The Effect of College and University Endowments on Financial Aid, Admissions, and Student Composition*

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Abstract

This paper examines how private college and university endowments affect financial aid, admissions selectivity, and the economic and racial composition of incoming students. Because endowment levels are a function of expenditures and alumni giving, both of which are potentially endogenous to outcomes of interest, the design exploits variation generated by differential investment returns. Estimates reveal that investment returns are highly predictive of changes in endowment levels and generate persistent changes in future spending. There is evidence that colleges and universities that experience greater returns provide more generous institutional aid, reduce admissions rates, and have higher freshman yield rates. However, these institutions do not increase the size of incoming cohorts and enroll a lower percentage of low-income students and students of color. In aggregate, colleges and universities appear use new endowment wealth to increase expenditures and student aid and to become more selective, but not to increase the number or diversity of their student populations. These results are important in light of the preferential tax treatment of endowment wealth and interest in increasing access to elite postsecondary education for underserved student populations.

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I Introduction

Relatively little is known about the causal effect of college and university endowment wealth on financial aid generosity and academic spending, the number of students institutions serve, and the economic and racial diversity of student populations. Institutions report spending an average of two-thirds of endowment income on financial aid and academic programs (NACUBO, 2018).[1] However, it is not known whether reported expenditures offset spending from other revenue sources or translate into real increases in financial aid and academic support and, more specifically, increase access to elite education in general and for low-income and minority students specifically. Shedding light on these questions is informative for understanding institutional objectives and opportunities for low-income and minority students at elite institutions (Pallais and Turner, 2006; Blair and Smetters, 2015). The estimates are informative about the potential effects of taxing endowments (or other approaches to inducing endowment expenditures) on institutional outcomes.[2]

In the cross-section, colleges and universities with larger endowments provide more generous grant aid, but are more selective and serve undergraduate populations with lower fractions of minority students.[3] Likewise, exploiting variation over time indicates that colleges and universities with growing endowment wealth have increasing operating expenditures, provide more institutional grant aid, and become more selective, but do not increase the number of students they serve and enroll a decreasing percentage of minority students. This is an interesting phenomenon, as it suggests that institutions may not use endowment wealth to expand capacity or increase diversity. However, these changes may not represent the causal effects of endowment wealth. Variation in endowment levels over time is partially a function of the rate of expenditure of endowment assets (which mechanically attenuates the relationship between endowment levels and spending) and differences in alumni giving, which may reflect changes in actual or perceived college outcomes.

[1] The 2018 NACUBO survey was the first in which institutions reported the extent to which endowment income was allocated to various expenditure categories. Institutions report allocating 49 percent to financial aid, 16 percent to academic programs, 10 percent to faculty, 7 percent to campus operations, and 18 percent to other uses.

[2] See, for example, Hinrichs (2018) and Levine (2018) for discussions of the endowment income tax of 1.4 percent included in the Tax Cuts and Jobs Act of 2017. The tax is relevant to the highest endowment institutions with at least $500,000 of endowment wealth per full-time student.

[3] Baum, Hill, and Schwartz (2018) and Baum and Lee (2019) detail differences across institutions in the fraction of students who are eligible for financial need and the amounts of financial aid received. This reveals that the highest endowment institutions offer more institutional aid and have lower net cost for students from lower-income households, but serve smaller percentages of these high-need students. In the sample used in this study, I also find that higher endowment institutions are more selective, have higher yield rates for admitted students, and enroll lower fractions of Black students. While these statistics are suggestive that institutions may not use their endowments to expand the diversity of the students they serve, they should not be interpreted as the causal effect of endowment wealth. Factors such as the age and prestige of the institution are likely to shape endowment levels and alumni giving, as well as other sources of revenue (e.g., from tuition and federal grants), research intensity, the applicant pool, selectivity, and student enrollment decisions.

In the seminal paper on spending endowment income, Brown et al. (2014) exploit variation in investment returns to document evidence of "endowment hoarding" in which institutions reduce, rather than increase, the rate of endowment spending in the short run if they experience larger negative returns during an economic downturn.[4] Following this approach, and to abstract from endogenous changes in endowment levels, this study exploits both short-run and cumulative variation in investment returns across otherwise similar institutions to examine the impact of endowment wealth on expenditure categories, financial aid, admissions, and incoming student composition. Specifically, colleges and universities with the same initial endowment levels per student frequently experience substantially different returns on their assets due to differences in investment portfolios. Annually, the gap between the 10th and 90th percentiles of investment returns is approximately 10 percent. These large differences in annual returns generate large differences in cumulative returns over market booms and busts. Estimates reveal that investment returns are largely retained in the endowment and used to generate a steady stream of future spending.[5] As a result, prior investment returns have a substantial impact on current endowment levels and operating expenditures. The empirical design assumes that, for institutions of the same type and with similar initial endowment levels, differences in investment returns represent a plausibly exogenous source of variation in endowments that is more credible than variation due institutional expenditures or alumni giving.

The analysis reveals that colleges and universities that experience larger investment returns retain a significant fraction of the returns as endowment wealth and, in turn, substantially increase spending on instruction, student services, administration, and research in each subsequent year (i.e., positive and negative investment returns permanently alter endowment levels and thus future expenditures). Colleges and universities that experience high investment returns do not significantly increase the fraction of students receiving institutional aid, but do increase the average amount of aid conditional on receipt. The magnitude of the increases in aid are larger than increases in list tuition and room and board at these institutions and a smaller fraction of students are observed taking loans. These results are consistent with colleges using endowments to increase expenditures for a wide range of institutional functions, including greater grant support for undergraduate students.

However, there is no evidence that institutions with growing endowments increase enrollments. These

[4]The authors also document evidence that, year-to-year, institutions appear to reduce faculty positions but not administration if they experience larger negative returns during economic downturns.

[5]On average, endowments have grown substantially over time, indicating that institutions are growing their endowments and enabling greater future expenditures, rather than preserving the current set of activities as proposed in Tobin (1974).

institutions experience significantly higher yields for admitted students (perhaps due in part to more generous aid offers and greater spending on academic programs). But, rather than increasing cohort sizes, these institutions become more selective, reducing admissions rates and experiencing increased median admissions scores. The resulting entering cohorts have, on average, lower fractions of Black and Hispanic students and higher fractions of White, Asian, and foreign students. The changes in minority representation are statistically significant and meaningful in magnitude relative to baseline rates. There is also evidence that institutions with higher returns serve fewer low-income students, as the share of entering students receiving Federal Pell Grant aid decreases. These results are similar when focusing on liberal arts colleges and research universities (which represent the majority of large endowment institutions), and when considering all colleges and universities that have substantial endowment wealth in the baseline year.[6] The analysis indicates that institutions do not use their wealth to expand educational opportunity to a broader set of students, and contributes to the academic literature documenting barriers to access to elite colleges for low-income and minority students.[7]

Overall, the results reveal that increased endowment wealth is associated with increased spending and institutional aid, greater selectivity, and reduced low-income and minority student representation. This is evident when considering variation over time in endowment levels and when exploiting only variation generated by differential investment returns (which are not a function of expenditures or alumni giving). The baseline design groups institutions that have the same Carnegie Classification and similar endowment levels per student in the initial year of the sample. Several alternative designs are used to examine the robustness of the estimates to accounting for pre-existing differences in the outcomes of interest and investment returns. The first alternative groups institutions using the baseline values of the outcome of interest. For example, institutions are grouped based on their percentage of minority students when estimating changes in the racial composition of incoming students. The second groups institutions based on their pre-existing trends in the outcome of interest. For example, estimates are based on comparisons of institutions that have the same classification and the same pre-trend in minority enrollment. The third alternative design groups institutions based on their annual investment returns prior to the sample period.[8] Finally, some institutions have substantial assets that are not part of the endowment and thus may conflate interpretation. Thus, I

[6] In the primary sample we include all institutions with endowments of at least 50,000 dollars per student in the baseline year.
[7] See De Alva and Schneider (2015), Woodhouse (2015), Nichols and Santos (2016), Meyer and Zhou (2017), and Zinshteyn (2017) for examples of policy interest in the disconnect between endowment wealth and serving low-income and minority students.
[8] This is possible because long-term investments are reported in years prior to endowments being reported.

replicate the design using long-term assets rather than endowments as the explanatory variable. The primary results of the baseline analysis are robust to each of these alternative designs. Institutions with greater annual investment returns have increased spending and institutional aid, greater selectivity, and reduced low-income and minority student enrollment.

The paper is organized as follows. Section II discusses the data sources, sample, and variable construction. Section III presents the empirical design and the effect of investment returns on endowment levels and total expenditures. Section IV presents the effect of endowment returns on expenditures by category and financial aid for incoming freshman. Section V presents estimates of endowment returns on admissions selectivity and the composition of incoming cohorts. Section VI concludes.

II Data

The data used in the paper is published by the Integrated Postsecondary Education Data System (IPEDS) and the National Association of College and University Business Officers (NACUBO). The analysis focuses on private colleges and universities with endowment income between 2001 and 2018 and outcomes measured between 1998 and 2018.

II.1 Endowments, Long-Term Investments, and Returns

IPEDs data include reported endowment levels at the beginning and end of each year starting in 2003. In addition, institutions report their annual investment returns, making it possible to compute each institution's annual percent return. NACUBO publishes self-reported endowment levels each year for a subset of high endowment institutions, which are used to verify the accuracy of the IPEDs measures. Some colleges and universities have long-term investment assets that are not part of their endowments. Total long-term investment assets are reported in IPEDs each year and closely mirror endowment levels for most institutions, but serve two important functions. First, they allow the identification of institutions that have substantial investment assets that are not part of the endowment, and thus for which considering endowments alone could produce a biased measure of the effect of endowment returns. Second, they provide an alternate measure of college wealth, extending further back than endowments in IPEDs, which can be used to test the robustness of the estimates.

In the analysis, all measures of college wealth, returns, and other variables measured in dollars (e.g.,

tuition levels) are adjusted to real 2018 dollars. The primary analysis is based on percent investment returns and the natural log of changes in endowment levels. This approach provides approximately equal weight to each institution in the sample. Natural alternative measures such as endowment dollars per student and weighting by the ratio of endowment size to total expenditures substantially shift the focus to a small number of very wealthy colleges and are considered as robustness checks.

II.2 Outcomes of Interest

A rich set of expenditure, employment, financial aid, admissions, enrollment, and retention data from IPEDs are merged to the measures of endowments and investment returns. Expenditures are reported separately for primary categories such as instruction, academic support, student services, auxiliary enterprises, institutional support (administration), and research. Financial aid measures include the number of freshman receiving federal, state, and institutional grants, loans, and the amount of aid conditional on receipt. These variables are used to compute the percent of students receiving aid of each type and the generosity of that aid. Colleges and universities report their list tuition, fees, and on-campus room and board price, which are used to estimate whether institutions with growing endowment wealth alter their list prices and providing context for changes in aid levels. The analysis considers the number of applicants for first-time undergraduate admission, the number of students admitted, and the number of students who enroll. These are used to compute the admissions rates and enrollment yields in each year. Many colleges report SAT and ACT scores for incoming students, providing an additional measure of selectivity.

Enrollment for each institution is computed as full-time equivalents, with full-time students counting as 1 FTE and part-time students as 0.5 FTE. Counts of the race of entering freshman are used to document the percent of students who are Asian, Black, Hispanic, White, or non-resident alien. Starting in 2010, many colleges started using a "two or more races" category, resulting in an equal and off-setting reduction in the number of students categorized as "race unknown". Thus, to maintain consistency across years, I merge students identified as having two or more races with those identified as having unknown race.[9] I construct two aggregate measures of race to shed additional light on potential changes in the composition of incoming students. The first is a measure of minority students equal to the sum of Black and Hispanic enrollment. The second is a measure of non-minority enrollment equal to the sum of Asian, White, and non-resident alien

[9]Note that any systematic reclassification of race groups across years should be common to all institutions with similar initial demographics and thus accounted for by the inclusion of year fixed effects.

students.

II.3 Sample Construction

The sample in this study is comprised of private, not-for-profit colleges and universities that award bachelors degrees. Specifically, attention is restricted to institutions identified in the Carnegie Classification as research universities, masters colleges and universities, liberal arts colleges, and general interest baccalaureate colleges. Colleges that primarily award associate's degrees, have narrow specialties (e.g., theology, art, music), and graduate institutes that do not serve undergraduate students are not included.

Not all colleges and universities have significant endowments, and this is highly correlated with the institution type. In 2018, research universities and liberal arts colleges had median endowments of approximately $73,000 and $104,000 per student, respectively, while master's colleges and universities and general baccalaureate colleges had median endowments of $21,000 and $17,000. Colleges and universities with very small endowment levels per-student are unlikely to significantly alter their expenditures in response to market-driven variation in investment returns, as their primary revenue comes from other sources (e.g., tuition payments). Thus, I consider two samples of colleges and universities for which endowments are likely to be a primary revenue source. First, I consider the set of research universities and liberal arts colleges, nearly all of which have substantial endowments. Only research universities and liberal arts colleges that have very modest endowments (of less than $10,000 per student in the first year of the sample period) are excluded, which reduces the sample by 6 percent. The second sample includes all research universities, masters colleges and universities, liberal arts colleges, and general interest baccalaureate colleges that have high endowment levels in the first period of the sample. In the body of the paper I present estimates restricting attention to institutions with baseline endowments of $50,000 per student or more, while heterogeneity analysis by initial endowment levels sheds light on the effects for institutions with modest endowments. Natural alternative measures of endowment returns include endowment dollars per student (where enrollment is measured in the baseline period) or weighting returns by the ratio of the size of the endowment to total spending (where spending is measured in the baseline period). [10]

As noted above, a small fraction of colleges and universities have substantial long-term investments

[10] These measures of endowment returns include endowment levels in the numerator and thus give far greater weight to a small number of institutions with very large endowments. Giving the greatest weight to the wealthiest institutions is problematic if their responses tend to be atypical (e.g., if their greater wealth allows them to more easily absorb fluctuations in endowment income or if they are more reliant on endowment income than other institutions). In practice, these measures generate similar patterns of estimates.

outside of their endowments. This poses challenges for analyses that consider only endowment wealth or endowment income. Most importantly, it may cause a misinterpretation of treatment. First, considering only endowment income for institutions that have substantial non-endowment investment income may cause the effect of the endowment to be systematically overstated. Second, if institutionally reported investment returns include returns for assets not in the endowment, then the percent return will be miscalculated. This paper takes two approaches to address this issue. In the primary sample, based on endowment wealth, I exclude the small fraction of institutions (about 5 percent) for which endowment assets represent a modest fraction (less than 70 percent) of overall long-term investments in the baseline year. As an alternative, the appendix presents the analysis based entirely on reported long-term investment assets rather than endowments, providing a robustness check for the endowment measure. Of note is that long-term investments are reported for more years in IPEDS than is endowment wealth, allowing the sample period to be extended without the use of the subset of institutions surveyed by NACUBO.

A small number of institutions in the sample have multiple campuses and inconsistent reporting of data across years. Specifically, the campuses report merged data in some years and separately for the primary campus in others. Such reporting inconsistencies render changes in outcomes over time spurious, so these institutions are excluded from the analysis.

III Empirical Design

This paper attempts to isolate the causal effect of endowment wealth and income on the generosity of financial aid packages, admissions selectivity, and the composition of students who are served by post-secondary academic institutions. A primary identification concern is that a college or university can mechanically increase its endowment by reducing the number of students receiving financial aid, the generosity of aid it provides to eligible students, and by serving fewer low-income students who require financial assistance. This would create a negative relationship between endowment wealth and serving a larger or lower-income student population. Alternatively, well-managed colleges and universities that are on an upward trajectory on dimensions such as selectivity and prestige may be more likely to attract new endowment gifts, provide more generous grant aid, and attract a more diverse student body. That is, there are fundamental sources of endogeneity when considering variation in endowment levels over time: 1) the mechanical negative relationship between expenditures and retaining endowment wealth; and 2) the likely correlation between an

institution's capacity to attract new endowment gifts and its overall trajectory.

Brown et al. (2014) examine how contemporaneous variation in endowment investment returns affect the rate at which the endowment is spent, finding that institutions with larger negative returns tend to reduce the spending rate. They argue that investment returns are "largely exogenous, as the variation arises from historical differences in activities to build and invest an endowment combined with fluctuations in global financial markets." To abstract from the endogeneity issues detailed above, I therefore exploit variation in endowment income and wealth generated by differential investment returns. That is, we examine the impact of market returns on endowment levels, expenditures, financial aid packages, and selectivity and student composition. Because many of the outcomes are unlikely to change immediately in response to returns, I consider both short-run and cumulative investment returns. The design considers institutions that are the same type (e.g., research university, master's university, liberal arts college, bachelor's granting college) and that have similar initial endowment levels, but that experience different market returns. Differences in market returns are often substantial, and some institutions experienced both large losses during the recession and modest rebounds when markets rallied, while others perform above the average during both boom and bust markets. For example, among highly ranked liberal arts colleges with large initial endowments, colleges such as Haverford, Carleton, and Bryn Mawr experienced average annual returns during the sample period of just 4 to 6 percent, while Bowdoin, Grinnell, and Smith had returns of 8 to 10 percent.

Table 1 presents the average annual investment returns for each year between 2003 and 2018. These statistics reveal two important facts. First, while there are large fluctuations in average annual returns across years, significant positive growth is the norm and drives most of the variation over time. For example, between 2001 and 2018, there were 9 years with positive returns exceeding 10 percent, and just one year with endowment losses of 10 percent or more.[11] Second, the differences in returns across institutions are large. The gap in returns between the 10th and 90th percentile of returns in each year ranges from 8 to 15 percent, indicating that some institutions achieved significantly higher returns in individual years. Importantly, these annual differences generate large average differences in returns over time. Figure 1 presents the average annual returns for each private research university and liberal arts college in the sample between 2003 and 2018. These differences in average returns, as well as differences in the timing of when large and small returns are realized, generate large differences in cumulative investment returns. Closer examination indicates

[11] Gilbert and Hrdlicka (2015) attribute the high level of returns and risk in university endowments to constraints generated by The Uniform Prudent Management of Institutional Funds Act, which dictates that the future spending power of endowments, rather than initial principal, should be preserved.

that these differences are not driven primarily by some institutions having greater investment volatility and thus experiencing larger gains and larger losses. For example, of institutions with above median returns in 2004-2007 boom, 46 percent also had above median returns during the 2008-2009 downturn. That is, some institutions were winners during both boom and bust periods, while others were losers during both, creating large gaps in cumulative returns. One concern with using cumulative returns as variation in endowment income and wealth is evidence that, on average, higher endowment institutions tend to have higher returns, as noted in surveys of investment returns and several prior analyses.[12] In the sample of research institutions and liberal arts colleges used in this study, larger endowments are correlated with slightly higher average returns. Specifically, institutions with above median initial endowments have average returns of 7.2 percent, while below median endowment institutions have returns of 6.6 percent. However, variation across institutions with similar initial endowments is much larger in magnitude. For example, the 10th and 90th percentiles of average returns are 4.6 and 8.4 percent for below median endowment institutions and 5.1 and 9.2 percent for above median endowment institutions. Nonetheless, to account for the correlation between endowment size and returns, the primary specification compares institutions of the same Carnegie classification and with similar initial endowment levels.

III.1 Investment Returns, Endowment Levels, and Expenditures

This section examines how investment returns affect endowment levels and expenditures. Investment income may be spent in the short run or retained as endowment wealth. If it is retained as endowment wealth, it is likely to affect expenditures in subsequent years, creating a persistent effect of prior year returns. Institutions have spending rules, often stating that approximately 5 percent of the average endowment over the prior three years will be spent each year, and the data indicate that the average expenditure rates typically fall close to this target (Hansman, 1990; Sedlacek and Jarvis, 2010; Brown et al., 2014).

If endowment investment returns are spent rapidly, then large changes in outcomes could occur shortly after the returns are realized. Alternatively, if colleges follow their expenditure rules and retain investment returns in the endowment and then spend a percentage of the endowment in each subsequent year, then returns should have a cumulative effect on future expenditures and outcomes. The analysis first examines the extent to which investment returns are retained as endowment income. Specification 1 is used to estimate

[12] See, for example, Lerner, Schoar, and Wang (2008), Dimmock(2012), and Cejnek, Franz, and Stoughton (2017), each of which finds that institutions with larger endowments tend to take riskier investment positions and have higher average returns.

how investment returns in the current year and each of the prior 5 years affect the change in the endowment level in the current year.

$$AnnualPercentEndowChange_{i,t} = \alpha + \sum_{t=0}^{5} \gamma_t AnnualPercentReturn_{i,t} + \varepsilon_{i,t} \quad (1)$$

The annual change in endowment and annual return are measured as percents. This gives each institution in the sample approximately equal weight. The coefficient on the current year return (T=0) reveals the extent to which current investment returns are retained in the endowment. The coefficients on prior years (T=-1 through T=-5) reveal whether wealth is temporarily retained in the endowment and then spent quickly in subsequent years. The specification can also be estimated with the natural log of the endowment as the outcome variable. If returns in each year are retained in the endowment, then the coefficients on each prior year should be approximately equal.

Another approach to examining the extent to which investment income is retained in the endowment is to estimate the endowment level as a function of returns in prior years and the cumulative returns in prior years.

$$Log(Endowment_{i,t}) = \alpha_i + \alpha_{g,y} + \beta CumulativeReturnPercent_{i,t} + \sum_{t=0}^{5} \gamma_t AnnualPercentReturn_{i,t} + \varepsilon_{i,t} \quad (2)$$

Specification 2 will reveal whether cumulative prior returns are a sufficient statistic for the change the endowment level. Discounted cumulative returns will be sufficient if investment returns essentially become a permanent part of the endowment. This specification can also be applied to expenditures, revealing whether current expenditure levels depend on cumulative returns or the most recent returns.

Table 1 presents estimates of the effect of investment returns on changes in endowment levels in subsequent years. Column 1 presents a regression of the annual percent change in endowment on the percent return on endowment income in the current and prior five years. This suggests that the vast majority of the current investment return is retained in the endowment.[13] There is also no evidence of large negative effects of returns in prior years, indicating that returns are retained in the endowment. Column 2 adds a measure of cumulative returns, which reveals no evidence that institutions with higher overall returns retain more or less endowment wealth than would be predicted by recent returns. Overall, there is no evidence that returns are

[13] A specification using endowment and investment levels indicates that the endowment increases almost one-to-one with each dollar of investment return. This specification places greater weight on institution with large endowments.

initially retained in the endowment and then spent rapidly in subsequent years, indicating that institutions with high returns experience substantial growth in their endowments.

Examining the endowment level over time provides further evidence that investment income is largely retained in the endowment such that current endowment levels reflect cumulative returns. Column 3 of Table 1 reveals large and approximately equal effects of prior year investment returns on current endowment levels. Column 4 indicates that cumulative prior returns represent a sufficient statistic for prior returns in each year, with no evidence that recent returns have larger effects on endowment levels than prior returns. Overall, the evidence is consistent with colleges and universities retaining the majority of investment returns in their endowments, such that high investment returns lead to substantial real growth in endowments.[14]

I next explore whether prior year returns, which are retained as endowment wealth, in turn increase future expenditures. Specification 2 can also be used to examine whether expenditures are a function of recent investment returns, or cumulative prior investment returns. If investment returns are retained in the endowment, and then provide a steady income stream used to fund expenditures, then the coefficient on β will be significant, while the γ_t coefficients will not indicate substantially different expenditure rates for returns in recent years. The goal of this exercise is to determine whether we should expect to see large shifts in current expenditures and outcomes in response to recent returns (which would be the case if returns were spent rapidly), or whether returns are retained in perpetuity. In the latter case, current outcomes will be a function of the cumulative returns. Columns 5 and 6 of Table 1 reveal that operating expenditures are a function of cumulative investment returns, and do not vary substantially in response to the most recent returns. That is, as with endowment levels, cumulative returns are a sufficient statistic for the effect of prior year returns on operating expenditures. This is consistent with institutions retaining investment returns in their endowments and spending a percentage of their endowment wealth each year. In summary, the effect of prior investment returns on current college outcomes can be interpreted as the net effect of changing the level of the college endowment and thus altering the future stream of expenditures.

III.2 Primary Specification and Control Groups

In light of the evidence above, the primary design examines the effect of differential cumulative returns on each outcome of interest: types of expenditures, financial aid packages, admissions standards, and freshman

[14] Hoxby (2015) poses that research universities and the most selective college may justify retaining endowment wealth in the context of high market returns because it will open the door to even greater research (and possibly human capital) investment in the future.

class socioeconomic and racial diversity.

$$Outcome_{i,t} = \alpha_i + \alpha_{g,y} + \beta CumulativePercentReturn_{i,t} + \varepsilon_{i,t} \quad (3)$$

The specification includes institution fixed effects and thus exploits only variation in the outcome within the institution over time. Year effects are determined at the college group-by-year level. That is, there are year effects for each group of institutions based on their initial Carnegie classification and baseline endowment per student. The coefficient of interest is β reflects the effect of cumulative prior investment returns on current outcomes. Given that returns are primarily retained in the endowment, this will reveal the net effect of expenditures from the endowment in the current and prior years. Standard errors are clustered at both the institution and year levels. If we assume that current outcomes are primarily affect by changes in the endowment level, rather than by prior expenditures, then cumulative prior returns can be used as an instrument for the change in the endowment level.

The results are presented for the two samples described in the data section: 1) all research universities and liberal arts colleges; and 2) all institutions with high baseline endowment levels per student. In addition, heterogeneity analysis is conducted based on baseline endowment levels. Differential effects as a function of baseline endowment levels are likely for several reasons. First, institutions with small endowments will experience smaller per-student dollar gains as a function of investment returns, reducing the potential impact of the returns on expenditures and other outcomes (having high returns on a small endowment may have little effect). Alternatively, institutions with very large endowments may not alter their expenditures or experience changes in outcomes of interest if they do not face binding constraints.

Differences in short-run and cumulative investment returns provide variation in endowment wealth and income that is not a function of potentially endogenous expenditure decisions or alumni gifts. The variation is valid if we assume that similar institutions (in terms of type and initial endowment wealth) have similar goals for their endowments, and variation in returns stems from good or bad luck in investment markets. However, market driven differences in endowment returns are problematic if, for example, colleges that intend to serve smaller fractions of lower-income and minority students in the future successfully allocate their investments to assets that have higher average returns. Concerns of this nature can be at least partially eased by comparing only institutions that are very similar in the baseline period and by accounting for potential differences in pre-trends in investment returns and the outcomes of interest. Cumulative returns

across years are calculated using the percent return in each year, and not the amount of the returns relative to the baseline period. While the percent return in each year represents market factors, the amount of returns relative to prior years is a function of endowment levels and thus endogenous factors such as expenditures and endowment gifts.

The identification strategy is dependent on comparing similar colleges and universities that experience different market returns. These institutions must, in the absence of differential investment returns, have experienced similar trends in the outcomes of interest, including expenditures, financial aid levels, selectivity, and the racial composition of incoming students. The baseline specification groups colleges by their Carnegie classification and initial endowment levels (measured in dollars-per-student). Research universities, liberal arts colleges, master's college, and other bachelor's colleges have fundamentally different structures, faculty composition, and serve student bodies with different compositions (e.g., research universities often serve high fractions of graduate students). As institutions of different types are likely to experience different trends in various outcomes of interest, comparisons are only made between institutions with the same classification.[15] Within the same Carnegie classification, institutions can differ substantially in terms of their endowment wealth and in terms of the various outcomes of interest. In order to restrict comparisons to the most similar institutions, college and universities within each classification are placed into groups of approximately 20 based on their endowment-per-student level in the baseline year. Thus, for example, research universities with the highest endowments such as Yale, Stanford, and Princeton are compared with each other and not other institutions, and likewise for high-endowment liberal arts colleges such as Swarthmore, Bowdoin, and Middlebury. Making comparisons only within these relatively narrow groups ensures that estimates are based on variation over time between similar institutions.[16]

I present three alternative methods of grouping institutions to account for potential pre-existing differences. The first alternative groups institutions based on their Carnegie classifications and the baseline values of the outcomes of interest. Specifically, estimates are based on differential returns across institutions that have the same initial value of the outcome of interest. This approach will generate valid estimates if, for example, institutions with the same baseline levels of expenditures, admissions selectivity, and racial composition experience similar changes in these outcomes over time. A primary concern is that institutions

[15] In practice, we find that the pattern of results is broadly similar when comparisons are made across institution types.

[16] Goetzmann and Oster (2015) find that close competitor institutions attempt to mimic each others investment strategies, and often chase the investment strategies of successful competitors. This suggests that competitor institutions have similar investment objectives, providing justification for making comparisons within, rather than across, these groups.

may have had differential trends in the outcome of interest prior to the sample period. To examine whether this affects the results, I first estimate the pre-trend for each outcome of the interest. Specifically, outcome measures from 1997 to 2003 are used to estimate the trends in the outcomes, such as changes in the racial composition of entering students, prior to the sample period. Institutions are grouped according these pre-existing trends and the baseline specification is replicated. That is, the estimates are based on comparing institutions that had the same pre-trends in the outcome of interest. Finally, this approach is replicated, but while grouping institutions with the same average investment returns prior to the sample period.

IV Institutional Aid and Expenditures

Little is known about how endowment wealth and income causally affect institutional grant aid and spending across operating categories. In surveys, colleges and universities report using endowment wealth to fund institutional aid for students. However, such surveys are self-reported and do not take into account crowd-out of other funding sources. That is, documenting the effects of endowment spending that is fungible with spending from other revenue sources (such as tuition payments), is ultimately an empirical question and not an accounting exercise. This section examines the effect of cumulative endowment returns on various categories of expenditures, with the primary focus on financial aid for entering freshmen.[17] Understanding the impact of endowment income on spending and financial aid packages reveals how colleges and universities use their endowments in practice, and a primary avenue for how endowments may affect the desirability of the institution for potential students. Considering the longer-run effects of endowment wealth is important, as changes in spending and the effects of additional spending are likely to take time to become evident (e.g., due to lags in hiring, expanding academic programs, and altering and institution's perceived quality).

Table 3 presents the change in core operating expenditures per student overall as well as for each category, including instruction, student services, institutional support, and research. Institutions with higher investment returns experience larger increases in expenditures across each category. The changes in operating expenditures are large in magnitude and relative to baseline levels. The pattern of expenditure increases is similar for the sample of research universities and liberal arts colleges and the sample of all high endowment institutions. Estimates based on natural logs, indicate similar percent increases for instruction, student

[17] Previously, the only causal evidence about the effect of endowment income on spending categories comes from Brown et al. (2014), who find evidence that endowment funds may be used to preserve administrative positions but not faculty positions in the short-run during economic downturns.

services, and research, and larger increases for institutional support. These estimates are based on comparisons of institutions with the same Carnegie classification and in the same quintile of initial endowment per student. Estimates based on grouping institutions with the same Carnegie classification and baseline quintile of expenditures per student reveals nearly identical results (Appendix Table B2). Likewise, the results do not appear to be driven by pre-existing trends in expenditures or by institutions that had higher returns prior to the sample period. We note that changes in expenditure represent the net effect of higher investment returns. That is, if higher returns alter the tuition that colleges charge or alter other sources of revenue (such as tuition payments or federal grants), the estimated changes in expenditures will reflect these mechanisms. These results are informative for understanding the potential effects of endowment taxes.[18] That is, these estimates capture the actual incidence of changes in endowment wealth and spending across categories of operational expenditures.

Table 4 reveals that increases in endowment returns result in a large and statistically significant reduction in the fraction of students taking loans. There is also evidence of a negative effect on the fraction of entering students receiving federal grant aid. When grouping institutions based on their baseline aid levels or accounting for pre-existing trends in aid levels (Appendix Table B3), there is a modest but statistically significant reduction in the fraction receiving institutional grant aid of 2 to 3 percentage points. However, Table 5 indicates that institutions with larger endowments provide greater amounts of institutional aid conditional on aid receipt. In contrast, students receive statistically significantly less federal Pell grant aid. These results are consistent across the sample of research universities and liberal arts colleges and the sample of all high endowment institutions. They are also evident when accounting for baseline levels and pre-trends in aid (Appendix Table B4).

The financial aid estimates suggest two primary conclusions. First, it appears that larger college endowments lead to more generous institutional aid packages. This is consistent with surveys suggesting that colleges and universities allocate endowment income to grant aid for eligible students. Second, the estimates reveal that larger endowments do not cause colleges to serve more low-income students who are eligible for grant aid. Most notably, there is no increase in the fraction of incoming students eligible for Pell grant aid, and, conditional on receiving a Pell grant, the average amount is lower. Likewise, there is a reduction in the fraction of students receiving any aid or grant aid from other sources. The reduction

[18] In response to the tax placed on the largest endowments by the Tax Cuts and Jobs Act of 2017, institutions reported potential cuts to financial aid, as well teaching and research and other operations (Lorin, 2019; Selig, 2020; Seltzer, 2020).

in students taking loans is likely to reflect both the increased generosity of institutional aid and, perhaps, a change in the composition of students toward those who are less likely to need financial assistance. In summary, greater endowment returns cause colleges to provide greater grant aid to eligible students, but does not cause them to serve more lower-income students.

In addition to providing greater institutional aid, colleges and universities could use greater endowment levels to reduce their tuition and room and board prices, thereby reducing the net price without altering aid levels. Alternatively, colleges with higher endowments have greater spending and may become more desirable, which could be used to demand higher prices. Panel data suggests that institutions with increasing endowments have higher list tuition prices (Appendix Table A2). However, this would be consistent with higher tuition revenue allowing institutions to increase their endowments. However, estimates based solely on investment returns indicate that institutions with greater endowment returns charge more for room and board and have slightly higher overall prices (Table 6) Thus, it does not appear that colleges and universities use endowment wealth to reduce tuition and fees.

V Admissions and Student Composition

This section examines whether or not higher endowments lead institutions to serve a greater number of students or to increase the racial diversity of their incoming classes. Institutions with greater endowments have the capacity to expand enrollment without sacrificing per-student expenditures and to provide sufficient aid to enroll higher fractions of low-income and minority students.

Across specifications and samples, there is no evidence that greater endowments lead to increased enrollment. The estimates in Table 7 reveal a small and statistically insignificant negative effect on freshman enrollment.[19] That is, it does not appear that greater endowment wealth leads colleges and universities to provide education to larger numbers of students, as might be afforded by additional infrastructure and increased hiring.[20] Instead, the estimates in Table 7 indicate that colleges and universities reduces the number of students they admit. This is evident both when considering the number of students admitted and the admissions rate. Specifically, cumulative investment returns lead to large and statistically significant

[19] Additional estimates reveal no change in overall student enrollment, total undergraduate enrollment, or total graduate enrollment. This is consistent with the finding in Bound and Turner (2007) that the most selective public institutions are "least likely" to expand enrollments in response to larger state cohorts.

[20] Estimates presented in Appendix Table B6 reveal that this lack of cohort growth is robust to alternative specifications and is not due to pre-trends in enrollment.

reductions in the natural log of both measures. Grouping institutions based on their baseline admissions selectivity and pre-trends in admissions rates generates slightly larger increases in selectivity (Appendix Table B6).

Colleges with increased endowments are able to maintain cohort sizes while increasing selectivity through substantially increased yields. Both the sample of research universities and liberal arts colleges and all high endowment institutions reveal significantly higher yield rates. The increase in yield rates could stem from numerous factors, including the ability of the institution to offer more generous aid (as described above), greater per-student spending on instruction and student services, greater spending on infrastructure projects, and possibly increased prestige due to each of these factors. Evidence of increased selectivity and higher yields is also evident in the admissions scores of students who enroll. Both average SAT and ACT scores increase for incoming cohorts. Overall, the estimates suggest that colleges and universities that experience high endowment returns are able to become more selective, but do not increase the number of students they serve.

Table 8 presents estimates of the effect of endowment returns on the racial composition of enrolled freshmen. Both samples reveal decreases, rather than increases, in the percent of students who are Black and Hispanic. Overall, minority enrollment decreases statistically significantly and by a non-trivial magnitude relative to baseline rates. Comparing only institutions with the same initial rates of minority enrollment and pre-trends in minority enrollment consistently reveal reductions in Black and Hispanic enrollment for institutions after higher endowment returns. That is, conditional on two institution having the same baseline level of minority enrollment, higher investment returns result in reductions in minority enrollment. Across each specification, the estimates reveal positive effects on the enrollment of Asian, White, and foreign students. The combined increases in Asian, White, and international student enrollment is statistically significant and large enough to offset the reduction in minority enrollment. Thus, the evidence consistently shows that private institutions become more selective at the expense of minority enrollment, and there is no evidence that endowment wealth is used to expand access to minority students. This result is consistent with the finding in the prior section that endowment wealth reduces the fraction of students enrolled who are eligible for federal Pell grant aid.

One potential explanation for the lack of increased enrollment and diversity in response to increased wealth are restrictions on the use of endowment funds or the inability of institutions to convert endowments into liquid assets. However, several analyses of such factors indicate that a significant fraction of endow-

ment wealth is unrestricted and liquid (Conti-Brown, 2011; Brown et al., 2014). That is, endowment are comprised of both traditional endowments that must be preserved, and other assets that institution have the freedom to spend (Ehrenberg, 2009). The results in this study are also not consistent with an explanation based on restrictions on endowments. Specifically, there is clear evidence that endowment wealth causes increases in spending across a wide range of operational categories and financial aid. This, in conjunction with institutions' freedom to redirect general funds, suggest that wealth could be used to increase enrollment or support more low income and minority students. An alternative explanation is that institutions with increased wealth are unable to attract additional low-income and minority applicants. However, such an explanation is hard to reconcile with evidence of increased selectivity, increased yields, and the potential to allocate resources to recruitment and more generous financial aid packages.

VI Conclusion

There is little causal evidence about how private colleges and universities use their endowment wealth in practice and, specifically, whether they use it to increase the number or diversity of the students they serve. In surveys, institutions note that endowments are used in part to fund institutional aid, ostensibly allowing them to serve a more racially and economically diverse student body. However, institutions' self-reported expenditures from endowment income are unlikely to account for the fungible nature of revenue sources and crowd-out. Further, panel evidence indicates that, while colleges and universities increase institutional aid generosity as their endowments grow, there is no corresponding increase in the diversity of their student bodies. Interpreting this relationship is problematic, however, as institutions that do not provide great aid will mechanically increase their endowments through increased savings.

This study exploits variation in endowments solely generated by cumulative investment returns to examine the effect on student outcomes. Wide variation in returns across institutions reveal that a significant fraction of investment income is retained in the endowment, and this increased wealth generates persistent increases in subsequent spending. College and universities use their endowments to increase spending, including in the form of institutional aid and academic programs. However, as these institutions achieve higher enrollment yields, they become more selective, and ultimately end up enrolling fewer minority students. There is also no evidence that they enroll more low-income students, as the fraction of student receiving federal aid decreases. The results are robustness to examining the differential returns of institutions with the

same baseline endowment, outcome measures, and pretrends.

These estimates provide some of the first evidence of the net effect of endowment income and wealth on institutional spending across categories and the effects of this spending on the population of students served. The pattern of results is informative about the objective functions of private post-secondary institutions, providing evidence of seeking greater selectivity and prestige over serving higher numbers of qualified students and low-income and minority populations. This raises questions about the incentives institutions face for using their wealth to increase educational access and to benefit low-income and minority students.

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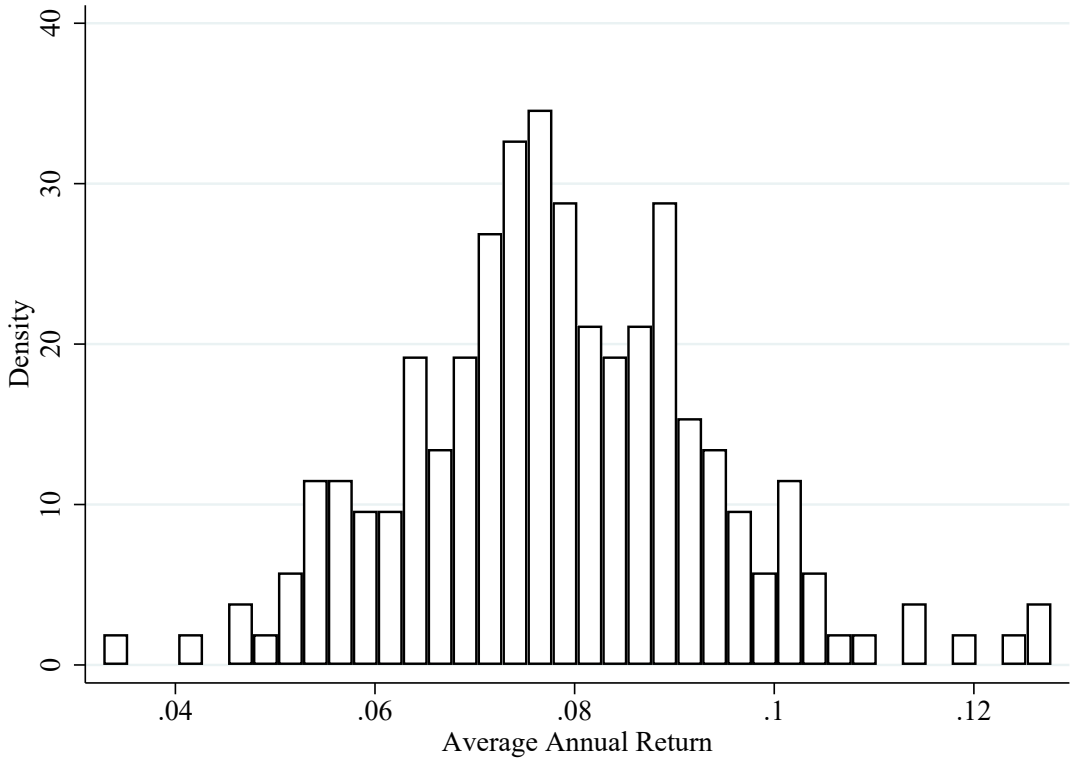
FIGURE 1
Variation in Average Returns Across Institutions



Note: This figure presents that average annual investment return between 2003 and 2018. The sample includes private research universities and liberal arts colleges with endowments of at least $10,000 per full-time equivalent student in the baseline year.

TABLE 1
Annual Investment Returns

	Research Universities and LACs			*All High Endowment Institutions*		
	Mean	10th Percentile	90th Percentile	Mean	10th Percentile	90th Percentile
2001	-0.016	-0.102	0.080	-0.011	-0.085	0.071
2002	-0.047	-0.100	0.010	-0.047	-0.104	0.016
2003	0.033	-0.015	0.077	0.026	-0.023	0.075
2004	0.164	0.113	0.211	0.148	0.079	0.206
2005	0.113	0.074	0.165	0.098	0.049	0.143
2006	0.133	0.081	0.185	0.117	0.055	0.173
2007	0.197	0.152	0.245	0.180	0.120	0.237
2008	-0.015	-0.069	0.049	-0.013	-0.072	0.046
2009	-0.197	-0.266	-0.133	-0.181	-0.266	-0.086
2010	0.127	0.081	0.164	0.121	0.065	0.168
2011	0.196	0.149	0.244	0.190	0.123	0.246
2012	-0.007	-0.048	0.036	-0.010	-0.055	0.033
2013	0.129	0.085	0.173	0.129	0.080	0.184
2014	0.155	0.108	0.199	0.147	0.091	0.197
2015	0.031	-0.005	0.078	0.032	-0.003	0.068
2016	-0.023	-0.055	0.002	-0.020	-0.051	0.020
2017	0.128	0.090	0.162	0.122	0.078	0.159
2018	0.089	0.058	0.123	0.085	0.049	0.119
Total	0.066	0.018	0.115	0.062	0.007	0.115

Note: This table presents mean, 10th percentile, and 90th percentile investment returns for each year from 2001 to 2018. Returns are presented for two samples of "endowment" dependent institutions. The first sample is comprised of all private research universities and liberal arts colleges with at least 10,000 dollars of endowment per full-time student in the baseline year. The second sample is comprised of all private research universities, liberal arts colleges, master's universities and colleges, and other bachelor's granting institutions with at least 50,000 dollars of endowment per full-time student.

TABLE 2
Timing of Effect of Investment Returns on Endowment Levels and Expenditures

	Annual Endowment Percent Change		Log Endowment		Log Total Expenses	
	(1)	(2)	(3)	(4)	(5)	(6)
Research Universities and Liberal Arts Colleges						
Cumulative Returns		0.004		0.355***		0.140***
		(0.004)		(0.061)		(0.022)
Percent Return Year T=0	0.876***	0.871***	0.132	0.034	0.014	-0.025
	(0.022)	(0.024)	(0.109)	(0.095)	(0.042)	(0.043)
Percent Return Year T=-1	0.053***	0.048***	0.207**	0.002	0.029	-0.052
	(0.015)	(0.015)	(0.081)	(0.073)	(0.038)	(0.039)
Percent Return Year T=-2	-0.034*	-0.038*	0.204**	0.017	0.048	-0.026
	(0.019)	(0.020)	(0.078)	(0.069)	(0.042)	(0.043)
Percent Return Year T=-3	0.031*	0.026	0.252**	0.024	0.071*	-0.019
	(0.017)	(0.016)	(0.100)	(0.073)	(0.038)	(0.035)
Percent Return Year T=-4	-0.038**	-0.042**	0.202	-0.015	0.064	-0.022
	(0.016)	(0.018)	(0.117)	(0.084)	(0.040)	(0.033)
Percent Return Year T=-5	-0.027*	-0.033**	0.157	-0.049	0.084*	0.004
	(0.014)	(0.014)	(0.099)	(0.075)	(0.042)	(0.037)
Mean Dep	0.05	0.05	19.58	19.58	18.79	18.79
Observations	3,684	3,684	3,684	3,684	3,687	3,687
High Endowment BA, MA, and PhD Institutions						
Cumulative Returns		-0.001		0.399***		0.123***
		(0.003)		(0.061)		(0.023)
Percent Return Year T=0	0.912***	0.913***	0.243**	0.121	0.055	0.018
	(0.014)	(0.015)	(0.108)	(0.091)	(0.048)	(0.052)
Percent Return Year T=-1	0.038***	0.039***	0.305***	0.056	0.088*	0.011
	(0.011)	(0.012)	(0.093)	(0.075)	(0.042)	(0.044)
Percent Return Year T=-2	-0.011	-0.010	0.283***	0.091	0.106**	0.047
	(0.012)	(0.012)	(0.085)	(0.067)	(0.047)	(0.050)
Percent Return Year T=-3	0.014	0.015	0.352***	0.081	0.108**	0.025
	(0.009)	(0.010)	(0.110)	(0.064)	(0.043)	(0.040)
Percent Return Year T=-4	-0.015*	-0.015	0.315**	0.073	0.115**	0.041
	(0.008)	(0.009)	(0.112)	(0.061)	(0.044)	(0.036)
Percent Return Year T=-5	-0.031***	-0.030***	0.275**	0.041	0.111*	0.038
	(0.011)	(0.011)	(0.113)	(0.060)	(0.053)	(0.047)
Mean Dep	0.04	0.04	19.63	19.63	18.62	18.62
Observations	3,578	3,578	3,578	3,578	3,581	3,581

Note: This table presents estimates of the effect of annual and cumulative endowment returns on changes in endowment levels and expenditures. Returns in the current year are identified as T=0 and in the five prior years as T=-1 to T=-5. Columns 3 through 6 include institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges). Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 3
Expenditure Per Student by Category

	Core Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
Research Universities and Liberal Arts Colleges							
Cumulative Returns	16,413.770***	6,197.432***	1,359.446	1,206.809***	2,578.309**	2,753.486***	2,155.827**
	(3,812.988)	(1,724.554)	(940.829)	(351.531)	(1,186.001)	(519.113)	(1,001.944)
Mean Dep	56,205.48	21,298.80	5,807.02	6,428.00	7,870.90	8,867.44	5,622.91
Observations	3,687	3,687	3,687	3,687	3,687	3,687	3,687
High Endowment BA, MA, and PhD Institutions							
Cumulative Returns	15,830.338***	5,714.632***	1,499.898	1,436.764***	2,617.145**	2,261.123***	1,933.060**
	(3,832.300)	(1,749.389)	(967.977)	(382.525)	(1,306.047)	(538.450)	(952.454)
Mean Dep	55,949.49	20,993.16	5,807.58	6,675.32	7,827.53	8,838.62	5,491.82
Observations	3,579	3,579	3,579	3,579	3,579	3,579	3,579

Note: This table presents estimates of the effect of cumulative endowment returns on expenditures for core operating categories. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 4
Percent of Freshman Receiving Aid

	Any Aid	Federal Grants	State Grants	Institutional Grants	Loans
Research Universities and Liberal Arts Colleges					
Cumulative Returns	-0.557	-1.158	1.329	-1.353	-4.524***
	(1.371)	(1.150)	(1.743)	(1.513)	(1.480)
Mean Dep	82.59	21.28	23.94	76.60	54.18
Observations	3,683	3,683	3,683	3,683	3,683
High Endowment BA, MA, and PhD Institutions					
Cumulative Returns	0.186	-2.184*	2.306	0.066	-5.543***
	(1.333)	(1.228)	(2.051)	(1.365)	(1.743)
Mean Dep	83.56	22.61	26.64	78.07	54.20
Observations	3,575	3,575	3,575	3,575	3,575

Note: This table presents estimates of the effect of cumulative endowment returns on the rate of receipt of financial aid. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 5
Average Aid Per Freshman Recipient

	Federal Grants	State Grants	Institutional Grants	Loans
Research Universities and Liberal Arts Colleges				
Cumulative Returns	-521.051*	-191.255	2,511.836***	-187.580
	(256.554)	(273.135)	(753.639)	(303.299)
Mean Dep	5,663.94	4,200.58	22,638.51	7,013.28
Observations	3,683	3,683	3,683	3,683
High Endowment BA, MA, and PhD Institutions				
Cumulative Returns	-569.130**	-94.673	3,064.262***	-28.635
	(257.841)	(269.524)	(743.575)	(291.520)
Mean Dep	5,573.51	4,211.19	22,291.77	6,900.25
Observations	3,575	3,575	3,575	3,575

Note: This table presents estimates of the effect of cumulative endowment returns on average amounts of financial aid received by incoming freshmen (conditional on receipt). Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 6
List Price Tuition and Room and Board

	Total List Price	Tuition	Room and Board
Research Universities and Liberal Arts Colleges			
Cumulative Returns	51.885	-348.380	400.266*
	(596.607)	(489.018)	(193.511)
Mean Dep	50,971.28	39,432.34	11,538.94
Observations	3,645	3,645	3,645
High Endowment BA, MA, and PhD Institutions			
Cumulative Returns	805.738	384.228	421.510**
	(668.260)	(561.822)	(210.210)
Mean Dep	49,505.77	38,289.07	11,216.70
Observations	3,519	3,519	3,519

Note: This table presents estimates of the effect of cumulative endowment returns on list price tuition and room and board. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 7
Admissions Selectivity

			Natural Log			Median Score	
	Apps	Admits	Admit Rate	Enroll	Yield	SAT	ACT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Research Universities and Liberal Arts Colleges							
Cumulative Returns	-0.062	-0.180**	-0.119**	-0.038	0.147**	14.401	0.515**
	(0.055)	(0.063)	(0.046)	(0.025)	(0.059)	(9.336)	(0.226)
Mean Dep	7,868.56	3,133.57	0.53	808.73	0.30	1,241.08	27.15
Observations	3,650	3,650	3,650	3,687	3,650	3,177	2,892
High Endowment BA, MA, and PhD Institutions							
Cumulative Returns	-0.033	-0.178***	-0.146**	-0.038	0.142**	21.026**	0.690***
	(0.060)	(0.068)	(0.057)	(0.025)	(0.066)	(8.174)	(0.231)
Mean Dep	6,445.36	2,381.44	0.53	678.95	0.31	1,231.10	26.77
Observations	3,536	3,536	3,536	3,579	3,536	3,054	2,851

Note: This table presents estimates of the effect of cumulative endowment returns on applications, admissions, admissions rates, yield rates, and admissions exam scores (when reported by institutions). Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 8
Race of Incoming Freshman: Percent of Cohort

	Asian (1)	Black (2)	Hispanic (3)	White (4)	Foreign (5)	Unknown (6)	Black or Hispanic (7)	White or Asian (8)
Research Universities and Liberal Arts Colleges								
Cumulative Returns	0.650	-1.431*	-1.120*	2.184	-0.108	-0.174	-2.551**	2.726*
	(0.472)	(0.693)	(0.592)	(1.464)	(0.765)	(1.051)	(0.944)	(1.297)
Mean Dep	7.11	7.49	7.17	64.70	5.55	7.99	14.66	77.35
Observations	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677
High Endowment BA, MA, and PhD Institutions								
Cumulative Returns	0.239	-1.745**	-1.557**	2.608	1.059	-0.604	-3.302***	3.906***
	(0.497)	(0.680)	(0.660)	(1.607)	(0.701)	(1.154)	(1.082)	(1.486)
Mean Dep	6.40	7.15	6.81	66.96	5.09	7.60	13.96	78.44
Observations	3,569	3,569	3,569	3,569	3,569	3,569	3,569	3,569

Note: This table presents estimates of the effect of cumulative endowment returns on the racial composition of incoming freshmen. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

Appendix

TABLE A1
Panel: Expenditure Per Student by Category

	Operating Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
Research Universities and Liberal Arts Colleges							
Ln Endowment	10,513.572***	4,891.678***	996.131**	1,145.464***	674.588	1,869.143***	1,092.005**
	(2,107.972)	(931.879)	(446.216)	(299.278)	(500.224)	(575.870)	(493.225)
Mean Dep	56,205.48	21,298.80	5,807.02	6,428.00	7,870.90	8,867.44	5,622.91
Observations	3,687	3,687	3,687	3,687	3,687	3,687	3,687
High Endowment BA, MA, and PhD Institutions							
Ln Endowment	10,818.712***	5,370.404***	1,203.567**	1,203.435***	818.070	1,779.321**	719.504
	(2,274.313)	(1,009.196)	(491.530)	(342.394)	(541.317)	(681.896)	(446.955)
Mean Dep	55,949.49	20,993.16	5,807.58	6,675.32	7,827.53	8,838.62	5,491.82
Observations	3,579	3,579	3,579	3,579	3,579	3,579	3,579

Note: This table presents estimates of the relationship between changes in endowment levels and expenditures for core operating categories. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A2
Panel: List Price Tuition and Room and Board

	Total List Price	Tuition	Room and Board
Research Universities and Liberal Arts Colleges			
Ln Endowment	649.572	520.344	129.228
	(980.325)	(833.082)	(242.604)
Mean Dep	50,971.28	39,432.34	11,538.94
Observations	3,645	3,645	3,645
High Endowment BA, MA, and PhD Institutions			
Ln Endowment	896.815	717.953	178.862
	(1,207.622)	(1,041.813)	(256.425)
Mean Dep	49,505.77	38,289.07	11,216.70
Observations	3,519	3,519	3,519

Note: This table presents estimates of the relationship between changes in endowment levels and list price tuition and room and board. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A3
Panel: Average Aid Per Freshman

	Federal Grants	State Grants	Institutional Grants	Loans
Research Universities and Liberal Arts Colleges				
Ln Endowment	-604.625*	-424.467	2,388.480**	-212.335
	(294.219)	(256.920)	(929.831)	(353.386)
Mean Dep	5,663.94	4,200.58	22,638.51	7,013.28
Observations	3,683	3,683	3,683	3,683
High Endowment BA, MA, and PhD Institutions				
Ln Endowment	-621.581*	-56.162	2,557.246**	-711.377*
	(308.660)	(256.887)	(1,048.010)	(358.208)
Mean Dep	5,573.51	4,211.19	22,291.77	6,900.25
Observations	3,575	3,575	3,575	3,575

Note: This table presents estimates of the relationship between changes in endowment levels and average amounts of financial aid received by incoming freshmen (conditional on receipt). Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A4
Panel: Admissions Selectivity

			Natural Log			Median Score	
	Apps	Admits	Admit Rate	Enroll	Yield	SAT	ACT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Research Universities and Liberal Arts Colleges							
Ln Endowment	-0.160**	-0.267***	-0.108**	-0.014	0.248***	26.611**	0.973***
	(0.070)	(0.070)	(0.049)	(0.037)	(0.061)	(9.567)	(0.269)
Mean Dep	7,868.56	3,133.57	0.53	808.73	0.30	1,241.08	27.15
Observations	3,650	3,650	3,650	3,687	3,650	3,177	2,892
High Endowment BA, MA, and PhD Institutions							
Ln Endowment	-0.099	-0.280***	-0.182***	0.001	0.274***	47.146***	1.218***
	(0.090)	(0.083)	(0.058)	(0.041)	(0.069)	(8.966)	(0.304)
Mean Dep	6,445.36	2,381.44	0.53	678.95	0.31	1,231.10	26.77
Observations	3,536	3,536	3,536	3,579	3,536	3,054	2,851

Note: This table presents estimates of the relationship between changes in endowment levels and applications, admissions, admissions rates, yield rates, and admissions exam scores (when reported by institutions). Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A5
Panel: Race of Incoming Freshman

	Asian (1)	Black (2)	Hispanic (3)	White (4)	Foreign (5)	Unknown (6)	Black or Hispanic (7)	White or Asian (8)
Research Universities and Liberal Arts Colleges								
Ln Endowment	0.085	-2.680**	-0.496	2.427	1.893*	-1.229	-3.176**	4.405
	(0.425)	(1.159)	(0.585)	(2.622)	(0.938)	(2.581)	(1.357)	(2.539)
Mean Dep	7.11	7.49	7.17	64.70	5.55	7.99	14.66	77.35
Observations	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677
High Endowment BA, MA, and PhD Institutions								
Ln Endowment	-0.247	-3.707***	-0.801	4.451	1.995**	-1.692	-4.508***	6.200*
	(0.424)	(0.832)	(0.684)	(3.114)	(0.855)	(3.047)	(1.164)	(3.175)
Mean Dep	6.40	7.15	6.81	66.96	5.09	7.60	13.96	78.44
Observations	3,569	3,569	3,569	3,569	3,569	3,569	3,569	3,569

Note: This table presents estimates of the relationship between changes in endowment levels and the racial composition of incoming freshmen. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges) and the same quintile of endowment wealth per full-time students in the baseline period. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE B1

Robustness: Timing of Effect of Investment Returns on Long-Term Investment Levels

	Annual Endowment Percent Change		Log Endowment		Log Total Expenses	
	(1)	(2)	(3)	(4)	(5)	(6)
Cumulative Returns		-0.001		0.337***		0.240**
		(0.003)		(0.049)		(0.087)
Percent Return Year T=0	0.940***	0.942***	0.143	0.201*	-0.120	-0.079
	(0.021)	(0.022)	(0.150)	(0.101)	(0.083)	(0.068)
Percent Return Year T=-1	0.050***	0.052***	0.212	0.085	-0.026	-0.117
	(0.017)	(0.018)	(0.159)	(0.082)	(0.144)	(0.096)
Percent Return Year T=-2	-0.034**	-0.031	0.156	0.056	0.020	-0.051
	(0.017)	(0.019)	(0.169)	(0.094)	(0.149)	(0.113)
Percent Return Year T=-3	0.033**	0.035**	0.249	0.127	0.033	-0.053
	(0.016)	(0.016)	(0.162)	(0.080)	(0.147)	(0.108)
Percent Return Year T=-4	-0.039***	-0.037**	0.228	0.121*	0.045	-0.031
	(0.015)	(0.016)	(0.146)	(0.070)	(0.131)	(0.104)
Percent Return Year T=-5	-0.023	-0.022	0.206	0.117	0.084	0.022
	(0.016)	(0.016)	(0.131)	(0.079)	(0.143)	(0.107)
Mean Dep	0.06	0.06	19.60	19.60	18.75	18.75
Observations	4,628	4,628	4,628	4,628	4,629	4,629

Note: This table presents estimates of the effect of annual and cumulative long-term investment returns on changes in endowment levels and expenditures. Returns in the current year are identified as T=0 and in the five prior years as T=-1 to T=-5. Columns 3 through 6 include institution fixed effects as well as year-by-comparison group fixed effects. The comparison group are institutions of the same Carnegie classification (research university, liberal arts colleges, master's colleges and universities, general bachelor's colleges). Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE B2
Robustness: Expenditure Per Student by Category

	Total Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
Research Universities and Liberal Arts Colleges: Grouped by Baseline Outcome							
Cumulative Returns	14,980.96***	5,534.72***	1,496.03	1,206.03***	2,742.68**	2,163.60***	1,756.41**
	(3,545.57)	(1,556.59)	(969.50)	(340.07)	(1,205.21)	(424.80)	(738.45)
Mean Dep	56,205.48	21,298.80	5,807.02	6,428.00	7,870.90	8,867.44	5,622.91
Observations	3,687	3,687	3,687	3,687	3,687	3,687	3,687
Research Universities and Liberal Arts Colleges: Grouped by Pretrend of Outcome							
Cumulative Returns	16,624.508***	6,711.065***	1,559.825	1,085.765***	2,758.619**	2,555.173***	1,612.625**
	(3,823.503)	(1,812.272)	(968.675)	(337.814)	(1,215.992)	(556.075)	(754.733)
Mean Dep	56,205.48	21,298.80	5,807.02	6,428.00	7,870.90	8,867.44	5,622.91
Observations	3,687	3,687	3,687	3,687	3,687	3,687	3,687
Research Universities and Liberal Arts Colleges: Grouped by Pre-Period Returns							
Cumulative Returns	16,629.753***	6,610.355***	1,609.317*	1,114.494***	2,582.047**	2,725.205***	1,683.084*
	(3,825.521)	(1,707.566)	(913.410)	(358.313)	(1,205.035)	(485.931)	(890.616)
Mean Dep	56,205.48	21,298.80	5,807.02	6,428.00	7,870.90	8,867.44	5,622.91
Observations	3,687	3,687	3,687	3,687	3,687	3,687	3,687
Research Universities and Liberal Arts Colleges: Long-Term Investments							
Cumulative Returns	11,722.035***	4,368.472***	1,473.400*	1,181.661***	1,205.309*	1,851.371***	1,505.122
	(2,690.985)	(1,297.707)	(709.401)	(280.735)	(679.661)	(459.517)	(1,004.999)
Mean Dep	54,064.61	20,458.49	5,472.88	5,995.84	7,677.20	8,536.13	5,532.97
Observations	4,629	4,629	4,629	4,629	4,629	4,629	4,629

Note: This table presents estimates of the effect of cumulative investment returns on expenditures for core operating categories. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. In the first panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the outcome of interest. In the second panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the pretrend in the outcome of interest. In the third panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of pre-period investment returns. In the fourth panel, the primary specification is replicated using total long-term assets rather than endowments to measure cumulative returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE B3
Robustness: Percent of Freshman Receiving Aid

	Any Aid	Federal Grants	State Grants	Institutional Grants	Loans
Research Universities and Liberal Arts Colleges: Grouped by Baseline Outcome					
Cumulative Returns	-2.394*	-1.093	0.643	-2.873*	-5.986***
	(1.357)	(1.070)	(1.795)	(1.567)	(1.615)
Mean Dep	82.59	21.28	23.94	76.60	54.18
Observations	3,683	3,683	3,683	3,683	3,683
Research Universities and Liberal Arts Colleges: Grouped by Pretrend of Outcome					
Cumulative Returns	-1.544	-1.188	0.972	-2.502*	-5.941***
	(1.273)	(1.069)	(1.734)	(1.416)	(1.607)
Mean Dep	82.59	21.28	23.94	76.60	54.18
Observations	3,683	3,683	3,683	3,683	3,683
Research Universities and Liberal Arts Colleges: Grouped by Pre-Period Returns					
Cumulative Returns	-2.221*	-1.140	1.319	-3.135**	-5.567***
	(1.233)	(1.023)	(1.650)	(1.470)	(1.618)
Mean Dep	82.59	21.28	23.94	76.60	54.18
Observations	3,683	3,683	3,683	3,683	3,683
Research Universities and Liberal Arts Colleges: Long-Term Investments					
Cumulative Returns	0.433	-1.302*	-0.047	1.110	-4.114***
	(1.053)	(0.709)	(1.333)	(1.244)	(1.290)
Mean Dep	82.36	22.02	24.37	75.44	54.65
Observations	4,204	4,204	4,204	4,204	4,204

Note: This table presents estimates of the effect of cumulative investment returns on the rate of receipt of financial aid. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. In the first panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the outcome of interest. In the second panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the pretrend in the outcome of interest. In the third panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of pre-period investment returns. In the fourth panel, the primary specification is replicated using total long-term assets rather than endowments to measure cumulative returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE B4
Robustness: Average Aid Per Freshman Recipient

	Federal Grants	State Grants	Institutional Grants	Loans
Research Universities and Liberal Arts Colleges: Grouped by Baseline Outcome				
Cumulative Returns	-530.225	-34.522	2,602.006***	-140.653
	(325.332)	(263.123)	(752.810)	(281.381)
Mean Dep	5,663.94	4,200.58	22,638.51	7,013.28
Observations	3,683	3,683	3,683	3,683
Research Universities and Liberal Arts Colleges: Grouped by Pretrend of Outcome				
Cumulative Returns	-536.806*	-24.373	3,746.333***	-111.865
	(270.836)	(287.654)	(840.072)	(297.295)
Mean Dep	5,663.94	4,200.58	22,638.51	7,013.28
Observations	3,683	3,683	3,683	3,683
Research Universities and Liberal Arts Colleges: Grouped by Pre-Period Returns				
Cumulative Returns	-578.383**	-163.242	3,467.660***	-167.541
	(249.502)	(255.124)	(886.554)	(306.873)
Mean Dep	5,663.94	4,200.58	22,638.51	7,013.28
Observations	3,683	3,683	3,683	3,683
Research Universities and Liberal Arts Colleges: Long-Term Investments				
Cumulative Returns	-315.256	-114.477	2,361.432***	-35.599
	(219.898)	(222.129)	(529.117)	(199.919)
Mean Dep	5,570.19	4,196.68	21,567.14	6,900.74
Observations	4,204	4,204	4,204	4,204

Note: This table presents estimates of the effect of cumulative investment returns on average amounts of financial aid received by incoming freshmen (conditional on receipt). Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. In the first panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the outcome of interest. In the second panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the pretrend in the outcome of interest. In the third panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of pre-period investment returns. In the fourth panel, the primary specification is replicated using total long-term assets rather than endowments to measure cumulative returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE B5
Robustness: List Price Tuition and Room and Board

	Total List Price	Tuition	Room and Board
Research Universities and Liberal Arts Colleges: Grouped by Baseline Outcome			
Cumulative Returns	664.509	149.746	514.763**
	(591.986)	(486.428)	(189.003)
Mean Dep	50,971.28	39,432.34	11,538.94
Observations	3,645	3,645	3,645
Research Universities and Liberal Arts Colleges: Grouped by Pretrend of Outcome			
Cumulative Returns	764.320	144.612	619.708***
	(577.842)	(479.437)	(178.274)
Mean Dep	50,971.28	39,432.34	11,538.94
Observations	3,645	3,645	3,645
Research Universities and Liberal Arts Colleges: Grouped by Pre-Period Returns			
Cumulative Returns	397.770	-127.563	525.332**
	(654.093)	(557.440)	(183.598)
Mean Dep	50,971.28	39,432.34	11,538.94
Observations	3,645	3,645	3,645
Research Universities and Liberal Arts Colleges: Long-Term Investments			
Cumulative Returns	445.781	155.200	290.581**
	(418.353)	(372.991)	(130.956)
Mean Dep	49,404.59	38,063.51	11,341.08
Observations	4,139	4,139	4,139

Note: This table presents estimates of the effect of cumulative investment returns on list price tuition and room and board. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. In the first panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the outcome of interest. In the second panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the pretrend in the outcome of interest. In the third panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of pre-period investment returns. In the fourth panel, the primary specification is replicated using total long-term assets rather than endowments to measure cumulative returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE B6
Robustness: Admissions Selectivity

			Natural Log			Median Score	
	Apps	Admits	Admit Rate	Enroll	Yield	SAT	ACT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Research Universities and Liberal Arts Colleges: Grouped by Baseline Outcome							
Cumulative Returns	0.043	-0.107**	-0.151***	-0.024	0.092*	10.679	0.443*
	(0.045)	(0.050)	(0.048)	(0.023)	(0.052)	(8.445)	(0.216)
Mean Dep	7,868.56	3,133.57	0.53	808.73	0.30	1,241.08	27.15
Observations	3,650	3,650	3,650	3,687	3,650	3,177	2,892
Research Universities and Liberal Arts Colleges: Grouped by Pretrend of Outcome							
Cumulative Returns	-0.045	-0.287***	-0.243***	-0.029	0.264***	18.096	0.580**
	(0.049)	(0.060)	(0.041)	(0.024)	(0.055)	(11.298)	(0.235)
Mean Dep	7,868.56	3,133.57	0.53	808.73	0.30	1,241.08	27.15
Observations	3,650	3,650	3,650	3,687	3,650	3,177	2,892
Research Universities and Liberal Arts Colleges: Grouped by Pre-Period Returns							
Cumulative Returns	-0.063	-0.269***	-0.207***	-0.029	0.245***	10.259	0.306
	(0.050)	(0.065)	(0.047)	(0.026)	(0.063)	(11.377)	(0.261)
Mean Dep	7,868.56	3,133.57	0.53	808.73	0.30	1,241.08	27.15
Observations	3,650	3,650	3,650	3,687	3,650	3,177	2,892
Research Universities and Liberal Arts Colleges: Long-Term Investments							
Cumulative Returns	-0.024	-0.085*	-0.062*	-0.031	0.045	14.570**	0.468***
	(0.039)	(0.041)	(0.030)	(0.020)	(0.035)	(6.644)	(0.161)
Mean Dep	7,776.53	3,145.90	0.54	814.13	0.30	1,235.38	26.93
Observations	3,936	3,936	3,935	4,629	3,935	3,405	3,109

Note: This table presents estimates of the effect of cumulative investment returns on applications, admissions, admissions rates, yield rates, and admissions exam scores (when reported by institutions). Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. In the first panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the outcome of interest. In the second panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the pretrend in the outcome of interest. In the third panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of pre-period investment returns. In the fourth panel, the primary specification is replicated using total long-term assets rather than endowments to measure cumulative returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE B7
Race of Incoming Freshman: Percent of Cohort

	Asian (1)	Black (2)	Hispanic (3)	White (4)	Foreign (5)	Unknown (6)	Black or Hispanic (7)	White or Asian (8)
Research Universities and Liberal Arts Colleges: Grouped by Baseline Outcome								
Cumulative Returns	0.735	-2.106**	-0.798	1.267	0.549	0.354	-2.904**	2.550*
	(0.437)	(0.960)	(0.556)	(1.354)	(0.706)	(1.282)	(1.055)	(1.230)
Mean Dep	7.11	7.49	7.17	64.70	5.55	7.99	14.66	77.35
Observations	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677
Research Universities and Liberal Arts Colleges: Grouped by Pre-trend of Outcome								
Cumulative Returns	0.591	-1.670**	-1.145*	2.517	0.370	-0.663	-2.815***	3.478**
	(0.457)	(0.633)	(0.617)	(1.492)	(0.743)	(0.951)	(0.862)	(1.260)
Mean Dep	7.11	7.49	7.17	64.70	5.55	7.99	14.66	77.35
Observations	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677
Research Universities and Liberal Arts Colleges: Grouped by Pre-period Returns								
Cumulative Returns	0.668	-1.605**	-0.890	1.941	0.161	-0.275	-2.495***	2.769**
	(0.499)	(0.606)	(0.591)	(1.468)	(0.735)	(1.039)	(0.837)	(1.260)
Mean Dep	7.11	7.49	7.17	64.70	5.55	7.99	14.66	77.35
Observations	3,677	3,677	3,677	3,677	3,677	3,677	3,677	3,677
Research Universities and Liberal Arts Colleges: Long-Term Investments								
Cumulative Returns	0.126	-1.022**	-0.997**	2.091*	0.650	-0.848	-2.019***	2.867**
	(0.352)	(0.399)	(0.412)	(1.194)	(0.490)	(1.070)	(0.663)	(1.156)
Mean Dep	6.92	8.08	6.97	65.31	5.14	7.58	15.05	77.37
Observations	4,611	4,611	4,611	4,611	4,611	4,611	4,611	4,611

Note: This table presents estimates of the effect of cumulative investment returns on the racial composition of incoming freshmen. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. In the first panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the outcome of interest. In the second panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of the pretrend in the outcome of interest. In the third panel, the comparison group is institutions of the same Carnegie classification type with the same quintile of pre-period investment returns. In the fourth panel, the primary specification is replicated using total long-term assets rather than endowments to measure cumulative returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.