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The Relation Between University  
Endowment Fund Size and University  
Reputational Rankings

Jason Wolbrom

## **Abstract**

Universities compete with each other to admit the best students and achieve the highest quality ranking. Students use reputational ranking to determine which institution they want to attend. Universities use student tuition plus alumni donations to establish an investable endowment fund. In this paper, multiple analyses are run to investigate the relation between reputational rankings and endowment funds between 2006 and 2014. The main and surprising finding of the paper is that the expectation of a strong positive link between the two rankings is not borne out by the data. One additional interesting finding is that the lower a university's endowment ranking, the more volatility there is in endowment ranking change. This also holds true with reputational rankings as there is more volatility for universities ranked lower.

# **1. Introduction**

This thesis examines the time-series correlation between university reputational rankings and the size rankings of their endowment funds. Data are obtained from *U.S. News* for the former reputational rankings and from the National Association of College and University Business Officers (NACUBO) for the latter. Endowment fund values and rankings are measured using a one-period lag. The time period examined is 2006 through 2014. Analysis includes the population of U.S. universities, with separate examinations of public and private universities. Finding the way that university endowment fund size maps to a future change in reputational ranking is the goal of this paper.

# **2. Literature Review**

The literature review provides an overview of university endowments, a few examples of challenges institutions have faced in endowment management, alumni growth, and university rankings and the implication. Much of the literature about endowment funds is focused on large universities such as Ivy League schools. This section concentrates only on theoretical literature instead of empirical results because the use of the empirical results is discussed throughout this paper.

The importance of endowment funds is essential for a university's growth. To grow the current endowment through higher investment returns, many endowments have begun using alternative assets in their portfolios. Statistically, the richer the endowment the more alternative assets they hold. This creates background risk and illiquidity when there are revenue shocks (Dimmock 2012). Along with endowments, universities focus on their reputational ranking. These rankings are highly influential for students in choosing what university they would like to

attend. One concern is that no matter how the reputational rankings are created there will always be criticism to what is used in the formula (Kehm 2014).

### *2.1 University Endowments*

Endowment funds have performed exceptionally well compared to the S&P 500 Index. This might be the result of universities putting their money in riskier assets. Giants, such as Harvard, invest as much as 90% of their endowment in risk assets. Smaller universities, such as Chapman University, invest only about 60% in risk assets (Gilbert 2012). Because of investment minimums, universities with larger endowments have access to more diversified alternative assets to create a larger return compared to smaller universities. Universities with larger endowments also have access to more talented portfolio managers. These better managers have had more experience and have access to a broader knowledge base (Lerner 2008). The other side of managing an endowment is that even if smaller schools have established asset allocation, they might not be gaining any more return than other schools without efficient asset allocation (Brown 2010). Therefore, schools such as Harvard and Yale prevail and will have a higher probability of creating more return, making it hard for smaller schools to ever overtake their endowment rank.

### *2.2 University Mistakes*

In some instances, universities are ranked highly on endowment size but make bad investments that severely hurt the institution. One such case was Yeshiva University during the 2000's. Yeshiva held over \$500 million in United States Treasury Bonds but sold all of it to buy \$500 million in highly risky assets. This occurred during 2001 when eight board members were

changed in a sixteen-month period. Fast-forward to 2014 and Yeshiva holds \$567 million in debt and it is having a difficult time paying it back (Weiss 2014). Yeshiva University is just one example of schools that increased risk exposure during the 2000's but is notable because of the size of the error and losses to the university.

Another large university that suffered from a bad investment is the University of Rochester. The University of Rochester had the third highest endowment fund in the early 1970's behind Harvard and the University of Texas. Rochester had put a large allocation into the common stock of companies such as Kodak and Xerox at their peak and suffered dramatic losses. Rochester fell to 25<sup>th</sup> in 1995 and had to cut many programs and faculty (Lerner 2008). Examples such as these demonstrate that no matter their endowment size, all institutions are vulnerable to bad decisions that can lead to spending cutbacks.

### *2.3 Alumni Growth*

University endowments offer an economic benefit for students in the form of regular payouts from endowment investment portfolios. An important reason why an endowment exists is because it can protect against financial shocks. Universities are particularly susceptible to financial shocks because unlike companies, universities cannot issue new equity during bad times and costs are inflexible due to professor tenure. (Hansmann 1990). Since growing the endowment is a safety net for a university, trying to raise more is an essential part of the institution. The easiest way is to accept more students and wait 15 to 20 years to start receiving more donations from the alumni class.

Elite universities have been actively expanding their student population. Schools such as Harvard, Princeton, and Stanford have initiated plans to accept more students. For example,

Princeton is currently expanding its undergraduate enrollment from 5,000 to 5,900 and has added over 500 students recently (Farrell 2007). This is significant because universities adding more students increase the amount of potential future alumni donations.

For a university figuring out why alumni give back is important. A study of 125 public and private doctoral granting research universities and liberal arts colleges in 1990 concluded that there are a few main reasons why alumni donate. These qualities include if the alumni collegiate experience was excellent and alumni wealth levels. Donations per alumni are lower in public institutions compared to private institutions. This is because a larger proportion of wealthier individuals, on average, attend private universities. Another reason wealthier individuals donate is for the high tax benefits of donating to a university. These tax benefits are greater in wealthier individuals so they tend to donate more than the middle class. A different reason why individuals donate is that if a liberal arts school has a lower acceptance rate than previous years. The reason for this phenomenon is that alumni are led to believe that when a university has a lower acceptance rate, the more likely the university is perceived to be prestigious. One negative conclusion that impacts all universities is when there are cutbacks and limited spending on students. This reiterates the point that students having an enjoyable collegiate experience tend to give back as alumni (Baade 1996). With all this in mind, private universities that are accepting more students but are keeping acceptance rates flat will have a higher chance of receiving donations in the future.

#### *2.4 University Rankings and Implications*

Knowing how important rankings are, it is important to distinguish how *U.S. News* creates the weights to produce its rankings. The weighting breakdown is 22.5% from academic

reputation, 22.5% from retention rate of students, 20% from family resources, 12.5% from student selectivity, 10% from endowment fund, 7.5% from graduate rate performance and 5% from alumni giving rate. Academic reputation is established by a survey given to presidents, provosts, and deans of admission. Because these people are important to the academic process, they will have the greatest knowledge of competing schools. The retention calculation measures the proportion of students staying at the school from year to year. Low retention hurts a university's ranking. The last important factor is faculty and how they impact the university. Studies show that the more satisfying experience with a professor, the more likely students will learn, thus leading to a higher probability they will graduate (Morse 2015).

With the importance of *U.S. News* rankings, students are affected by change in the rankings year after year. Students choosing schools within the top 20 and attending full time, are affected by a 0.45% change for every one placement difference in ranking. This 0.45% change is the overall influence of a *U.S. News* ranking change from one year to the next. But from the 20 to 40 range, the percent change is lowered to 0.35%. Full time students are affected at a higher rate of university ranking change than all undergraduate students which includes part time students. For all students, the effect is 0.15% for a change in a top 20 university and a 0.1% change in university ranking change from universities ranked in the 20 to 40 range (Griffith 2007).

### **3. Hypothesis**

This study's principal hypothesis is that university reputational rankings and endowment fund rankings have a positive correlation. In the Data Analysis section, many different kinds of analysis are run between reputational rankings and endowment funds. This study is the first-ever comparison of reputational rankings and endowment fund rankings. Abundant literature



discusses endowment funds but very little information exists on university rankings, mainly because *U.S. News* has only recently released extensive data for university rankings. With regard to testing the data, regressions will examine the effect of endowment fund change against reputational ranking change. There will be a separation between the elite schools and the middle tier schools while also taking into account differences if the universities are public or private. This all leads to an alternative hypothesis that states the correlation between university reputational ranking and endowment fund ranking is positive.

## **4. Data Collection and Description**

This section explains the sample and how it is used in the analysis. Also, this section shows a basic approach to measuring reputational ranking change based on endowment fund change.

### *4.1 Sample*

Endowment fund data were gathered from NACUBO's website. NACUBO has a database of endowment funds for every year from 1990 to 2014. The data are separated into three main categories: university name, rank, and endowment size. The other main source of data is *U.S. News*, for university reputational rankings. *U.S. News* ranks only the top 125 and lower ranked universities are not given an individual ranking. The data on endowment funds contain more in-depth analysis opportunities for the study between 2006 and 2014.

Using endowment fund rankings as the dependent variable helps demonstrate the ability to add wealth to an endowment fund to find how much reputational ranking is gained. The

independent variable is the university reputational ranking. Lagging endowment data one year is consistent with what *U.S. News* uses for its future reputational rankings.

## 4.2 Overview of Data

In this study, reputational ranking is the dependent variable and endowment fund ranking is the explanatory variable. The reason for this is because this study is looking into the effect a change in endowment fund has on a university's reputational ranking. Exhibit A and Exhibit B show preliminary analysis of the data. Exhibit A shows the average change in endowment fund rankings. Exhibit B displays averages for each tier for reputational rankings. Exhibit A and Exhibit B have results that are more exaggerated from the years 2006 to 2014. Throughout this paper, universities are put into 3 different tiers, Tier 1 are universities ranked 1-30, Tier 2 are universities ranked 31-60, and Tier 3 are universities ranked 61-90. The reason the data is separated into 3 tiers is because there might be significance in a lower tier compared to an upper tier. As expected, in both endowment ranking change and reputational ranking change, there is more volatility in Tier 2 and Tier 3 compared to Tier 1.

### Exhibit A

*Average absolute change in endowment fund rankings*

Change in endowment ranking (x)	Starting rank			
	1-30 (Tier 1)	31-60 (Tier 2)	61-90 (Tier 3)	1-90 (All)
<b>2006-2010</b>	3.21	8.18	6.87	6.04380
<b>2010-2014</b>	2.66	12.07	9.87	8.15
<b>2006-2014</b>	3.25	16.96	14.91	11.51

## Exhibit B

### *Average absolute change in reputational rankings*

Change in reputational ranking (y)	Starting rank			
	1-30 (Tier 1)	31-60 (Tier 2)	61-90 (Tier 3)	1-90 (All)
2006-2010	1.54	4.43	6.78	4.05
2010-2014	1.38	3.07	6.06	3.57
2006-2014	2.11	4.71	10.04	5.34

## 5. Methodology

In this section, regressions are done on reputational rankings compared to endowment rankings while breaking up the data into three different time periods; 2006 to 2014 will encompass all the years in the study, 2006 to 2010 will include a time period during a recession, and 2010 to 2014 will include a growth period in the U.S. economy. Besides separating the data into three time periods, an analysis is run separately on private and public schools. There is also an analysis done on not only change in endowment ranking but dollar change and percent change in the dollar value of an endowment.

### *5.1 Reputational Ranking Change versus Endowment Ranking Change*

The first test that is run is between the relationship between reputational ranking and endowment ranking. In Exhibit C, the *p-values* for the regression are displayed. First, running the analysis on all years during the study is necessary because it identifies any long-term effect. The relation is found to be insignificant, and then the time period is split to see the effect before and after the recession of 2008. None of the latter regressions are significant. Even when separating

the universities into different Tiers, no significance results. This is a surprising result because as noted, one component of the *U.S News* reputational ranking formula is the size of the endowment fund. Despite the insignificance of these statistical results, looking into other areas might help discover where an endowment fund is important in determining a university's reputational ranking.

### Exhibit C

#### *Change in Reputational Ranking versus Change in Endowment Fund Rankings*

<i>p-values for Regression Slope Coefficient</i>	<i>Starting Rank</i>			
	<b>1-30 (Tier 1)</b>	<b>31-60 (Tier 2)</b>	<b>61-90 (Tier 3)</b>	<b>1-90 (All)</b>
<b>2006-2010</b>	0.6375	0.5428	0.3032	0.2179
<b>2010-2014</b>	0.8931	0.5174	0.4672	0.7636
<b>2006-2014</b>	0.9514	0.3354	0.7202	0.4110

#### *5.2 Percent Change and Amount Change in Endowment Funds*

Instead of focusing on only endowment ranking change, using percent change in endowment value as an explanatory variable instead of using endowment rankings might produce significant results. The results in Exhibit D are similar to all the previous analyses, resulting in no significance at an alpha level of 5%.

### Exhibit D

#### *Change in Reputational Ranking versus Percent Change in Endowment Fund Rankings*

<i>p-values for Regression Slope Coefficient</i>	<i>Starting Rank</i>			
	<b>1-30 (Tier 1)</b>	<b>31-60 (Tier 2)</b>	<b>61-90 (Tier 3)</b>	<b>1-90 (All)</b>
<b>2006-2010</b>	0.6247	0.7726	0.3814	0.4292
<b>2010-2014</b>	0.9149	0.3731	0.9197	0.4910
<b>2006-2014</b>	0.8280	0.3526	0.8563	0.5478

Similar to Exhibit D, Exhibit E contains regressions run on the actual amount of endowment change. Like the analysis run on percent change, endowment fund change does not reveal any significance. This is important because it shows that there is similarity in endowment size and endowment percent change. Even though there is no significance, finding none has been consistent through most of the study.

## Exhibit E

### *Change in Reputational Ranking versus Endowment Fund Amount Change*

<i>p-values for Regression Slope Coefficient</i>	<i>Starting Rank</i>			
	<b>1-30 (Tier 1)</b>	<b>31-60 (Tier 2)</b>	<b>61-90 (Tier 3)</b>	<b>1-90 (All)</b>
<b>2006-2010</b>	0.8550	0.6951	0.1469	0.7280
<b>2010-2014</b>	0.8057	0.4735	0.9884	0.8531
<b>2006-2014</b>	0.9161	0.2396	0.9231	0.5164

### *5.3 Ranking Changes for Private School*

The next approach to finding significant results is separating the sample into public universities and private universities. While public universities rely on public taxes as a source of income, private schools rely exclusively on tuition and endowment proceeds, and are self-sufficient. When the data are separated, Exhibit F shows that there is significance among Tier 2 institutions, and in years 2006 to 2010 and 2006 to 2014. The significant *p-values* have a positive coefficient. Although the coefficients are positive, they are low which means a change in endowment fund rankings has little effect on reputational rankings.

## Exhibit F

### *Change in Reputational Ranking versus Endowment Fund Rankings Change for Private Schools*

<i>p-values for Regression Slope Coefficient</i>	<i>Starting Rank</i>			
	<b>1-30 (Tier 1)</b>	<b>31-60 (Tier 2)</b>	<b>61-90 (Tier 3)</b>	<b>1-90 (All)</b>
<b>2006-2010</b>	0.7594	0.3647*	0.6221	0.1762**
<b>2010-2014</b>	0.5669	0.5680	0.9221	0.2506
<b>2006-2014</b>	0.8431	0.2390**	0.5023	0.1779***

\* Highlighted numbers are coefficients

### *5.4 Ranking Changes for Public Universities*

Since the regressions for private universities reveal significant relations in some cases, the next area to consider is public universities. Looking into public universities in isolation could yield better results because private schools could be making the results insignificant. Along with focusing on lower ranked universities, looking into the actual change in endowment and the percent change might lead to a different result. In Exhibit G, the data show that there is still no significant relation between public universities reputational rankings and the endowment funds actual change and percent change. Deciding to focus on lower ranked public schools seemed to be the best path because the rankings for the higher universities such as Harvard and Yale do not change very much.

## Exhibit G

### *Regressions run for Public Schools*

<i>P-values Regression</i>	<b>All Public Schools</b>	<b>Ranked 50 and Worse</b>	<b>Worst 25 Ranked</b>
<b>Dollar Change in Endowment</b>	0.7884	0.7282	0.8031
<b>Percent Change Endowment</b>	0.6309	0.8147	0.6399

### 5.5 Percent and Endowment Fund Change for Private Universities

Since using private universities resulted in the greatest amount of significance, trying endowment size change might yield a new result. In Exhibit H, the *p-values* are displayed and similar results occurred when private universities have an analysis on actual rank change. Only Tier 2 is significant again when the analysis is run on endowment ranking change. The coefficients for the significant values are high in Tier 2. A reason why there could be such a high coefficient is because the coefficients are being multiplied by a percentage instead of a large number.

#### Exhibit H

##### *Reputational Ranking Change against Endowment Fund Dollar Change for Private Universities*

<i>p-values for Regression Slope Coefficient</i>	<i>Starting Rank</i>			
	<b>1-30 (Tier 1)</b>	<b>31-60 (Tier 2)</b>	<b>61-90 (Tier 3)</b>	<b>1-90 (All)</b>
<b>2006-2010</b>	0.6893	23.1576**	0.8949	0.3044
<b>2010-2014</b>	0.6376	0.8374	0.2830	2.7141*
<b>2006-2014</b>	0.9946	13.7336**	0.1776	0.8176

\* Highlighted numbers are coefficients

Exhibit I shows the results for percent change in endowment funds for private universities will lead to a result that supports the alternative hypothesis. The results are similar to those discussed previously in that there are only a few categories significant. Once again that category is Tier 2. The lower and upper Tiers show no significance like all the other analysis run on private universities. The coefficient in Tier 2 is much lower than the coefficient in the previous regressions run for private universities. This is because these coefficients would be multiplied by a large number, even though the regression is run in millions since endowments have hundreds of millions of dollars.

## Exhibit I

### *Reputational Ranking Change against Endowment Fund Percent Change for Private Universities*

<i>p-values for Regression Slope Coefficient</i>	<i>Starting Rank</i>			
	<b>1-30 (Tier 1)</b>	<b>31-60 (Tier 2)</b>	<b>61-90 (Tier 3)</b>	<b>1-90 (All)</b>
<b>2006-2010</b>	0.8803	0.0181**	0.7926	0.0018*
<b>2010-2014</b>	0.7640	0.3457	0.8792	0.5377
<b>2006-2014</b>	0.9648	0.0099**	0.6413	-0.0001**

\* Numbers run in millions

\* Highlighted numbers are coefficients

## 6. Results

After analyzing all of the data, it seems that there is significance only for private institutions with reputational rankings between 31 and 60. The relation between endowment funds and reputational rankings is insignificant for public universities no matter which way the analysis is conducted. The most significant results found are for private schools when endowment funds are measured based on their percent change in value. Even with percent change being the best results, the use of finding a reputational ranking change with a percentage change in an endowment funds is limited. As discussed earlier that there is no significance in Tier 1 and Tier 3. One final result found is that there is no significance in the years 2010 to 2014. Even when running the data as a whole or separating the data into subsamples of private and public institutions, this time period results in insignificant findings.

## 7. Conclusion

It is reasonable to expect a strong positive correlation between university rankings and endowment fund size ranking. *U.S. News* uses endowment funds as part of its process to create



reputational rankings. One would assume that this means that they are closely related, which would be reflected in high statistical significance.

This paper finds that the relation is weak in some cases, and nonexistent in even more. Only for private institutions is the relation significant, and even then in only the first half of the last decade. Subsequent to the financial crisis of 2008, reputational and endowment rankings are not highly correlated. This result will come as a surprise to many institutions that may erroneously believe the path to a higher reputational ranking is paved with greater alumni donations.

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