

NBER WORKING PAPER SERIES

ARE UNIVERSITIES BECOMING MORE UNEQUAL?

Yan Lau
Harvey S. Rosen

Working Paper 21432
<http://www.nber.org/papers/w21432>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
July 2015

We are grateful to Michael Geruso, Jonathan Meer, Shlomo Yitzhaki, Jonathan Morduch, Tatiana Homonoff, two referees, and members of Princeton's Public Finance Working Group for useful comments, and to the Griswold Center for Economic Policy Studies for financial support. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2015 by Yan Lau and Harvey S. Rosen. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Are Universities Becoming More Unequal?

Yan Lau and Harvey S. Rosen

NBER Working Paper No. 21432

July 2015

JEL No. I22,I23

ABSTRACT

Observers have expressed concern about growing inequality in resources across universities. But are universities really becoming more unequal? We argue that the typical approach of examining endowment growth alone is not sensible. In line with the literature on household inequality, we focus instead on a comprehensive income measure. We find that although there is considerable inequality among institutions, concerns about the inexorable growth of inequality are overblown. Whether one looks at income, endowment wealth, or expenditure, inequality has been high but stable, exhibiting only negligible increases in recent years. Furthermore, there has been little mobility within the higher education sector.

Yan Lau

Reed College

3203 SE Woodstock Blvd

Portland, OR 97209-8199

yanlau@reed.edu

Harvey S. Rosen

Department of Economics

Fisher Hall

Princeton University

Princeton, NJ 08544-1021

and NBER

HSR@princeton.edu

An online appendix is available at:

<http://www.nber.org/data-appendix/w21432>

1 Introduction

In recent years, a number of observers have expressed grave concern about growing inequality among institutions of post-secondary education. For example, the former Provost of Columbia University and sociologist, Jonathan Cole, stated that “The alarming growth of inequality among university endowments over the past two decades has produced an unnerving potential for a few institutions to be able to dominate the competition for talent” (quoted in Goldin, 2010). Lerner, Schoar and Wang (2008, p. 2) also focus on growing differences in endowment values; their findings “suggest an increasing skewness of endowment sizes, where the rich universities are getting richer while the rest of the schools are falling behind.”¹ News of record-breaking donations to the wealthiest universities has reinforced such views, with one financial analyst noting that “Over the past decade, there has been increasing concentration of giving to already wealthy institutions” (see Belkin, 2014).²

Desrochers and Wellman (2011), perhaps the paper most closely related to our own work, consider sources of income in addition to endowments (such as tuition payments) over the period 1999-2009. The majority of income for US universities comes from three sources: 1) tuition payments from students; 2) private gifts and investment income; and 3) government funding from federal, state, and local authorities.³ Private universities rely mostly on the first two categories (42.6% and 24.9% of total income, respectively), while public universities rely mainly on the third (57.3%). On the basis of trends in these revenue sources (p. 18) and enrollment disparities between public and private universities (p. 44), they reach the same conclusion as other observers: “rich institutions are getting richer and poor institutions are getting poorer” (p. 45).

These comments reflect the tenor of virtually all discussions of the consequences of growing inequality among universities: it is socially undesirable.⁴ Our purpose here, though, is not to discuss the possible consequences of rising inequality among schools, but rather to question whether the premise underlying the entire discussion is correct. How unequal are the resources available to universities, and has the level

¹Lerner, Schoar and Wang (2008) investigate how rates of return on endowment funds vary among universities and find that institutions with larger endowments and more selective admissions policies have higher rates of return. Additional research relating to university endowments includes Brown, Dimmock, Kang and Weisbenner (2010), Barber and Wang (2013), Brown and Tiu (2014), Dimmock (2012), and Goetzmann and Oster (2012).

²Inequality among universities in other respects has also been studied. For example, Halfman and Leydesdorff (2010) examine how inequality in research output has been changing over time.

³See Table 2 below for more detail. Section 4 provides precise definitions of these income categories.

⁴One argument of proponents for this view is that students with relatively fortunate socioeconomic backgrounds are more likely to matriculate at richer institutions, which are able to provide better instruction and employment opportunities to their students. Thus, for example, Vedder (2014) argues that growing inequality across universities may exacerbate income inequality among individuals. However, Goldin (2010) takes a different perspective, noting that inequality might be socially desirable to the extent that there are scale economies in the production of research: “. . . are such inequalities good or bad? Could 125 equally sized automobile firms produce cars as cheaply as a few very large ones? Probably not. So why isn't that the case for university research as well?”

of inequality increased in recent years?

It helps to begin by noting that as they stand, the questions are not well posed, because they fail to specify inequality with respect to *what*. To inform our thinking about this issue, we turn to the burgeoning literature on inequality among households. Virtually all the research on inequality focuses on the flow of *income* during a given period of time, usually a year. While a household's stock of wealth plays an important role because it generates income for the household, it would be odd to analyze household inequality considering only wealth and ignoring sources of income such as wages. In the same way, an institution's endowment is not the only determinant of its command over resources. Other income sources include tuition, research grants, alumni donations, and so on.⁵ After all, it is possible for low-wealth schools to have high incomes (if, for example, they receive large gifts from donors) and vice versa.

While focusing on the computation of annual income is sensible, it is well known from the literature on household consumption that income in a given year might be inferior to expenditure as a measure of *permanent* income.⁶ The same consideration would seem pertinent to universities, so in order to provide a more complete picture, we also examine inequality with respect to expenditure.

In this paper, we document the trends in inequality among institutions of higher education in the United States between 2002 and 2010. Although our main focus is on income and expenditure, we look at the evolution of inequality with respect to endowment wealth as well. We further examine whether any sources of income have contributed particularly to the growth of inequality, and the degree of mobility within the distributions of university income and wealth. Documenting these trends carefully and systematically provides a way to assess the validity of the anecdotal evidence relating to inequality among universities, and may help inform the public discourse about the financing of higher education.

Section 2 briefly reviews the previous literature on this topic. Section 3 discusses methodological issues, and Section 4 describes the data. The results are reported in Section 5. We find that although there is considerable inequality among institutions, concerns about the inexorable *growth* of inequality are overblown. Using a conceptually sensible definition of income, there is no evidence of a substantial increase in inequality during the period 2002-2010. In particular, income inequality within the set of public institutions has been very stable. While there have been more year-to-year changes in inequality for private institutions, even within this group, inequality has not been substantially increasing. Inequality

⁵As a consistent alternative to comparing institutions on the basis of their comprehensive flows of income, one could compare them on the basis of the stocks of wealth that generate that income. This would involve adding the endowment to the capitalized value of flows of non-endowment income, and is essentially the tack taken by Merton (1993) in his theory of optimal endowment management policy.

⁶See, for example, Campbell (1987).

in terms of endowment wealth and expenditure has been high but stable, exhibiting only a negligible increase. Furthermore, there has been very little income, expenditure or wealth mobility within the higher education sector.

2 Previous Literature

A number of papers have investigated issues that are related to inequality among universities. Bowen (1981) documents the disparities among universities with respect to costs per student, with an emphasis on whether these differences can be rationalized from an efficiency perspective. Hauptman (1997) discusses the trends in the major sources of revenues that support higher education, focusing on differences between public and private institutions. Alexander (2001) also examines public versus private differences in resources, and discusses whether the decrease in the relative wealth of public institutions has affected their ability to recruit the best scholars. The notion that disparities in wealth across institutions affect the relative well-being of their faculties is also taken up by Breneman (2008). Slaughter and Leslie (2001) focus more generally on the consequences of competition for resources among universities. Clotfelter (2014) examines one particular source of differences in wealth across universities, alumni donations, and links the growing inequality in gifts to the underlying growth in inequality across households.⁷

A paper that is similar to ours in its goals is Davies and Zarifa (2012), who examine inequality among Canadian and US institutions over a 35 year period (1971 to 2006), focusing on how inequality with respect to the various components of revenue has changed. They find that in both countries, inequality has increased, although the extent of inequality is much greater in the United States. A limitation to Davies and Zarifa's analysis is that for most of their sample period, their income data do not include realized or unrealized capital gains on endowment portfolios. As we argue below, such information is needed in order to generate a comprehensive measure of universities' incomes.

3 Methodological Issues

Any analysis of income inequality across a set of units must address three related questions. First, how are the income and wealth of each unit to be measured? Second, how are these variables to be normalized? In the household context, for example, one would need to decide how to compare households

⁷On the evolution of inequality among households, see Piketty and Saez (2003), DeNavas-Walt, Proctor and Smith (2011), Congressional Budget Office (2011), and Jones and Weinberg (2000). A general finding is that inequality was relatively stable in the post-World War II period, and has been increasing since the 1970s, although not monotonically. Katz and Autor (1999) provide an authoritative discussion of the factors that have led to increases in inequality over time.

of different sizes. In the higher education context, the analogous problem is how to compare institutions whose student bodies, faculties, and so on, vary in magnitude. Third, once each unit's appropriately normalized income and wealth are computed, how does one characterize the extent of inequality? This section discusses each of these issues in turn.

Measuring Income We adopt the Haig-Simons (H-S) definition of annual income, which states that a unit's income during a given period of time is the monetary value of the net increase in its ability to consume.⁸ This equals the amount actually consumed during a period plus net additions to wealth. Net additions to wealth must be included in income because they represent an increase in potential ability to consume. Importantly, the H-S criterion requires the inclusion of all sources of potential increases in spending, regardless of whether the actual spending takes place, and regardless of the form in which the consumption occurs. The H-S criterion also implies that any decreases in a unit's potential to consume should be subtracted in determining income.

In the context of higher education, the H-S definition encompasses those items that one might ordinarily think of as income: tuition, government grants, gifts from alumni, and so on. But perhaps less obviously, it also includes changes in the value of the institution's investments. If a school owns an asset that increases in value by a million dollars over the course of a year, then this capital gain is income to the institution. If the institution sells the asset at the end of the year, the capital gain is said to be realized; otherwise, it is unrealized. If the capital gain is not realized, then in effect the owner is choosing to save by reinvesting it. Hence, from the H-S point of view, it is irrelevant whether a capital gain is realized or unrealized. Both represent an increase in the potential to consume and hence are income.

All the arguments for adding in capital gains apply to subtracting capital losses. If the value of an asset decreases by \$500,000 during a given year, the \$500,000 should be subtracted from income. Viewed through the lens of the H-S criterion, the claim by Desrochers and Wellman (2011, p. 5) that decreases in endowment values experienced by some institutions during the financial crisis that began in 2008 can be dismissed as mere "paper losses" seems odd. H-S principles tell us that such losses reduce an institution's command over resources, and indeed, Brown, Dimmock, Kang and Weisbenner (2010) and others have documented that they have substantial impacts on universities' behavior. In the household context, Armour, Burkhauser and Larrimore (2013) have shown that failure to follow H-S logic and include unrealized capital gains in income leads to highly misleading estimates of the extent to which inequality across households has increased over time in the United States. This is one reason why our

⁸This definition takes its name from Robert M. Haig and Henry C. Simons, economists who wrote in the first half of the 20th century.

results, which are calculated according to H-S principles, differ from those of previous studies.⁹

Our focus so far has been on the appropriate way to measure institutions' annual incomes. An alternative approach would be to focus on their permanent incomes. This immediately raises the question of how to estimate permanent income. Standard theoretical considerations suggest that under the permanent income hypothesis, consumption is proportional to permanent income (Campbell, 1987, p. 1250).¹⁰ With this assumption, annual expenditures are a suitable proxy for permanent income, so we also examine how inequality in annual expenditure changes over time.¹¹

Normalization In the public finance literature on comparing resources across different jurisdictions, a central problem is determining the effective flow of services arising from a given amount of government expenditure. For example, to the extent that goods and services provided by localities are purely public in nature (that is, they are non-rival in consumption) there is no reason to divide expenditures by the number of individuals in the jurisdiction to assess the impact of the expenditures on people's welfare. On the other hand, if a local government provides a pure private good, one would want to divide the expenditure by the number of people in the jurisdiction, and if it is an impure public good, one would want to normalize by some positive number less than that figure (see Oates, 1988). An analogous problem arises in our context. To the extent that colleges and universities provide their students with goods and services that are largely non-rival (for example, playing fields), it would be inappropriate to divide by the number of students. On the other hand, if the provided goods and services are largely private (for example, laptops for students), then normalizing by the number of students would make sense.

In the absence of information on the extent to which schools' expenditures are non-rival, we consider two extremes. First we assume that all expenditures are private, and divide income, expenditure and endowment wealth by the number of full-time equivalent (FTE) students enrolled at the institution.¹² Second, we assume the opposite, that all expenditures are non-rival. In this case, no normalization at all is required. Presumably, actual institutional expenditures fall somewhere between these two extremes, so they will bracket the appropriate normalization. However, as shown below, although the magnitude of inequality in a given year depends substantially on whether or not one divides by the number of FTE

⁹Haig-Simons logic suggests that one should take into account the imputed income and capital gains generated by all the institution's assets, not just the financial assets in the endowment portfolio. While this would make sense conceptually, from a practical standpoint, it is hard to imagine how one could obtain meaningful estimates of the flow of imputed income generated by (say) a university's dormitories, administration buildings, laboratories, and so on. Similar intractable problems arise when trying to compute comprehensive values of households' H-S incomes.

¹⁰Indeed, many universities with endowments have explicit spending rules whose function is to reduce year-to-year fluctuations in spending. See Brown and Tiu (2014).

¹¹Since capital expenditures are essentially a form of saving, we exclude allocations for depreciation from our calculation of annual spending. This is the conventional approach in the empirical literature on consumption spending. See Hall (1988).

¹²Another possible deflator would be number of full-time equivalent faculty members. Doing so has no substantive effects on our results with respect to trends in inequality.

students, the trends in inequality are not much affected.

Characterizing the Extent of Inequality As Sen (1992) and others have pointed out, there is no single ideal statistic for summarizing the extent of inequality among a set of units. Following the Congressional Budget Office's (2011) tack in its discussion of trends in inequality across households, we take two approaches. First, we present graphs depicting how the average amount of income in each quartile of the income distribution has varied over time. Second, for each year we compute the Gini coefficient associated with the distribution of income.¹³ The Gini coefficient, defined as the ratio of the area between the Lorenz curve and the 45-degree line of equality, and the entire area under the line of equality, is probably the most commonly used numerical measure of income inequality, doubtless because the intuition behind it is so straightforward.¹⁴

4 Data

Our data come from two sources: the Integrated Post-secondary Education Data System (IPEDS) and the National Association of College and University Business Officers (NACUBO).

The IPEDS data are collected annually by the U.S. Department of Education's National Center for Education Statistics. Information is available from any institution that receives federal student aid (reporting these data is a legal condition for receiving funds). In effect, then, the IPEDS sample comprises the universe of institutions of higher education in the United States. The IPEDS data include variables relating to school characteristics such as public versus private status, location, finances, student enrollments, and size of faculty, among others. We use a version of the dataset produced by the Delta Cost Project (part of the American Institutes for Research), in which variables are standardized and made comparable across years. IPEDS is our source of data for institutions' incomes and expenditures. NACUBO, a membership organization representing higher education providers, collects its information annually from member institutions that opt to complete the annual survey as part of the NACUBO-Commonfund Study of Endowments. These data contain variables relating to university endowments such as the total value and the allocation across various classes of investments. Because participation is voluntary, the NACUBO sample of institutions is less comprehensive than that of the IPEDS. Interestingly, while the NACUBO sample is not a random draw from the universe of institutions, we show

¹³The Desrochers and Wellman (2011) study of inequality among universities includes no summary calculations of inequality or their trends over time; that is, there are no computations of inter-quartile differences, Gini coefficients, or like measures.

¹⁴See Yitzhaki (1982).

Table 1: Number of Observations in the IPEDS and NACUBO Data Sets by Year

Academic Year Ending	IPEDS	NACUBO
2002	2,182	627
2003	2,188	626
2004	2,191	646
2005	2,191	653
2006	2,186	661
2007	2,190	678
2008	2,186	679
2009	2,177	713
2010	2,174	682

below that the trends present in the two data sets are very similar. NACUBO is our source of data on endowment wealth.

Our analysis sample consists of a subset of the IPEDS data comprised only of the following six types of schools as defined by the 2005 Carnegie classification system: public research, public master’s, public community colleges, private research, private master’s, and private bachelor’s.¹⁵ We only use academic years ending 2002 through 2010 because changes in accounting conventions introduced in 2002 make it problematic to compare resource flows before and after that year.^{16,17}

Table 1 shows the sample sizes for the IPEDS and NACUBO datasets by year. The NACUBO sample is in general slightly less than one-third the size of the IPEDS dataset; as noted above, the NACUBO sample is smaller because it is based on a voluntary survey. The number of NACUBO institutions varies from year to year due to variation in survey response. Toward the beginning of our sample period, the number of IPEDS institutions is slightly lower because several had yet to adopt critical accounting changes implemented in 2002, rendering these observations unusable in our analysis. The number of IPEDS institutions in our analysis sample varies slightly from year-to-year because of entry and attrition, and because in some years a few institutions may fail to report certain key variables.¹⁸

Table 2 shows means and standard deviations of FTE student counts, income (total as well as by category), expenditure, and endowment wealth, each calculated over all years for both the IPEDS and

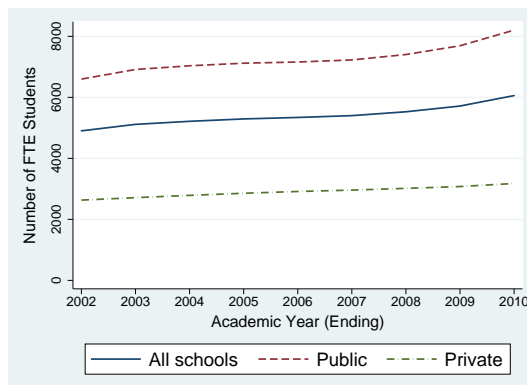
¹⁵Like Desrochers and Wellman (2011), we exclude for-profits, private two-year colleges, public bachelor’s schools, tribal colleges, and specialty schools.

¹⁶Prior to 2002, the figures for endowment income from the IPEDS data included neither realized nor unrealized capital gains, rendering this information of limited utility for computing a comprehensive estimate of income.

¹⁷Fiscal years at U.S. universities start in July and end in June. All years mentioned in this paper refer to the end year of an academic year. Thus, for example, 2005 refers to the academic year 2004-2005.

¹⁸Specifically, we dropped observations for which FTE student counts or any sources of revenue were missing. Some observations had missing values for total expenditure. These observations are included in our counts of IPEDS institutions provided that all revenue sources are reported. The slight drop in the number of IPEDS institutions during the last two years is due to late reporting. These schools eventually report their data to IPEDS, but because the Delta Cost project only releases consistent data periodically, these are the most recent data available.

Figure 1: Full Time Equivalent (FTE) Students by Year



NACUBO data.¹⁹ For the four categories of income per FTE, their percentages of total income per FTE are also reported (in square brackets), both for the entire sample and for public and private institutions separately. The figures related to endowment wealth in the IPEDS columns are based only on the subsample of IPEDS institutions that participated in the NACUBO survey. Similarly, the figures in the NACUBO column relating to all variables other than endowment wealth are from IPEDS, but only for NACUBO participating institutions. The means and standard deviations of the IPEDS data are also shown separately for public and private institutions. The figures indicate that relative to the IPEDS sample, the NACUBO institutions are more likely to be private, have larger student populations, higher incomes, and higher expenditures. One reason for such differences is that schools participate in the NACUBO survey to learn about endowment practices at other institutions. Such information is primarily of value to relatively wealthy schools, which tend to be private, large, and have large expenditures.

Figure 1 shows the number of FTE students²⁰ at the schools in our IPEDS sample from 2002 to 2010. We also display this information separately for public and private institutions. Public schools have substantially more students than private schools. Both sectors have seen a gradual, smooth upward trend in students during our sample period, suggesting that any variation in figures which have been normalized by FTE students is coming in part from changes in the numerator rather than the denominator.

In constructing income, we adhere as closely as possible to the Haig-Simons definition. Specifically, it is the sum of net tuition, government funding, private gifts, investment income, and other revenues.

More precisely:

¹⁹All dollar amounts are expressed in 2010 dollars. We account for inflation using the Consumer Price Index (CPI) for urban consumers as published by the US Bureau of Labor Statistics.

²⁰As stipulated by the National Center for Education Statistics, FTE students are calculated as the number of full-time students, plus the number of part time students multiplied by a factor which depends on the public/private status of an institution and student type. For details, see <http://nces.ed.gov/ipeds/glossary/index.asp?id=854>.

Table 2: Summary Statistics

Variable:	IPEDS			NACUBO
	Private	Public	Overall	
FTE Students	2,903 (3,757)	7,261 (10,530)	5,396 (8,611)	8,312 (11,310)
Income / FTE Student	33,180 (54,030)	16,790 (12,510)	23,810 (37,470)	38,730 (60,420)
Total Income (thousands)	136,900 (502,100)	173,800 (471,700)	158,000 (485,300)	361,000 (799,100)
Net Tuition / FTE Student	14,130 (7,239)	3,879 (2,383)	8,265 (7,168)	13,140 (6,700)
Government Sources / FTE Student*	[42.6%] 2,654 (9,065)	[23.1%] 9,614 (6,205)	[34.7%] 6,636 (8,309)	[33.9%] 6,588 (11,240)
PI / FTE Student**	[8%] 8,275 (27,220)	[57.3%] 502.1 (2,356)	[27.9%] 3,829 (18,300)	[17%] 8,749 (31,280)
Other / FTE Student	[24.9%] 8,127 (32,230)	[3%] 2,797 (5,965)	[16.1%] 5,078 (21,720)	[22.6%] 10,250 (36,160)
Expenditures / FTE Student	[24.5%] 29,130 (44,770)	[16.7%] 16,140 (11,300)	[21.3%] 21,700 (31,180)	[26.5%] 34,410 (49,900)
Total Expenditures (thousands)	(376,100) 119,000 (376,100)	(437,000) 163,800 (437,000)	(412,700) 144,600 (412,700)	(666,500) 325,200 (666,500)
Endowment / FTE Student***	104,700 (200,900)	14,670 (24,920)	76,130 (171,800)	76,130 (171,800)
Total Endowment (thousands)	516,100 (2,017,000)	379,200 (1,153,000)	472,600 (1,789,000)	472,600 (1,789,000)
Proportion Public			0.572	0.317
Sample Size	8,416	11,249	19,665	5,965

Notes: Data for endowment values are available only for institutions in the NACUBO sample. Other than endowment values, the statistics for the institutions in the NACUBO sample are calculated from the IPEDS data. Standard deviations are in parentheses. For income breakdowns, percentages of total income are in square brackets. Figures are rounded to 4 significant figures and averaged across the entire sample period (2002 to 2010). All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level. Only observations that include FTE student counts are included in these calculations. The sample used to calculate expenditures is smaller due to observations with missing expenditure values.

* Government sources include grants, contracts and appropriations from federal, state and local levels.

** PI is the sum of private gifts and investment income. See the text for a full definition.

*** The sample used to calculate endowment figures is restricted to those institutions that responded to the NACUBO survey. Hence, the figures relating to endowments in the third and fourth columns are the same.

- Net tuition is revenue received from tuition and fees (including the portion funded by outside aid, such as Pell grants) less institutional aid provided to students.²¹
- Government funding includes receipts from grants, contracts and appropriations at the federal, state, and local levels (except Pell grants, which are included in the net tuition category).
- Private gifts and investment income (PI) has two components. First is private gifts, which include donations, grants and contracts contributed to the school by private sources such as alumni, affiliated entities (such as foundations set up specifically to do fundraising on behalf of the institution at arm’s length), and other non-governmental sources. Second is investment income, common types of which include dividends, interest, royalties, and both realized and unrealized capital gains on the endowment portfolio. The IPEDS data report these two categories separately, but because of differences in the way institutions account for them, it makes sense to analyze them as a single grouping. For example, some schools’ endowments are managed through affiliated foundations. Of these schools, some characterize transfers from such foundations to the school as private gifts, while others count them as investment income.²²
- Other revenues comprise income received from auxiliary enterprises (for example, dining halls), affiliated hospitals²³, educational activities (such as university presses), independent operations²⁴, as well as other miscellaneous sources.

Figure 2 shows how mean and median revenues for public and private institutions have evolved over time. The diagram on the left shows figures per FTE student and the one on the right shows totals, a convention we adopt in subsequent figures as well. A striking aspect of the figure is the difference in the stories suggested by the means and the medians. Consider first the diagram on the left side, which shows trends in income divided by FTE students. In general, the median income for private institutions exceeds the median for public institutions; this gap grew from \$7,636 in 2002 to \$12,473 in 2007, and then declined in 2008 and 2009 as a result of the financial crisis. Similarly, mean income is substantially higher for private institutions, but the difference between mean income at private versus public institutions varies more dramatically (compared to the gap in the medians) from year to year. At its peak in 2007, the mean income of private institutions was almost two and a half times higher than that of public institutions, but in 2008 this ratio fell to 1.77 before recovering subsequently.

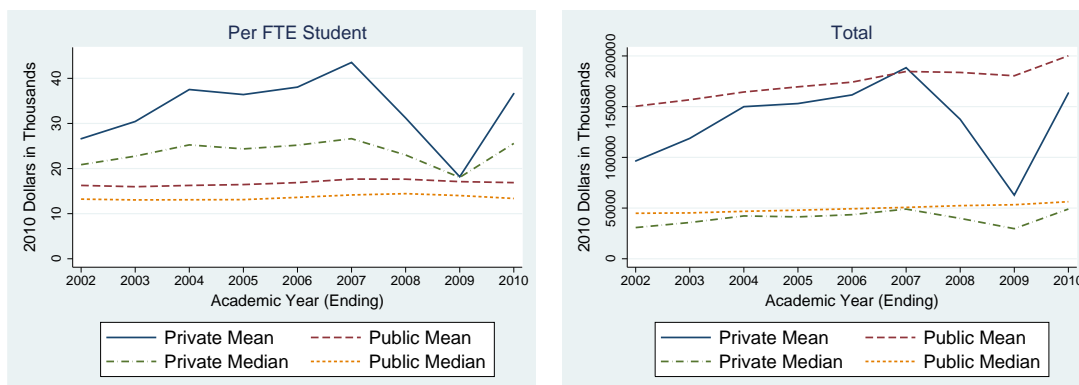
²¹Ehrenberg (2012) documents the importance of tuition discounts in higher education.

²²Because capital gains are not reported separately from overall investment income, we are unable to assess whether our substantive results would change if unrealized capital gains and losses were excluded from the income measure.

²³ Revenues from an institution’s medical school are not included in this category.

²⁴Independent operations revenues generally include income from federally funded research and development centers that do work unrelated to the instruction, research and public services mission of the institution itself.

Figure 2: Mean and Median Incomes for Public and Private Institutions

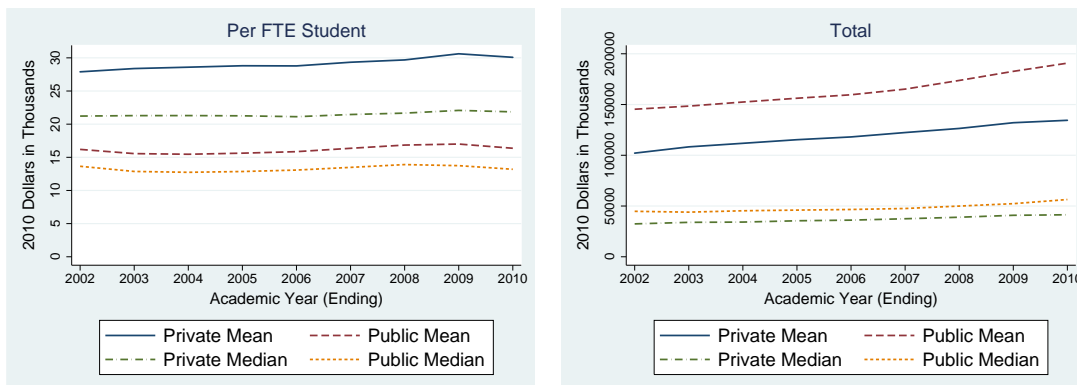


Note: Income is defined as the sum of tuition, government grants, private gifts and investment income, and other sources. See the text for details. All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

The mean and median figures differ because the distributions of income per student among both public and private universities are highly skewed to the right. For example, at public universities, the mean income per FTE student over our sample period is roughly constant at \$17,000, while the median is closer to \$14,000. The gap between mean and median incomes per FTE student in private universities is also generally large, but much more variable, ranging from \$16,900 in 2007 to a negligible \$140 in 2009. As we document below, the gyrations in incomes for the private universities arise primarily because a relatively large component of their incomes comes from investment income, which can be extremely volatile. The panel on the right side of Figure 2, which does not normalize by FTE students, indicates that public institutions have higher total incomes than private ones. This reflects the fact that, as shown in Table 1, their student bodies are larger on average. But the differences in the medians are not large, and they are fairly steady over time, about \$9.5 million, though the gap did widen during 2007 and 2008. The differences in the means are larger and more variable.

We next turn to expenditures, which are the sum of the following spending categories reported in the IPEDS data: instruction, research, public service, academic support, student services, institutional support, operations and maintenance of plant, scholarships and fellowships, auxiliary enterprises, hospitals, independent operations, and other operating expenses not accounted for in the previous categories. Figure 3 shows mean and median expenditures of public and private institutions. Mean expenditures deflated by FTE student are about 80 percent higher for private than public institutions. On the other hand, because of their larger size, mean total expenditures for public institutions exceed those of private institutions. Overall, both total and per FTE student real expenditures increased during our sample

Figure 3: Mean and Median Expenditures for Public and Private Institutions



Note: Expenditures are the sum of spending on instruction, research, academic support, student services, and other items. Further details are provided in the text. All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

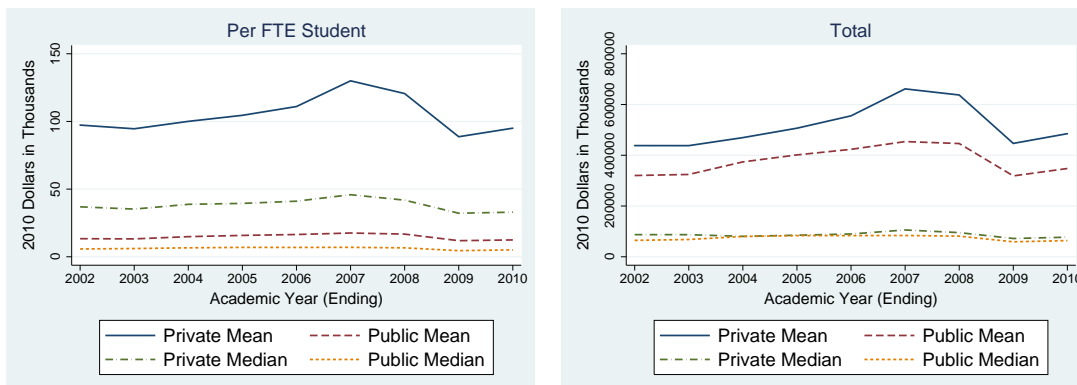
period. A comparison with Figure 2 indicates that expenditures were much less volatile than incomes. This is consistent with the notion that institutions smooth their spending in a way that is reminiscent of the permanent income hypothesis.

As noted above, for purposes of gauging inequality, our preferred measure of the economic status of an institution is income, either annually computed according to Haig-Simons principles, or permanent as proxied by expenditures. But the stock of endowment wealth plays (for some institutions) an important role in determining income, and differences in endowments have been central to much of the public discussion of inequality among colleges and universities. Hence, in Figure 4 we display summary information on endowment wealth.²⁵

The panel on the left shows mean and median endowment wealth per FTE student for both public and private institutions. Perhaps the most striking finding relates to the medians, which are very low for both private and, in particular, public institutions. At private institutions, the median endowment (averaged over all years) is roughly \$38,000 per FTE student, while at public institutions it is only \$6,000 per FTE student. These figures tell us that most schools simply don't have much in the way of endowment wealth. The means and medians both indicate that private schools are much better endowed than public schools on a per FTE student basis. This advantage is so great that even when we don't normalize by FTE student in the panel on the right, the mean total endowment size is still higher for private than public schools, although the medians are roughly the same.

²⁵Some endowments include illiquid assets such as venture capital investments, an observation that leads to the question of how they are valued. NACUBO provides no guidelines to institutions with respect to valuation procedures, and receives no information about the procedures employed. According to our conversations with one endowment specialist, there are common industry practices for valuing illiquid assets. For example, for real assets, standard appraisal techniques are used.

Figure 4: Mean and Median Endowments for Public and Private Institutions



Note: All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

Figures 2, 3, and 4 indicate the presence of considerable differences in income, expenditure, and endowment between public and private institutions. As well, the means are greater than the medians for all these measures, indicating that their distributions are skewed to the right. By itself, though, this does not tell us whether the extent of inequality has been changing over time. We now turn to this issue.

5 Inequality and its Trend

We take two approaches to characterizing the extent of inequality. The first is to represent graphically the average amounts of income, expenditure, and endowment wealth of institutions in each quartile of the income distribution over time.²⁶ Second, we supplement the graphical approach by calculating yearly Gini coefficients for each of our three measures of command over resources.

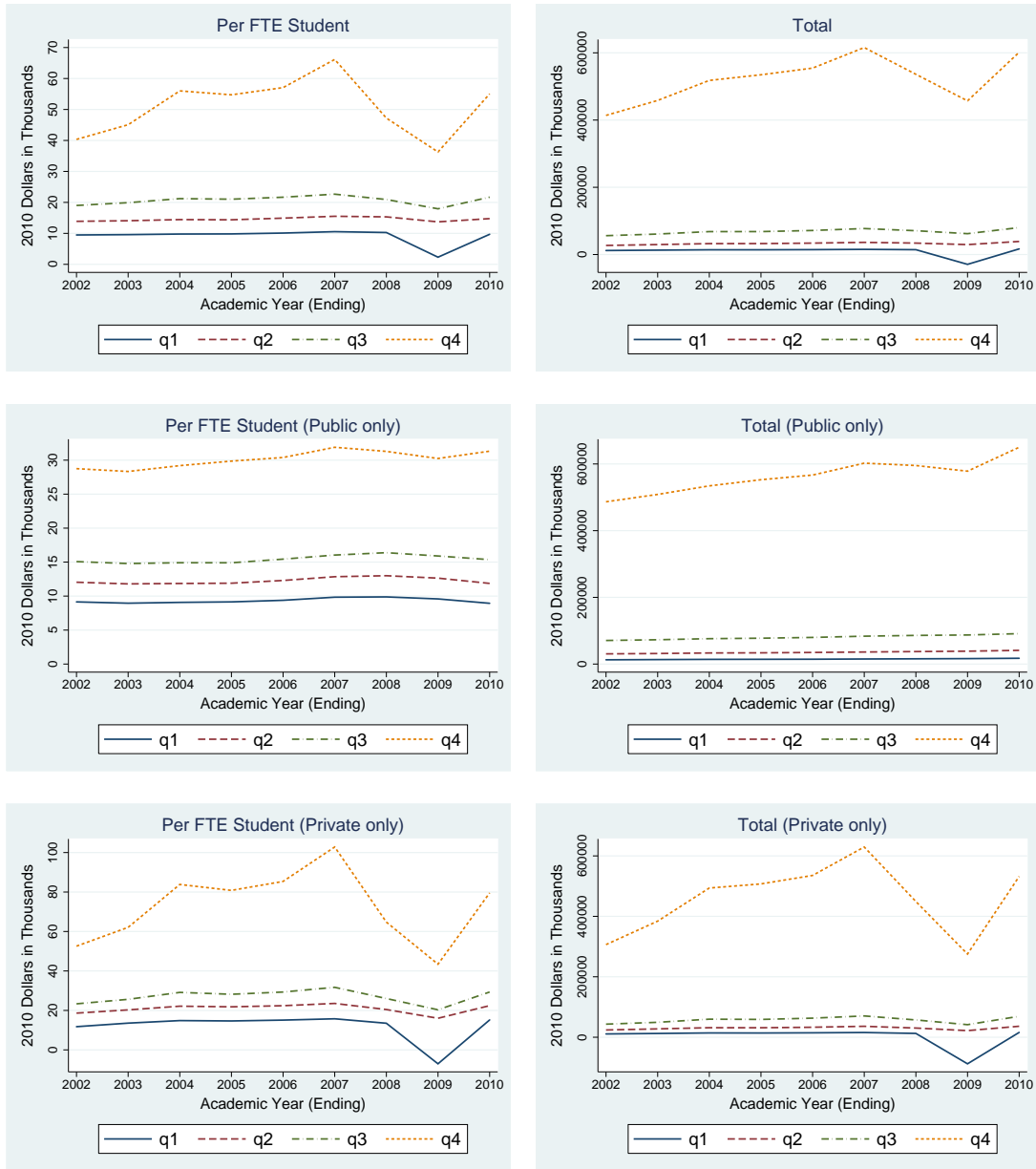
Even if the level of inequality remains similar over time, this might mask “churning” within the distributions, in that rich schools can become poor while poor schools become rich without affecting overall inequality measures. Hence, we also provide some calculations relating to the extent of mobility among schools and whether it changed during our sample period.

5.1 Inter-quartile Differences

Income Figure 5 shows the average income within each quartile, first for all institutions and then for public and private schools separately. In general, whether we normalize income by FTE student or not,

²⁶In addition to quartile differences, we examined differences between the 95th and 5th percentiles, as well as differences between the 90th and 10th percentiles. Our substantive conclusions were not affected.

Figure 5: Income by Quartile for Public and Private Institutions



Note: Income is defined as the sum of tuition, government grants, private gifts and investment income, and other sources. See the text for details. All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

top quartile incomes are substantially higher and more volatile than incomes in the other three quartiles. Although a high degree of volatility in the top quartile is present throughout our time period, it is most dramatically illustrated by the drastic fall in income during the academic years ending 2008 and 2009, when the economy experienced a severe financial crisis.

Because of the volatility in the top quartile, the ratio of incomes in the top quartile to the bottom quartile varied considerably, from about 4.3 in 2002 to 6.3 in 2007. Another noteworthy aspect of the figure is the slight dip in bottom quartile incomes in 2009. In that year, a number of schools experienced negative incomes due to substantial capital losses in their endowments. Consequently, several schools that were in the top three quartiles just the year before dropped into the bottom quartile and pulled down the average in that quartile.

The other panels in Figure 5 indicate that income inequality is less substantial among public than private institutions. This is true regardless of whether income is deflated by FTE students. Another observation based on the graphs is that most of the volatility in overall average income in the top quartile is generated by private schools. On the whole, the bottom three quartiles of both public and private institutions have relatively steady incomes (excluding the dips in the bottom quartiles in 2009, mainly a result of some institutions' negative incomes as explained above). Taken together, the overall impression one gets from Figure 5 is that although income of the schools in the top quartile is generally much higher than incomes in the other three quartiles, because of the volatility in income at the top, it is hard to detect any trend in inequality. We return to this issue below.

Sources of Income An important question is whether changes in one particular category of income dominate the movements that we see in Figure 5. To investigate this issue, Figure 6 decomposes income into its sources. As noted earlier, these are net tuition, government funding, private gifts and investment returns (PI), and other revenues.

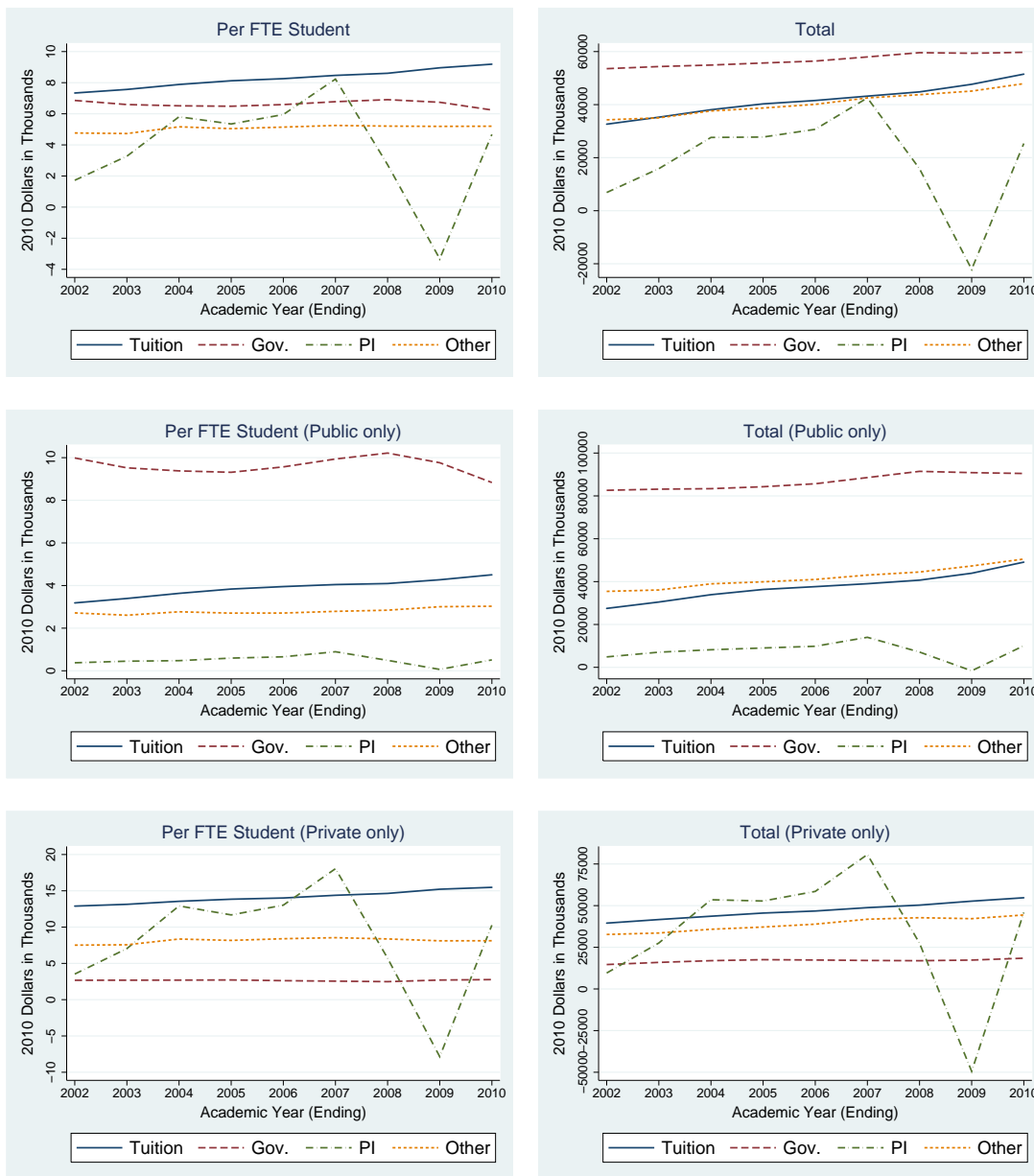
The graphs indicate that government funding and other income sources have essentially remained constant over time,²⁷ and net tuition revenues have increased, but only gradually. The chief source of the volatility comes from the private gift²⁸ and investment income²⁹ category. Both these components of income are quite sensitive to overall economic conditions. Separating private from public universities, it becomes clear that this volatility arises primarily in the private sector. Because public universities rely proportionally more on relatively stable government funding and less on private gifts and investment income, their overall incomes are less volatile. These graphs also reflect the fact that private institutions rely much more heavily on net tuition as an income source than public institutions. Net tuition has

²⁷This finding may seem counterintuitive, given the well-publicized decreases in state appropriations to public universities. However, the largest reductions took place after our sample period. See Government Accountability Office (2014, p. 35).

²⁸With regards to the effect of economic conditions on private gifts, see Ehrenberg and Smith (2003).

²⁹Interestingly, the Congressional Budget Office (2011, p. 17) documents a similar phenomenon with respect to capital income in its analysis of household inequality: "Capital gains are the most volatile source of household income, and their importance as a share of household income for the top 1 percent of the population has fluctuated." The CBO also observes that omitting capital gains and losses from its calculation of household income smoothes out some of the year-to-year jumps in inequality, but it does not change the trend (pp. 5-6).

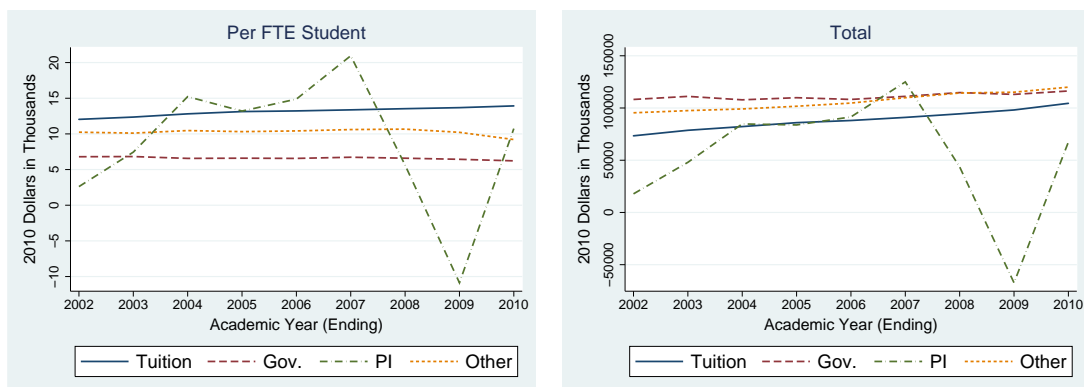
Figure 6: Income by Source for Public and Private Institutions



Note: PI refers to private gifts and investment returns, as defined in the text. Net tuition is the revenue received from tuition and fees (including the portion funded by outside aid, such as Pell grants) less institutional aid provided to students. All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

been trending up gradually, consistent with the widespread notion that colleges and universities have been charging more over time. Interestingly, although the levels of these key variables differ between the IPEDS and NACUBO samples, their trends over time are quite similar. This can be seen in Figure 7, which decomposes income for the NACUBO schools into the same sources as Figure 6.

Figure 7: Income by Source for NACUBO Institutions Only



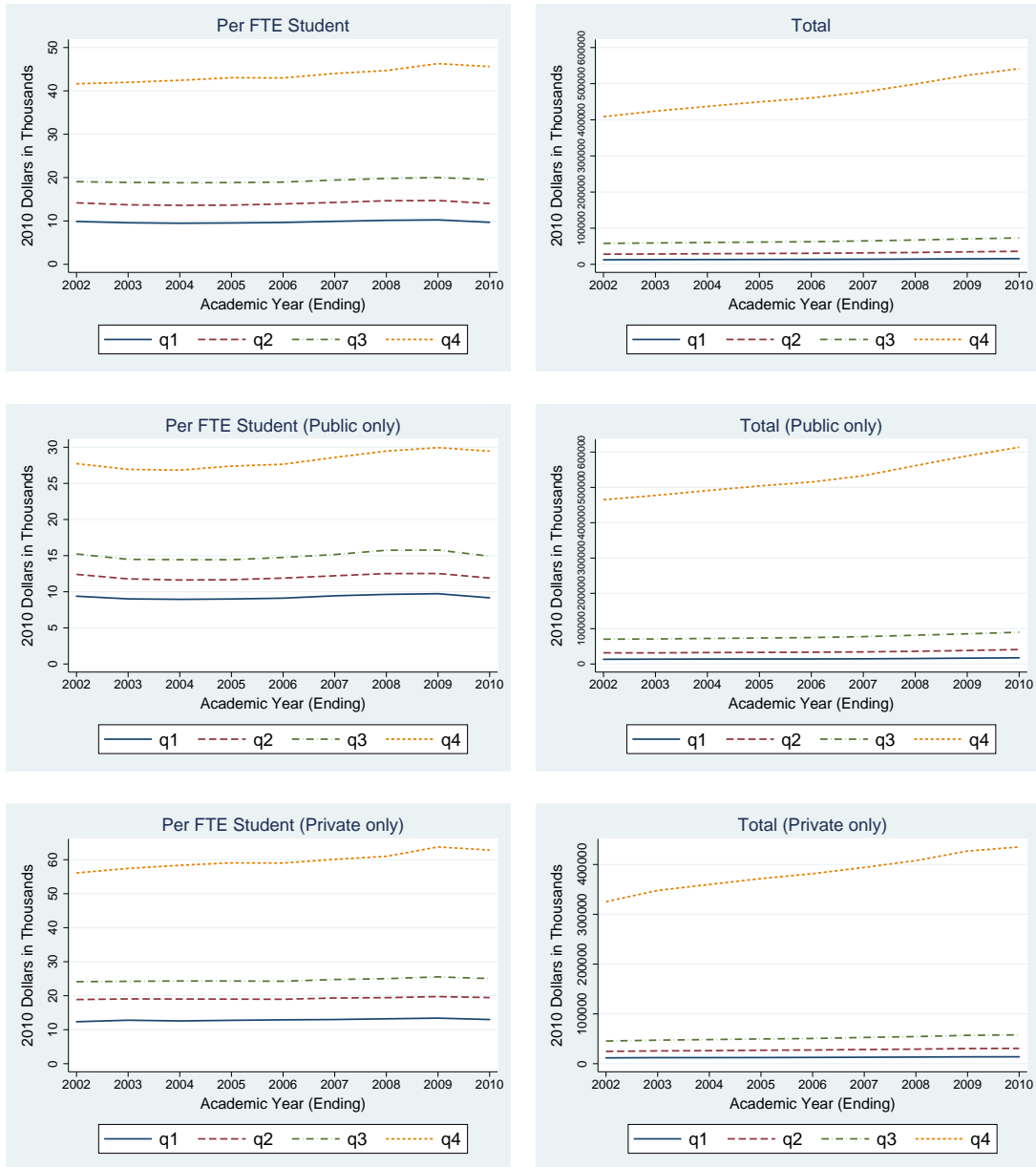
Note: PI is the sum of private gifts and investment returns, as defined in the text. Net tuition is the revenue received from tuition and fees (including the portion funded by outside aid, such as Pell grants) less institutional aid provided to students. All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

Expenditures Figure 8 depicts yearly average real expenditures by quartile, both for all institutions, and for public and private institutions separately. The figures on the left indicate that expenditures per FTE student in the top quartile were substantially higher than those in the other three quartiles. Furthermore, in both public and private institutions, real expenditure per FTE student in the top quartile increased substantially from 2002 to 2009. During this period expenditure per FTE student in the other quartiles also increased, although by barely perceptible amounts. However, in 2010, the last year in our sample period, expenditures per FTE student decreased slightly in all quartiles. To see why, refer to the graphs for real total expenditures in the right hand side of Figure 8. The graphs indicate that total real expenditures in each quartile increased, or did not decrease, in 2010. This implies that the decreases in expenditures per FTE student were due to enrollment increases that exceeded the growth of total expenditures.

Perhaps, though, the most striking lesson from Figure 8 is that the recession-induced decreases in income for institutions in the top quartile that we saw at the end of our sample period did not end up having a substantial impact on expenditure inequality across quartiles. Colleges and universities in the top quartile smoothed their expenditures in order to mitigate the fall in their incomes.

Endowments As noted above, differences in endowments across institutions play an important part in generating differences in incomes. Therefore, in Figure 9 we examine endowment wealth by quartiles. The top panel indicates that for the higher education sector as a whole: 1) Endowment wealth in the top quartile is substantially higher than in the bottom three quartiles. 2) During the first half of the 2000s

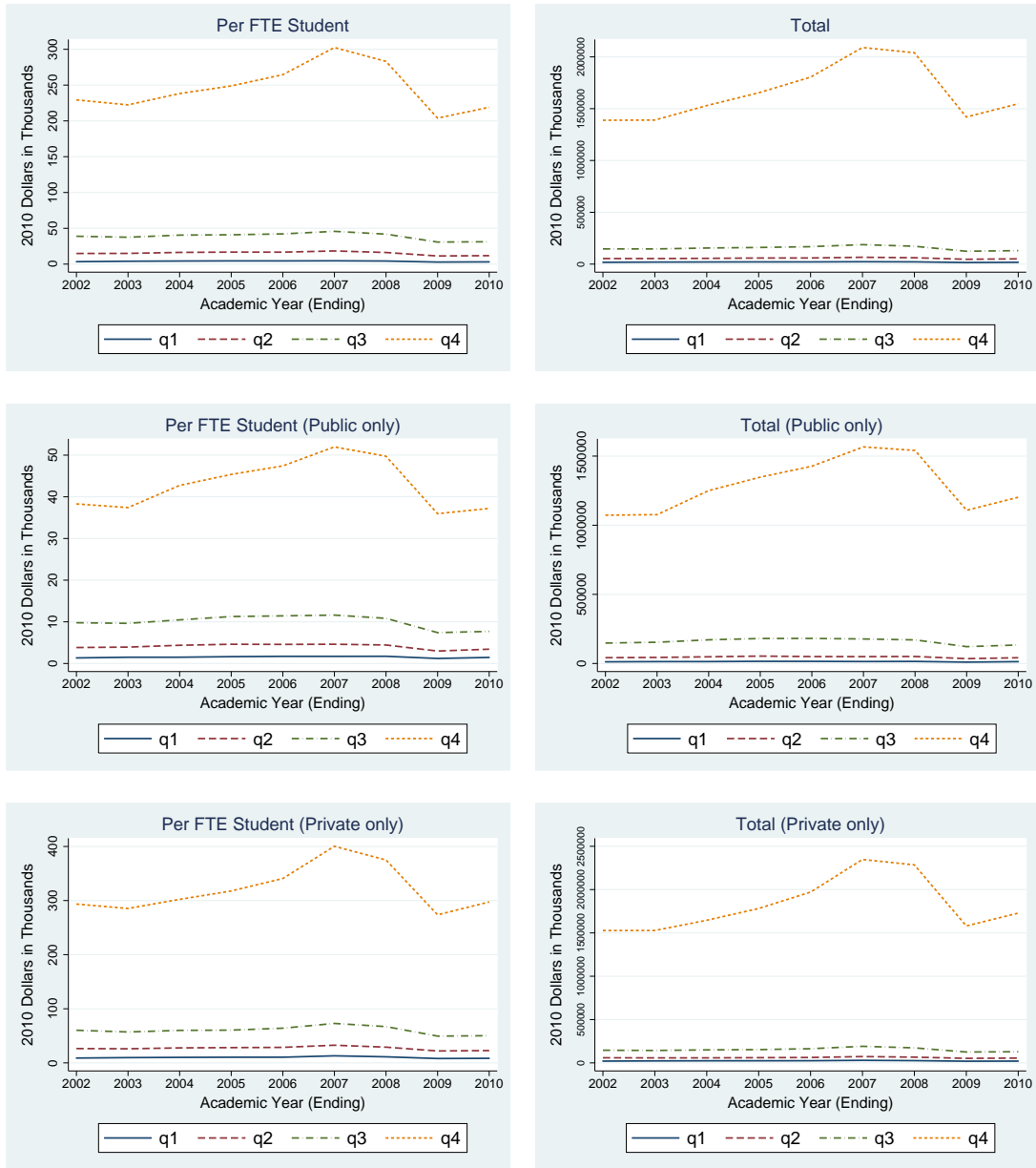
Figure 8: Expenditure by Quartile for Public and Private Institutions



Note: Expenditures are the sum of spending on instruction, research, academic support, student services, and other items. Further details are provided in the text. All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

average endowment wealth grew throughout the distribution (although in the figure it is a bit difficult to detect the growth in the lower three quartiles). 3) However, with the financial crisis that began in 2008, endowment wealth decreased in all quartiles. While the fall in absolute terms was especially abrupt at the top, endowments of institutions in the lower three quartiles also fell substantially, though again, this is

Figure 9: Endowment by Quartile for Public and Private Institutions



Note: All dollar amounts are expressed in 2010 dollars; the CPI for Urban Consumers is used to account for changes in the price level.

not easy to see in the diagram. These tendencies are present whether or not one normalizes endowments by FTE students, and as the second and third panels in the figure indicate, they are present for both public and private institutions. In short, as is the case with income, nothing in the diagrams suggests that endowment wealth became substantially more unequally distributed across institutions during our sample period.

Table 3: Gini Coefficients by Year

		2002	2003	2004	2005	2006	2007	2008	2009	2010	All Years	Time Trend Coefficient	
Income	Per FTE	Overall	0.342	0.367	0.417	0.413	0.415	0.445	0.361	0.450	0.410	0.402	0.00736 (0.00413)
		Public	0.273	0.274	0.279	0.285	0.281	0.283	0.274	0.273	0.301	0.280	0.00156 (0.00134)
		Private	0.353	0.365	0.418	0.416	0.422	0.457	0.378	0.652	0.401	0.429	0.01682 (0.01264)
	Total	Overall	0.730	0.734	0.739	0.744	0.743	0.749	0.737	0.870	0.736	0.754	0.00723 (0.00653)
		Public	0.725	0.728	0.729	0.732	0.732	0.735	0.727	0.717	0.730	0.728	-0.00025 (0.00071)
		Private	0.719	0.735	0.749	0.757	0.756	0.766	0.745	1.377	0.740	0.816	0.03348 (0.03121)
Expenditure	Per FTE	Overall	0.341	0.351	0.357	0.360	0.356	0.356	0.353	0.361	0.370	0.356	0.00225* (0.00070)
		Public	0.256	0.260	0.261	0.266	0.264	0.265	0.266	0.270	0.280	0.265	0.00225* (0.00050)
		Private	0.358	0.358	0.365	0.367	0.366	0.369	0.370	0.378	0.380	0.368	0.00266* (0.00027)
	Total	Overall	0.722	0.725	0.727	0.729	0.730	0.731	0.732	0.732	0.731	0.729	0.00108* (0.00021)
		Public	0.715	0.718	0.720	0.722	0.723	0.723	0.724	0.723	0.721	0.721	0.00076* (0.00031)
		Private	0.721	0.726	0.729	0.730	0.732	0.732	0.733	0.734	0.736	0.730	0.0016* (0.00026)
Endowment	Per FTE	Overall	0.708	0.703	0.703	0.708	0.716	0.725	0.731	0.732	0.739	0.718	0.00472* (0.00069)
		Public	0.626	0.617	0.628	0.626	0.632	0.646	0.646	0.652	0.643	0.635	0.00381* (0.00089)
		Private	0.653	0.650	0.653	0.661	0.668	0.671	0.680	0.677	0.684	0.666	0.00450* (0.00049)
	Total	Overall	0.787	0.787	0.793	0.799	0.806	0.811	0.816	0.811	0.815	0.803	0.00405* (0.00048)
		Public	0.756	0.751	0.759	0.760	0.769	0.782	0.782	0.783	0.784	0.770	0.00454* (0.00061)
		Private	0.796	0.797	0.803	0.811	0.817	0.818	0.827	0.819	0.826	0.813	0.00407* (0.00049)

Note: The calculations in this table are depicted graphically in Figures 10, 11, and 12. The figure in the last column of each row is the coefficient on time in a regression of the yearly Gini coefficient on a constant and a time trend. The sample size for each regression is 9. Robust standard errors are reported in parentheses. An asterisk (*) indicates significance at the 5% level.

5.2 Gini Coefficients

While graphical approaches to characterizing inequality have the advantage of transparency, they do not provide a summary statistic that incorporates all the information in the sample. The Gini coefficient is

a convenient measure of the extent of inequality among a set of units. The greater the Gini, the more unequal the distribution. The top panel of Table 3 shows how the Gini coefficients for income have evolved over time, both for all institutions and for public and private schools separately. As before, we look at both income per FTE student and total income. For convenience, Figure 10 depicts these annual Gini coefficients graphically.

Do the Gini computations tell more or less the same story as the quartile differences that were illustrated above? Consider first the results relating to income per FTE student for all institutions in the top panel of Table 3. According to the table, the Gini for income per FTE student starts at 0.342 in 2002, goes only as high as 0.445 in 2007, then fluctuates somewhat immediately after the financial crisis and by 2010 it is down to 0.410. Thus, while there was a gentle increase in inequality during the early part of the decade when the economy was doing fairly well, that trend was reversed with the advent of the 2008 financial crisis. This impression is confirmed when we graph the yearly Gini calculations in Figure 10. In short, as suggested above, there does not appear to have been much of a trend in inequality over time.

To obtain a more precise sense of whether there was a trend in the Gini, we estimate a regression of the Gini coefficient on a constant and a time trend. The last column of Table 3 shows the coefficient on the time trend, 0.00736 with a standard error of 0.00416. We therefore cannot reject the hypothesis that there was no trend in the Gini over time. As can be seen from the other figures in the last column of the first bank of numbers in the table, this finding of no statistically significant trend holds whether we look at total or per FTE student income, and for both public and private institutions.³⁰

A comparison of the Gini coefficients for total income and income per FTE student in Table 3 reminds us that the choice of normalization convention has a major effect on the measure of inequality in any given year—the Gini is much lower when we divide by FTE student, confirming our earlier observation that there is substantially less inequality with respect to income per FTE student than total income. But the finding that there is no discernible trend in inequality is the same regardless of whether or not we divide by FTE students.³¹

The second bank of numbers in Table 3 shows the yearly Gini coefficients for expenditures; these are graphed in Figure 11. The graphs don't suggest much in the way of a positive time trend in expenditure inequality, whether we look at public or private institutions, and whether or not we deflate by FTE students. This impression is confirmed when we examine the regression results in the last column of Table 3. Consider first the estimate of the time trend in expenditure per FTE student for all institutions.

³⁰The anomalous spike in the Gini in 2009 is caused by the fact that some institutions had negative incomes due to large capital losses on their endowment wealth. When some incomes are negative, the Gini coefficient can exceed one.

³¹As a point of comparison, according to the Congressional Budget Office (2011, pp. 13, 39), the Gini of market income for U.S. households was 0.590 in 2007; between 2002 and 2007 it grew by 3.6 percentage points.

Figure 10: Income Gini Coefficients for Public and Private Institutions

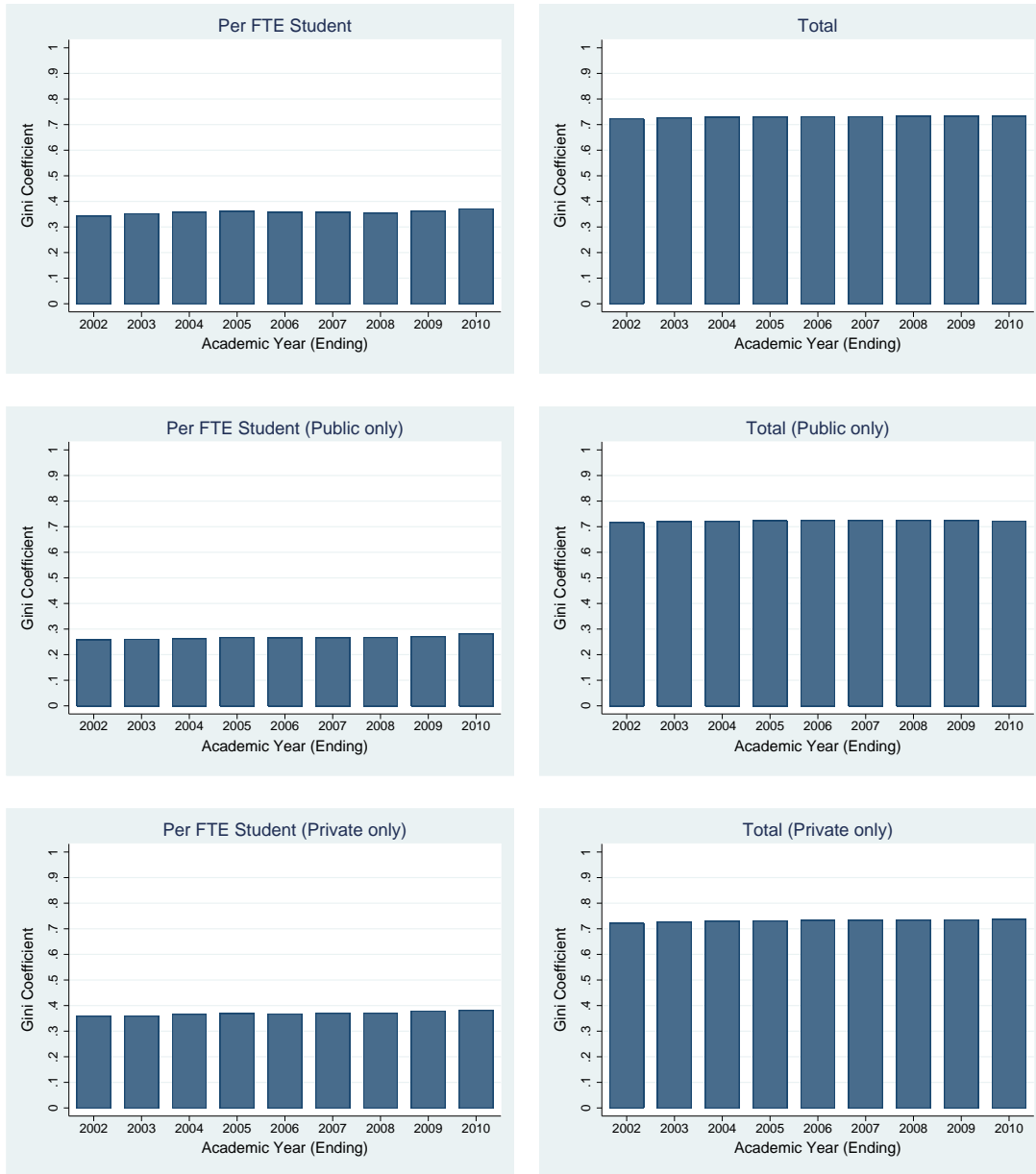


Note: The Gini coefficient among private institutions for 2009 was 1.38. Gini coefficients can exceed one when some observations have negative incomes, as was the case in 2009. In the graph, we have capped Gini coefficient values at 1.

While the coefficient is statistically different from zero, it is very small in magnitude, implying an increase in the Gini of only 0.00255 per year. Over an eight year period, this would amount to an increase of 0.02, which is minor given that we start from a base of 0.341 in the first year of our sample.³² Similar results

³²To help put a 0.02 increase in the Gini in perspective, note that the Gini coefficient is half of the average difference in expenditure between every pair of institutions in our sample, expressed as a proportion of average expenditure (see Congressional Budget Office, 2011, p. 5). Hence, an increase in the Gini of 0.02 implies an increase in the average difference

Figure 11: Expenditure Gini Coefficients for Public and Private Institutions



are obtained whether we consider trends in the Gini for the entire set of schools or by sector, and deflated by number of FTE students or not. In short, over our sample period, there was no substantial increase in inequality with respect to annual expenditures. Thus, to the extent one is willing to assume that annual expenditures are proportional to permanent income, there has not been a consequential increase in inequality with respect to permanent income.

in expenditure between every pair of institutions in our sample as a proportion of average expenditure of only 0.04, or about \$870 in expenditure per FTE student, over eight years.

The last bank of numbers in Table 3 shows the yearly Gini coefficients for endowment wealth; the associated graphs are in Figure 12. The overall measure in the first panel indicates that whether we focus on endowment wealth per FTE student or on the total, the story is pretty much the same—during our sample period, the change in inequality has been minimal. This impression is confirmed by the regression coefficients in the last column of Table 3. For example, while the coefficient on the time trend for endowment per FTE student for the entire sample is statistically significant, it indicates that the Gini increased at a rate of only 0.00472 per year. Over an 8 year period, this amounts to a change of only 0.038, starting from an initial value of 0.708 in the first year of our sample. Contrary to the view often expressed in popular discussions, and despite the high growth rate of endowments early in the sample period, there have been no substantial increases in endowment wealth inequality across universities in recent years. Inequality in endowment wealth is somewhat higher within the set of private schools than public schools, but the upward trend in inequality in our sample period has only been slight for both groups, regardless of whether or not we account for differences in FTE students.³³

5.3 Mobility

We have shown that whether one looks at income, expenditures or endowments, schools are unequal by any measure. We have also documented that, contrary to the concerns expressed by many commentators, schools have not been growing substantially more unequal in recent years. However, distributional statistics that remain relatively constant over time can conceal considerable churning within the distribution. To the extent that schools that are toward the bottom of the distribution in a given year move up the next year, one’s concerns about inequality, or at least its social significance, could be attenuated. Hence, it is instructive to see whether there is significant mobility within the various distributions.

There is no single way to characterize the extent of mobility within a distribution and how it varies over time. We choose a simple approach, which is to calculate the rank-rank slope in every year for income, expenditure and endowment wealth (in both per student FTE and total terms). The rank-rank slope is obtained by regressing an institution’s rank in the current year on its rank in the previous year.³⁴ The coefficient on lagged rank measures the degree of immobility within the distribution from year to year. The higher the rank-rank slope, the lower is mobility. A rank-rank slope of 1 implies that lagged rank perfectly predicts current rank, indicating no change in relative positions within the distribution. A

³³The fact that the Gini coefficients for endowment wealth are higher than those for income mirrors an empirical regularity in the literature on household inequality. In most countries, wealth Gini coefficients are higher than income Gini coefficients (both before and after transfers). See Davies, Sandstrom, Shorrocks and Wolff (2011).

³⁴For another example of the use of rank-rank regressions to study mobility issues, see Chetty, Hendren, Kline, Saez and Turner (2014), who study inter-generational income mobility.

Figure 12: Endowment Gini Coefficients for Public and Private Institutions



rank-rank slope of 0 suggests that lagged rank and current rank are completely uncorrelated, implying a high degree of churning.

Figure 13 graphs the rank-rank slopes for income, expenditure and endowment, both totals and normalized by FTE students. In the graphs, the gray shaded area represents the 95 percent confidence interval around each of the estimated slopes. The first row, which shows the results for income, indicates that before 2008, the rank-rank slopes were generally very close to one. Thus, it was rare for institutions

to change places within the income distribution. The rank-rank slope fell somewhat during and after the financial crisis that began in 2008. The reason for increased income mobility at this time is that in 2008, incomes at a number of institutions at the top of the distribution fell sharply (and some even became negative) because of large capital losses on their endowments. Many of these institutions fell into lower quantiles, and some into the bottom of the distribution. However, starting in 2009, many of these then low quantile institutions recovered from the negative income shock and bounced back into the top. This same pattern is observed for relative rankings in total income, which are displayed in the diagram to the right.

The second row of Figure 13 indicates that mobility in terms of expenditure (both per FTE student and total) is even less than it is for income—the rank-rank slope is close to 1 for all years. Furthermore, according to the third row of Figure 13, the story with respect to endowments is quite similar. Whether we look at the figures in total or per FTE student terms, movement within the endowment distribution is essentially non-existent.

The graphs in Figure 13 convey a clear message: Throughout our sample period, regardless of whether we look at the distribution of income, expenditure, or endowment wealth, there is very little mobility.³⁵ Hence, the absence of trends in the inequality data is not masking changes in the identities of the schools in various parts of the respective distributions.

5.4 Results by Carnegie Class

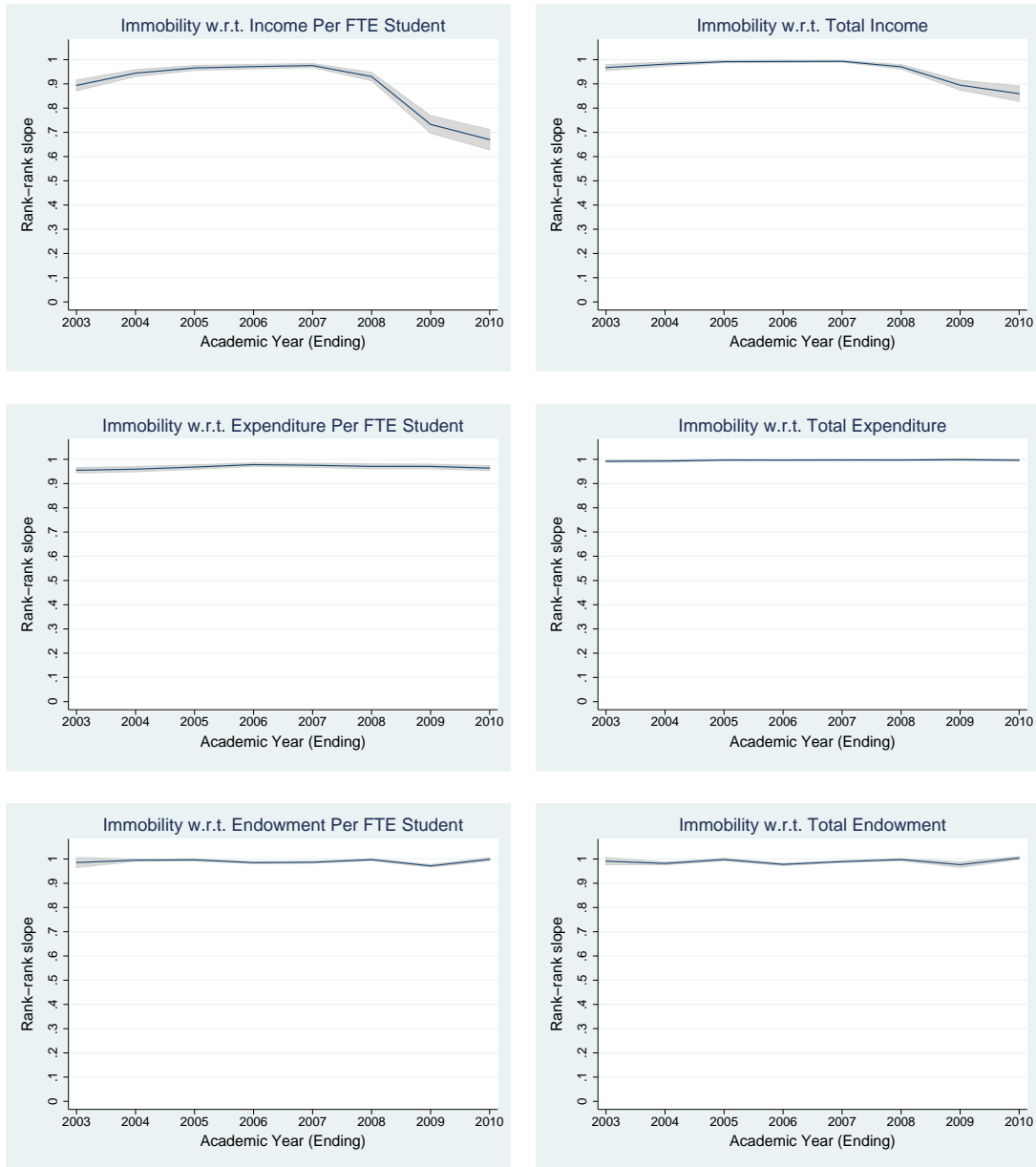
In the literature on inequality among households, all types of households are taken into account, regardless of (say) ethnicity, immigrant status, occupation, and so on. We have followed an analogous approach by including essentially all types of institutions in our analysis sample. The private schools, for example, range from poorly endowed bible colleges to Harvard University. It could be, however, that doing so risks glossing over important differences in patterns among various types of institutions. In order to investigate this possibility, we replicated the analysis separately for each of the six Carnegie classifications of schools: Public Research, Public Masters, Public Associates, Private Research, Private Masters, and Private Bachelors.³⁶ The number of graphs and tables is very large, and they are included in an online appendix. The major results are as follows:

1. The findings with respect to income are essentially the same. Inequality (in terms of Gini coeffi-

³⁵Just as there has been very little change in the rankings with respect to resources, apparently there has not been much mobility with respect to overall reputation. Indeed, according to Healy (2014), the ranking of reputations has not changed substantially since 1911.

³⁶Only 16 public associates institutions (essentially, community colleges) took part in the NACUBO survey, so the endowment results for this class must be regarded with caution.

Figure 13: Immobility within the Distributions of Income, Expenditure, and Endowment Wealth



Note: Each graph plots the rank-rank slopes over time for income, expenditures, and wealth, respectively. The rank-rank slope is a measure of immobility. It is computed by regressing an institution's rank with respect to a given variable in the current year on the institution's rank in the previous year. Hence, the greater the rank-rank slope, the lower is mobility. The gray shaded area represents the 95% confidence interval of each year's estimates.

cents) is quite stable for all Carnegie classes of public institutions. It varies within the three classes of private institutions, but there is no discernible trend. Income inequality is highest among the private research universities.

2. With respect to expenditures, during our sample period the extent of inequality is basically unchanged for all classes of institutions. Again, inequality is highest among private research universities.
3. For all classes of institutions, endowments increased until the financial crisis of 2008, after which they fell in value. Since the recovery, endowments have rebounded, except for public masters institutions. However, their endowments are much smaller than those in the other Carnegie classes. In spite of the financial crisis, endowment inequality has been quite stable during our time period for all Carnegie classifications, although there has been a slight upward trend within some of the classes. Once again, most of the dispersion observed at the aggregate level comes from private research universities, which have the highest levels of inequality, followed by public research universities.

Another way to group universities is by research mission, regardless of whether the institutions are public or private. Growing inequality among research institutions could be a concern if, for example, public research universities are losing out to elite private research institutions in competition for talented faculty (Alexander, 2001). To address this issue, we group together both public and private institutions that have research as part of their central mission (according to their Carnegie classifications). We then generate graphs analogous to those presented above. The results, which are found in the online appendix, show that within the set of public *and* private research universities, the patterns in average income, expenditure and endowment by quartiles, as well as their Gini measures of inequality, are similar to those calculated for the overall sample.

In short, during our sample period, the trends in inequality within Carnegie classes and among research universities only do not depart substantially from those we have identified for the sample as a whole.

6 Conclusion

Some observers have expressed concerns about growing inequality among institutions of post-secondary education. They argue that well-off students generally matriculate at richer institutions. To the extent this leads to better educations for these already relatively wealthy students and more stratification by socioeconomic status, inequality across universities may exacerbate inequality across individuals. However, it is just as challenging to think about the optimal extent of inequality among institutions as it is for households. Efficiency considerations, for example, suggest that because of possible economies of scale in the production and dissemination of knowledge, it might be more efficient to concentrate resources

at a few universities. But even this efficiency criterion may fail to rationalize the current degree of inequality, if diminishing returns set in relatively early. In any case, a prerequisite to a sensible discussion of whether or not growing inequality among schools is socially desirable is an assessment of whether the premise behind the question is correct. In this paper, we have used standard analytical tools to examine whether institutions of higher education are, in fact, inexorably becoming more unequal.

We have drawn upon the burgeoning empirical literature on inequality among households to develop an operational and conceptually sensible framework for assessing the extent of inequality across universities. We confirm the common view that there is extensive inequality. However, we find no evidence of a substantial increase in inequality in recent years. This is true both for the sample as a whole and within different classes of institutions. In addition, we find that mobility within the distribution has been minimal, with the most well-off institutions remaining at the top of the distribution year after year, and the least well-off remaining at the bottom.

The data that are necessary to attack this problem are available for only the period 2002-2010. As is always the case, it is not clear whether past trends (or non-trends) will continue into the future, particularly when those trends are based on a relatively short time series. Further, although no decade is typical, our period did witness the Great Recession, which certainly had an impact on university finances. Hence, an important topic for future research is to analyze new data as they become available. That said, we believe that our results cast substantial doubt on the proposition that access to resources among US institutions of higher education is inexorably becoming more unequal.

References

- Alexander, F. King (2001) “The Silent Crisis: The Relative Fiscal Capacity of Public Universities to Compete for Faculty,” *The Review of Higher Education*, Vol. 24, No. 2, pp. 113–129.
- Armour, Philip, Richard V Burkhauser, and Jeff Larrimore (2013) “Deconstructing Income and Income Inequality Measures: A Crosswalk from Market Income to Comprehensive Income,” *The American Economic Review*, Vol. 103, No. 3, pp. 173–177.
- Barber, Brad M and Guojun Wang (2013) “Do (Some) University Endowments Earn Alpha?” working paper, SSRN.
- Belkin, Douglas (2014) “Harvard Receives Its Largest Donation,” Wall Street Journal, September 08. Accessed: 2014-09-23.
- Bowen, Howard R. (1981) “Cost Differences: The Amazing Disparity among Institutions of Higher Education in Educational Costs per Student,” *Change*, Vol. 13, No. 1, pp. 21–27.
- Breneman, David W. (2008) “What Colleges Can Learn From Recessions Past,” *The Chronicle of Higher Education*, October 10.
- Brown, Keith C and Cristian Ioan Tiu (2014) “The Interaction of Spending Policies, Asset Allocation Strategies, and Investment Performance at University Endowment Funds,” in Jeffrey R. Brown and Caroline M. Hoxby eds. *How the Financial Crisis and Great Recession Affected Higher Education*: University of Chicago Press, Chap. 2.
- Brown, Jeffrey, Stephen G Dimmock, Jun-Koo Kang, and Scott Weisbenner (2010) “How University Endowments Respond to Financial Market Shocks: Evidence and Implications,” Working Paper 15861, National Bureau of Economic Research.
- Campbell, John Y. (1987) “Does Saving Anticipate Declining Labor Income? An Alternative Test of the Permanent Income Hypothesis,” *Econometrica*, Vol. 55, No. 6, pp. 1249–1273.
- Chetty, Raj, Nathaniel Hendren, Patrick Kline, Emmanuel Saez, and Nicholas Turner (2014) “Is the United States Still a Land of Opportunity? Recent Trends in Intergenerational Mobility,” *The American Economic Review*, Vol. 104, No. 5, pp. 141–147.
- Clotfelter, Charles (2014) “Competition among Unequals,” working paper, Duke University.

- Congressional Budget Office (2011) “Trends in the Distribution of Household Income between 1979 and 2007,” Technical report, Congressional Budget Office.
- Davies, Scott and David Zarifa (2012) “The Stratification of Universities: Structural Inequality in Canada and the United States,” *Research in Social Stratification and Mobility*, Vol. 30, No. 2, pp. 143–158.
- Davies, James B, Susanna Sandstrom, Anthony Shorrocks, and Edward N Wolff (2011) “The Level and Distribution of Global Household Wealth,” *The Economic Journal*, Vol. 121, No. 551, pp. 223–254, March.
- DeNavas-Walt, Carmen, Bernadette D. Proctor, and Jessica C. Smith (2011) “Income, Poverty, and Health Insurance Coverage in the United States: 2010,” *Current Population Reports*, pp. 60–239, September.
- Desrochers, Donna M. and Jane V. Wellman (2011) “Trends in College Spending 1999-2009: Where Does the Money Come From? Where Does It Go? What Does It Buy?” *Delta Cost Project*. Report.
- Dimmock, Stephen G (2012) “Background Risk and University Endowment Funds,” *Review of Economics and Statistics*, Vol. 94, No. 3, pp. 789–799.
- Ehrenberg, Ronald G. (2012) “American Higher Education in Transition,” *The Journal of Economic Perspectives*, Vol. 26, No. 1, pp. 193–216.
- Ehrenberg, R.G and C.L Smith (2003) “The Sources and Uses of Annual Giving At Selective Private Research Universities and Liberal Arts Colleges,” *Economics of Education Review*, Vol. 22, No. 3, pp. 223–235.
- Goetzmann, William N and Sharon Oster (2012) “Competition Among University Endowments,” Working Paper 18173, National Bureau of Economic Research.
- Goldin, Claudia (2010) “Tales out of School,” *New York Times Sunday Book Review*, p. 26, February 5.
- Government Accountability Office (2014) “Higher Education: State Funding Trends and Policies on Affordability,” Report to the Chairman, Committee on Health, Education, Labor, and Pensions, United States Senate GAO-15-151, US Government Accountability Office.
- Halfman, Willem and Loet Leydesdorff (2010) “Is Inequality Among Universities Increasing? Gini Coefficients and the Elusive Rise of Elite Universities,” *Minerva*, Vol. 48, No. 1, pp. 55–72.

- Hall, Robert E. (1988) "Intertemporal Substitution in Consumption," *Journal of Political Economy*, Vol. 96, No. 2, pp. 339–357.
- Hauptman, Arthur M. (1997) "Financing American Higher Education in the 1990s," *New Directions for Institutional Research*, Vol. 1997, No. 93, pp. 19–35.
- Healy, Kieran (2014) "The Persistence of the Old Regime," Crooked Timber <http://crookedtimber.org/2014/08/06/the-persistence-of-the-old-regime/>, August 6, 2014. [Accessed August 25, 2014].
- Jones, Arthur F. and Daniel H. Weinberg (2000) "The Changing Shape of the Nation's Income Distribution, 1974-1998," Current Population Reports Series P60-204, US Census Bureau.
- Katz, Lawrence F. and David H. Autor (1999) "Changes in the Wage Structure and Earnings Inequality," in Orley C. Ashenfelter and David Card eds. *Handbook of Labor Economics*, Vol. 3, Part A: Elsevier, pp. 1463 – 1555.
- Lerner, Josh, Antoinette Schoar, and Jialan Wang (2008) "Secrets of the Academy: The Drivers of University Endowment Success," *Journal of Economic Perspectives*, Vol. 22, No. 3, pp. 207–222.
- Merton, Robert C. (1993) "Optimal Investment Strategies for University Endowment Funds," in Charles T. Clotfelter and Michael Rothschild eds. *Studies of Supply and Demand in Higher Education*: University of Chicago Press, Chap. 7, pp. 211–242.
- Oates, Wallace E (1988) "On the Measurement of Congestion in the Provision of Local Public Goods," *Journal of Urban Economics*, Vol. 24, No. 1, pp. 85–94.
- Piketty, Thomas and Emmanuel Saez (2003) "Income Inequality in the United States, 1913-1998," *The Quarterly Journal of Economics*, Vol. 118, No. 1, pp. 1–39, February.
- Sen, Amartya (1992) *Inequality Reexamined*: Oxford University Press.
- Slaughter, Sheila and Larry L. Leslie (2001) "Expanding and Elaborating the Concept of Academic Capitalism," *Organization*, Vol. 8, No. 2, pp. 154–161.
- Vedder, Richard K. (2014) "Cut Off Harvard to Save America," *Bloomberg View*, February 19.
- Yitzhaki, Shlomo (1982) "Stochastic Dominance, Mean Variance, and Gini's Mean Difference," *The American Economic Review*, Vol. 72, No. 1, pp. 178–185.