

The Effect of Endowments on Access to Selective Colleges and Universities *

George Bulman

2025

Abstract

This paper examines how the endowments of private colleges and universities affect undergraduate enrollment, financial aid, admissions selectivity, and the economic and racial composition of incoming students. The design exploits substantial variation in investment returns over time and across peer institutions. Estimates reveal that returns generate persistent endowment growth and net increases in spending across a range of activities including instruction, student services, and administration. Institutions with high returns offer modestly more generous aid, become more selective, and achieve higher institutional rankings. However, they do not expand undergraduate capacity and they enroll fewer students of color and students from lower-income families. The estimates shed light on how endowments shape access to elite education in the U.S. and the potential implications of policies targeting endowment wealth.

*Department of Economics, University of California, Santa Cruz and NBER. Contact: gbulman@ucsc.edu. All data used in this study are publicly available. I am thankful to Michael Boskin, Thomas Dee, Mark Duggan, Joshua Goodman, Caroline Hoxby, Hilary Hoynes, Rucker Johnson, Neale Mahoney, Emmanuel Saez, Gabriel Zucman, and seminar participants at the University of California Berkeley, Stanford University, and the 2025 Western Economic Association Annual Conference for helpful comments.

I Introduction

Many selective private universities and liberal arts colleges in the U.S. have large endowments that support a substantial share of institutional spending. While some endowment funds are earmarked for specific purposes, the majority are unrestricted or dedicated to core categories of operation. Institutions report that approximately half of endowment revenue is allocated to financial aid, while a quarter is dedicated to faculty positions and academic programs (NACUBO, 2018).¹ However, there is little empirical evidence about the net impact of endowment revenue on spending patterns and how this spending affects access to elite education. This study explores these questions by estimating the effect of changes in endowment wealth on institutional spending, student cohort size, financial aid generosity, admissions selectivity, and the economic and racial diversity of student populations. The analysis is informative for understanding institutional objectives, opportunities for underserved populations at selective institutions, and the potential effects of policies intended to induce spending from endowments.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 Black and low-income students.³ Similarly, colleges and universities with faster growing endowments increase operating expenditures more rapidly than peer institutions, but do not have corresponding increases in enrollment levels or socioeconomic and racial diversity. However, such correlations in the cross-section and over time cannot be interpreted as representing the causal impact of endowment revenue. Factors such as the age and prestige of institutions are likely to shape endowments and other sources of revenue, such as tuition and research grants, as well as outcomes of interest such as admissions selectivity and the composition of students who apply and attend. Further, endowments decrease mechanically with spending, such that enrolling more students who are eligible for aid creates a negative relationship between endowments and socioeconomic diversity.

¹The 2018 NACUBO survey was the first in which institutions reported how endowment income is 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. The extent to which spending from the endowment generates net increases in spending for these categories, or offsets revenue from other sources, is not clear.

²Blair and Smetters (2021) argue that the historical pattern of low enrollment growth and increased selectivity at elite institutions is better explained by competition for prestige than by a desire to expand access. In contrast, institution mission statements for the 201 institutions in this analysis consistently emphasize the importance of providing access and enrolling diverse student populations.

³Among the 201 private colleges and universities examined in this study, those with larger endowments per student are more selective, have higher yield rates for admitted students, and provide more institutional aid conditional on receipt, but enroll a smaller fraction of Black students and students receiving federal or institutional aid.

In the seminal paper on endowment spending, 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 during economic downturns.⁴ Following this approach, and to abstract from endogenous changes in endowments, this study exploits variation in investment returns within and across private liberal arts colleges and national universities. Average investment returns vary considerably during the sample period, ranging from gains of 20 percent or more in 2007, 2011, and 2021, to losses of 20 percent in 2009. Returns also vary considerably across close peer institutions. For example, average returns between 2003 and 2023 varied from 5 to 12 percent among the top 25 national liberal arts colleges, and from 7 to 12 percent among the top 25 national universities. Because institutions adopt fiscal “rules” that target spending a fixed fraction of endowment wealth each year (typically 4 to 5 percent of the three-year rolling average), investment returns affect revenue in the short-run and long-run endowment growth and the stream of future revenue.⁵ In turn, spending from the endowment may affect a range of institutional and student outcomes, such as financial aid generosity, admissions selectivity, and the socioeconomic and racial composition of incoming cohorts.

The empirical design examines changes in the outcomes of interest within and across institutions in response to investment returns and endowment growth. I present reduced form estimates of the effect of returns on each outcome as well as instrumental variables estimates scaled to capture the impact of endowment levels.⁶ In order to exploit variation in returns across close peer institutions, private colleges and universities are grouped using their baseline U.S. News and World Report rankings. Within these groups, investment returns during the sample period are not significantly correlated with baseline institutional characteristics. The analysis uses endowment, expenditure, enrollment, aid, and admissions data from the Integrated Postsecondary Education Data System, and is supplemented with endowment and investment return data from the National Association of College and University Business Officers, IRS Form 990, and institutional financial reports, as well as historical U.S. News and World Report college and university rankings.

The analysis reveals that colleges and universities retain a significant fraction of their investment re-

⁴The authors also document evidence that institutions appear to reduce faculty positions but not administrative positions when they experience negative returns.

⁵On average, endowments have grown substantially in real terms 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).

⁶Instrumenting for endowment levels with investment returns is valid in this context because nearly all of the returns are retained in the endowment for this sample of institutions. This implies that endowment growth, and the resulting increase in revenue that can be drawn from the endowment, is the primary mechanism by which investment returns affect institutional spending and the outcomes of interest. In addition to finding that returns are retained in the endowment, I find no evidence of short-run increases in spending and returns do not meaningfully change the composition of endowment funds.

turns in their endowments and, as a result, increase annual spending in subsequent years. A doubling of the endowment results in a 23 percent net increase in core areas of operational spending, or approximately \$15,000 per student.⁷ The increase in institutional spending is allocated to a range of operating categories, including instruction, academic support, student services, and administration. However, there is no evidence that endowment growth results in expanded enrollments. The point estimates are negative and precise enough to rule out even modest enrollment increases. That is, increases in spending due to endowment revenue do not lead to greater overall access to these selective institutions. Colleges and universities with greater endowment returns do not increase the fraction of students receiving institutional aid but do increase aid amounts for those who receive it. Estimates indicate that approximately 17 percent of the net increase in spending generated by endowment returns is allocated to financial aid, but these increases are largely offset by increases in list prices for tuition and room and board. Institutions with higher returns do not increase the fraction of entering first-year students who are eligible for federal aid, revealing that endowment wealth does not generate increased access for lower-income students.

Endowment growth leads to changes in undergraduate admissions. Specifically, wealthier institutions become more selective with lower admissions rates and higher average admissions test scores. For example, a doubling of the endowment results in an increase in the average SAT score of incoming students of 35 points. Entering cohorts have, on average, lower fractions of students who are American Indian, Black, or Hispanic, and higher fractions who are White or Asian. The overall reduction in enrollment of underrepresented students of about 5 percentage points is statistically significant and meaningful in magnitude relative to baseline levels, revealing that, on average, institutions do not use additional endowment revenue to expand access to underrepresented populations. This result is consistent with a contemporaneous reduction in the estimated average federal aid received. Institutions with greater endowment growth do, however, experience significant gains in their rankings in the U.S. News and World Report, at least partially driven by increased spending and selectivity.⁸

The estimates are robust to a range of alternative specifications, methods of grouping peer institutions, and designs. Notably, controlling for baseline levels and pre-trends in endowments and the outcomes of

⁷Note that this is an estimate of the net increase in total institutional spending, accounting for changes in spending from other revenue sources.

⁸The improvements in rankings are largest for liberal arts colleges. Higher rankings stem in part from the direct effect of increased spending per student, which is weighted explicitly in ranking formulas. Additionally, rankings weight factors that the analysis reveals are responsive to endowment wealth, such as admissions selectivity, and that are likely to change as a result of greater spending and selectivity (e.g., peer assessment scores).

interest has modest effects on point estimates.⁹ To examine if the results are driven by institutions that are more or less willing to take investment risks, colleges and universities are grouped based on having the same variance of annual returns, but different return averages, during the sample period. Results are also presented for a design that exploits only short-run changes in the outcomes in response to concurrent investment returns. This design confirms the findings that growing endowments increase spending but do not result in expanded enrollment or greater access for low-income students and students of color.

Finding that endowment growth does not translate into institutional aid at the rate reported in surveys and that there is no evidence of greater enrollment of underserved populations supports the concerns of policy advocates that institutions do not prioritize using their wealth to increase educational opportunity.¹⁰ The estimates are consistent with evidence in the literature that elite institutions compete more for prestige than expanded access (Blair and Smetters, 2021). More broadly, the analysis contributes to the large academic literature documenting barriers to elite postsecondary education.¹¹ The results also highlight potential challenges for policies that might wish to increase access or reduce student debt by inducing spending from endowments.¹² Specifically, in the absence of incentives to allocate additional spending to specific purposes, and transparent methods of measuring net changes in these outcomes, it is not clear that such policies would result in expanded access.

The paper is organized as follows. Section II discusses the data sources and sample construction. Section III introduces the empirical design, documents variation in returns across peer institutions, and presents evidence of balance. Section IV presents estimates of the effect of endowments on expenditures, enrollment, financial aid, admissions, the composition of incoming students, and institutional rankings. Section V concludes.

⁹Robustness is also examined for alternative approaches to defining and grouping peer institutions. In the primary design, colleges are placed into groups of peer institutions based on their U.S. News Rankings (e.g., liberal arts colleges ranked 1 to 10, 11 to 21, etc.). As alternatives, institutions are grouped using baseline endowment wealth, baseline outcome levels, and pre-period investment returns.

¹⁰See 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 underrepresented minority students.

¹¹As documented by Pallais and Turner (2006), there is a supply of academically eligible, low-income students who could be pursued by elite institutions through outreach, aid, and other initiatives.

¹²The Tax Cuts and Jobs Act of 2017 targeted college and university endowments with a 1.4 percent investment returns tax. See Hinrichs (2018) and Levine (2018) for detailed discussions of this policy. More recently, the 2025 spending bill passed by Congress includes a tiered system with even higher tax rates for institutions with the highest per-student endowment levels.

II Data

The data for this paper are derived from the National Center for Education Statistics Integrated Postsecondary Education Data System (IPEDS), endowment reports from the National Association of College and University Business Officers (NACUBO), IRS Form 990s, institutional financial reports, and historical U.S. News and World Report rankings. The analysis focuses on investment returns and changes in endowments at private colleges and universities between 2003 and 2023.¹³

II.1 Endowments and Investment Returns

IPEDs data include endowments at the beginning and end of each reporting year and their annual investment returns (NCES 1999-2023). NACUBO publishes endowment levels and returns each year for high endowment colleges and universities (NACUBO 1999-2023). Institutions also report endowment levels and investment returns to the IRS on Form 990s, which are available beginning in 2008, and in their annual financial statements.

Throughout the analysis, endowments, investment returns, and outcomes measured in dollars (e.g., spending, list price tuition, federal and institutional aid) are adjusted to 2020 dollars. As detailed in Section III, institutions adopt spending targets such that revenue drawn from endowments is largely determined by the three-year lagged average of endowment levels. Thus, the primary specifications use discounted cumulative investment returns averaged over the prior three years and the natural log of three-year lagged endowment levels.

II.2 Institution and Student Outcomes

A rich set of expenditure, enrollment, financial aid, admissions, and demographic data from IPEDS are merged to the panel of investment returns and endowment levels (NCES 1999-2023). Expenditures are reported separately for categories such as instruction, academic support, student services, auxiliary enterprises, institutional support, and research.¹⁴ Financial aid measures for full-time first-year students include

¹³The sample period is determined by the availability of data for several of the outcomes of interest in IPEDS as well as reliable data on institutional investment returns.

¹⁴Instruction includes expenses directly associated with courses, while academic support includes peripheral components such as libraries, IT, and academic administrators. Student services include psychological services, student activities, sports, and the registrar's office, while auxiliary enterprises include residence halls, dining, and health services. Institutional support captures general administration, management, legal, and public relations. Research expenditures include institutes, research centers, and faculty research funds.

the number receiving federal, state, and institutional grants, loans, and any form of financial aid. These counts are used to compute the percent of first-year students receiving aid of each type. Federal aid receipt sheds light on the fraction of incoming students who are Pell Grant eligible, a proxy for being lower-income, while the fraction receiving institutional aid can reflect both the socioeconomic composition of the student body and an institution's eligibility criteria. In addition, IPEDs includes the average amount for each type of aid, conditional on receipt, revealing the generosity of institutional aid per recipient. Colleges and universities report their list tuition and fees and on-campus room and board prices, which are used to estimate whether institutions with growing endowments reduce or increase their prices, providing context for changes in aid levels and making it possible to approximate the average net prices faced by students and their families. The analysis considers changes in the number of first-time undergraduate applicants who are admitted and the yield rate based on the number who matriculate. Many, but not all, colleges in the sample report SAT and ACT scores for incoming students, providing an additional measure of selectivity.

Enrollment for each institution is computed as full-time equivalents (FTE), with full-time students counting as 1 FTE and part-time students as 0.5 FTE. Counts of the race of entering first-year students are used to document the percent of students who are American Indian, Asian, Black, Hispanic, White, or non-resident alien.¹⁵ I construct an aggregate measure of underrepresented students of color equal to the sum of Black, Hispanic, and American Indian students.

U.S. News and World Report college and university rankings are widely used by college applicants when choosing where to apply and attend. Factors receiving weight in the ranking during this period include per-student spending, admissions selectivity, and peer assessment scores from other institutions. Thus, rankings represent an outcome of interest as well as a potential mechanism by which endowments can affect outcomes such as admissions selectivity and student diversity. In order to assess the effect of endowments on rankings, I merge historical rankings for each institution in each year.¹⁶

II.3 Sample Construction

The sample is comprised of institutions identified in the Carnegie Classification as private research universities and liberal arts colleges. Colleges that primarily award associates degrees, have narrow specialties (e.g.,

¹⁵Starting in 2010, many colleges started reporting a "two or more races" category. Thus, as an alternative to the primary race variables, students classified as two or more races are distributed proportionately to the other races at the institution. Using this alternative set of race variables has little effect on the estimates.

¹⁶The rankings were compiled by Andrew G. Reiter and can be found at the following website: <http://andyreiter.com/datasets>.

theology, art, music), and graduate institutes are not included. Not all private colleges and universities have significant endowments. Institutions with low endowment levels per student are unlikely to significantly alter their expenditures in response to market-driven variation in investment returns as their revenue comes from other sources such as tuition payments. Thus, the sample is restricted to research universities and liberal arts colleges with endowments of at least \$20,000 per student in the first year of the sample period.¹⁷ For this sample of selective national institutions, endowments often account for a significant fraction of total annual revenue.¹⁸ A small number of institutions in the sample (about 2 percent) have multiple campuses and inconsistent reporting of data for these campuses across years. Such reporting inconsistencies render changes in outcomes over time spurious, so these institutions are excluded from the analysis.

The resulting sample includes 201 institutions (138 liberal arts colleges and 63 research universities) that serve more than 1.1 million students and 700,000 undergraduate students in recent years. The sample captures the majority of highly selective private institutions in the United States, including all of the 50 highest ranked liberal arts colleges and 34 of the 50 highest ranked national universities in the U.S. News World Rankings.¹⁹ In recent years, the average acceptance rate across these institutions is less than 50 percent, with a quarter of institutions accepting less than 20 percent of applicants. The institutions are characterized by large endowments (averaging 298,000 dollars per student in 2023) and high operational spending (averaging 66,000 dollars per student). As of 2023, approximately 24 percent of students at these colleges and universities receive need-based federal aid, 13 percent of students are Hispanic, and 8 percent are Black.

III Empirical Design

This paper attempts to isolate the causal effect of endowments on institutional spending, and the impact of that spending on financial aid generosity, admissions selectivity, and the composition of incoming first-year students. However, there are multiple sources of endogeneity between endowment levels and the outcomes

¹⁷Few institutions that are classified as private research universities or liberal arts colleges have such modest endowments. Thus, restricting the sample to institutions with at least \$20,000 of endowment per student only excludes 8 percent of the sample. In 2020, private research universities and liberal arts colleges had median endowments of approximately \$90,000 and \$143,000 per student, respectively, while master's colleges and universities and general baccalaureate colleges had median endowments of \$38,000 and \$29,000. The results in the analysis are robust to other cutoffs for minimum endowment size.

¹⁸For example, Swarthmore College and Haverford College report that approximately 50 percent and 25 percent of annual operating revenue comes from their endowments, respectively.

¹⁹The analysis does not include public research universities such as the University of California at Berkeley, the University of Virginia, and the University of Michigan.

of interest. In the cross-section, factors such as institution age, prestige, and alumni networks can shape endowment wealth as well as admissions selectivity and the composition of students who apply and attend. Endogeneity also poses challenges to panel analyses. First, there is a mechanical negative relationship between endowment levels and spending, as distributing revenue from endowments means that less can be retained. This can create bias when examining the relationship between endowments and, for example, aid generosity and enrolling low-income students. Second, there are likely to be correlations between an institution's capacity to attract new endowment gifts and its trends in the outcomes of interest. For example, a college or university with a positive trajectory in terms of its prestige or academic reputation may simultaneously become more selective and more able to attract new gifts that grow its endowment.

III.1 Variation in Investment Returns

To abstract from the endogeneity issues detailed above, the design exploits variation in endowment investment returns over time. Variation in returns provides shocks to endowment growth across otherwise similar institutions and a promising approach for identifying how revenue from the endowment impacts institutional outcomes. Brown et al. (2014) 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.” Differences in returns across institutions can emerge from allocating investments to different asset classes or from choosing different assets within those classes.²⁰

This study examines the effect of endowment returns on endowment levels, institutional spending, and various measures of financial aid and access. Because the analysis reveals that returns at these institutions are largely retained in their endowments, which in turn leads to increases in spending, I use investment returns to instrument for endowment levels. Specifically, I compute predicted endowment levels for each institution and year by applying annual investment returns to baseline endowment levels. Institutional spending targets are based on the average endowment level over the prior three years, so three-year averages of the predicted endowments are used as instruments for the three-year averages of the actual endowment levels.²¹ That is, I use annual returns to determine expected endowments in each year, compute the three-year lagged

²⁰Institution-specific endowment portfolios are not publicly available, but NACUBO reports summary statistics based on a survey of some institutions. In 2008, 75 percent of assets were invested in stocks, bonds, and cash, 17 percent in hedge funds, private equity, and venture capital, 4 percent in real estate, 2 percent in commodities and energy, and 2 percent in other vehicles (NACUBO 2008). Decisions about how to invest endowment wealth are typically made by trustees, professional managers, internally by institutions, or by some combinations of these.

²¹Analyses indicate that average expenditure rates from endowments typically fall close to the 4 to 5 percent targets outlined in institutional spending rules (Hansman, 1990; Sedlacek and Jarvis, 2010; Brown et al., 2014).

value of these expected endowments, and then use this value as an instrument for the actual three-year rolling endowment average. Using returns as an instrument for endowment levels is only valid if investment returns do not affect the outcomes of interest through other channels. This is violated if, for example, returns are partially spent in the short run, cause changes in the endowment spending rate, or change the composition of the endowment in such a way that it affects spending patterns. On average, for this sample of institutions, there is no evidence of these other channels. However, the goal of the analysis is to understand how endowment revenue and spending impacts institutional outcomes, which does not necessitate scaling the estimates by endowment levels, so I also present reduced form estimates measuring the direct effect of cumulative investment returns.

It is crucial to the design that investment returns vary within institutions over time and across similar institutions. As shown in Figure 1, after a downturn in 2001 and 2002, there were strong returns between 2003 and 2007, a sharp decline at the start of the Great Recession, and a rebound after 2010. While there are large fluctuations in average annual returns across years, significant positive growth is the norm and drives most of the variation. For example, between 2003 and 2023, there were ten years with average endowment investment returns exceeding 10 percent, and just one year with losses of 10 percent or more.²² Differences in returns across institutions are large. For example, the gap in returns between the 10th and 90th percentile institutions in a given year average more than 9 percent. Some institutions experienced both large losses during the recession and modest rebounds when markets rallied, while other, similar institutions performed above the average during both boom and bust markets.²³ These annual differences generate large cumulative differences in returns over time. As shown in Figure 1, the difference in cumulative returns between the 10th and 90th percentile of institutions during the sample period is approximately 200 percent.

Figure 2 presents the distribution of average returns for the 201 institutions in the sample. Notably, there is significant variation in returns across institutions that are very similar in terms of their characteristics. Figure 3 shows that there are large differences in average returns across colleges (top panel) and universities (bottom panel) with similar baseline U.S. News and World Report rankings.²⁴ Likewise, there are large

²²Gilbert and Hrdlicka (2015) attribute the high level of returns and risk in university endowments to The Uniform Prudent Management of Institutional Funds Act, which dictates that the future spending power of endowments, rather than initial principal, should be preserved.

²³For example, among highly ranked liberal arts colleges with large initial endowments, colleges such as Haverford, Carleton, and Bates experienced average annual returns during the sample period of just 5 to 7 percent, while Bowdoin, Kenyon, and Wellesley had returns of 9 to 11 percent.

²⁴The differences in returns across similar institutions are evident when examining variation in cumulative returns over time (Appendix Figure A1). Among groups of colleges and universities of similar rank, the gap between the 10th and 90th percentiles of cumulative returns often exceeds 100 percent.

differences in returns across institutions with similar baseline endowment wealth.²⁵ Thus, it is not the case that variation in returns stems solely from higher ranked and richer schools having greater capacity to invest more aggressively and achieve higher returns.

III.2 Primary Specification

To exploit the wide variation in returns across similar colleges and universities, the primary design groups institutions of the same type, separating research universities and liberal arts college, and baseline U.S. News and World Report rankings. Specifically, in order to restrict comparisons to peer institutions, college and universities are placed into groups of 10 institutions based on their rankings in the baseline year. Thus, for example, highly selective research universities such as Yale, Stanford, and Princeton are compared to each other, and likewise for elite liberal arts colleges such as Swarthmore, Bowdoin, and Middlebury. Making comparisons only within these narrow groups ensures that estimates are based on variation over time between close peer institutions.²⁶

The instrumental variables design examines the effect of endowments on each outcome of interest: spending by category, enrollment, financial aid, admissions, socioeconomic and racial diversity, and institutional rankings.

$$Outcome_{i,y} = \alpha_i + \alpha_{g,y} + \beta \ln(Endowment)_{i,y} + \varepsilon_{i,y} \quad (1)$$

Endowment is the three-year rolling average of endowment levels, the relevant value under institutional endowment spending rules. Because actual endowments are endogenous to spending and new gifts, they are instrumented for using investment returns. The specification includes institution fixed effects and thus examines variation in the outcome within the institution over time. Fixed effects are included for each year at the institution group level, where groups are based on initial Carnegie Classification (college or university) and institutional ranking.²⁷ The coefficient of interest β reflects the effect of a 100 percent increase in the

²⁵Appendix Figure A2 presents average returns by baseline per-student endowment level. Lerner, Schoar, and Wang (2008), Dimmock (2012), Smith (2015), and Cejnek, Franz, and Stoughton (2017), each note that institutions with larger endowments tend to take riskier investment positions and have higher average returns. This is observable in Figure A2, which has an upward slope, though there is significant variation in returns across similarly resourced institutions.

²⁶Goetzmann and Oster (2014) find that close competitor institutions attempt to mimic each other's investment strategies, and often chase the investment strategies of successful competitors. This suggests that competitor institutions have similar investment objectives, providing additional justification for making comparisons within, rather than across, these groups.

²⁷Group year fixed effects capture common changes in the outcomes of interest. For example, over time there have been increases in the fraction of college students who are Hispanic, changes in the generosity of Pell Grant aid, and widespread economic shocks. The inclusion of year fixed effects ensures that the correlation of such changes with endowment levels are not spuriously interpreted as causal effects.

endowment (or doubling) on the outcome. Standard errors are clustered at the institution level and at the year level.

An instrumental variables approach is valid if the causal channel through which investment returns affect the outcomes of interest is by increasing endowment levels. This would be violated if, for example, institutions did not retain the returns in the endowment and instead spent some of the returns in the short run. Similarly, the instrumental variables assumption would be violated if higher endowment returns caused institutions to increase or decrease their endowment spending rates or if the returns changed the composition of the endowments (such as the fraction of endowments that are unrestricted) and thus the endowment spending pattern. For this sample of 201 institutions, the evidence is consistent with a high fraction of endowment returns being retained in the endowment. I find no empirical evidence of excess increases in spending in the years immediately following high returns, and there is no statistically significant change in the share of assets that are unrestricted in response to cumulative returns. Nonetheless, these channels may be significant for some institutions, or types of institutions, and I cannot rule out that other causal channels exist. However, the goal of this study is to understand how endowment wealth affects institutional spending and the outcomes of interest, and is not dependent on instrumenting for endowment levels. Thus, in addition to the instrumental variables estimates, I also present the reduced form effects of discounted cumulative endowment returns on each of the outcomes.

Differences in investment returns provide variation in endowment revenue that are not a direct function of expenditure decisions or alumni giving. The design is valid if variation stems from unanticipated shocks in investment markets and peer institutions would otherwise experience similar changes in the outcomes of interest. As a test of these assumptions, I first examine if the grouped institutions are balanced in terms of baseline characteristics. Table 1 presents the relationship between cumulative returns during the sample period and a rich set of institutional characteristics. Within ranking groups, returns are not significantly correlated with baseline expenditures (overall and across categories), enrollment levels, student demographics, admissions selectivity, list price tuition, and aid generosity.

The effect of endowment revenue on enrollment levels, financial aid, and student composition could be muted if there are strong restrictions on how endowment revenue can be used. Several analyses of this question indicate that a significant fraction of endowment wealth is unrestricted and liquid (Conti-Brown, 2011; Brown et al., 2014). That is, endowments are comprised of both traditional endowments

that must be preserved, and other assets that institutions have the freedom to spend (Ehrenberg, 2009).²⁸ Among the institutions in this sample, 61 percent of net assets are unrestricted at the start of the sample period. Further, many restricted endowment funds are dedicated to purposes that overlap significantly with those supported through general funds, such as student aid, faculty positions, and academic departments and programs. For example, institutions report that approximately half of spending from endowments is allocated to financial aid, suggesting that any restrictions on the use of funds do not preclude significant spending on aid (NACUBO 2018).

III.3 Investment Returns and Endowment Growth

If endowment investment returns are spent rapidly, then large changes in spending and other outcomes could occur shortly after the returns are realized. Alternatively, if colleges adhere to fixed-percent spending targets, then returns will be retained in the endowment and generate persistent changes in future spending. I first estimate how investment returns in each year affect future endowment levels.

$$AnnualPercentEndowChange_{i,y} = \alpha_{g,y} + \sum_{t=-5}^0 \gamma_t AnnualPercentReturn_{i,t} + \varepsilon_{i,y} \quad (2)$$

The annual change in endowment and annual return are measured in percents. 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, for example, returns are temporarily retained in the endowment and then spent quickly in subsequent years.

Without controlling for year effects, the coefficient γ_0 reveals that approximately 90 percent of investment returns are retained in the endowment. However, identification in this study exploits differential, concurrent returns across institutions. Thus, Table 2 presents the extent to which annual returns affect endowments while controlling for year fixed effects common to all institutions. The results reveal that the majority of differential investment returns are retained in endowments. There is also no evidence of significant negative effects of prior year investment returns, indicating that the increases in the endowment are

²⁸Prior to 2008, states generally followed the Uniform Management of Institutional Funds Act, which dictated that non-profit institutions could not spend endowment funds if they fell below the level of the initial principal. This could, in times of significant down markets, significantly restrict the ability of an institution to spend from endowment funds. By 2012, this law had been replaced in nearly every state by the Uniform Prudent Management of Institutional Funds Act, which allows for prudent spending of underwater endowments, but also dictates that the future spending power, and not the baseline principal, must be preserved. There is evidence that the new law made endowments more liquid and resulted in greater spending during the Great Recession in states where it had been adopted (Anderson, 2019).

persistent.²⁹ These results are robust to making comparisons only among peer institutions through the inclusion of ranking group-by-year fixed effects. Further, controlling for baseline endowments and pre-trends in investment returns reveals that changes in endowment levels are not driven by pre-existing differences.

With an understanding of these dynamics in hand, returns are used as an instrument for the actual endowment. Specifically, annual returns are applied to the baseline endowment and then this value is reduced by inflation and a fixed percent to reflect average annual spending out of the endowment. The result is a predicted endowment level in each year that varies over time across institutions only because of differences in their investment returns. Predicted endowments are averaged over the prior three years to generate a proxy for the endowment measure used in spending targets. Table 3 examines the predictive power of the instruments for the actual endowments. The estimates reveal a strong first stage, consistent with the estimated effects of annual returns on year-to-year changes in endowments. A 1 percent change in the predicted three-year average endowment is associated with a more than 0.8 percent change in the actual three-year average endowment. The power of this relationship remains strong when including group-by-year fixed effects and when allowing differential trends across institutions with different baseline endowment levels and different average pre-period returns.³⁰

III.4 Robustness Tests and Alternative Specifications

Several robustness tests are conducted for the primary design, focusing on the sensitivity of the estimates to pre-existing differences in levels and trends between peer-institutions. The specification is replicated while including the interaction of year with measures of: baseline endowment level per student, pre-period returns, and baseline and pre-trends in the outcomes of interest. Estimates using this alternative specification are presented alongside the baseline specification in the main tables. Additionally, I examine the sensitivity of the estimates to alternative groupings of peer institutions. Colleges and universities are grouped by their baseline endowments, pre-period returns, and baseline and pre-trends in the outcomes. Higher investment returns may reflect greater willingness to take investment risk on the part of institutions. To examine if the

²⁹Hoxby (2014) poses that research universities and the most selective colleges 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.

³⁰Table A1 examines the robustness of the first stage relationship between predicted endowments and actual endowments. The primary design is replicated for alternative groupings of colleges and universities with peer institutions. Specifically, institutions are grouped based on having the same: a) baseline per-student endowments; b) pre-period investment returns; and c) variance in investment returns during the sample period. Predicted endowments are strongly correlated with actual endowments for each of these alternatives.

effects are driven by differences in risk preferences across institutions that are correlated with the outcomes of interest, I group institutions according to the variance of their returns during the sample period. Estimates based on alternative groupings of institutions are presented in the appendix.

I present reduced form estimates showing the effect of discounted cumulative investment returns without instrumenting for endowments. These estimates can be interpreted without the assumption that returns only affect the outcomes by shifting endowment levels. In addition, I consider shorter-run responses to endowment returns. Specifically, I estimate how the outcomes change over five-year periods relative to concurrent returns. This approach is appealing to the extent that it provides more within-institution variation over the sample period. However, the estimates for some outcomes will be attenuated if changes take time to materialize. For example, endowment growth should have a short-run impact on spending, as spending targets are based on three-year endowment averages, and this may be reflected in aid generosity for new students, whereas increasing institutional capacity is likely to require capital investments and a longer time horizon.

IV The Effect of Endowments on Institutional and Student Outcomes

IV.1 Expenditures

Table 4 presents estimates of the effect of endowments on institutional spending. These reveal effects that are large in magnitude and highly statistically significant, with a doubling of the endowment increasing core spending by 23 percent.³¹ The magnitude of the spending response is essentially unchanged when controlling for pre-existing trends in investment returns and spending. This finding is consistent with institutions following endowment spending targets or “rules” which suggest that variation in endowment levels over time should mechanically impact spending. When estimated in levels, doubling the endowment increases institutional spending by \$15,593 per student annually (Table A2). The magnitude of the estimate reveals the important role that endowments play in overall institutional spending at these private institutions, and is especially noteworthy in light of the large differences in cumulative endowment returns across institutions over time.³² I now turn to documenting how this spending is allocated and the impact it has on the student

³¹Core spending includes instruction, academic support, student services, auxiliary student services, administration, and research. It excludes spending associated with university hospitals, external public service, and operations independent of the primary mission of the institutions.

³²Changes in spending represent the net effect of changes in endowments. For example, if endowment growth leads to changes in tuition collected or other sources of revenue, the estimated changes in expenditures will reflect these mechanisms. Empirical

population.

Little is known about how endowment wealth causally affects spending across operating categories.³³ Note that this is not an accounting exercise whereby endowment revenue is allocated to specific purposes, but rather an examination of the net effects on spending. Documenting the effects of endowment revenue, which may be fungible with revenue from other sources (such as tuition payments), is ultimately an empirical question (Avery et al., 2024). Table 4 presents the change in expenditures per student across six operating categories: instruction, academic support, student services, auxiliary services, institutional support (administration), and research. Every category exhibits gains in response to endowment growth, with statistically significant increases for instruction, academic support, student services, and administration. The baseline estimates are based on comparisons of institutions with the same Carnegie classification and the same ranking. Allowing for differential trends across institutions with different baseline endowment levels, pre-period returns, baseline spending levels, and spending trends, does not meaningfully alter the estimates.³⁴ Overall, the estimates reveal that increases in endowment revenue lead to greater spending across a wide range of operational categories. This, in conjunction with institutions' freedom to redirect general funds, suggest that, on average, institutions can use wealth to affect a range of student outcomes. In contrast to survey results, these estimates capture the net impact of endowment revenue on spending across operational categories. The results are informative for understanding the potential effects of endowment taxes.³⁵

IV.2 Enrollment

An important question is whether institutions with growing endowments use the additional revenue and spending to enroll larger incoming classes and thus increase access to selective higher education. Institutions could potentially increase enrollment while maintaining the quality of faculty and the student experience through increased investment in facilities and personnel. Institutions could also attempt to expand while maintaining student quality by offering more generous aid packages to attract stronger students. Conversely,

tests indicate that endowment growth generates positive, but not statistically significant increases in other sources of revenue. Specifically, there is no evidence of increased tuition revenue and modest increases in new alumni giving.

³³Previously, 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.

³⁴Tables A2 and A3 present estimates for alternative methods of grouping colleges and universities. Pairing institutions with those of similar baseline endowment and spending levels and trends produces estimates that are nearly identical to those based on the primary design. The results are also robust to grouping institutions by the variance of their investment returns.

³⁵In 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).

colleges with less endowment growth might be forced to increase enrollments to generate additional revenue. That is, large endowments may provide institutions with the financial freedom to remain small (if desired) as they are less reliant on tuition revenue.

The estimates in Table 5 indicate that larger endowments do not lead to larger enrollments. Specifically, doubling the endowment leads to a small and statistically insignificant reduction in enrollment. A negative point estimate is documented for first-year enrollment, all undergraduates, and total enrollment including graduate students. Thus, 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, increased hiring, or the ability to recruit and support students with more generous aid. These results are robust to controlling for baseline endowment and enrollment levels and pre-trends in enrollment.³⁶ This pattern is consistent with the lack of expansion across decades at elite institutions documented by Blair and Smetters (2021).³⁷

IV.3 Financial Aid and College Cost

Institutions with larger endowments could maintain or increase spending levels while providing more financial aid and deriving less revenue from tuition and room and board payments. Greater institutional generosity could take the form of smaller increases in list prices that apply to all students, expanding the fraction of students who receive institutional aid, or increasing institutional aid packages. Wealthier institutions could also enroll higher fractions of low-income students, which would be revealed through increases in the fraction of students receiving federal grant aid. Thus, I examine the effect of changes in endowments on list price, the percent of students receiving aid, average aid levels conditional on receipt, estimated net price, and the fraction of students receiving federal aid.³⁸

Colleges and universities could use increased endowment revenue 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

³⁶The estimates are also robust to grouping institutions with those that have the same baseline enrollment levels and enrollment trends (Table A4).

³⁷Finding that selective private institutions do not expand enrollments is also consistent with Bound and Turner (2007), who document that the most selective public institutions are “least likely” to expand enrollments in response to larger state cohorts.

³⁸More generous institutional aid could also lead to a smaller fraction of students taking out loans, so I examine this as an additional outcome of interest. However, changes in the fraction of students taking out loans could also reflect changes in the composition of enrolled students, and thus the results should be interpreted with an understanding of potential changes in the fraction of students from lower and higher income households.

higher prices. The estimates in Table 6 indicate that institutions with larger endowments do not reduce tuition or room and board. The point estimates are positive, so it seems clear that, on average, these colleges and universities do not use endowment wealth to reduce list prices.³⁹ Thus, any change in cost for students overall would need to take the form of greater grant aid, either through expanding eligibility for aid to a larger set of students or providing more generous aid to recipients.

Table 7 reveals that increases in endowments result in no significant increase in the fraction of students receiving institutional aid. Indeed, when controlling for pre-trends, the small positive effect on the share of students receiving institutional aid turns negative. Further, there is a negative but insignificant effect on the fraction of students receiving federal aid, which suggests that wealthier colleges and universities are, if anything, reducing the fraction of low-income students they serve. In conjunction, the results reveal that institutions are not expanding aid by admitting more low-income students or by expanding the fraction of students receiving institutional aid. Estimates reveal a statistically significant reduction in the fraction of students taking loans. This reduction could reflect increased generosity of institutional aid (i.e., larger aid packages per recipient), but could also reflect a change in the composition of students toward those who are less likely to need financial assistance.

Table 8 reveals that institutions with greater endowment returns increase in the amount of institutional aid conditional on receipt. Specifically, doubling the endowment increases institutional grant aid by approximately \$3,600, or about 14 percent relative to average aid levels. As a back of the envelope exercise, I note that approximately 77 percent of students receive institutional aid, indicating that the amount of institutional aid per enrolled student increases by about \$2,700 when the endowment doubles. Thus, about 17 percent of the increase in per-student spending is allocated to institutional financial aid. This causal estimate of the share of endowment revenue allocated to aid is much smaller than what is reported in surveys, as colleges and universities indicate that half of endowment revenue goes to financial aid (NACUBO 2018).⁴⁰ Combining the fraction of students receiving each type of aid, the generosity of aid conditional on receipt, and list tuition and room and board provides an approximation of net price per student. Estimates indicate that these net prices do not decrease with endowment growth. That is, significant increases in endowment wealth lead to greater institutional spending, but, for the average student, no reduction in net price.

³⁹The estimates are relatively unchanged in specifications that include pre-trends. Additionally, grouping institutions based on their baseline endowment and tuition levels and trends produces consistently modest and insignificant estimates (Table A5).

⁴⁰The difference highlights the importance of estimating net effects that account for offsetting changes from other revenue sources. The survey was completed by high endowment institutions reporting to NACUBO and thus should be approximately comparable to the sample of institutions included in this analysis.

The financial aid estimates result in two primary conclusions. First, it appears that growing endowments lead to more generous institutional aid packages but that the increases are not as large as would be suggested by institutional surveys, and that aid increases are partially offset by increases in list prices. Second, endowment returns do not cause colleges and universities 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 Grants, and, conditional on receiving a federal grant, the average amount is not higher. Likewise, there is a reduction in the fraction of students receiving aid from any source. The pattern of effects of endowment wealth on the fraction of students receiving aid, per-student aid amounts, and the fraction of low-income students served is robust to grouping institutions that serve similar fractions of low-income students in the baseline period or that have similar pre-trends in the fraction of low-income students they serve.

IV.4 Admissions and Student Composition

This section examines whether or not investment returns and the resulting endowment growth lead institutions to increase the racial diversity of their incoming classes. This could stem from, for example, offering students who belong to underrepresented populations more generous aid packages, providing a higher quality product that attracts more diverse applicants, or spending on outreach programs. Alternatively, colleges and universities could use increased aid and quality to achieve other goals, such as becoming more selective, potentially making it more difficult for underrepresented groups to gain admission.

As shown in Table 9, institutions with growing endowments reduce the number of students they admit. These institutions have modestly higher admission yield rates suggesting an increase in desirability, perhaps stemming from greater per-student spending and possibly increased prestige. The reduction in admissions and increase in yield of admitted students are offsetting and produce no net increase in first-year enrollment (as detailed in Section IV.2). That is, colleges with growing endowments are able to maintain cohort sizes while increasing selectivity.⁴¹ Increased selectivity is supported by evidence of higher average SAT and ACT scores for incoming cohorts.

Larger endowments result in somewhat more generous institutional aid, which institutions could use to attract underrepresented groups. Conversely, colleges and universities with growing endowments appear to become more selective, which may make them less likely to admit lower-income students and students

⁴¹The reduction in admissions and increase in the yield rate are robust to grouping institutions by their baseline levels and pre-trends in selectivity (Table A8).

of color. Table 10 presents estimates of the effect of endowments on the racial composition of enrolled first-year students. The estimates reveal positive coefficients for Asian and White students and negative coefficients for Hispanic and Black students. A doubling of the endowment is estimated to decrease the enrollment of students of color by 5 percentage points. The estimate is statistically significant and large in magnitude relative to baseline levels. A potential concern is that institutions with differing demographic compositions, or with different trends in demographic composition, experience differing endowment investment returns and thus endowment growth. However, the results are robust to accounting for baseline levels and pre-trends in racial composition.⁴² Thus, the evidence is that private institutions with growing endowments become more selective at the expense of expanding access to underrepresented student populations. This result is consistent with the finding in the prior section that endowment wealth reduces the fraction of enrolled students who are eligible for federal grant aid. A possible explanation for this pattern is that institutions may have difficulty attracting additional low-income applicants or students of color. However, such an explanation is hard to reconcile with evidence of increased selectivity, increased yields and average admissions scores, the potential to allocate resources to recruitment and more generous financial aid packages, and evidence in the literature that there is a supply of high ability low-income students who are not attending elite colleges (Pallais and Turner, 2006).

IV.5 College and University Rankings

Larger endowments may cause colleges and universities to achieve higher U.S. News and World Report rankings. This is relevant to the analysis for two reasons. First, these high-profile rankings represent a potential mechanism by which endowment growth and the resulting increase in per-student spending may affect institution and student outcomes. For example, greater spending directly factors into ranking formulas, and the resulting rankings improvements could increase admissions yields and selectivity. Second, improving institutional rankings could be an objective of college and university administrators, and thus an outcome of interest in response to endowment growth. Institutions may try to improve their rankings as a means to increase their desirability to alumni, faculty, and students, and thus to strengthen their academic and financial standing.

U.S. News and World Report publishes the most well-known ranking of colleges and universities. The

⁴²Additionally, grouping institutions with similar baseline student demographics and trends produces estimates consistent with those in the primary specification. The estimates in Table A9 indicate negative effects on enrolling students of color across five alternative methods of pairing institutions.

rankings are calculated separately for national research universities and liberal arts colleges. Factors receiving weight in the rankings include a reputation score derived from a survey of peer institutions, retention and graduation rates, faculty resources (such as class size), admissions selectivity measures, financial resources such as spending on instruction and student services, and alumni giving rates. Each of these factors can be directly or indirectly affected by the increased revenue generated by growing endowments. As examined above, larger endowments directly increase per-student spending on instruction and student services, which mechanically increases institutional rankings. Likewise, greater spending on instruction leads to improved faculty resources.⁴³ The finding that larger endowments leads to increased selectivity and higher admissions yields may also stem from increased spending (e.g., through greater aid packages or offering a more desirable college experience) as well as indirectly from increased prestige. In turn, greater spending and increased selectivity can affect outcomes such as student retention which also lead to higher rankings.

Table 11 presents the estimated effect of endowment growth on college and university rankings. Overall, larger endowments substantially improve rankings, with the effects largely driven by liberal arts colleges. The effects are largest for lower-ranked colleges in the sample (those that started the sample period with a national ranking between 50 and 100), which likely reflects the limited scope for ranking gains among those ranked highest in the baseline period. For example, a doubling of the endowment is estimated to improve the ranking of a liberal arts college by approximately 25 positions if it is ranked outside the top 50 in the baseline period.

IV.6 Alternative Designs

This section considers estimates from two alternative specifications. The first examines the reduced form effect of discounted endowment returns without instrumenting for endowment levels. The second estimates the effects of shorter-run returns on endowment levels and the outcomes of interest.

The analysis thus far has focused on the impact of investment returns on institutional spending and undergraduate outcomes through its impact on endowment levels.⁴⁴ However, the goal of the analysis is to examine how endowment revenue affects outcomes regardless of whether it operates through endowment levels and spending rate targets or some other mechanism. Tables A11 through A18 present the reduced for

⁴³Additional estimates reveal that larger endowments reduce student-to-faculty ratios overall and for liberal arts colleges in particular. This stems from a combination of increased faculty numbers and the previously estimated reduction in student enrollment.

⁴⁴The significant majority of endowment returns are retained in the endowment for this set of colleges and universities. Thus, the primary mechanism by which returns affect institutional outcomes is through changes in endowment levels, which generate increases in spending due to institutions' endowment target spending rates.

estimates. The pattern of estimates is consistent with those in the instrumental variables analysis. Notably, there is clear evidence of increased spending across a range of operational categories in response to cumulative returns, but no evidence of increased enrollments or reduced prices. Further, higher returns lead to lower rates of enrolling underrepresented student populations but higher institutional rankings.

The second alternative examines shorter-run changes in the outcomes. Specifically, I examine five-year rolling changes in outcomes in response to five-year changes in endowments.⁴⁵ This places more weight on short-run variation in returns within institutions, but will not capture changes in outcomes that require time to be realized. The analysis reveals that short-run returns are highly predictive of changes in endowment levels and spending (Table A19). New spending is allocated to academic support, student services, and administration (Table A20). However, there is no evidence that institutions increase enrollment, reduce tuition, or increase the fraction of students receiving aid (Tables A21 and A22). Consistent with the primary design, there is evidence that colleges and universities increase institutional grant aid. Larger endowments lead to increased admissions selectivity and reduced enrollment of students of color (Table A23). Wealthier institutions do, however, experience significantly improved U.S. News and World Report rankings (Table A24). Overall, the alternative approaches produce patterns of results that are consistent with the primary design.

V Conclusion

There is little causal evidence about how private colleges and universities spend endowment revenue, and whether such spending leads to increased student access through expanded enrollments or greater socioeconomic and racial diversity. A number of factors suggest that greater endowment wealth should lead to increased access, including colleges and universities reporting that half of endowment revenue is allocated to financial aid and emphasizing diversity in their mission statements. However, self-reported expenditures from endowment revenue are unlikely to capture net effects that account for the fungible nature of revenue from different sources, while concurrent variation in endowment levels and outcomes of interest have multiple sources of endogeneity.

To examine the net, causal effect of endowment wealth on spending, financial aid, and student composition, this study exploits variation in solely generated by investment returns. Variation in returns over

⁴⁵As in the primary design, investment returns are used to create instruments for the three-year lagged endowment averages that determine institutional spending targets.

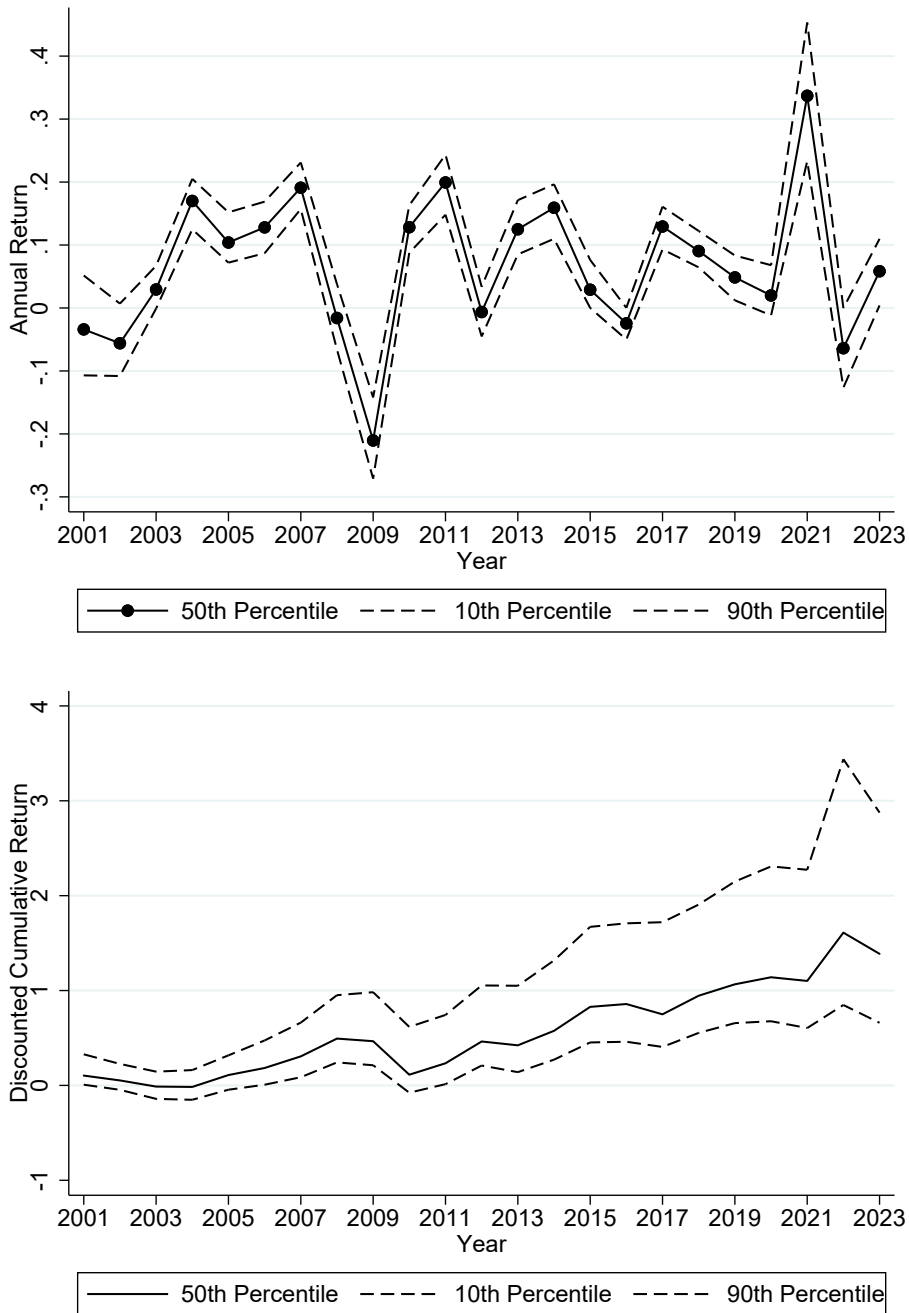
time and across close peer institutions reveal that a significant fraction of investment income is retained in the endowment, generating persistent increases in subsequent spending. However, the estimates reveal that institutional aid for students accounts for less than 20 percent of the overall increase in spending caused by endowment growth. Further, colleges and universities with greater returns and endowment growth do not increase enrollment overall to expand access to elite education and do not increase the fraction of low-income students or students of color they serve. Specifically, colleges and universities whose endowments grew the most due to investment returns over the last twenty years reduced their enrollment of Pell Grant eligible students and Black and Hispanic students relative to peer institutions. Instead, institutions with growing wealth reduced the number of admitted students, becoming more selective and achieving higher institutional rankings. The pattern of results is informative about the objective functions of private post-secondary institutions and the incentives they face. It also sheds light on which aspects of institutional operation and student access are likely to be affected by the taxation of endowment returns.

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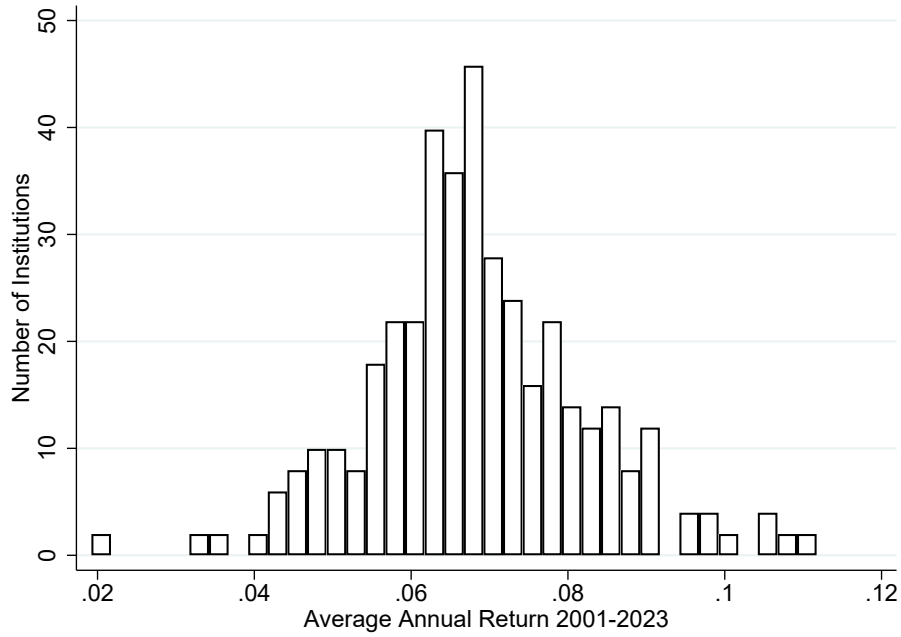
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FIGURE 1
Annual and Cumulative Investment Returns Over Time



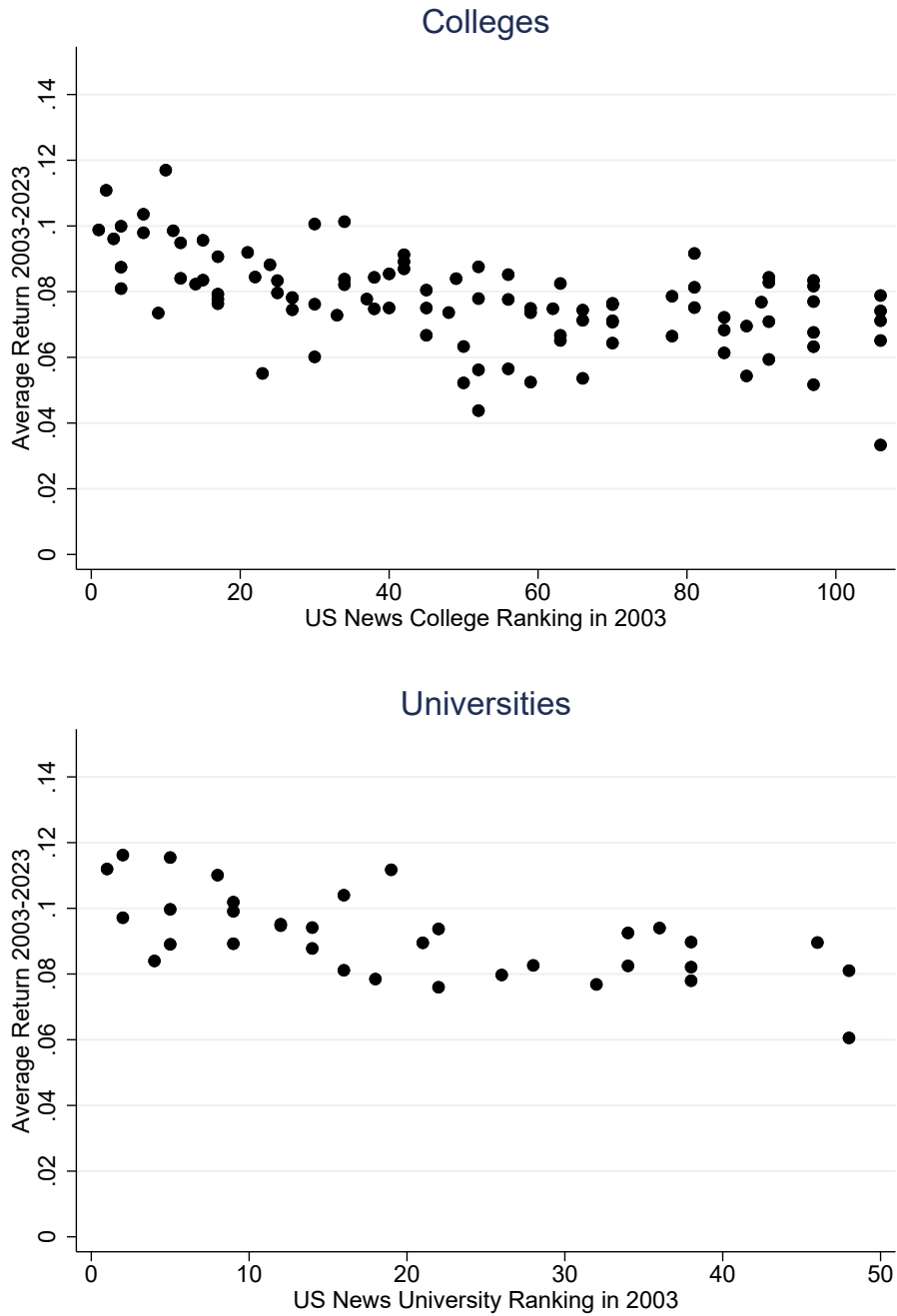
Note: The top and bottom figures present annual and cumulative endowment investment returns by year from 2001 to 2023. The 10th, 50th, and 90th percentiles are presented in each year. Liberal arts colleges and research universities are identified using the Carnegie Classification of Institutions of Higher Education. Attention is restricted to private colleges and universities with endowments of at least \$20,000 per student at the beginning of 2003. Annual percent returns are measured using investment return totals and endowment levels reported by the National Center for Education Statistics Integrated Postsecondary Education Data System.

FIGURE 2
Distribution of Average Annual Investment Returns by Institution



Note: The figure presents the distribution of average annual endowment investment returns between 2001 and 2023. The sample includes 200 institutions categorized as liberal arts colleges and research universities by the Carnegie Classification of Institutions of Higher Education. Attention is restricted to private colleges and universities with endowments of at least \$20,000 per student at the beginning of 2003. Annual percent returns are measured using investment return totals and endowment levels reported by the National Center for Education Statistics Integrated Postsecondary Education Data System.

FIGURE 3
Average Annual Investment Returns by Baseline Ranking



Note: The figures present the average investment returns between 2003 and 2023 for colleges and universities by their baseline U.S. News and World Report rankings. Rankings are measured in 2003 and attention is restricted to the top 100 colleges and top 50 research universities. Liberal arts colleges and research universities are identified using the Carnegie Classification of Institutions of Higher Education. Attention is restricted to private institutions with endowments of at least \$20,000 per student at the beginning of 2003. Annual percent returns are measured using investment return totals and endowment levels reported by the National Center for Education Statistics Integrated Postsecondary Education Data System.

TABLE 1
Relationship Between Baseline Characteristics and Cumulative Returns

	Mean	Coeff	Std Error	P-value
<i>Expenditures Per Student</i>				
Total Core Spending	61,529.65	-547.48	(1,462.02)	0.71
Instruction	23,201.56	-501.98	(781.69)	0.52
Academic support	6,348.29	-254.63	(362.35)	0.48
Student service	7,097.56	123.38	(283.88)	0.66
Auxiliary enterprises	8,331.31	-76.48	(299.52)	0.80
Institutional support	9,572.70	-386.99	(600.14)	0.52
Research	6,982.35	-1,386.61	(1,539.82)	0.37
<i>Enrollment (Full-Time Equivalents)</i>				
Total	5,213.12	22.01	(220.19)	0.92
Undergraduate	3,453.07	140.28	(118.22)	0.24
Freshman	832.31	38.28	(25.01)	0.13
<i>Freshman Demographics</i>				
Percent Asian	7.72	-0.38	(0.30)	0.21
Percent Black	6.21	0.07	(0.17)	0.67
Percent Hispanic	8.02	-0.06	(0.16)	0.69
Percent White	64.45	-0.29	(0.67)	0.66
Percent Other	13.60	0.66	(0.43)	0.13
<i>Admissions</i>				
Admissions rate	50.88	-0.64	(0.77)	0.41
Admissions yield	29.27	0.73	(0.50)	0.14
Median SAT	1,270.90	5.25	(4.10)	0.20
Median ACT	27.92	0.26*	(0.15)	0.09
<i>Tuition and Financial Aid</i>				
List price	54,530.69	195.67	(235.84)	0.41
Percent receiving aid	82.17	-1.45*	(0.77)	0.06
Average federal aid	5,729.17	120.75	(118.59)	0.31
Average state aid	4,299.81	-235.19*	(120.94)	0.05
Average institutional aid	25,607.09	-139.29	(225.38)	0.54
Average loan amount	7,148.08	-9.97	(100.97)	0.92

Note: This table examines the relationship between college and university characteristics measured in the baseline year (2003) and cumulative investment returns between 2003 and 2023. The second column presents the coefficient from a regression of each characteristic on the discounted cumulative return. Colleges and universities are grouped by their baseline year ranking by the U.S. News and World Report. Core spending includes instruction, academic support, student services, administration, and research. It excludes spending associated with university hospitals, external public service, and operations independent of the primary mission of the institutions. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 2
Investment Returns and Percent Changes in Endowment Levels

	(1)	(2)	(3)
Percent Return Year T=0	0.809*** (0.060)	0.767*** (0.058)	0.759*** (0.053)
Percent Return Year T=-1	0.049** (0.021)	0.029 (0.023)	0.021 (0.025)
Percent Return Year T=-2	0.008 (0.014)	-0.009 (0.016)	-0.018 (0.018)
Percent Return Year T=-3	-0.012 (0.030)	-0.028 (0.029)	-0.036 (0.026)
Percent Return Year T=-4	-0.011 (0.023)	0.005 (0.026)	-0.003 (0.027)
Percent Return Year T=-5	0.012 (0.020)	0.009 (0.020)	0.001 (0.024)
Mean Dep Observations	0.05 4,774	0.05 4,774	0.05 4,774
Year FEs	X		
US News Grp by Year FEs		X	X
Initial Endow by Year			X
Pre-trend Return by Year			X

Note: This table presents estimates of the effect of investment returns on endowment levels. Columns 1 through 3 examine the effect of annual returns in each of the prior six years on annual changes in endowment levels. Returns in the current year are identified as T=0 and in the five prior years as T=-1 to T=-5. Column 1 includes year fixed-effects to account for changes in endowments that are common across all institutions. Column 2 includes college and university group-by-year fixed effects, where groups are based on baseline U.S. News and World Report rankings. Column 3 allows for differential trends across institutions by baseline endowment levels and prior investment 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 3
First Stage: Actual and Predicted Endowments

	Ln Endowment (3-Yr Avg)		
	(1)	(2)	(3)
Ln Predicted Endowment: 3 Yr Avg	0.899*** (0.082)	0.861*** (0.091)	0.826*** (0.082)
Mean Dep	19.81	19.81	19.81
Observations	4,773	4,773	4,773
Year FEs	X		
US News Grp by Year FEs		X	X
Initial Endow by Year			X
Pre-trend Return by Year			X

Note: This table presents estimates of the effect of changes in predicted endowment levels on changes in actual endowment levels. Predicted endowments are created using investment returns. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. Each specification includes institution fixed effects. Column 1 includes year fixed-effects to account for percent changes in endowments that are common across all institutions. Column 2 includes college and university group-by-year fixed effects, where groups are based on baseline U.S. News and World Report rankings. Column 3 allows for differential trends across institutions by baseline endowment levels and prior investment 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 4
Expenditure Per Student by Category: Natural Log

	Core Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
<i>College Type Groups</i>							
Ln Endowment: 3 Yr Avg	0.228*** (0.052)	0.232*** (0.055)	0.336** (0.138)	0.415*** (0.132)	0.116 (0.102)	0.302*** (0.101)	0.154 (0.168)
Mean Dep	10.87	9.88	8.41	8.74	8.86	9.05	6.88
Observations	4,764	4,764	4,764	4,764	4,764	4,764	4,764
<i>College Type Groups with Endowment and Outcome Trends</i>							
Ln Endowment: 3 Yr Avg	0.214*** (0.052)	0.241*** (0.057)	0.337** (0.152)	0.329*** (0.116)	0.018 (0.119)	0.235** (0.094)	0.170 (0.148)
Mean Dep	10.87	9.88	8.41	8.74	8.86	9.05	6.88
Observations	4,764	4,764	4,764	4,764	4,764	4,764	4,764

Note: This table presents estimates of the effect of endowments on the natural log of expenditures for core operating categories. Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. 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
Student Enrollment (Full-Time Equivalents)

	Total	Natural Log	
		Undergrad	Freshman
<i>College Type Groups</i>			
Ln Endowment: 3 Yr Avg	-0.034 (0.053)	-0.039 (0.055)	-0.051 (0.057)
Mean Dep	5,213	3,453	832
Observations	4,772	4,772	4,772
<i>College Type Groups with Endowment and Outcome Trends</i>			
Ln Endowment: 3 Yr Avg	-0.038 (0.056)	-0.030 (0.059)	-0.046 (0.062)
Mean Dep	5,213	3,453	832
Observations	4,772	4,772	4,772

Note: This table presents estimates of the effect of endowments on student enrollment. Total, undergraduate, and freshman enrollment are measured in terms of full-time equivalents, with part-time students counting for 0.5 FTEs. Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. 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
<i>College Type Groups</i>			
Ln Endowment: 3 Yr Avg	2,570 (1,522)	1,479 (1,205)	1,040* (524)
Mean Dep	54,530	42,326	12,198
Observations	4,771	4,725	4,725
<i>College Type Groups with Endowment and Outcome Trends</i>			
Ln Endowment: 3 Yr Avg	2,286 (1,371)	1,447 (1,135)	580 (469)
Mean Dep	54,530	42,326	12,198
Observations	4,771	4,725	4,725

Note: This table presents estimates of the effect of endowments on list price tuition and room and board. Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. 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
Percent of Freshman Receiving Aid

	Any Aid	Federal Grants	State Grants	College Grants	Loans
<i>College Type Groups</i>					
Ln Endowment: 3 Yr Avg	3.835 (2.696)	-1.162 (2.980)	-1.993 (4.576)	1.855 (3.150)	-3.951 (2.670)
Mean Dep	82.17	21.96	22.74	77.03	51.56
Observations	4,769	4,769	4,769	4,769	4,769
<i>College Type Groups with Endowment and Outcome Trends</i>					
Ln Endowment: 3 Yr Avg	1.296 (3.162)	-4.267 (3.309)	-4.433 (4.123)	-1.038 (3.589)	-8.529*** (2.880)
Mean Dep	82.17	21.96	22.74	77.03	51.56
Observations	4,769	4,769	4,769	4,769	4,769

Note: This table presents estimates of the effect of endowments on the rate of receipt of financial aid. Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. 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
Average Aid and Net Price

	Federal Grants	State Grants	Institutional Grants	Loans	Net Price
<i>College Type Groups</i>					
Ln Endowment: 3 Yr Avg	-1,198.965* (596.687)	471.997 (559.187)	3,559.316** (1,594.196)	-374.047 (476.481)	157.605 (1,764.268)
Mean Dep	5,729.17	4,299.81	25,607.09	7,148.08	33,708.46
Observations	4,767	4,767	4,767	4,767	4,765
<i>College Type Groups with Endowment and Outcome Baselines and Pretrends</i>					
Ln Endowment: 3 Yr Avg	-707.666 (418.523)	-98.423 (500.909)	3,684.511** (1,661.671)	-472.801 (480.217)	-31.986 (1,823.816)
Mean Dep	5,729.17	4,299.81	25,607.09	7,148.08	33,708.46
Observations	4,767	4,767	4,767	4,767	4,765

Note: This table presents estimates of the effect of endowments on average amounts of financial aid received by incoming freshmen (conditional on receipt). Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 9
Admissions Selectivity

	Natural Log			Median Score	
	Admits (1)	Enroll (2)	Yield (3)	SAT (4)	ACT (5)
<i>College Type Groups</i>					
Ln Endowment: 3 Yr Avg	-0.224** (0.107)	-0.051 (0.057)	3.157 (2.853)	34.503** (16.181)	1.577** (0.621)
Mean Dep	7.75	6.41	29.27	1,270.90	27.92
Observations	4,554	4,772	4,553	3,935	3,662
<i>College Type Groups with Endowment and Outcome Trends</i>					
Ln Endowment: 3 Yr Avg	-0.099 (0.119)	0.008 (0.068)	2.550 (2.683)	38.654* (18.828)	1.751** (0.647)
Mean Dep	7.75	6.41	29.27	1,270.90	27.92
Observations	4,554	4,772	4,553	3,935	3,662

Note: This table presents estimates of the effect of endowments on admissions, enrollments, yield rates, and admissions exam scores (when reported by institutions). Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE 10
Race of Incoming Freshman: Percent of Cohort

	Asian (1)	White (2)	Hispanic (3)	Black (4)	Other (5)	White, Asian (6)	Black, Am Ind, Hispanic (7)
<i>College Type Groups</i>							
Ln Endowment: 3 Yr Avg	1.523* (0.800)	5.352* (2.864)	-3.596** (1.585)	-1.492 (1.635)	-1.787 (2.596)	6.876** (2.802)	-5.089** (2.049)
Mean Dep	7.72	64.45	8.02	6.21	13.60	72.17	14.63
Observations	4,756	4,756	4,756	4,756	4,756	4,756	4,756
<i>College Type Groups with Endowment and Outcome Trends</i>							
Ln Endowment: 3 Yr Avg	1.383 (0.843)	6.836** (2.932)	-3.253* (1.658)	-1.113 (1.679)	-0.953 (1.972)	7.550** (2.726)	-4.666** (2.202)
Mean Dep	7.72	64.45	8.02	6.21	13.60	72.17	14.63
Observations	4,756	4,756	4,756	4,756	4,756	4,756	4,756

Note: This table presents estimates of the effect of endowments on the racial composition of incoming freshmen. Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. The “Other” race category includes students who are American Indian, foreign, or whose race is unknown. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution’s baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

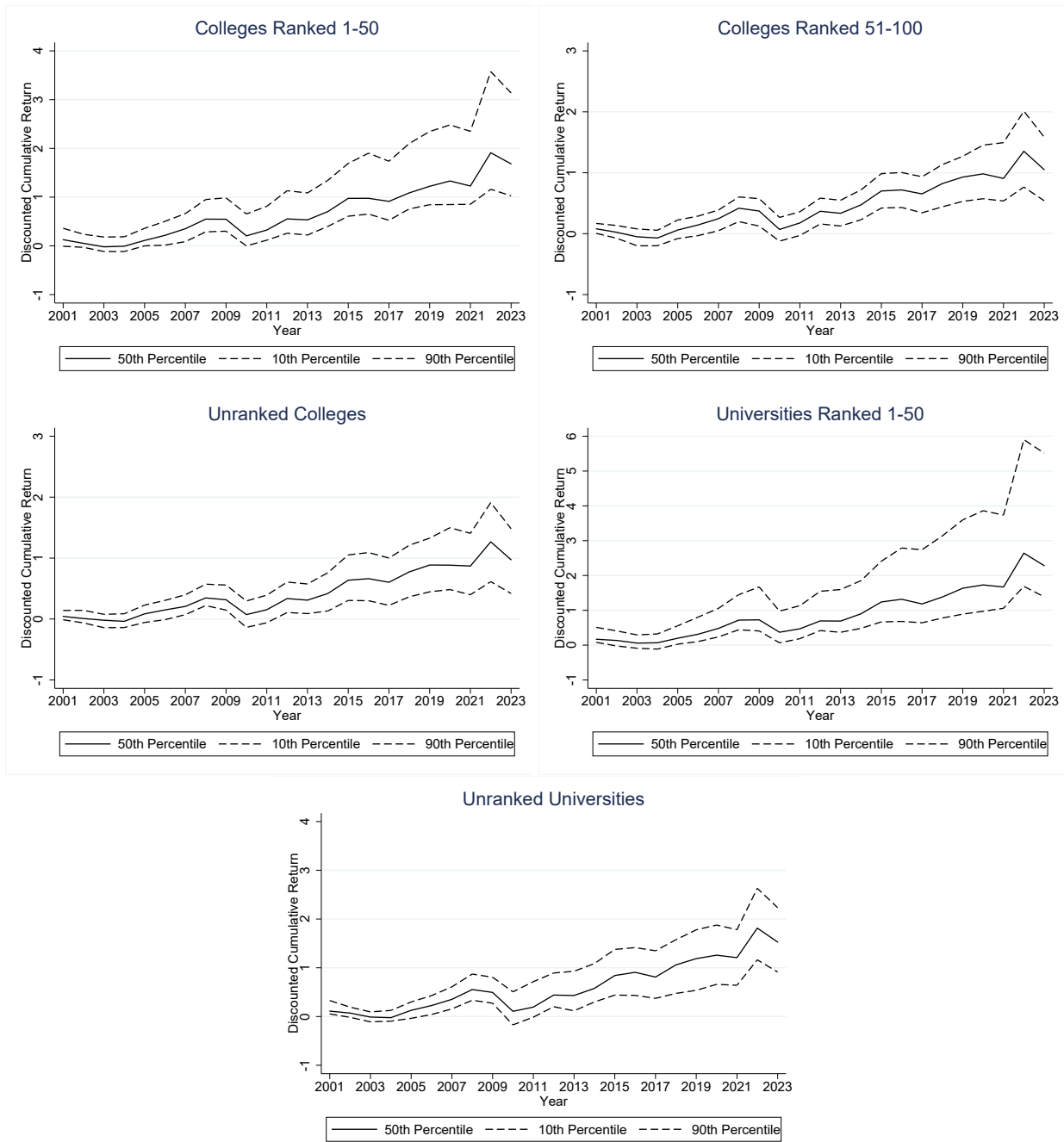
TABLE 11
US News and World Report Rankings

	Overall	Colleges (by 2003 rank)			Universities (by 2003 rank)			
		All	#1-25	#26-50	#51-100	All	#1-25	#26-50
<i>College Type Groups</i>								
Ln Endowment: 3-Yr Avg	-15.64*** (4.85)	-17.49*** (5.36)	-9.86* (4.92)	-14.10** (6.23)	-24.65** (8.64)	-8.17 (13.74)	-10.15* (5.20)	25.09 (108.01)
Mean Dep	52.46	55.99	14.43	41.96	85.71	46.34	11.19	41.52
Observations	3,104	1,966	520	486	960	1,138	440	320
<i>College Type Groups with Endowment Trends</i>								
Ln Endowment: 3-Yr Avg	-15.21** (5.64)	-18.73*** (6.38)	-7.60 (5.45)	-27.42** (10.07)	-25.60** (9.84)	-4.23 (14.99)	-9.32 (5.83)	7.02 (34.87)
Mean Dep	52.46	55.99	14.43	41.96	85.71	46.34	11.19	41.52
Observations	3,104	1,966	520	486	960	1,138	440	320

Note: This table presents estimates of the effect of endowments on U.S. News and World Report rankings. Cumulative investment returns are used to instrument for endowment levels. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student and pre-trend in investment returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

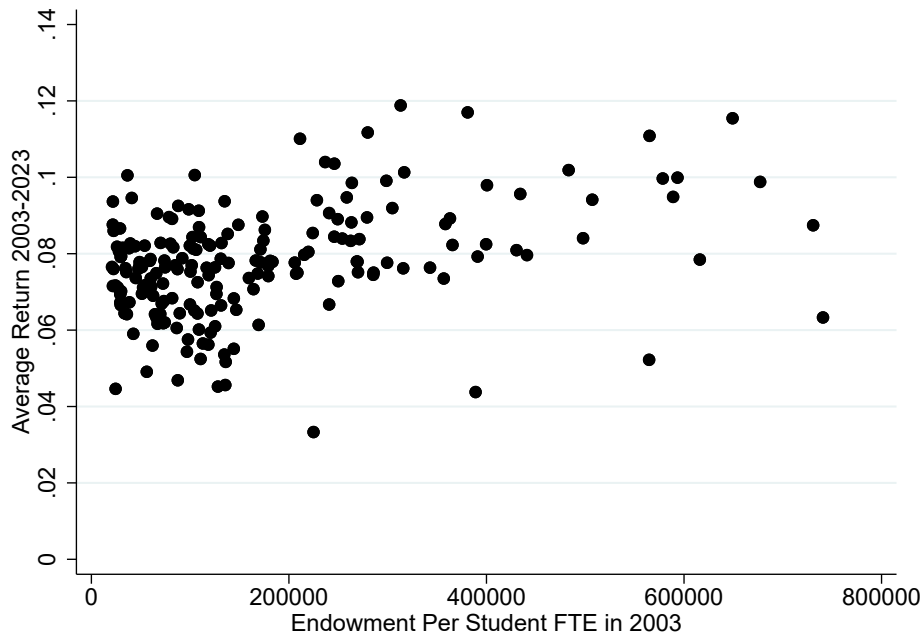
Appendix

FIGURE A1
Cumulative Returns Over Time by College Type and Ranking



Note: The figures present the discounted cumulative endowment returns from 2003 to 2023 for colleges and universities by their baseline rankings. The 10th, 50th, and 90th percentiles of cumulative returns are presented in each year for the institutions in the sample. Liberal arts colleges and research universities are identified using the Carnegie Classification of Institutions of Higher Education. Attention is restricted to private colleges and universities with endowments of at least \$20,000 per student at the beginning of 2003. Annual percent returns are measured using investment return totals and endowment levels reported by the National Center for Education Statistics Integrated Postsecondary Education Data System. U.S. News and World Report rankings are measured in 2003.

FIGURE A2
Average Annual Investment Returns by Baseline Endowment Per Student



Note: The figure presents the average annual endowment investment returns for colleges and universities by their baseline endowment levels. Average annual returns are measured from 2003 to 2023. Baseline endowment levels per student are measured in 2003. Liberal arts colleges and research universities are identified using the Carnegie Classification of Institutions of Higher Education. Attention is restricted to private colleges and universities with endowments of at least \$20,000 per student at the beginning of 2003. Annual percent returns are measured using investment return totals and endowment levels reported by the National Center for Education Statistics Integrated Postsecondary Education Data System.

TABLE A1
Robustness: Actual and Predicted Endowments

	Ln Actual Endowment (3-Yr Avg)		
	Baseline Endowment (1)	Pre-trend Endowment (2)	Investment Variance (3)
Ln Predicted Endowment (3-Yr Avg)	0.837*** (0.075)	0.805*** (0.093)	0.771*** (0.094)
Mean Dep	19.81	19.81	19.81
Observations	4,773	4,770	4,773

Note: This table presents estimates of the effect of changes in predicted endowment levels on changes in actual endowment levels using alternative methods of grouping institutions. Predicted endowments are created using investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for three different methods of grouping colleges and universities. Columns 1 through 3 are grouped by: baseline endowment level, pre-trend in endowment growth, and variance in investment returns. Specifications include institution fixed effects and fixed effects for each group-by-year. 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
Robustness: Expenditure Per Student by Category

	Core Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
<i>Grouped by US News</i>							
Ln Endowment: 3 Yr Avg	15,593*** (4,903)	3,493* (1,849)	4,191 (2,873)	2,953*** (865)	1,327 (999)	3,659** (1,431)	381 (1,201)
<i>Grouped by US News and Baseline Endowment</i>							
Ln Endowment: 3 Yr Avg	15,771*** (5,026)	4,823*** (1,478)	3,531 (2,555)	3,114*** (722)	1,070 (898)	3,335* (1,724)	236 (1,361)
<i>Grouped by US News and Return Pretrends</i>							
Ln Endowment: 3 Yr Avg	20,569*** (5,734)	5,482*** (1,799)	4,935 (3,554)	2,823*** (948)	1,231 (1,043)	5,016*** (1,630)	1,389 (1,031)
<i>Grouped by US News and Baseline Outcome</i>							
Ln Endowment: 3 Yr Avg	17,395*** (6,028)	4,904** (1,929)	4,605 (2,694)	2,315** (894)	1,290 (1,219)	3,580** (1,463)	960 (1,607)
<i>Grouped by US News and Outcome Pretrends</i>							
Ln Endowment: 3 Yr Avg	14,602** (5,653)	3,361 (2,152)	3,556 (2,707)	3,361*** (984)	591 (1,272)	4,032** (1,575)	107 (1,545)
<i>Grouped by US News and Return Variance</i>							
Ln Endowment: 3 Yr Avg	15,262** (6,367)	2,244 (2,394)	5,909 (3,647)	2,711*** (914)	-63 (1,249)	4,161** (1,765)	748 (1,299)

Note: This table presents estimates of the effect of endowments on expenditures for core operating categories using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. In addition to the baseline specification in the top panel, the estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline expenditures per student, and pre-trends in expenditures per student. Specifications include institution fixed effects and fixed effects for each group-by-year. 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
Robustness: Expenditure Per Student by Category: Natural Log

	Core Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
<i>Grouped by US News and Baseline Endowment</i>							
Ln Endowment: 3 Yr Avg	0.239*** (0.046)	0.251*** (0.053)	0.375*** (0.132)	0.433*** (0.116)	0.036 (0.128)	0.280** (0.107)	0.216 (0.160)
<i>Grouped by US News and Return Pretrends</i>							
Ln Endowment: 3 Yr Avg	0.268*** (0.053)	0.247*** (0.058)	0.373** (0.142)	0.409** (0.171)	0.131 (0.135)	0.415*** (0.108)	0.188 (0.201)
<i>Grouped by US News and Baseline Outcome</i>							
Ln Endowment: 3 Yr Avg	0.229*** (0.053)	0.231*** (0.051)	0.379*** (0.133)	0.304** (0.111)	0.169 (0.113)	0.270*** (0.093)	0.197 (0.161)
<i>Grouped by US News and Outcome Pretrends</i>							
Ln Endowment: 3 Yr Avg	0.221*** (0.057)	0.198*** (0.059)	0.266* (0.138)	0.519*** (0.149)	0.072 (0.111)	0.339*** (0.106)	0.097 (0.197)
<i>Grouped by US News and Return Variance</i>							
Ln Endowment: 3 Yr Avg	0.214*** (0.062)	0.200*** (0.066)	0.390** (0.148)	0.389** (0.149)	-0.088 (0.155)	0.326*** (0.113)	0.227 (0.203)

Note: This table presents estimates of the effect of endowments on the natural log of expenditures for core operating categories using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline expenditures per student, and pre-trends in expenditures per student. Specifications include institution fixed effects and fixed effects for each group-by-year. 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
Robustness: Enrollment (Full-Time Equivalents)

	Total	Natural Log Undergrad	Freshman
<i>Grouped by US News and Baseline Endowment</i>			
Ln Endowment: 3 Yr Avg	-0.011 (0.055)	-0.013 (0.057)	-0.035 (0.064)
<i>Grouped by US News and Return Pretrends</i>			
Ln Endowment: 3 Yr Avg	-0.052 (0.059)	-0.071 (0.060)	-0.083 (0.058)
<i>Grouped by US News and Baseline Outcome</i>			
Ln Endowment: 3 Yr Avg	0.005 (0.057)	-0.009 (0.058)	-0.018 (0.058)
<i>Grouped by US News and Outcome Pretrends</i>			
Ln Endowment: 3 Yr Avg	-0.012 (0.058)	-0.010 (0.056)	-0.030 (0.057)
<i>Grouped by US News and Return Variance</i>			
Ln Endowment: 3 Yr Avg	-0.083 (0.061)	-0.085 (0.063)	-0.104 (0.065)

Note: This table presents estimates of the effect of endowments on student enrollment using alternative methods of grouping institutions. Total, undergraduate, and freshman enrollment are measured in terms of full-time equivalents, with part-time students counting for 0.5 FTEs. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline enrollment, and pre-trends in enrollment. Specifications include institution fixed effects and fixed effects for each group-by-year. 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
Robustness: List Price Tuition and Room and Board

	Total List Price	Tuition	Room and Board
<i>Grouped by US News and Baseline Endowment</i>			
Ln Endowment: 3 Yr Avg	2,651.034 (1,596.145)	1,822.111 (1,318.286)	875.755* (477.317)
<i>Grouped by US News and Return Pretrends</i>			
Ln Endowment: 3 Yr Avg	1,949.625 (1,601.727)	1,189.941 (1,284.480)	638.458 (562.948)
<i>Grouped by US News and Baseline Outcome</i>			
Ln Endowment: 3 Yr Avg	1,577.434 (1,424.600)	702.344 (1,186.536)	870.919 (513.534)
<i>Grouped by US News and Outcome Pretrends</i>			
Ln Endowment: 3 Yr Avg	1,765.907 (1,342.403)	768.968 (1,111.687)	956.621* (501.067)
<i>Grouped by US News and Return Variance</i>			
Ln Endowment: 3 Yr Avg	2,460.064 (1,662.436)	1,375.338 (1,402.797)	1,150.266* (573.091)

Note: This table presents estimates of the effect of endowments on list price tuition and room and board using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline tuition and room and board, and pre-trends in tuition and room and board. Specifications include institution fixed effects and fixed effects for each group-by-year. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A6
Robustness: Percent of Freshman Receiving Aid

	Any Aid	Federal Grants	State Grants	College Grants	Loans
<i>Grouped by US News and Baseline Endowment</i>					
Ln Endowment: 3 Yr Avg	1.187 (2.800)	-0.523 (3.079)	-1.315 (4.876)	-0.379 (3.219)	-3.627 (2.967)
<i>Grouped by US News and Return Pretrends</i>					
Ln Endowment: 3 Yr Avg	5.591* (3.067)	1.220 (3.914)	-1.711 (5.186)	3.146 (3.541)	-6.181* (3.272)
<i>Grouped by US News and Baseline Outcome</i>					
Ln Endowment: 3 Yr Avg	3.968 (3.301)	-2.530 (3.390)	-6.272 (4.907)	0.858 (3.512)	-3.762 (3.285)
<i>Grouped by US News and Outcome Pretrends</i>					
Ln Endowment: 3 Yr Avg	5.651* (2.947)	-2.035 (3.004)	-1.585 (4.996)	3.522 (3.259)	-4.029 (3.276)
<i>Grouped by US News and Return Variance</i>					
Ln Endowment: 3 Yr Avg	3.923 (3.150)	-0.269 (3.383)	-2.005 (5.407)	0.434 (3.662)	-4.440 (3.205)

Note: This table presents estimates of the effect of endowments on the rate of receipt of financial aid using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline percent receiving federal aid, and pre-trends in receiving federal aid. Specifications include institution fixed effects and fixed effects for each group-by-year. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A7
Robustness: Average Aid Per Freshman Recipient

	Federal Grants	State Grants	Institutional Grants	Loans	Net Price
<i>Grouped by US News and Baseline Endowment</i>					
Ln Endowment: 3 Yr Avg	-1,234.425** (580.739)	214.799 (574.407)	4,089.193** (1,704.995)	-828.378 (493.952)	386.722 (1,911.986)
<i>Grouped by US News and Return Pretrends</i>					
Ln Endowment: 3 Yr Avg	-1,031.077* (512.366)	274.118 (662.454)	3,427.481** (1,572.256)	-438.769 (559.813)	-1,072.424 (1,747.685)
<i>Grouped by US News and Baseline Outcome</i>					
Ln Endowment: 3 Yr Avg	-939.692* (537.847)	806.179 (583.535)	2,789.694* (1,568.251)	-456.541 (599.360)	-514.590 (1,763.073)
<i>Grouped by US News and Outcome Pretrends</i>					
Ln Endowment: 3 Yr Avg	-1,119.627** (506.723)	675.343 (574.436)	2,520.511 (1,528.401)	-461.345 (551.107)	-445.038 (1,587.079)
<i>Grouped by US News and Return Variance</i>					
Ln Endowment: 3 Yr Avg	-855.160 (597.733)	240.270 (736.354)	3,446.525* (1,755.111)	-320.151 (558.634)	-239.749 (1,857.442)

Note: This table presents estimates of the effect of endowments on average amounts of financial aid received by incoming freshmen (conditional on receipt) using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline receipt of federal aid, and pre-trends in receipt of federal aid. Specifications include institution fixed effects and fixed effects for each group-by-year. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A8
Robustness: Admissions Selectivity

	Natural Log		Yield	Median Score	
	Admits	Enroll		SAT	ACT
	(2)	(3)	(5)	(6)	(7)
<i>Grouped by US News and Baseline Endowment</i>					
Ln Endowment: 3 Yr Avg	-0.202*	-0.035	3.508	34.528**	1.556**
	(0.114)	(0.064)	(2.955)	(15.505)	(0.665)
<i>Grouped by US News and Return Pretrends</i>					
Ln Endowment: 3 Yr Avg	-0.228*	-0.083	2.897	18.745	1.195**
	(0.122)	(0.058)	(3.288)	(15.697)	(0.556)
<i>Grouped by US News and Baseline Outcome</i>					
Ln Endowment: 3 Yr Avg	-0.269**	-0.057	4.459	39.953**	1.944***
	(0.108)	(0.059)	(2.648)	(14.298)	(0.542)
<i>Grouped by US News and Outcome Pretrends</i>					
Ln Endowment: 3 Yr Avg	-0.204*	-0.053	2.787	29.557	1.442**
	(0.103)	(0.056)	(2.813)	(17.417)	(0.572)
<i>Grouped by US News and Return Variance</i>					
Ln Endowment: 3 Yr Avg	-0.280*	-0.104	2.527	22.213	0.896
	(0.138)	(0.065)	(3.479)	(15.603)	(0.564)

Note: This table presents estimates of the effect of endowments on admissions, enrollments, yield rates, and admissions exam scores (when reported by institutions) using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline admissions rate, and pre-trends in the admissions rate. Specifications include institution fixed effects and fixed effects for each group-by-year. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A9
Robustness: Race of Incoming Freshman: Percent of Cohort

	Asian (1)	White (2)	Hispanic (3)	Black (4)	Other (5)	White, Asian (6)	Black, Am Ind, Hispanic (7)
<i>Grouped by US News and Baseline Endowment</i>							
Ln Endowment: 3 Yr Avg	2.237*** (0.723)	4.968 (2.987)	-4.057** (1.593)	-1.269 (1.786)	-1.879 (2.576)	7.205** (2.953)	-5.848*** (2.024)
<i>Grouped by US News and Return Pretrends</i>							
Ln Endowment: 3 Yr Avg	1.793** (0.801)	3.751 (2.923)	-3.448** (1.596)	0.304 (1.430)	-2.399 (2.751)	5.543* (2.836)	-3.501* (1.872)
<i>Grouped by US News and Baseline Outcome</i>							
Ln Endowment: 3 Yr Avg	1.105 (0.786)	5.761** (2.493)	-3.414** (1.337)	-1.526 (1.662)	-1.926 (2.293)	6.866*** (2.426)	-5.396*** (1.703)
<i>Grouped by US News and Outcome Pretrends</i>							
Ln Endowment: 3 Yr Avg	1.029 (0.769)	6.911** (2.961)	-4.289** (1.648)	-1.568 (1.790)	-2.083 (2.639)	7.940** (2.902)	-6.395*** (2.067)
<i>Grouped by US News and Return Variance</i>							
Ln Endowment: 3 Yr Avg	1.359 (1.008)	7.612** (3.072)	-4.708** (1.755)	-0.459 (1.490)	-3.804 (2.751)	8.971*** (3.019)	-5.856*** (1.935)

Note: This table presents estimates of the effect of endowments on the racial composition of incoming freshmen using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, variance in investment returns, baseline percent students of color, and pre-trends in percent students of color. Specifications include institution fixed effects and fixed effects for each group-by-year. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A10
Robustness: US News and World Report Ranking

	Overall	Colleges	Universities
<i>Grouped by US News and Baseline Endowment</i>			
Ln Endowment: 3 Yr Avg	-9.998** (4.412)	-12.778** (5.015)	-2.327 (10.560)
<i>Grouped by US News and Return Pretrends</i>			
Ln Endowment: 3 Yr Avg	-15.104*** (5.239)	-19.282*** (5.796)	-3.605 (12.543)
<i>Grouped by US News and Return Variance</i>			
Ln Endowment: 3 Yr Avg	-12.911** (5.717)	-18.828*** (5.863)	5.299 (15.813)

Note: This table presents estimates of the effect of endowments on U.S. News and World Report rankings using alternative methods of grouping institutions. Predicted endowments are created using annual investment returns. Under institutional rules, spending from the endowment is based on average levels over the prior three years. Thus, the predicted and actual endowment levels in this analysis are three-year rolling averages. The estimates are presented for five different methods of grouping colleges and universities. Specifically, the panels are grouped by: baseline endowment level, pre-trend in endowment growth, and variance in investment returns. Specifications include institution fixed effects and fixed effects for each group-by-year. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A11
Discounted Cumulative Returns: Expenditure Per Student by Category - Natural Log

	Core Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
<i>College Type Groups</i>							
Cumulative Returns: 3-Yr Avg	0.116*** (0.026)	0.095** (0.036)	0.232** (0.083)	0.211*** (0.069)	0.079 (0.063)	0.133** (0.054)	0.046 (0.084)
Mean Dep	10.87	9.88	8.41	8.74	8.86	9.05	6.88
Observations	4,771.00	4,771.00	4,771.00	4,771.00	4,771.00	4,771.00	4,771.00
<i>College Type Groups with Endowment and Outcome Trends</i>							
Cumulative Returns: 3-Yr Avg	0.107*** (0.026)	0.096** (0.038)	0.236** (0.092)	0.154** (0.057)	-0.001 (0.066)	0.121*** (0.043)	0.036 (0.075)
Mean Dep	10.87	9.88	8.41	8.74	8.86	9.05	6.88
Observations	4,771.00	4,771.00	4,771.00	4,771.00	4,771.00	4,771.00	4,771.00

Note: This table presents estimates of the effect of discounted cumulative endowment returns on the natural log of expenditures for core operating categories. Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A12
Discounted Cumulative Returns: Student Enrollment (Full-Time Equivalents)

	Total	Natural Log	
		Undergrad	Freshman
<i>College Type Groups</i>			
Cumulative Returns: 3-Yr Avg	-0.014 (0.026)	-0.014 (0.028)	-0.014 (0.030)
Mean Dep	5,213.12	3,453.07	832.31
Observations	4,779.00	4,779.00	4,779.00
<i>College Type Groups with Endowment and Outcome Trends</i>			
Cumulative Returns: 3-Yr Avg	-0.016 (0.026)	-0.007 (0.029)	-0.013 (0.031)
Mean Dep	5,213.12	3,453.07	832.31
Observations	4,779.00	4,779.00	4,779.00

Note: This table presents estimates of the effect of discounted cumulative endowment returns on student enrollment. Total, undergraduate, and freshman enrollment are measured in terms of full-time equivalents, with part-time students counting for 0.5 FTEs. Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A13
Discounted Cumulative Returns: List Price Tuition and Room and Board

	Total List Price	Tuition	Room and Board
<i>College Type Groups</i>			
Cumulative Returns: 3-Yr Avg	1,154.408 (765.536)	527.633 (623.407)	607.761** (257.596)
Mean Dep	54,530.69	42,326.13	12,198.24
Observations	4,778.00	4,732.00	4,732.00
<i>College Type Groups with Endowment and Outcome Trends</i>			
Cumulative Returns: 3-Yr Avg	952.097 (656.750)	456.117 (539.632)	337.177 (233.662)
Mean Dep	54,530.69	42,326.13	12,198.24
Observations	4,778.00	4,732.00	4,732.00

Note: This table presents estimates of the effect of discounted cumulative endowment returns on list price tuition and room and board. Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A14
Discounted Cumulative Returns: Percent of Freshman Receiving Aid

	Any Aid	Federal Grants	State Grants	College Grants	Loans
<i>College Type Groups</i>					
Cumulative Returns: 3-Yr Avg	2.439 (1.464)	0.081 (1.555)	-0.529 (2.178)	2.079 (1.585)	-2.220 (1.466)
Mean Dep	82.17	21.96	22.74	77.03	51.56
Observations	4,776.00	4,776.00	4,776.00	4,776.00	4,776.00
<i>College Type Groups with Endowment and Outcome Trends</i>					
Cumulative Returns: 3-Yr Avg	0.570 (1.565)	-1.288 (1.620)	-1.252 (1.730)	0.173 (1.723)	-4.754*** (1.338)
Mean Dep	82.17	21.96	22.74	77.03	51.56
Observations	4,776.00	4,776.00	4,776.00	4,776.00	4,776.00

Note: This table presents estimates of the effect of discounted cumulative endowment returns on the rate of receipt of financial aid. Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A15
Discounted Cumulative Returns: Average Aid and Net Price

	Federal Grants	State Grants	Institutional Grants	Loans	Net Price
<i>College Type Groups</i>					
Cumulative Returns: 3-Yr Avg	-791.361** (336.921)	185.943 (388.250)	1,173.519 (903.313)	-157.373 (302.653)	158.643 (1,148.157)
Mean Dep	5,729.17	4,299.81	25,607.09	7,148.08	33,708.46
Observations	4,774.00	4,774.00	4,774.00	4,774.00	4,772.00
<i>College Type Groups with Endowment and Outcome Baselines and Pretrends</i>					
Cumulative Returns: 3-Yr Avg	-436.206* (225.036)	-130.382 (357.301)	1,197.778 (892.224)	-297.039 (297.493)	176.043 (1,056.651)
Mean Dep	5,729.17	4,299.81	25,607.09	7,148.08	33,708.46
Observations	4,774.00	4,774.00	4,774.00	4,774.00	4,772.00

Note: This table presents estimates of the effect of discounted cumulative endowment returns on average amounts of financial aid received by incoming freshmen (conditional on receipt). Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A16
Discounted Cumulative Returns: Admissions Selectivity

	Natural Log			Median Score	
	Admits (1)	Enroll (2)	Yield (3)	SAT (4)	ACT (5)
<i>College Type Groups</i>					
Cumulative Returns: 3-Yr Avg	-0.086* (0.048)	-0.014 (0.030)	1.001 (1.616)	12.427 (7.813)	0.610* (0.346)
Mean Dep	7.75	6.41	29.27	1,270.90	27.92
Observations	4,561.00	4,779.00	4,560.00	3,936.00	3,664.00
<i>College Type Groups with Endowment and Outcome Trends</i>					
Cumulative Returns: 3-Yr Avg	-0.035 (0.051)	0.013 (0.033)	1.512 (1.362)	14.262 (8.621)	0.725** (0.340)
Mean Dep	7.75	6.41	29.27	1,270.90	27.92
Observations	4,561.00	4,779.00	4,560.00	3,935.00	3,662.00

Note: This table presents estimates of the effect of discounted cumulative endowment returns on admissions, enrollments, yield rates, and admissions exam scores (when reported by institutions). Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A17
Discounted Cumulative Returns: Race of Incoming Freshman - Percent of Cohort

	Asian (1)	White (2)	Hispanic (3)	Black (4)	Other (5)	White, Asian (6)	Black, Am Ind, Hispanic (7)
<i>College Type Groups</i>							
Cumulative Returns: 3-Yr Avg	0.803 (0.482)	2.880** (1.364)	-1.592** (0.718)	-1.030 (0.773)	-1.061 (1.316)	3.683** (1.354)	-2.641*** (0.938)
Mean Dep	7.72	64.44	8.01	6.21	13.60	72.16	14.62
Observations	4,763	4,763	4,763	4,763	4,763	4,763	4,763
<i>College Type Groups with Endowment and Outcome Trends</i>							
Cumulative Returns: 3-Yr Avg	0.585 (0.488)	3.805** (1.364)	-1.364* (0.782)	-0.750 (0.793)	-0.807 (0.891)	3.949*** (1.256)	-2.254** (1.001)
Mean Dep	7.72	64.44	8.01	6.21	13.60	72.16	14.62
Observations	4,763	4,763	4,763	4,763	4,763	4,763	4,763

Note: This table presents estimates of the effect of discounted cumulative endowment returns on the racial composition of incoming freshmen. Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. The “Other” race category includes students who are American Indian, foreign, or whose race is unknown. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution’s baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A18
Discounted Cumulative Returns: US News and World Report Rankings

	Overall	All	Colleges (by 2003 rank)			Universities (by 2003 rank)		
			#1-25	#26-50	#51-100	All	#1-25	#26-50
<i>College Type Groups</i>								
Cumulative Returns: 3-Yr Avg	-5.613** (2.028)	-9.438** (3.424)	-4.215** (1.952)	-10.077*** (3.346)	-18.975 (11.628)	-1.346 (2.214)	-2.126* (1.088)	0.441 (5.683)
Mean Dep	52.460	55.992	14.429	41.959	85.713	46.336	11.193	41.519
Observations	3,111	1,973	520	493	960	1,138	440	320
<i>College Type Groups with Endowment Trends</i>								
Cumulative Returns: 3-Yr Avg	-4.825* (2.386)	-8.933** (3.699)	-3.155 (2.046)	-11.005*** (3.260)	-17.744 (11.365)	0.364 (2.970)	-2.470* (1.390)	-0.268 (5.600)
Mean Dep	52.460	55.992	14.429	41.959	85.713	46.336	11.193	41.519
Observations	3,111	1,973	520	493	960	1,138	440	320

Note: This table presents estimates of the effect of discounted cumulative endowment returns on U.S. News and World Report rankings. Discounted returns account adjust for inflation and average rates of endowment spending. Under institutional rules, spending from the endowment is based on average endowment levels over the prior three years. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The second panel controls for the interaction of year with each institution's baseline endowment per student and pre-trend in investment 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 A19
Rolling: Endowments and Returns

	(1)	(2)	(3)
Returns Prior 5 Years	0.851*** (0.070)	0.788*** (0.067)	0.772*** (0.066)
Mean Dep	19.83	19.83	19.83
Observations	3,765	3,765	3,765
Year FEs	X		
US News Grp by Year FEs		X	X
Initial Endow by Year			X
Pre-trend Return by Year			X

Note: The table presents estimates of the effect of five year investment returns on changes in endowment levels over the same period. Column 1 includes year fixed-effects to account for changes that are common across all institutions. Column 2 includes college and university group-by-year fixed effects, where groups are based on baseline U.S. News and World Report rankings. Column 3 allows for differential trends across institutions by baseline endowment levels and prior investment 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 A20
Rolling: Expenditure Per Student by Category

	Core Expenses	Instruction	Academic Support	Student Services	Aux Enterprise	Institutional Support	Research
Endowment Change: Rolling	0.191*** (0.046)	0.166*** (0.052)	0.345* (0.173)	0.424*** (0.142)	0.195** (0.089)	0.259** (0.108)	0.360 (0.386)
Mean Dep	0.06	0.05	0.08	0.16	0.03	0.08	0.18
Observations	3,755	3,755	3,660	3,736	3,686	3,755	2,957

Note: This table presents estimates of the effect of changes in endowment levels on changes in expenditures for core operating categories. Investment returns are used to instrument for changes in endowment levels. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The specification controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A21
Rolling: Student Enrollment (Full-Time Equivalents)

	Total	Natural Log	
		Undergrad	Freshman
Endowment Change: Rolling	-0.077* (0.039)	-0.063 (0.039)	-0.067 (0.048)
Mean Dep	0.02	0.02	0.03
Observations	3,763	3,763	3,735

Note: This table presents estimates of the effect of changes in endowment levels on changes in student enrollment. Total, undergraduate, and freshman enrollment are measured in terms of full-time equivalents, with part-time students counting for 0.5 FTEs. Investment returns are used to instrument for changes in endowment levels. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The specification controls for the interaction of year with each institution’s baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A22
Rolling: Effect of Endowments on College Price and Financial Aid

	List Price Tuition and Room and Board				
	Total List Price	Tuition	Room and Board		
Endowment Change: Rolling	1,646.922 (1,203.137)	1,463.158 (1,050.187)	159.738 (403.326)		
Mean Dep	5,020.57	4,041.94	961.64		
Observations	3,763	3,713	3,713		
	Percent Receiving Aid				
	Any Aid	Federal Grants	State Grants	College Grants	Loans
Endowment Change: Rolling	4.277* (2.359)	0.574 (2.949)	-0.700 (3.855)	3.013 (2.748)	-0.301 (2.910)
Mean Dep	1.84	3.13	-2.21	2.61	-1.43
Observations	3,760	3,760	3,760	3,760	3,760
	Aid Amounts and Net Price				
	Federal Grants	State Grants	Institutional Grants	Loans	Net Price
Endowment Change: Rolling	-600.991 (446.350)	221.515 (452.394)	4,203.542*** (1,272.323)	-58.032 (532.235)	-2,197.024 (1,395.422)
Mean Dep	48.76	-68.78	4,123.88	460.84	1,336.20
Observations	3,758	3,758	3,758	3,758	3,756

Note: This table presents estimates of the effect of changes in endowment levels on changes in tuition, the percent of incoming freshman receiving aid, and aid amounts (conditional on receipt). Investment returns are used to instrument for changes in endowment levels. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The specification controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A23
Rolling: Admissions Selectivity

	Natural Log			Median Score			
	Admits (1)	Enroll (2)	Yield (3)	SAT (4)	ACT (5)		
Endowment Change: Rolling	-0.140 (0.138)	-0.067 (0.048)	0.239 (2.392)	27.412* (14.902)	1.095** (0.480)		
Mean Dep	0.17	0.03	-2.14	17.52	0.65		
Observations	3,537	3,735	3,536	2,778	2,514		
	Asian (1)	White (2)	Hispanic (3)	Black (4)	Other (5)	White, Asian (6)	Black, Am Ind, Hispanic (7)
Endowment Change: Rolling	0.997 (0.748)	2.442 (2.540)	-2.430* (1.376)	-0.836 (1.120)	-0.172 (2.159)	3.439 (2.472)	-3.272* (1.756)
Mean Dep	0.55	-4.76	2.02	0.79	1.39	-4.21	2.75
Observations	3,741	3,741	3,741	3,741	3,741	3,741	3,741

Note: This table presents estimates of the effect of changes in endowment levels on changes in admissions, enrollments, yield rates, admissions exam scores (when reported by institutions), and the racial composition of incoming students. Investment returns are used to instrument for changes in endowment levels. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The specification controls for the interaction of year with each institution's baseline endowment per student, pre-trend in investment returns, baseline level of the outcome of interest, and the pre-trend in the outcome of interest. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.

TABLE A24
Rolling: US News and World Report Ranking

	Overall	All	Colleges (by 2003 rank)			Universities (by 2003 rank)		
			#1-25	#26-50	#51-100	All	#1-25	#26-50
Percent Endowment Change: Rolling	-8.328* (4.140)	-8.764 (5.559)	-9.168*** (2.860)	-17.254** (6.751)	-0.893 (13.973)	-7.254 (4.935)	-3.276 (3.612)	-49.486 (40.139)
Mean Dep	1.80	2.47	0.53	1.50	4.17	0.08	-0.00	0.21
Observations	1,547	1,104	312	279	513	443	264	179

Note: This table presents estimates of the effect of changes in endowment levels on changes in U.S. News and World Report rankings. Attention is also restricted to institutions that are ranked in the baseline year. Investment returns are used to instrument for changes in endowment levels. Each specification includes institution fixed effects as well as year-by-comparison group fixed effects. Institutions are grouped according to their classifications (college or university) and their baseline U.S. News and World Report rankings. The specification controls for the interaction of year with each institution's baseline endowment per student and pre-trend in investment returns. Standard errors are clustered at the institution and year levels. The symbols *, **, and *** represent statistical significance at 10, 5, and 1 percent, respectively.