	0.755
t-stat	1.63	-0.11	-0.08	-1.89	-1.48	-0.09	0.20	0.14
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	2.65%	46.25%	5.59%	28.97%	1.45%	0.16%	0.11%	4.37%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C2: Changes in university and endowment characteristics for outperforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
outperf	0.020	-0.165	0.003	-0.294	0.783	0.035	2.179	-36.529
t-stat	0.88	-9.42	0.72	-0.46	0.10	0.67	0.74	-2.05
outperf*aum	-0.001	0.007	0.000	0.020	-0.060	-0.002	-0.137	1.908
t-stat	-0.8	7.34	-0.87	0.57	-0.14	-0.71	-0.87	2.00
aum	0.002	0.008	0.000	0.518	-1.631	0.016	1.451	46.271
t-stat	0.4	1.94	0.31	3.35	-0.72	1.22	0.94	4.94
Payout	-0.003	0.000	0.000	0.874	0.150	0.000	-0.019	-0.028
t-stat	-4.73	-0.53	-0.39	56.25	0.91	0.28	-0.20	-0.05
Public Dummy	0.004	-0.001	-0.000	-0.132	-1.479	-0.001	0.216	0.504
t-stat	1.49	-0.66	-0.28	-1.74	-1.33	-0.11	0.24	0.09
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	2.64%	50.50%	5.45%	28.81%	1.35%	0.17%	0.19%	3.67%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Table 4: Endowment-per-student-based organic benchmarks and university characteristics

The table presents endowment and university characteristics differentiated by the size of the endowment-per-student. Panel A presents average allocations to alternatives ("Alt"; defined as the sum of Hedge Funds, Private Equity, Private Real Estate and Venture Capital portfolio weights), returns, alphas and Sharpe ratios averages across endowment-per-student terciles, as well as differences between terciles. The t-statistics of differences are reported in parentheses. Variables are demeaned annually. Panel B presents differences between the mean returns, alphas and Sharpe ratios of portfolios of endowments that are formed based on conformity or outperformance criteria. In order to characterize an endowment as conforming, at time (*t-1*) I divide endowments in endowment-per-student terciles and calculate the returns of each respective tercile. If the returns of the endowments are the closest to its respective tercile, I classify the endowment as conforming. Similarly, an endowment is classified as outperforming if its returns are greater to or equal than those of its respective endowment-per-student tercile. Based on their classification and assets under management at (*t-1*), I form endowment portfolios and measure their performance at time *t*. The test statistics reported are t-statistics for a test of differences between mean alphas and mean returns, and Jobson and Korkie (1981) test statistics with Memmel (2003) corrections for the test of Sharpe ratio differences. Panels C1 and C2 explore the changes in university characteristics and endowment performance as related to whether the endowment follows endowment-per-student-based benchmark. In Panel C1, we run the following regression:

$$\Delta\ \text{Characteristic}_{t+1} = a_0 + a_1\ \text{conforming}_t + a_2\ \text{conforming}_t\text{*log}(\text{AUM}_t) + a_3\ \log(\text{AUM}_t) + a_4\ \text{Payout}_t + a_5\ \text{PublicDummy} + \varepsilon_{t+1},$$

where "Characteristic" is a university or endowment characteristic and the symbol Δ represents the change in that characteristic over the period from *t* to (*t+1*). In panel C2, we run the following panel regression:

$$\Delta\ \text{Characteristic}_{t+1} = b_0 + b_1\ \text{outperf}_t + b_2\ \text{outperf}_t\text{*log}(\text{AUM}_t) + b_3\ \log(\text{AUM}_t) + b_4\ \text{Payout}_t + b_5\ \text{PublicDummy} + \varepsilon_{t+1}.$$

The characteristics considered are allocations to alternatives ("Alt"), the endowment alpha over the policy portfolio, the volatility of the policy portfolio, donations, tuition discounts offered by the endowment, enrollment and endowment per student. "conforming" is a dummy variable that is equal to one if the endowment's returns are closest to the returns of its endowment-per-student tercile at time *t*. "outperf" is a dummy variable equal to one if the endowment has outperformed its endowment-per-student benchmark.

Panel A: Endowment characteristics by endowment-per-student tercile

	Alternatives	Ret	Alpha	SR
Small Endowment per Student	-8.05%	0.02%	-0.46%	0.14
Medium	-0.67%	-0.25%	-0.11%	-0.10
Large Endowment per Student	9.86%	0.08%	0.59%	-0.03
Large – Small	17.91%	0.06%	1.05%	-0.17
	28.46	0.33	5.72	-1.38
Large – Medium	10.53%	0.34%	0.69%	0.06
	16.24	2.08	4.45	2.22

Panel B: Conforming vs. Non-Conforming and Outperforming vs. Underperforming endowment characteristics

	Conforming vs. Non-Conforming				Outperforming vs. Underperforming			
	Value-weighted		Equally weighted		Value-weighted		Equally weighted	
	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic
Returns	1.40%	0.32	-3.24%	-1.35	1.28%	0.30	0.99%	0.40
Alpha	1.14%	0.75	-0.15%	-0.09	1.03%	0.61	0.44%	0.25
Sharpe ratio	-0.12	-0.64	0.14	0.98	-0.33	-1.09	-0.47	-0.86

Panel C1: Changes in university and endowment characteristics for conforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
conforming	-0.022	0.063	0.001	-0.116	-0.000	-0.027	-0.374	-0.843
t-stat	-0.58	2.26	0.13	-0.21	-0.81	-1.34	-0.13	-0.03
conforming*aum	0.001	-0.003	-0.000	0.007	0.000	0.002	0.021	0.170
t-stat	0.58	-2.21	-0.12	0.23	0.79	1.53	0.14	0.12
aum	-0.012	-0.001	-0.002	0.505	0.000	0.012	1.031	41.785
t-stat	-0.60	-0.05	-0.68	1.79	1.80	1.21	0.69	3.01
Payout	-0.005	-0.000	-0.000	0.96	0.000	0.001	-0.007	0.141
t-stat	-6.55	-0.43	-1.10	77.27	1.16	1.29	-0.08	0.16
Public Dummy	0.017	0.008	-0.003	0.008	0.000	-0.003	0.854	1.777
t-stat	1.52	0.95	-1.46	0.05	2.15	-0.57	0.98	0.22
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	1.92%	29.93%	1.90%	51.69%	0.49%	1.22%	0.09%	1.99%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C2: Changes in university and endowment characteristics for outperforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
outperf	0.024	-0.193	0.002	0.593	0.000	0.002	2.779	-30.946
t-stat	0.68	-7.84	0.36	1.14	0.06	0.08	1.00	-1.20
outperf*aum	-0.001	0.008	-0.000	-0.032	0.000	-0.000	-0.168	1.632
t-stat	-0.64	6.05	-0.56	-1.15	0.00	-0.16	-1.13	1.18
aum	-0.012	0.006	-0.003	0.572	0.000	0.012	1.283	41.636
t-stat	-0.65	0.43	-0.82	2.05	1.76	1.20	0.86	3.00
Payout	-0.005	-0.001	-0.000	0.968	0.000	0.001	-0.012	0.151
t-stat	-6.72	-1.16	-1.42	78.3	1.13	1.38	-0.13	0.18
Public Dummy	0.013	0.009	-0.003	0.041	0.000	-0.003	0.881	1.195
t-stat	1.2	1.31	-1.76	0.25	1.90	-0.60	1.02	0.15
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	1.86%	37.13%	2.36%	51.84%	0.50%	0.98%	0.19%	2.00%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Table 5: Endowment contribution to university budgets and university characteristics

The table presents endowment and university characteristics differentiated by the size of the endowment budget contributions. Panel A presents average allocations to alternatives ("Alt"; defined as the sum of Hedge Funds, Private Equity, Private Real Estate and Venture Capital portfolio weights), returns, alphas and Sharpe ratios averages across budget contribution terciles, as well as differences between terciles. The t-statistics of differences are reported in parentheses. Variables are demeaned annually. Panel B presents differences between the mean returns, alphas and Sharpe ratios of portfolios of endowments that are formed based on conformity or outperformance criteria. In order to characterize an endowment as conforming, at time (*t-1*) I divide endowments in budget contribution terciles and calculate the returns of each respective tercile. If the returns of the endowments are the closest to its respective tercile, I classify the endowment as conforming. Similarly, an endowment is classified as outperforming if its returns are greater to or equal than those of its respective budget contribution tercile. Based on their classification and assets under management at (*t-1*), I form endowment portfolios and measure their performance at time *t*. The test statistics reported are t-statistics for a test of differences between mean alphas and mean returns, and Jobson and Korkie (1981) test statistics with Memmel (2003) corrections for the test of Sharpe ratio differences. Panels C1 and C2 explore the changes in university characteristics and endowment performance as related to whether the endowment follows a budget contribution-based benchmark. In Panel C1, we run the following regression:

$$\Delta\,\text{Characteristic}_{t+1} = a_0 + a_1\,\text{conforming}_t + a_2\,\text{conforming}_t{*}\log(\text{AUM}_t) + a_3\log(\text{AUM}_t) + a_4\,\text{Payout}_t + a_5\,\text{PublicDummy} + \varepsilon_{t+1},$$

where "Characteristic" is a university or endowment characteristic and the symbol Δ represents the change in that characteristic over the period from *t* to (*t+1*). In panel C2, we run the following panel regression:

$$\Delta\,\text{Characteristic}_{t+1} = b_0 + b_1\,\text{outperf}_t + b_2\,\text{outperf}_t{*}\log(\text{AUM}_t) + b_3\log(\text{AUM}_t) + b_4\,\text{Payout}_t + b_5\,\text{PublicDummy} + \varepsilon_{t+1}.$$

The characteristics considered are allocations to alternatives ("Alt"), the endowment alpha over the policy portfolio, the volatility of the policy portfolio, donations, tuition discounts offered by the endowment, enrollment and endowment per student. "conforming" is a dummy variable that is equal to one if the endowment's returns are closest to the returns of its endowment-per-student tercile at time *t*. "outperf" is a dummy variable equal to one if the endowment has outperformed its budget contribution benchmark.

Panel A: Endowment characteristics by budget contribution tercile

	Alternatives	Ret	Alpha	SR
Small budget contribution	-5.85%	0.14%	-31.04%	-0.05
Medium	1.46%	-0.03%	-9.01%	-0.01
Large budget contribution	8.42%	0.46%	-14.78%	0.01
Large – Small	14.28%	0.32%	16.26%	0.07
t-stat	25.36	2.12	1.67	2.38
Large – Medium	6.96%	0.49%	-5.77%	0.03
t-stat	11.84	3.47	-0.66	0.44

Panel B: Conforming vs. Non-Conforming and Outperforming vs. Underperforming endowment characteristics

	Conforming vs. Non-Conforming				Outperforming vs. Underperforming			
	Value-weighted		Equally weighted		Value-weighted		Equally weighted	
	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic
Returns	0.55%	0.10	-2.24%	-0.81	2.07%	0.37	1.80%	0.65
Alpha	-0.09%	-0.02	0.01%	0.00	-0.53%	-0.10	-0.59%	-0.12
Sharpe ratio	0.01	0.31	-0.22	-2.97	0.10	1.41	0.19	1.20

Panel C1: Changes in university and endowment characteristics for conforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
conforming	1.379	-6.497	0.008	-0.316	14.685	-0.008	-0.740	-117.35
t-stat	0.44	-3.75	1.44	-0.43	2.29	-0.61	-0.21	-5.72
conforming*aum	-0.086	0.342	-0.000	0.010	-0.791	0.000	0.042	6.406
t-stat	-0.51	3.72	-1.38	0.25	-2.31	0.61	0.23	5.86
aum	-0.085	0.175	0.001	0.811	1.283	0.003	1.175	49.741
t-stat	-0.08	0.31	0.48	3.16	0.64	0.63	0.68	4.83
Payout	-0.546	-0.016	-0.000	1.021	0.150	0.001	-0.021	0.088
t-stat	-7.62	-0.41	-1.05	60.24	1.10	1.83	-0.18	0.12
Public Dummy	0.606	0.328	-0.000	0.003	-1.163	0.000	0.217	2.026
t-stat	1.06	1.06	-0.27	0.02	-1.00	0.02	0.20	0.32
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	3.53%	76.47%	4.58%	41.56%	1.42%	1.20%	0.11%	4.81%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C2: Changes in university and endowment characteristics for outperforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
outperf	-0.595	2.655	0.003	-0.356	4.331	0.004	2.799	-28.789
t-stat	-0.19	1.59	0.49	-0.51	0.60	0.27	0.86	-1.45
outperf*aum	0.034	-0.049	-0.000	0.020	-0.258	-0.000	-0.172	1.472
t-stat	0.21	-0.55	-0.74	0.54	-0.67	-0.34	-0.98	1.39
aum	-0.115	-0.411	0.002	0.801	-1.030	0.006	1.465	48.820
t-stat	-0.12	-0.81	1.00	3.59	-0.45	1.30	0.88	4.86
Payout	-0.474	0.016	-0.000	0.974	0.150	0.000	-0.021	-0.039
t-stat	-6.91	0.44	-1.56	61.05	1.01	1.04	-0.21	-0.06
Public Dummy	0.446	0.366	-0.000	-0.100	-0.866	-0.000	0.214	0.668
t-stat	0.95	1.49	-0.53	-0.94	-0.70	-0.07	0.21	0.11
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	3.21%	77.78%	4.78%	39.95%	1.68%	1.10%	0.21%	3.77%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Table 6: Donations organic benchmarks and university characteristics

The table presents endowment and university characteristics differentiated by the size of donations. Panel A presents average allocations to alternatives ("Alt"; defined as the sum of Hedge Funds, Private Equity, Private Real Estate and Venture Capital portfolio weights), returns, alphas and Sharpe ratios averages across donation terciles, as well as differences between terciles. The t-statistics of differences are reported in parentheses. Variables are demeaned annually. Panel B presents differences between the mean returns, alphas and Sharpe ratios of portfolios of endowments that are formed based on conformity or outperformance criteria. In order to characterize an endowment as conforming, at time (*t-1*) I divide endowments in donations terciles and calculate the returns of each respective tercile. If the returns of the endowments are the closest to its respective tercile, I classify the endowment as conforming. Similarly, an endowment is classified as outperforming if its returns are greater to or equal than those of its respective donations tercile. Based on their classification and assets under management at (*t-1*), I form endowment portfolios and measure their performance at time *t*. The test statistics reported are t-statistics for a test of differences between mean alphas and mean returns, and Jobson and Korkie (1981) test statistics with Memmel (2003) corrections for the test of Sharpe ratio differences. Panels C1 and C2 explore the changes in university characteristics and endowment performance as related to whether the endowment follows a donations -based benchmark. In Panel C1, we run the following regression:

$$\Delta\ \text{Characteristic}_{t+1} = a_0 + a_1\ \text{conforming}_t + a_2\ \text{conforming}_t\text{*log}(\text{AUM}_t) + a_3\ \text{log}(\text{AUM}_t) + a_4\ \text{Payout}_t + a_5\ \text{PublicDummy} + \varepsilon_{t+1},$$

where "Characteristic" is a university or endowment characteristic and the symbol Δ represents the change in that characteristic over the period from *t* to (*t+1*). In panel C2, we run the following panel regression:

$$\Delta\ \text{Characteristic}_{t+1} = b_0 + b_1\ \text{outperf}_t + b_2\ \text{outperf}_t\text{*log}(\text{AUM}_t) + b_3\ \text{log}(\text{AUM}_t) + b_4\ \text{Payout}_t + b_5\ \text{PublicDummy} + \varepsilon_{t+1}.$$

The characteristics considered are allocations to alternatives ("Alt"), the endowment alpha over the policy portfolio, the volatility of the policy portfolio, donations, tuition discounts offered by the endowment, enrollment and endowment per student. "conforming" is a dummy variable that is equal to one if the endowment's returns are closest to the returns of its donations tercile at time *t*. "outperf" is a dummy variable equal to one if the endowment has outperformed its budget contribution benchmark.

Panel A: Endowment characteristics by budget contribution tercile

	Alternatives	Ret	Alpha	SR
Small donations	2.89%	0.36%	0.22%	0.02
Medium	2.09%	0.19%	0.15%	0.03
Large donations	-1.33%	0.06%	-0.01%	-0.01
Large – Small	-4.21%	-0.30%	-0.23%	-0.03
t-stat	-7.54	-2.07	-1.66	-0.48
Large – Medium	-3.42%	-0.13%	-0.16%	-0.04
t-stat	-6.18	-0.97	-1.21	-0.43

Panel B: Conforming vs. Non-Conforming and Outperforming vs. Underperforming endowment characteristics

	Conforming vs. Non-Conforming				Outperforming vs. Underperforming			
	Value-weighted		Equally weighted		Value-weighted		Equally weighted	
	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic
Returns	0.82%	0.16	-2.12%	-0.83	1.77%	0.34	1.75%	0.69
Alpha	0.53%	0.51	-0.18%	-0.14	1.11%	1.03	0.46%	0.37
Sharpe ratio	0.10	1.59	-0.15	-2.04	0.11	1.54	0.16	1.02

Panel C1: Changes in university and endowment characteristics for conforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
conforming	0.012	0.014	0.005	0.081	0	-0.008	3.832	-55.607
t-stat	0.38	0.61	0.97	0.12	-5.18	-0.51	1.11	-2.77
conforming*aum	-0.001	-0.001	-0.000	-0.005	0.000	0.000	-0.227	2.995
t-stat	-0.41	-0.71	-1.15	-0.14	4.82	0.43	-1.23	2.77
aum	-0.001	0.002	-0.000	0.676	-0.000	0.004	0.440	54.333
t-stat	-0.14	0.33	-0.15	3.01	-3.77	0.74	0.25	5.29
Payout	-0.005	0.000	0.000	1.012	0.000	0.000	-0.033	-0.058
t-stat	-6.66	0.42	-1.25	62.12	1.37	1.22	-0.32	-0.09
Public Dummy	0.008	0.001	0.000	-0.069	-0.000	-0.003	0.164	1.384
t-stat	1.69	0.45	0.11	-0.68	-0.52	-1.31	0.17	0.24
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	2.98%	42.11%	4.90%	41.70%	2.10%	1.39%	0.29%	3.47%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C2: Changes in university and endowment characteristics for outperforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
outperf	0.008	-0.170	-0.001	-0.211	0	0.009	3.366	-35.552
t-stat	0.28	-8.26	-0.14	-0.31	0.53	0.60	1.03	-1.83
outperf*aum	-0.001	0.007	-0.000	0.016	-0.000	-0.001	-0.203	1.809
t-stat	-0.31	6.5	-0.05	0.44	-0.63	-0.64	-1.16	1.74
aum	0.001	0.008	0.000	0.417	-0.000	0.008	0.709	53.686
t-stat	0.15	1.43	0.21	2.21	-3.02	1.90	0.42	5.31
Payout	-0.004	-0.001	-0.000	0.940	0.000	0.000	-0.036	-0.051
t-stat	-6.42	-1.35	-1.49	61.78	1.56	0.80	-0.36	-0.09
Public Dummy	0.008	0.002	-0.000	-0.087	-0.000	-0.002	0.194	0.654
t-stat	2.02	0.88	-0.10	-0.99	-0.59	-1.03	0.21	0.12
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	2.99%	48.65%	5.15%	39.00%	1.09%	1.26%	0.28%	3.63%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Table 7: Enrollment organic benchmarks and university characteristics

The table presents endowment and university characteristics differentiated by enrollment. Panel A presents average allocations to alternatives ("Alt"; defined as the sum of Hedge Funds, Private Equity, Private Real Estate and Venture Capital portfolio weights), returns, alphas and Sharpe ratios averages across enrollment terciles, as well as differences between terciles. The t-statistics of differences are reported in parentheses. Variables are demeaned annually. Panel B presents differences between the mean returns, alphas and Sharpe ratios of portfolios of endowments that are formed based on conformity or outperformance criteria. In order to characterize an endowment as conforming, at time (*t-1*) I divide endowments in university enrollment terciles and calculate the returns of each respective tercile. If the returns of the endowments are the closest to its respective tercile, I classify the endowment as conforming. Similarly, an endowment is classified as outperforming if its returns are greater to or equal than those of its respective enrollment tercile. Based on their classification and assets under management at (*t-1*), I form endowment portfolios and measure their performance at time *t*. The test statistics reported are t-statistics for a test of differences between mean alphas and mean returns, and Jobson and Korkie (1981) test statistics with Memmel (2003) corrections for the test of Sharpe ratio differences. Panels C1 and C2 explore the changes in university characteristics and endowment performance as related to whether the endowment follows an enrollment-based benchmark. In Panel C1, we run the following regression:

$$\Delta\,\text{Characteristic}_{t+1} = a_0 + a_1\,\text{conforming}_t + a_2\,\text{conforming}_t{*}\log(\text{AUM}_t) + a_3\log(\text{AUM}_t) + a_4\,\text{Payout}_t + a_5\,\text{PublicDummy} + \varepsilon_{t+1},$$

where "Characteristic" is a university or endowment characteristic and the symbol Δ represents the change in that characteristic over the period from *t* to (*t+1*). In panel C2, we run the following panel regression:

$$\Delta\,\text{Characteristic}_{t+1} = b_0 + b_1\,\text{outperf}_t + b_2\,\text{outperf}_t{*}\log(\text{AUM}_t) + b_3\log(\text{AUM}_t) + b_4\,\text{Payout}_t + b_5\,\text{PublicDummy} + \varepsilon_{t+1}.$$

The characteristics considered are allocations to alternatives ("Alt"), the endowment alpha over the policy portfolio, the volatility of the policy portfolio, donations, tuition discounts offered by the endowment, enrollment and endowment per student. "conforming" is a dummy variable that is equal to one if the endowment's returns are closest to the returns of its enrollment tercile at time *t*. "outperf" is a dummy variable equal to one if the endowment has outperformed its enrollment-based benchmark.

Panel A: Endowment characteristics by enrollment tercile

	Alternatives	Ret	Alpha	SR
Low enrollment	-1.62%	-0.04%	0.02%	-0.14
Med	-0.35%	0.01%	-0.02%	-0.12
High enrollment	3.09%	-0.11%	0.05%	0.10
High – Low	4.71%	-0.07%	0.03%	0.24
t-stat	6.79	-0.37	0.15	0.75
High – Med	3.44%	-0.11%	0.06%	0.02
t-stat	4.88	-0.67	0.39	0.34

Panel B: Conforming vs. Non-Conforming and Outperforming vs. Underperforming endowment characteristics

	Conforming vs. Non-Conforming				Outperforming vs. Underperforming			
	Value-weighted		Equally weighted		Value-weighted		Equally weighted	
	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic	Yes – No	Statistic
Returns	-0.03%	-0.01	-3.51%	-1.46	1.61%	0.38	1.08%	0.43
Alpha	0.07%	0.05	-0.16%	-0.09	1.23%	0.70	0.57%	0.32
Sharpe ratio	0.07	0.72	0.01	0.08	-0.27	-0.85	-0.48	-0.87

Panel C1: Changes in university and endowment characteristics for conforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
conforming	-0.059	-0.038	-0.000	-0.402	23.681	0.003	-1.332	-42.780
t-stat	-1.5	-1.38	-0.19	-0.71	2.90	0.13	-0.44	-2.35
conforming*aum	0.003	0.002	0.000	0.018	-1.320	0.000	0.084	2.232
t-stat	1.56	1.17	0.18	0.60	-3.02	-0.19	0.52	2.3
aum	-0.01	-0.000	-0.000	0.547	6.905	0.014	1.228	47.863
t-stat	-0.47	-0.01	-0.30	1.84	1.67	1.41	0.78	5.02
Payout	-0.005	-0.000	-0.000	0.958	0.099	0.001	-0.019	-0.056
t-stat	-6.36	-0.29	-1.06	76.14	0.63	1.33	-0.20	-0.10
Public Dummy	0.012	0.004	-0.000	0.102	2.359	-0.004	0.176	0.621
t-stat	1.04	0.52	-1.60	0.59	1.04	-0.71	0.19	0.11
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	2.02%	31.21%	1.73%	52.64%	0.64%	1.02%	0.14%	3.79%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C2: Changes in university and endowment characteristics for outperforming endowments

	Changes in							
	Alt	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
outperf	-0.018	-0.181	-0.000	0.485	-23.759	0.008	2.316	-36.452
t-stat	-0.46	-6.88	-0.11	0.86	-3.00	0.42	0.77	-1.99
outperf*aum	0.001	0.007	0.000	-0.027	1.338	-0.001	-0.144	1.915
t-stat	0.49	5.31	-0.03	-0.89	3.14	-0.54	-0.89	1.95
aum	-0.011	-0.003	0.000	0.568	5.462	0.012	1.450	46.433
t-stat	-0.56	-0.23	-0.44	1.92	1.34	1.17	0.92	4.86
Payout	-0.005	-0.001	-0.000	0.968	0.101	0.001	-0.022	-0.051
t-stat	-6.42	-1.07	-1.29	76.95	0.65	1.23	-0.24	-0.09
Public Dummy	0.01	0.007	-0.000	0.129	1.453	-0.004	0.235	0.684
t-stat	0.82	0.89	-1.88	0.75	0.66	-0.64	0.26	0.12
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	1.87%	37.14%	2.06%	52.79%	0.69%	0.96%	0.19%	3.75%
N	838	838	838	838	711	838	810	810
T	12	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Table 8: Size versus organic benchmarks

The table presents the effects of endowments tracking a size benchmark while at the same time diverging from an organic benchmark. For each organic benchmark (based on tuition discounts, endowment-per-person, university budget contributions from the endowment, donations and enrollment), I define a non-conformity dummy variable, "nonc," that is equal to one of the university conformed to its size-based benchmarks but at the same time did not conform to its organic benchmark. For each organic benchmark I also define a non-performing dummy variable "nonperf" that is equal to one if the endowment outperformed its size benchmark but did not outperform its organic benchmark. For each organic benchmark I report results of the following panel regressions:

$$\Delta\ \text{Characteristic}_{t+1} = a_0 + a_1 * \text{nonc}_t + a_2 * \text{aum}_t + a_3 * \text{Payout}_t + a_4 * \text{PublicDummy}_t + \varepsilon_{t+1}$$
$$\Delta\ \text{Characteristic}_{t+1} = b_0 + b_1 * \text{nonperf}_t + b_2 * \text{aum}_t + b_3 * \text{Payout}_t + b_4 * \text{PublicDummy}_t + \varepsilon_{t+1},$$

where "Characteristic" represents either the alpha or the volatility of the endowment, endowment's payout, the tuition discount offered by the university, total enrollment or the endowment-per-student. Panels A1, B1, C1, D1 and E1 present the results of the regressions where one of the independent variables is the "nonc" dummy, while Panels A2, B2, C2, D2 and E2 present the results where the dependent variable is the "nonperf" dummy.

Panel A1: Size conformity, tuition discount nonconformity

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonc	0.001	0.000	-0.02	-0.504	-0.003	-0.116	-3.823
t-stat	0.68	0.98	-0.34	-0.8	-2.70	-0.40	-2.19
aum	0.003	0.000	0.644	-0.944	0.004	1.297	48.043
t-stat	0.61	0.14	3.81	-0.43	1.41	0.82	5.04
Payout	0.000	-0.000	0.876	0.130	0.000	-0.017	-0.083
t-stat	1.11	-0.36	55.15	0.83	0.20	-0.18	-0.14
Public Dummy	-0.000	0.000	-0.155	-2.263	-0.000	0.185	0.886
t-stat	-0.09	0.01	-1.95	-2.08	-0.07	0.20	0.16
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	46.38%	5.56%	28.96%	1.22%	1.22%	0.11%	3.77%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel A2: Size outperformance and tuition discount underperformance

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonperf	-0.004	0.000	-0.071	0.139	-0.002	-0.025	-2.698
t-stat	-1.42	-0.16	-0.62	0.10	-1.13	-0.04	-0.66
aum	0.002	0.000	0.644	-1.837	0.004	1.283	47.589
t-stat	0.51	0.13	3.82	-0.80	1.24	0.81	4.99
Payout	0.000	-0.000	0.876	0.148	0.000	-0.016	-0.049
t-stat	0.98	-0.33	55.22	0.90	0.12	-0.17	-0.08
Public Dummy	-0.000	0.000	-0.157	-1.699	-0.000	0.188	0.925
t-stat	-0.10	0.05	-1.97	-1.48	-0.04	0.21	0.17
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	46.37%	5.63%	28.97%	1.40%	1.14%	0.10%	3.64%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel B1: Size conformity and endowment-per-person nonconformity

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonc	-0.004	-0.000	-0.053	0.000	-0.007	-0.143	-4.669
t-stat	-1.12	-0.32	-0.81	0.41	-3.05	-0.42	-2.25
aum	-0.000	-0.001	0.530	0.000	0.014	1.277	47.392
t-stat	-0.02	-0.31	1.78	1.91	1.36	0.81	4.97
Payout	-0.000	-0.000	0.958	0.000	0.001	-0.017	-0.08
t-stat	-0.29	-1.06	76.1	1.08	1.28	-0.18	-0.14
Public Dummy	0.005	-0.003	0.108	0.000	-0.004	0.192	1.124
t-stat	0.55	-1.59	0.63	2.10	-0.72	0.21	0.20
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	31.16%	1.74%	52.64%	0.44%	1.27%	0.11%	3.78%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel B2: Size outperformance and endowment-per-student underperformance

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonperf	-0.006	0.002	-0.074	-0.000	0.006	-0.038	-4.028
t-stat	-0.84	1.09	-0.47	-1.49	1.05	-0.05	-0.81
aum	-0.001	-0.002	0.543	0.000	0.012	1.282	47.45
t-stat	-0.08	-0.51	1.84	1.93	1.16	0.81	4.97
Payout	-0.000	-0.000	0.967	0.000	0.001	-0.016	-0.049
t-stat	-0.19	-1.34	76.97	1.02	1.40	-0.17	-0.08
Public Dummy	0.007	-0.003	0.122	0.000	-0.003	0.189	0.973
t-stat	0.85	-1.81	0.72	1.95	-0.59	0.21	0.18
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	30.96%	2.02%	52.81%	0.54%	0.98%	0.10%	3.65%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C1: Size conformity and budget contribution non-conformity

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonc	-0.023	0.000	0.034	0.293	0.001	-0.242	-5.32
t-stat	-0.15	0.40	0.50	0.52	0.95	-0.74	-2.71
aum	0.328	0.001	0.842	0.872	0.003	1.218	51.423
t-stat	0.58	0.32	3.29	0.43	0.70	0.71	4.96
Payout	-0.017	-0.000	1.022	0.148	0.001	-0.021	0.065
t-stat	-0.43	-1.03	60.15	1.09	1.83	-0.17	0.09
Public Dummy	0.282	-0.000	0.010	-1.146	0.000	0.221	1.678
t-stat	0.90	-0.24	0.07	-0.98	0.04	0.21	0.26
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	76.40%	4.50%	41.51%	1.25%	1.21%	0.12%	3.92%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel C2: Size outperformance and budget contribution underperformance

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonperf	-0.546	0.001	-0.031	-0.045	0.004	-0.067	-1.717
t-stat	-1.94	1.48	-0.26	-0.04	1.51	-0.09	-0.37
aum	-0.042	0.001	0.818	-1.387	0.006	1.246	49.338
t-stat	-0.08	0.75	3.69	-0.61	1.27	0.75	4.93
Payout	-0.001	-0.000	0.974	0.156	0.000	-0.015	-0.022
t-stat	-0.03	-1.47	61.03	1.05	1.04	-0.15	-0.04
Public Dummy	0.290	-0.000	-0.097	-0.859	-0.000	0.190	1.216
t-stat	1.14	-0.52	-0.91	-0.69	-0.10	0.19	0.20
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	77.52%	4.61%	39.96%	1.61%	1.14%	0.10%	3.69%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel D1: Size conformity and donations nonconformity

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonc	0.000	0.001	0.002	0.000	0.000	0.456	-0.562
t-stat	0.16	2.15	0.03	1.32	-0.23	1.47	-0.31
aum	0.002	-0.000	0.673	-0.000	0.004	0.409	55.417
t-stat	0.26	-0.27	3.00	-3.21	0.79	0.23	5.39
Payout	0.000	-0.000	1.012	0.000	0.000	-0.028	-0.035
t-stat	0.46	-1.14	62.17	1.64	1.26	-0.26	-0.06
Public Dummy	0.001	0.000	-0.070	-0.000	-0.003	0.176	1.215
t-stat	0.41	0.04	-0.69	-0.61	-1.33	0.18	0.21
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	42.10%	4.87%	41.71%	1.07%	1.37%	0.25%	3.23%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel D2: Size outperformance and donations underperformance

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonperf	0.001	0.000	-0.090	0.000	0.002	-0.018	0.546
t-stat	0.18	0.56	-0.82	0.41	0.91	-0.03	0.14
aum	0.005	0	0.442	0.000	0.008	0.418	54.568
t-stat	0.79	0.06	2.36	-3.20	1.82	0.25	5.42
Payout	-0.000	-0.000	0.939	0.000	0.000	-0.029	-0.024
t-stat	-0.11	-1.37	61.76	1.61	0.81	-0.29	-0.04
Public Dummy	0.003	-0.000	-0.084	-0.000	-0.002	0.136	1.06
t-stat	0.98	-0.10	-0.96	-0.62	-1.05	0.14	0.19
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	43.46%	5.04%	38.98%	1.04%	1.26%	0.16%	3.49%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel E1: Size conformity and enrollment nonconformity

	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonc	0.005	0.000	-0.067	1.644	-0.004	-0.437	-0.388
t-stat	2.06	-0.07	-1.23	2.25	-2.23	-1.52	-0.22
aum	-0.001	-0.000	0.532	6.647	0.014	1.275	47.569
t-stat	-0.08	-0.31	1.79	1.61	1.38	0.81	4.99
Payout	0.000	0.000	0.958	0.101	0.001	-0.019	-0.054
t-stat	-0.23	-1.06	76.12	0.65	1.30	-0.20	-0.09
Public Dummy	0.005	-0.000	0.102	2.109	-0.005	0.158	1.012
t-stat	0.63	-1.59	0.60	0.93	-0.78	0.17	0.18
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	31.15%	1.73%	52.65%	0.45%	1.14%	0.17%	3.63%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Panel E2: Size outperformance and enrollment underperformance							
	Changes in						
	Alpha	Volatility	Payout	Donations ($ mil.)	Tuition disc.	Enrollment (,000)	EndPerStu ($,000)
nonperf	-0.016	-0.000	-0.002	0.093	0.007	-0.029	-4.018
t-stat	-2.43	-0.38	-0.01	0.06	1.58	-0.04	-0.95
aum	0.001	-0.000	0.547	6.680	0.010	1.286	47.973
t-stat	0.06	-0.47	1.85	1.64	1.04	0.81	5.03
Payout	0.000	0.000	0.968	0.092	0.001	-0.016	-0.036
t-stat	-0.25	-1.22	76.99	0.59	1.25	-0.17	-0.06
Public Dummy	0.007	-0.000	0.122	1.777	-0.004	0.189	0.95
t-stat	0.82	-1.90	0.72	0.80	-0.65	0.21	0.17
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	30.82%	1.98%	52.80%	0.29%	0.96%	0.10%	3.66%
N	838	838	838	711	838	810	810
T	12	12	12	11	12	5	5
Obs.	7,334	7,334	7,334	4,420	7,334	3,360	3,360

Table 9: Growth of outperforming endowments

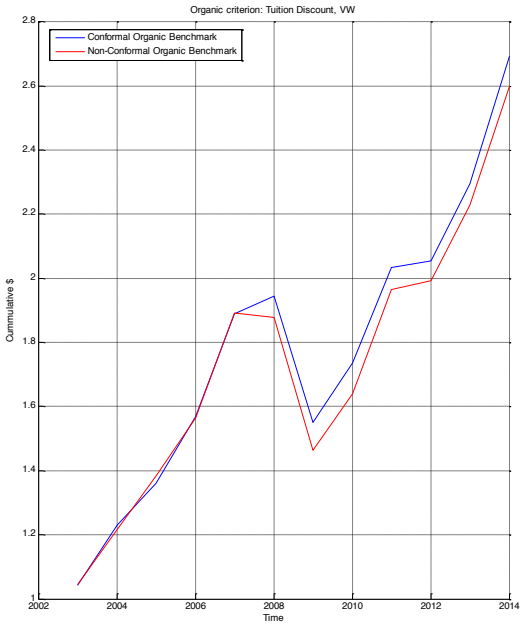
The table presents the difference between growth of $1 invested in 2004 in portfolios of endowments outperforming organic or sized-based benchmarks, and $1 invested in the portfolio of endowments underperforming the respective benchmark. Both value-weighted and equally weighted portfolios are considered.

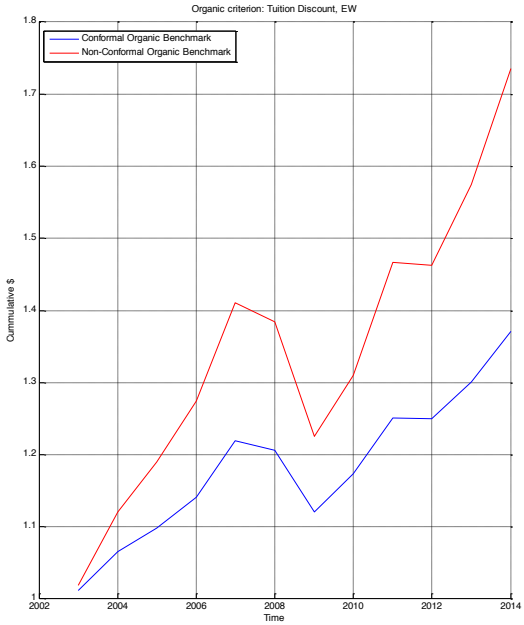
	Value-Weighted	Equally Weighted
Tuition discount	0.1013	0.0513
Endowment-per-student	0.0930	0.0583
Budget Contribution	0.1050	0.0769
Donations	0.0433	0.0656
Enrollment	0.1190	0.0637
Size	0.0997	0.0171

Figure 1: Organic benchmarks and endowment growth

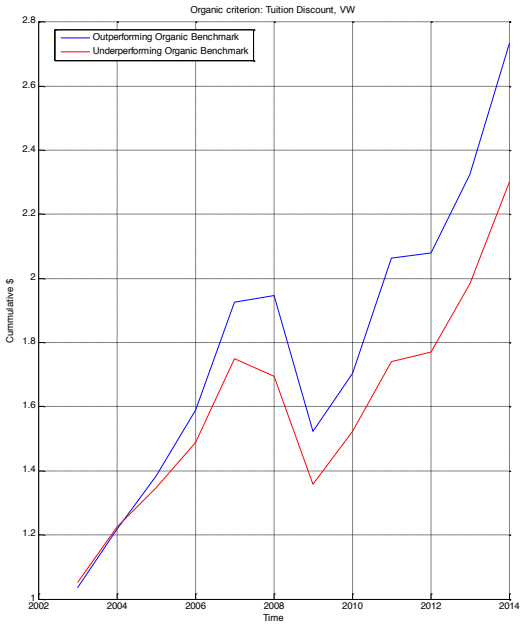
The figure presents the growth of $1 invested in a portfolio of endowment that conforms to (outperforms) a benchmark built either on an organic criterion (Panels A to E) or size (Panels F), versus the growth of $1 invested in a portfolio of endowments which does not conform to (underperforms) similarly constructed benchmarks. Each panel presents results for equally weighted, as well as for value weighted, portfolios.

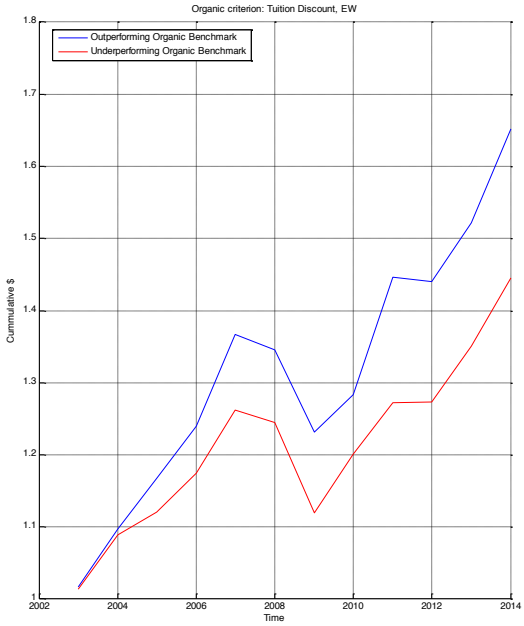
Panel A1: Conforming to tuition discounts



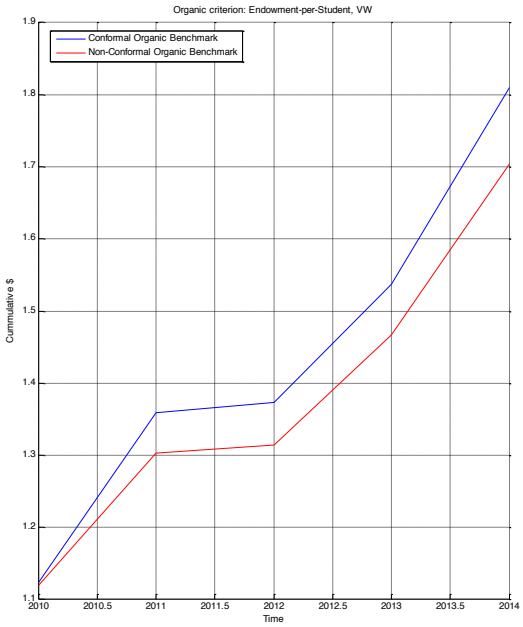


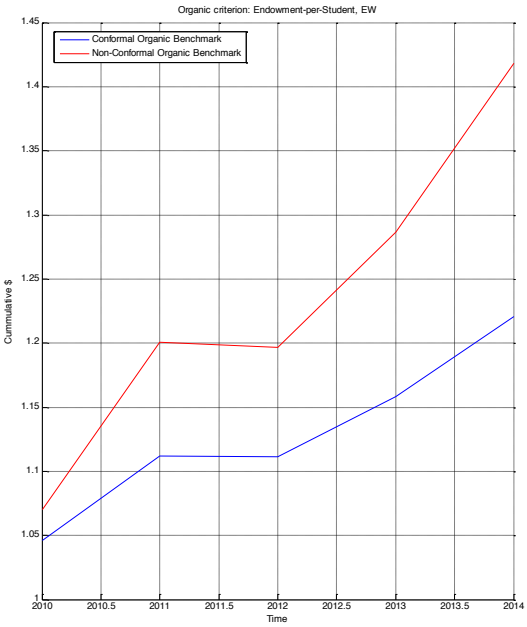
Panel A2: Outperforming tuition discount benchmark



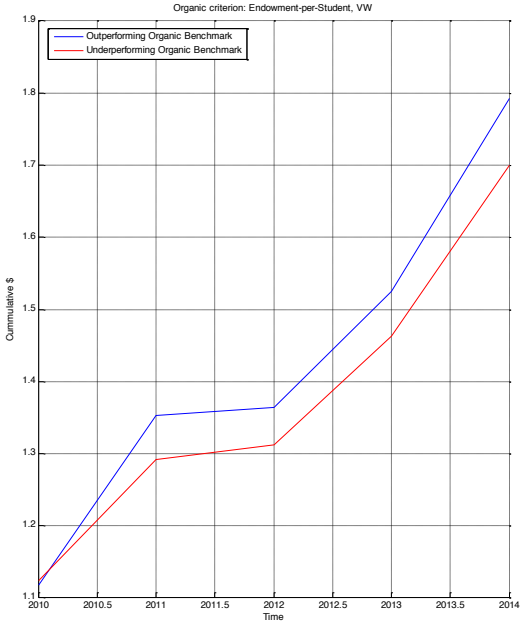


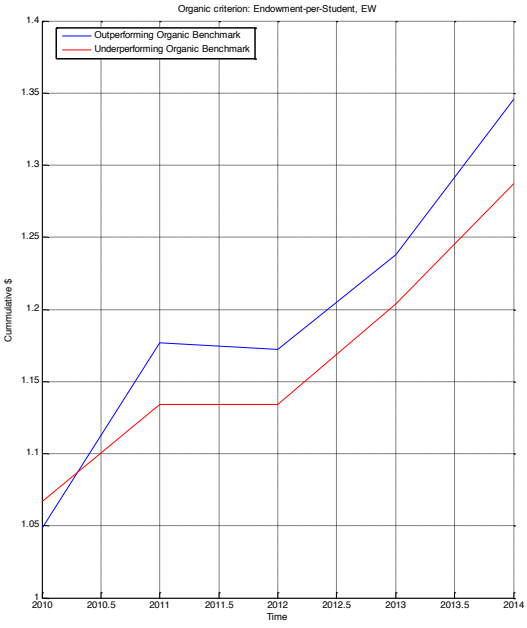
Panel B1: Conforming to endowment-per-student



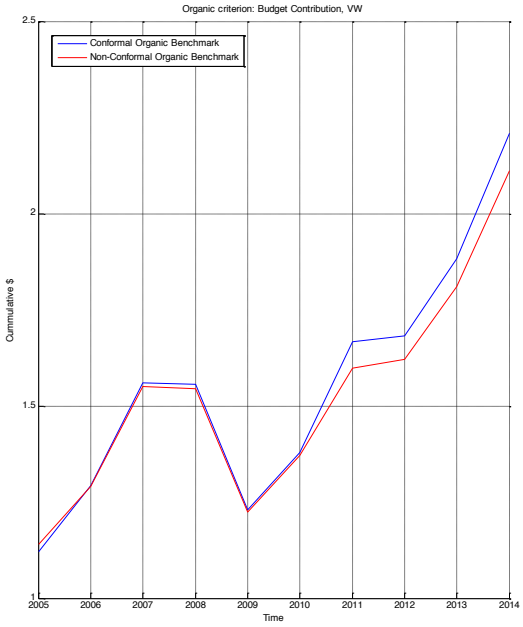


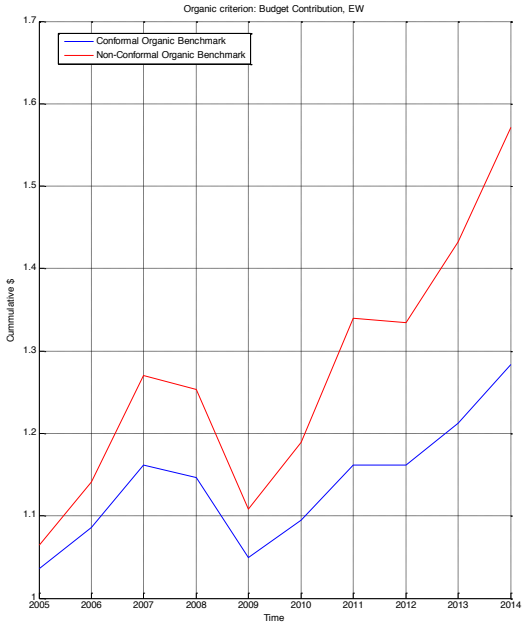
Panel B2: Outperforming endowment-per-student benchmarks



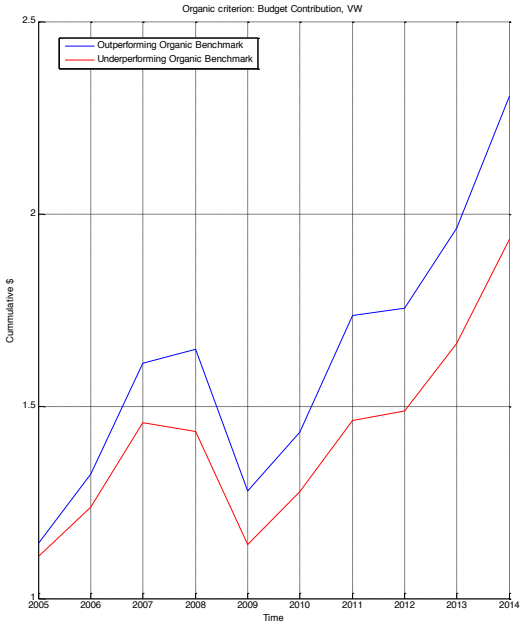


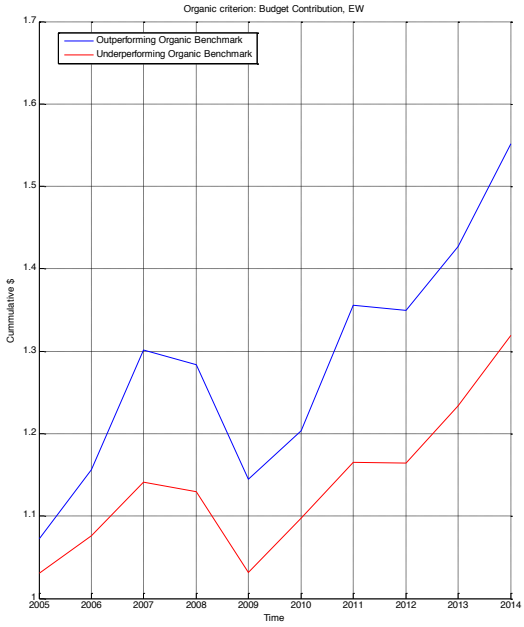
Panel C1: Conforming to budget contributions



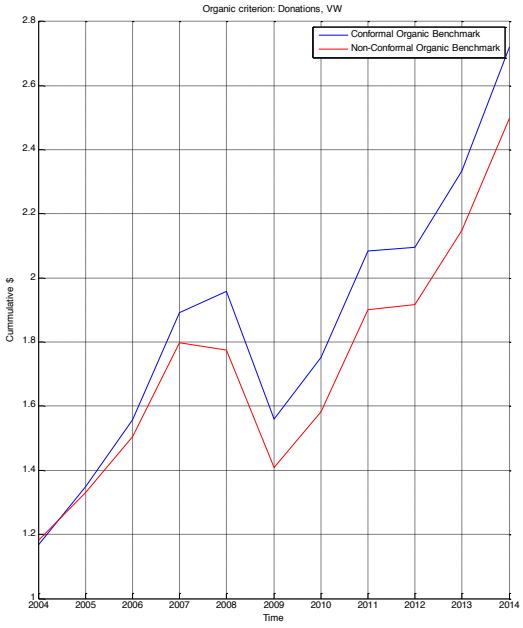


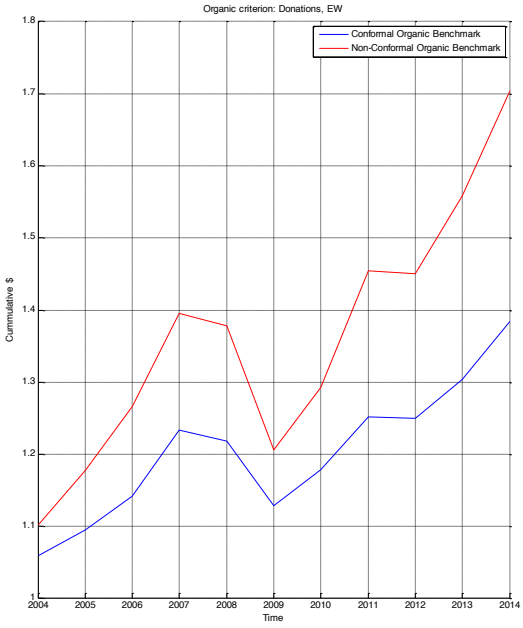
Panel C2: Outperforming budget contributions benchmarks



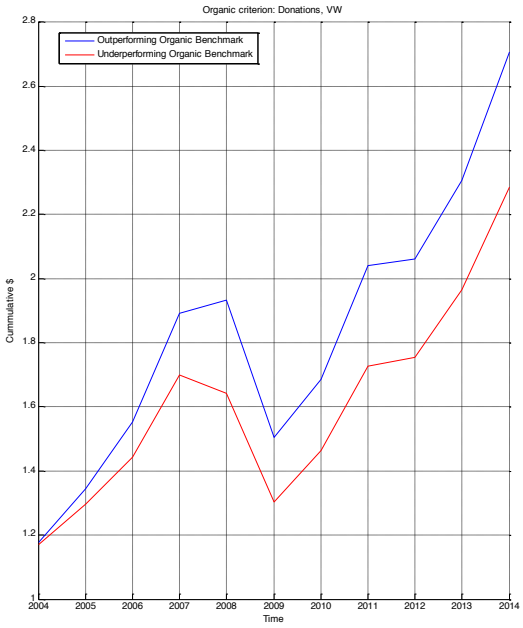


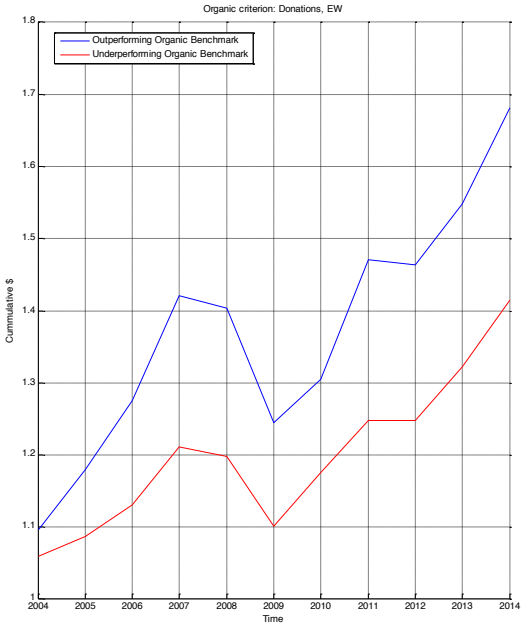
Panel D1: Conforming to donations



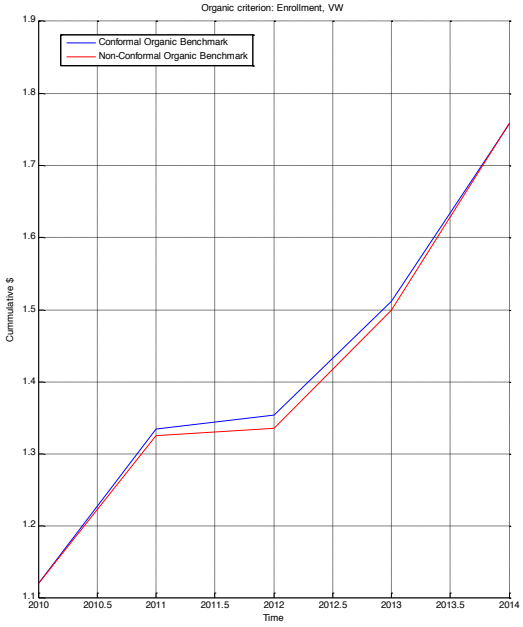


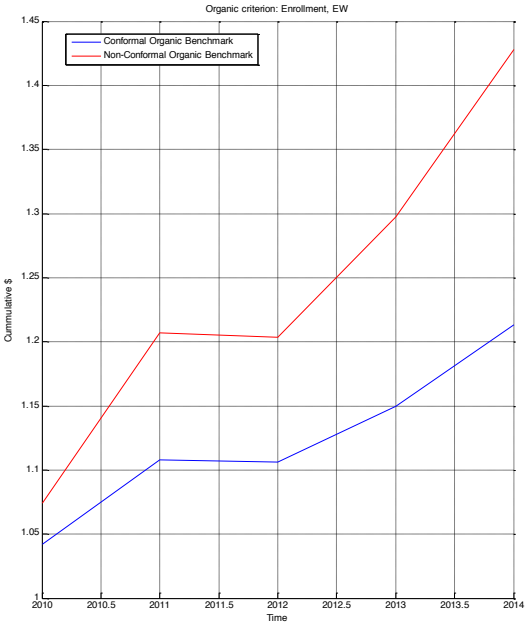
Panel D2: Outperforming donations benchmarks



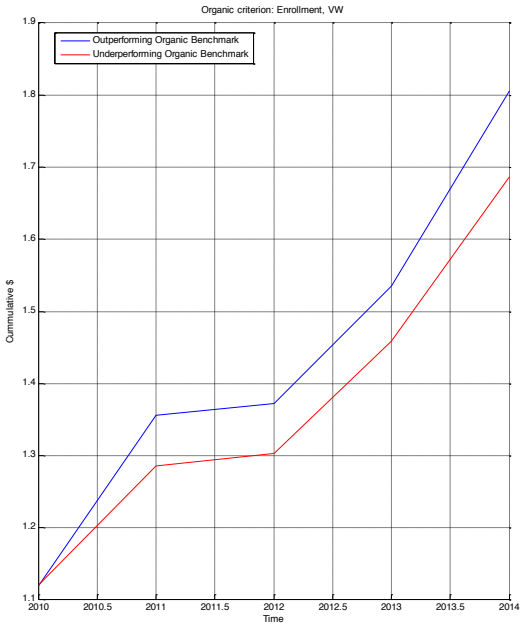


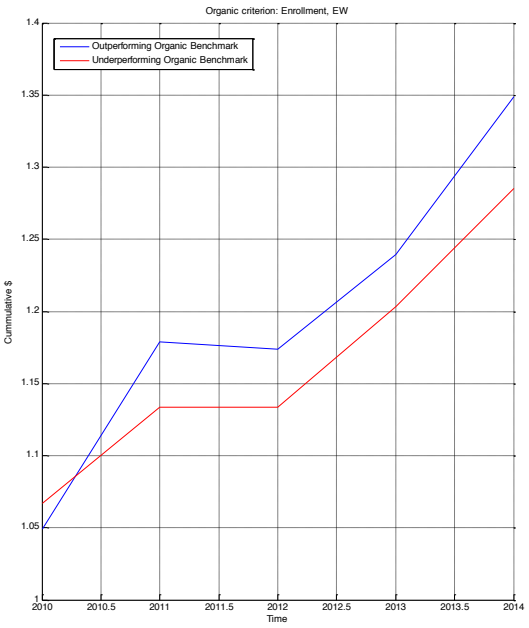
Panel E1: Conforming to enrollment



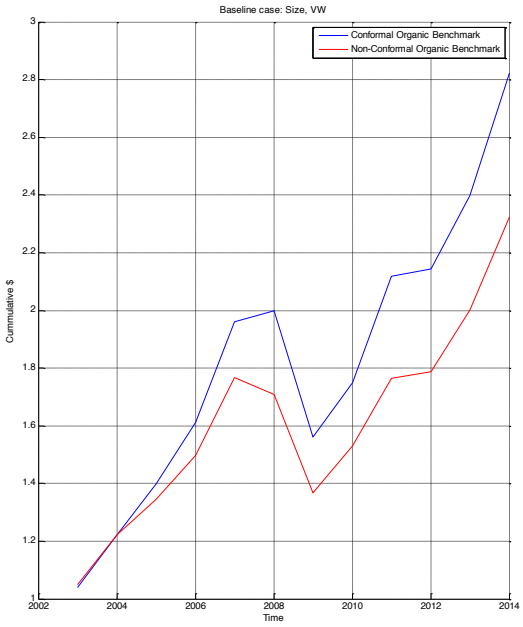


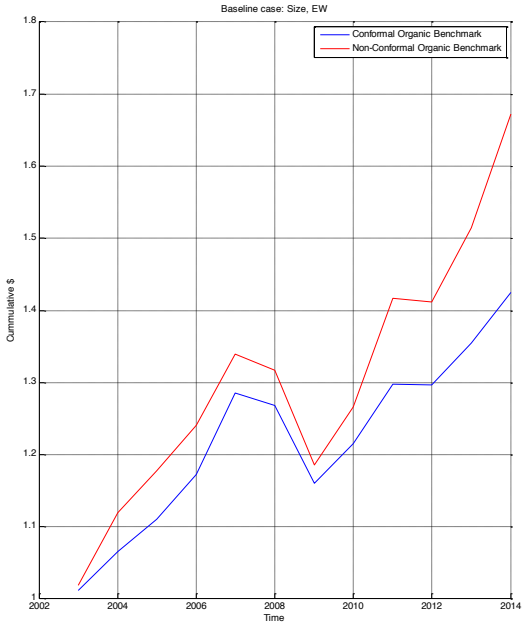
Panel E2: Outperforming enrollment benchmarks





Panel F1: Conforming to size





Panel F2: Outperforming size benchmarks