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WHY DO UNIVERSITIES COMPETE IN THE RATINGS GAME? AN EMPIRICAL ANALYSIS OF THE EFFECTS OF THE *U.S. NEWS AND WORLD REPORT* COLLEGE RANKINGS

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Previous research has concluded that an institution's ranking in the annual *U.S. News and World Report* "Best Colleges" issue impacts admission outcomes and pricing decisions at schools in the Consortium for Financing Higher Education. This article expands on the previous work by analyzing the effects of the *U.S. News and World Report* rankings across a broader range of universities and variables. The results show that many schools' admission outcomes are responsive to movements in the rankings; however changes in rank are more significant at certain locations in the rankings and affect public and private schools differently. The results also show that the socioeconomic and racial demographics of highly ranked universities may also be affected by changes in rank.

KEY WORDS: college rankings; admission outcomes; pricing decisions; demographics.

INTRODUCTION

Every fall, university administrators around the country anxiously await the results of the annual *U.S. News and World Report* (*USNWR*) college rankings. Many administrators decry the rankings as being superficial, arbitrary, and lacking any real measure of quality. Yet, universities are still quick to fill out *USNWR*'s questionnaires and to tout a high ranking to prospective students. Some universities have even fabricated test scores and acceptance data in hopes of improving their ranking (Stecklow, 1995). This prompts the question: Is there a payoff in admission outcomes for obtaining a higher ranking? Monks and Ehrenberg (1999) empirically analyzed whether the *USNWR* college rankings affected either admission outcomes or pricing decisions of universities in the Consortium for Financing Higher Education. Their results confirmed that changes in *USNWR*

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rankings impact admission outcomes, such as average SAT scores of incoming students, and university pricing policies, such as net tuition.

This article expands Monks and Ehrenberg's (1999) analysis across a broader range of schools and variables to determine a more precise understanding of the effects of the *USNWR* rankings on admission outcomes and pricing decisions at national doctoral universities during the 1990s. The article attempts to empirically answer three primary questions. First, how does the impact of the *USNWR* rankings on admission outcomes vary across different types of universities? Second, how are the racial and socioeconomic demographics of a university affected by a school's *USNWR* ranking? Third, does the *USNWR* ranking affect the amount of gifts a university receives?

This article begins with a historical background on the development and rise of college rankings. Some of the problems with the increased prevalence of college rankings are then examined. The purpose of this discussion is to provide a framework for why it is of interest if admission outcomes and pricing decisions are indeed affected by college rankings. This is followed by a description of Monks and Ehrenberg's (1999) previous research, the data, and the methodology used in the article. Finally, the results and conclusions are presented.

HISTORY OF COLLEGE RANKINGS

College rankings are not a new phenomenon. As early as 1870, annual reports by the United States Bureau of Education rank ordered universities based on statistical information. In 1925, Raymond Hughes published *A Study of the Graduate Schools of America*, the first college rankings based on a school's reputation among others in the field (Stuart, 1995). Most of the early rankings were of graduate departments and done by the universities themselves. As a result, many of the studies' methodologies were criticized for being biased toward the sponsoring university (Webster, 1992). As a result, these early studies helped to develop a niche for independently published rankings in sources like *The Chronicle of Higher Education,* and later *U.S. News and World Report*.

During the 1980s, college rankings came to the national forefront. The combination of declining applicant pools, rising costs, and an increased premium for attending an elite school all may have helped contribute to the explosion of college rankings (Eide, Brewer, and Ehrenberg, 1998; Hossler and Foley, 1995; Litten and Hall, 1989). In addition to graduate departments, rankings of professional schools of education, law, medicine, and business, as well as undergraduate programs began being published. The audience for these rankings also changed. Administrators, applicants, policymakers, and researchers all were paying more attention to institutions' standings (Stuart, 1995). The *USNWR* college rankings began in 1983, strictly as a reputational survey of schools' presidents. In 1987, *USNWR* switched to its current format of combining objective and reputational data. The "Best Colleges" issue of *USNWR*, where the undergraduate college rankings are first published, is one of their highest circulating issues of the year. This issue's profitability has led other national publications, like *Money Magazine* and *Business Week,* to publish their own rankings of undergraduate institutions and business schools, respectively. The current *USNWR* college rankings can be viewed worldwide via the Internet. Given this extensive publicity, it is easy to see how the *USNWR* rankings could significantly influence potential college applicants.

PROBLEMS WITH COLLEGE RANKINGS

A college application process that is highly influenced by college rankings may be problematic for both potential applicants and universities. First, high stakes rankings create more incentive for schools to publish inaccurate or misleading data (Carmody, 1987; Hunter, 1995). Second, academic quality is a difficult concept to quantify. As a result, there are questions about whether *USNWR* actually represents academic quality (McGuire, 1995; Schmitz, 1993). In addition, college rankings may encourage schools to make questionable strategic admission decisions. One example of a questionable strategic admission decision is to only base acceptance decisions on qualities that are components in the rankings, like standardized tests, rather than focusing on the overall quality of the student. As a result, a quality like leadership—which Guinier and Strum (2001) use as an example of quality that is difficult to quantify, yet has been shown to be correlated with success in school—may be less likely to be considered in admission decisions. Other examples of questionable strategic admission decisions include giving preference to Early Decision applicants, placing applicants who will likely decline admission on waitlists, and soliciting applications from likely rejects (Avery, Fairbanks, and Zeckhauser, 2001; Stecklow, 1995). The effects of these strategic admissions policies may especially hurt lower income applicants, who score comparatively worse on standardized tests and are financially less able to commit through Early Decision (Levinson, 2002; Nettles, Thoeny, and Gosman, 1986). If changes in the *USNWR* rankings have a significant amount of influence on applicants, arbitrary changes in rank due to misleading data or poor methodology can start a vicious cycle in which a perceived decline in quality may produce an actual decline.

PREVIOUS RESEARCH

The main source of previous empirical research on the effects of the *USNWR* college rankings is a National Bureau of Economic Research (NBER) Working Paper by Monks and Ehrenberg (1999), "The impact of *U.S. News and World Report* college rankings on admission outcomes and pricing policies at selective private institutions." Their paper analyzed the impact of the *USNWR* ranking on the 30 schools in the Consortium on Financing Higher Education. They found that changes in a school's *USNWR* ranking had a significant impact on the admission rate, yield, and SAT scores of the next incoming class. According to Monks and Ehrenberg, moving up one rank in the *USNWR* corresponded to a 0.4% reduction in the acceptance rate, a 0.2% improvement in the yield, and a three-point gain in average SAT score the following year. In addition, Monks and Ehrenberg found that a one-rank improvement in *USNWR* allowed schools to raise net tuition by 0.3% the next year.

While Monks and Ehrenberg's (1999) results demonstrated a strong relationship between *USNWR* ranking and admission outcomes, their study was somewhat limited in scope. Almost all of the schools in their study are found in the top 25 of the *USNWR* rankings. Given the evidence that high achieving students are more likely to look at college rankings (McDonough, Antonio, Walpole, and Perez, 1998), it is still unclear whether there exists a relationship between the *USNWR* ranking and admission outcomes at less prestigious universities. In addition, Monks and Ehrenberg's data set included only private schools, and therefore their results do not provide information about the effects of the *USNWR* rankings on public institutions. They also did not test the hypothesis that college rankings have a larger impact on smaller schools (Hossler and Foley, 1995). Finally, Monks and Ehrenberg never discussed whether changes in rank affected institutions' racial composition, socioeconomic demographics, or amount of gifts received.

DATA

Copies of the *USNWR*'s "Best Colleges" issues from 1991 to 2000 were used to get data on the SAT scores, acceptance rate, and the percentage of students in the top 10% of their class for the 233 schools classified as national doctoral universities. Since a lagged ranking term was used in the regression, data on *USNWR* ranking was gathered from 1990 to 1999. The *USNWR* rankings numerically order only the top 25 schools (top quartile since 1996), and then assigns quartile rankings to the rest of the universities. This ranking system makes it illogical to use only numerical rankings in the regressions, since a school moving between the second and third quartile would be moving about 50 spots in rank, while the rank of a school moving within the top 25 would rarely change by more than five. To account for this, a numerical ranking variable was generated to measure changes of rank within the top 25. Since an improved rank corresponds to a lower numeric value, the numerical rank variable was defined as negative rank to make the signs on its coefficient conventional. As in Monks and Ehrenberg (1999), all schools ranked outside the top 25 were assigned a numerical rank of −25, and top 25 and quartile dummy variables were created to capture the effects of movements in rank outside the top 25. Additional dummy variables were created to represent private and small schools. Small schools were defined as those with 4,000 students or less in at least one year of the sample.

The 1999 and 2000 Princeton Review *The Best 311 Colleges* guidebooks were used to construct a net tuition series. Net tuition was defined as tuition plus room and board minus average freshman grant. While this is not a perfect measure of net tuition, it provides a good approximation of how the average cost of attendance for freshmen varies over the 2 years.

The rest of the data were obtained via the Integrated Postsecondary Education Data System. This included data on total enrollment, ethnicity of incoming students, the total value of all private gifts, grants, and contracts, and the value of federal Pell Grants given to students attending the university. Enrollment and ethnicity data were available between 1990 and 1998, while financial data were available between 1990 and 1996. Federal Pell Grant data were standardized for yearly changes in funding by dividing a school's Pell Grants by the total value of all Pell Grants awarded nationally. Descriptive statistics for the variables are presented in Table 1.

TABLE 1. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Average SAT scores	1521	1119.58	140.83	760	1515
Percent of top 10% high school class	1894	39.43	24.95	5	100
Acceptance rate	2154	69.33	18.64	8	100
Natural log of private gifts, grants, and contracts	1175	16.45	1.29	8.95	19.87
Percent of National Pell Grants	1144	0.12	0.08	0.002	0.529
Percent 1st-year students Hispanic	1703	0.056	0.061	0	0.609
Percent 1st-year students Black	1703	0.088	0.117	0	1
Percent 1st-year students Asian	1703	0.089	0.105	0	0.874
Lagged top 25 dummy variable	2412	0.115	0.319	0	1
Lagged Quartile One dummy variable	2412	0.232	0.422	0	1
Lagged Quartile Two dummy variable	2412	0.274	0.446	0	1
Lagged Quartile Three dummy variable	2412	0.249	0.432	0	1
Lagged Quartile Four dummy variable	2412	0.243	0.429	0	1
Lagged modified rank 1–25	2412	23.61	4.57	1	25
Lagged modified rank 26–50	2412	45.15	9.32	26	50
Private school	2412	0.385	0.486	0	1
Small school	2412	0.201	0.400	0	1

METHODOLOGY

The basic model (1.1) used in this article represents an admission outcome for school k in year t (represented by $Y_{k,t}$) as a function of the previous year's *USNWR* rank, the year, an unobserved school effect, and a random shock term.

$$Y_{k,t} = \beta_1 * \text{Rank}_{k,t-1} + \beta_{2t} * \text{Year}_t + \nu_k + \mu_{k,t} \qquad (1.1)$$

where

$Y_{k,t}$ is an outcome:

Outcomes include: Average SAT Scores, Acceptance Rate, Percent Top 10% in High School Class, Natural Log of Private Gifts, Grants, and Contracts, Standardized Pell Grants, Percent 1st-Year Hispanic Students, Percent 1st-Year Black Students, Percent 1st-Year Asian Students;

$\text{Rank}_{k,t-1}$ is a vector containing the following components:

Modified Rank = A school's negative rank in year $t-1$. If the school is ranked outside of the top 25 the rank is set equal to –25;

Top 25 = A dummy variable set equal to 1 if the school is ranked in the top 25 in year $t-1$, 0 otherwise;

Quartile One = A dummy variable set equal to 1 if the school is ranked in Quartile One in year $t-1$, 0 otherwise;

Quartile Two = A dummy variable set equal to 1 if the school is ranked in Quartile Two in year $t-1$, 0 otherwise;

Quartile Three = A dummy variable set equal to 1 if the school is ranked in Quartile Three in year $t-1$, 0 otherwise;

Quartile Four = A dummy variable set equal to 1 if the school is ranked in Quartile Four in year $t-1$, 0 otherwise;

and

Year t = A dummy variable set equal to 1 in year t, 0 otherwise.

The year dummy variables are included in the regressions to account for changes in the college application environment that affect all of the universities in the sample consistently. An example of such an event would be an increase or decrease in the total number of potential applicants in a given year. We assume that the random shock term has zero mean and is uncorrelated with a school's *USNWR* ranking or the year dummy variables. An additional assumption, which will be discussed in the next paragraph, is that this unobserved school effect is time invariant. Therefore, this term can be eliminated from the equation by utilizing a fixed effects regression. This allows for model (1.2) to be used to estimate the impact of changes in the *USNWR* ranking on changes in admission outcomes.

$$Y_{k,t} - \overline{Y}_k = \gamma_1 * (\text{Rank}_{k,t-1} - \overline{\text{Rank}_k}) + \gamma_{2t} * (\text{Year}_t - \overline{\text{Year}_t}) + \varepsilon_t \quad (1.2)$$

The assumption that universities have an invariant unobserved effect on their admission outcomes is justified by their structure. Many of a university's qualities that influence college applicants, such as a university's location, size, history, and philosophy, are essentially fixed. Given space limitations and the bureaucratic nature of most national doctoral universities, a campus' facilities and infrastructure are also unlikely to drastically change over a 10-year period. Many other quality factors that do impact institutional choice, such as a school's reputation, quality of student body, and the size of the faculty, should be represented by changes in a school's *USNWR* ranking. It is possible that a couple of universities may have had exceptionally good fortune in receiving alumni donations and spent this money to alter this unobserved school effect significantly. However, the probability of this occurrence seems sufficiently limited, so that it is reasonable to assume that this unobserved school effect does remain constant across time.

A major difference between the framework used in this article and that used by Monks and Ehrenberg (1999) is that they controlled for a school's ability to fund itself from revenue sources other than tuition by including a school's average endowment in 1998 and 1999 as an explanatory variable. Monks and Ehrenberg did this since schools with less reliance on tuition may have a greater ability to financially offset the effects on admission outcomes caused from changes in ranking. Since a fixed effects model (1.2) is used in this article, this average endowment term cancels out. Yearly changes in endowment could have potentially replaced the average endowment term, but it is not possible to construct an accurate yearly endowment series for the entire sample. No attempts are made here to control for the ability of schools to discount tuition. Given the results from Monks and Ehrenberg that changes in net tuition are negatively correlated with changes in rank, the coefficients found without controlling for a school's ability to fund itself from revenue sources other than tuition may understate the impact of changes in the *USNWR* rankings on admission outcomes.

A second possible source of bias on the coefficients comes from the potential simultaneity between *USNWR* ranking and admission outcomes. This simultaneity results from the fact that changes in an admission outcome affect a school's *USNWR* ranking, which in turn affects the admission outcome. The reason that the effects from this potential simultaneity on coefficients should be relatively small is that, combined, all four measures of student quality—SAT/ACT scores, yield, acceptance rate, and percentage of students from the top 10% of their high school class—make up only 15% of a school's *USNWR* ranking. For example, acceptance rates account for only 2.25% of the overall ranking. Unless changes in student quality measures are correlated with movements in the rest of the ranking's indexes, the effects from movements in student quality measures on rankings should be minimal. It is still expected, however, that the simultaneity of *USNWR* ranking and admission outcomes will bias the coefficients somewhat. Specifically, since changes in an outcome should be positively correlated with changes in the outcome the following year, the coefficients found using the fixed effects model (1.2) might be biased upward. Given that there is potential for both a positive and negative bias on the coefficients, no definitive statement can be made about the overall bias.

Finding an instrumental variable for *USNWR* ranking would be one way to account for the endogeneity of *USNWR* ranking on admission outcomes in future research. Monks and Ehrenberg (1999) acknowledge this in their initial paper, but are unable to provide a valid instrument. One possible instrument is to recalculate the *USNWR* ranking, excluding the admission outcome indexes. This new ranking should be unaffected by changes in admission outcomes. However, this instrument is currently limited, because the *USNWR* has only published all 16 of its indexes for every school since 2000. Prior to 2000, *USNWR* only published about half of the indexes used to formulate its rankings. More data points are needed before for this instrument becomes feasible.

An additional potential source of bias that needs to be considered is how missing data points affect the coefficients. While most schools consistently submitted acceptance rates, a number of schools, especially those in the fourth quartile, did not consistently submit data on either test scores or the percentage of students in the top 10% of their class. A number of additional schools, many of which again were concentrated in the fourth quartile, lost data points by alternating between reporting SAT and ACT scores. Since the *USNWR* does not look favorably on missing data, it can be assumed that in most cases such data goes unreported since it is already very unfavorable for a school's ranking. Therefore, the coefficients obtained when throwing out data points may not represent accurately the effects of movements in *USNWR* rank on admission outcomes at schools that already perform very poorly in these measures.

Accounting for schools alternating between reporting SAT and ACT scores was part of a larger problem in using test score data. In 1995, SAT scores were recentered, with math and verbal scores being rescaled differently. Since the data set contained only the aggregate SAT score, it was difficult to make comparisons of SAT scores obtained before and after 1995 without knowing the school's breakdown of math and verbal scores. In addition, starting in 1996, the *USNWR* appears to have forced schools to be more consistent in reporting either ACT or SAT data. After 1995, no school that moved in the rankings switched their reported test format. To account for these problems, regressions using SAT scores only used data from 1995 to 2000.

RESULTS

The first set of regressions tested how the impact of the *USNWR* rankings on admission outcomes varied across different types of institutions. In many of the regressions, the time dummy variables were significant, though the coefficients are not reported. Among the coefficients on the *USNWR* ranking variables, there were a few general results. First, movements between quartiles one and two had a strong impact on admission outcomes relative to movements within the top 25. Second, the *USNWR* rankings affected admission outcomes at public and private schools very differently. Finally, no definitive conclusions can be made on whether small schools are impacted differently by the *USNWR* rankings. The coefficients from all of the *USNWR* ranking variables from these regressions are reported in Tables 2, 3, and 4.

The first set of regressions show that movements between the first and second quartiles have a significant impact on a school's percentage of students from the top 10% of their high school class and acceptance rate. A school improving its ranking from the second to the first quartile increases its percentage of students in the top 10% of their high school class by about 1.5% and decreases their acceptance rate by about 4.0%. A school improving its ranking from the third to the second quartile increases its percentage of students in the top 10% of their high school by about 1.4% and decrease its acceptance rate by about 1.0%. This compares to a statistically significant 0.31% increase in the percentage of students from the top 10%, and a statistically insignificant 0.31% decrease in the acceptance rate for schools moving up one rank within the top 25. These results indicate that being listed in the first quartile appears to have a large impact on schools, relative to movements within the top 25.

Given the method of presentation of the *USNWR* rankings, the importance of being listed in the first quartile is not surprising. While it is possible that movements between the first and second quartile may actually be informing applicants of large changes in quality, it seems likely that applicants are responding to the layout of the rankings. Since 1996, the first page in the *USNWR* "Best Colleges" issue has highlighted those schools in the first quartile of the rankings. Having a school's name put on the same page as Harvard, Stanford, and Princeton may provide a school with significant positive benefits in terms of how it is perceived. If being listed in the first quartile does overly impact applicants' perceptions of schools, this indicates that applicants may not be correctly responding to the information about changes in quality that movements in the *USNWR* rankings may provide.

TABLE 2. Effects of Lagged USNWR Rank on Acceptance Rate[a] (fixed effects regressions using Model 1.2)

Variable	All Schools ($N = 2154$)	Private Schools ($N = 823$)	Public Schools ($N = 1331$)	Small Schools ($N = 418$)
R^2	0.55	0.58	0.07	0.45
F statistic	3.34***	4.63***	2.63***	0.59
Mean acc. rate	69.33	61.09	74.42	68.11
(std. deviation)	(18.64)	(22.17)	(13.81)	(18.24)
Constant	56.11***	48.65***	78.63***	56.74***
(std. error)	(4.98)	(5.92)	(10.69)	(12.86)
Lagged negative rank	−0.313	−0.296	0.328	−0.310
	(.202)	(.251)	(.423)	(.528)
Top 25[b]	−0.56	−3.16	2.44	−4.60
dummy variable	(1.92)	(2.88)	(2.72)	(9.05)
Quartile Two	3.94***	1.35	4.28***	2.26
dummy variable	(1.19)	(2.19)	(1.36)	(3.47)
Quartile Three	5.01***	2.33	4.11**	3.02
dummy variable	(1.44)	(2.56)	(1.72)	(3.75)
Quartile Four	5.13***	2.77	3.79*	4.89
dummy variable	(1.67)	(3.05)	(1.97)	(4.31)

[a]Regressions use acceptance rate from 1991–2000, and include unreported time dummy variables. Excluded Group: 2000, non-top 25, Quartile One. Descriptive statistics are listed in Table 1.
All Schools—2,154 observations at 233 colleges; observations per group [2,10], mean = 9.2.
Private Schools—823 observations at 91 colleges; observations per group [2,10], mean = 9.0.
Public Schools—1,331 observations at 142 colleges; observations per group [3,10], mean = 9.4.
Small Schools—418 observations at 52 colleges; observations per group [2,10], mean = 8.0.
[b]Coefficients on the top 25 and quartile dummy variables indicate differences in acceptance rates from the excluded group. To calculate the change in acceptance rates from moving from quartile × to quartile y, the coefficient for the quartile × dummy variable should be subtracted from the quartile y dummy variable.
*Significant at the 90% level; **Significant at the 95% level; ***Significant at the 99% level.

One test of the importance of being listed on the first page is measuring whether movements between the new rankings of 26–50 between 1996 and 1999 affect admission outcomes. If effects of movements between 26 and 50 are small relative to the effects from being listed in the first quartile, this would provide more substantial evidence of the importance of being listed on the rankings' first page. A second numerical rank variable was constructed to test this. Prior to 1996, the variable was set equal to −26 if the university was ranked in the first quartile and −50 if it was ranked in the any of the other three quartiles. From 1996 to 1999, this variable was set equal to −26 for schools ranked in the top 25, a school's negative numeric rank for school's ranked between 26 and

50, and −50 for school ranked between in the three lower quartiles. Results from the regressions using this additional ranking term are listed in Table 5.

The coefficients on the additional ranking variable support the proposition that placement in the first quartile provides a school with significant positive benefits. The coefficients on the additional ranking term actually have the opposite sign as their corresponding coefficients on the original ranking term. Dropping one rank between 26 and 50 equates to a statistically significant 0.156% decrease in acceptance rate and a statistically insignificant 0.054% increase in the percentage of students from the top 10% of their high school class. This compares to a 6.55% and –2.48% change in the acceptance rate and percentage of students from the top 10% of their high school class resulting from moving between a rank of 50 and the second quartile. The magnitude of the effects on admission outcomes from moving between a rank of 50 and the second quartile

TABLE 3. Effects of Lagged *USNWR* Rank on SAT Scores[a]
(fixed effects regressions using Model 1.2)

Variable	All Schools ($N = 720$)	Private Schools ($N = 368$)	Public Schools ($N = 352$)	Small Schools ($N = 179$)
R^2	0.45	0.05	0.54	0.47
F statistic	8.78***	8.27***	3.93***	2.81***
Mean SAT score	1173.37	1228.78	1115.43	1170.93
(std. deviation)	(130.91)	(139.59)	(104.12)	(148.33)
Constant	1204.64***	1236.82***	1132.94***	1141.69
(std. error)	(27.89)	(29.40)	(89.23)	(85.83)
Lagged negative rank	0.878	0.747	–0.391	–0.109
	(1.17)	(1.31)	(3.56)	(3.57)
Top 25	8.54	14.04	8.42	14.05
dummy variable	(9.42)	(13.51)	(13.67)	(31.37)
Quartile Two	–7.73	12.92	–18.80**	24.65
dummy variable	(7.19)	(11.90)	(8.37)	(22.28)
Quartile Three	–9.18	20.15	–24.98**	34.68
dummy variable	(9.51)	(16.11)	(10.91)	(25.69)
Quartile Four	–2.84	67.29***	–39.82***	83.12***
dummy variable	(11.75)	(20.36)	(13.43)	(31.04)

[a]Regressions use SAT scores from 1995–2000, and include unreported time dummy variables. Excluded Group: 2000, non-top 25, Quartile One. Descriptive statistics are listed in Table 1.
All Schools—720 observations at 151 colleges; observations per group [1, 5], mean = 4.8.
Private Schools—368 observations at 76 colleges; observations per group [1, 5], mean = 4.8.
Public Schools—352 observations at 75 colleges; observations per group [1, 5], mean = 4.7.
Small Schools—179 observations at 40 colleges; observations per group [1, 5], mean = 4.5.
*Significant at the 90% level; **Significant at the 95% level; ***Significant at the 99% level.

TABLE 4. Effects of *USNWR* Rank on the Percent Top 10% of Class[a] (fixed effects regression using Model 1.2)

Variable	All Schools (*N* = 1894)	Private Schools (*N* = 745)	Public Schools (*N* = 1149)	Small Schools (*N* = 337)
R^2	0.63	0.40	0.23	0.66
F statistic	2.51***	4.13***	2.05**	2.15***
Mean % Top 10%	39.43	50.11	32.49	43.60
(std. deviation)	(24.95)	(25.59)	(21.90)	(22.80)
Constant	49.51***	59.94***	27.67***	49.89***
(std. error)	(3.25)	(4.19)	(6.24)	(8.75)
Lagged negative rank	0.312**	0.340*	0.276	–0.008
	(.132)	(.179)	(.247)	(.356)
Top 25	–1.11	–1.48	–0.86	3.11
dummy variable	(1.26)	(2.06)	(1.59)	(6.06)
Quartile Two	–1.53*	–0.00	–1.76**	–7.36*
dummy variable	(.806)	(1.70)	(.795)	(3.05)
Quartile Three	–2.92***	–1.70	–1.78*	–9.06***
dummy variable	(.999)	(2.03)	(1.03)	(3.35)
Quartile Four	–3.82***	–0.05	–3.84***	–9.11**
dummy variable	(1.18)	(2.41)	(1.22)	(3.74)

[a]Regressions use percentage top 10% of class from 1991–2000, and include unreported time dummy variables. Excluded Group: 2000, non-top 25, Quartile One. Descriptive statistics are listed in Table 1.
All Schools—1894 observations at 223 colleges; observations per group [1, 10], mean = 8.5.
Private Schools—745 observations at 87 colleges; observations per group [1, 10], mean = 8.6.
Public Schools—1149 observations at 136 colleges; observations per group [1, 10], mean = 8.4.
Small Schools—337 observations at 47 colleges; observations per group [1, 10], mean = 7.2.
*Significant at the 90% level; **Significant at the 95% level; ***Significant at the 99% level.

provides some further evidence of the importance of being listed on the first page of the *USNWR* rankings.

The first set of regressions also reveals that changes in the *USNWR* rankings impact admission outcomes at public and private universities differently. For example, improving in rank from the second to the first quartile lowers a public school's acceptance rate by over 4%. In contrast, improving in rank from the second to the first quartile at private institutions only decreases the acceptance rate by a statistically insignificant 1.35%. Likewise, improving in rank from the second to the first quartile only causes a statistically significant increase in the percentage of students in the top 10% of their high school class at public schools. Also notable is the substantially better fit of the fixed effects model (1.2) in explaining the variation of the acceptance rate and the percentage of student from the top 10% of their high school class at private schools. The R^2 statistics indicate that the model explained 58% of the variation in acceptance rates and 40% of the variation in the percentage of students from the top 10% of their high school class at private schools, versus only 7% and 23%, respectively, at public schools.

An even more stark difference between public and private schools is found in the response of SAT scores to the *USNWR* rankings. As a public school's ranking drops from quartile one to quartile two, SAT scores declined almost 20 points. SAT scores continue to drop significantly as a school's ranking falls into the third and fourth quartiles. In contrast, SAT scores at private schools actually

TABLE 5. Effects of *USNWR* Rank on Admission Outcomes with Additional Rank Term (fixed effects regression using Model 1.2)

Variable	Acceptance Rate[a] ($N = 2{,}154$)	SAT (Private)[b] ($N = 368$)	SAT (Public) ($N = 352$)	Percentage in Top 10% of Class ($N = 1{,}894$)
R^2	0.52	0.12	0.59	0.62
F statistic	3.44***	7.42***	3.57***	2.43***
Mean value	69.33	1228.78	1115.43	39.43
(std. deviation)	(18.64)	(139.59)	(104.12)	(24.95)
Constant	61.29***	1222.60	1164.93	47.75***
(std. error)	(5.52)	(62.16)	(103.24)	(3.68)
Lagged negative rank 1–25	−0.313	0.740	−0.404	0.313**
	(.202)	(1.31)	(3.57)	(.132)
Lagged negative rank 26–50	0.156**	−0.354	0.731	−0.054
	(.072)	(1.36)	(1.18)	(.049)
Top 25	−0.703	14.61	7.97	−1.06
dummy variable	(1.92)	(13.71)	(13.70)	(1.26)
Quartile Two	6.55***	11.89	−15.91*	−2.48**
dummy variable	(1.69)	(12.56)	(9.59)	(1.17)
Quartile Three	7.65***	19.13	−22.08*	−3.89***
dummy variable	(1.88)	(16.60)	(11.89)	(1.32)
Quartile Four	7.80***	66.32***	−36.85***	−4.81***
dummy variable	(2.07)	(20.73)	(14.28)	(1.47)

[a]Regressions use acceptance rate and percentage of students in the top 10% from 1991–2000, and include unreported time dummy variables. Excluded Group: 2000, non-top 25, Quartile One. Descriptive statistics are listed in Table 1.

Acceptance Rate—2,154 observations at 233 colleges; observations per group [2,10], mean = 9.2.
Top 10%—1,894 observations at 223 colleges; observations per group [1, 10], mean = 8.5.

[b]Regressions use SAT scores from 1995–2000, and include unreported time dummy variables. Excluded Group: 2000, non-top 25, Quartile One. Descriptive statistics are listed in Table 1.

Private Schools—368 observations at 76 colleges; observations per group [1, 5], mean = 4.8.
Public Schools—352 observations at 75 colleges; observations per group [1, 5], mean = 4.7.
*Significant at the 90% level; **Significant at the 95% level; ***Significant at the 99% level.

increase a statistically insignificant 13 points when a school's rank drops from quartile one to quartile two. Private schools' SAT scores continue to rise as the school's rank falls to the third and fourth quartiles. Unlike with the previous two admission outcomes, the R^2 statistics indicate that the fixed effects model (1.2) explains the variation in SAT scores much better at public schools. The difference in the signs on the coefficients at public and private institutions makes interpreting results from the regression using SAT scores across all schools difficult. It also leads to the question: Why are public and private schools affected differently by changes in *USWNR* ranking?

One possible explanation for the less significant coefficients at private institutions is that private schools have greater pricing flexibility than governmentally regulated public institutions. The greater ability to adjust price may allow private schools' net tuition to be more elastic to changes in the *USNWR* rankings. To test empirically whether changes in net tuition were greater at private schools, the standard deviations of the percentage change of net tuition were compared for private and public schools. The results show a standard deviation for net tuition changes of 14.4% at private schools versus 8.3% for out-of-state students at public institutions. This provides some evidence that private schools may have a greater ability to adjust net tuition to compensate for movements in the *USNWR* rankings. If public schools in fact do have less flexibility in adjusting net tuition in response to the *USNWR* rank, then the coefficients from the public school regressions may more accurately reflect the impact of the rankings. It is important to note, however, that of the top 25 universities in the 2000 *USNWR* rankings, only California-Berkeley (20), Virginia (22), UCLA (t25), and Michigan (t25) are public schools. Given this limited number of data points, it is questionable as to how well the public school regressions represent the effects on the *USNWR* rankings on highly ranked schools.

One potential criticism of the above explanation is that it does not account for why the R^2 is larger for private schools when using the acceptance rate and percentage from the top 10% of their class as a dependent variable, and larger for public schools when using SAT scores as a dependent variable. If pricing flexibility was the only factor causing effects of rankings on public and private schools to differ, it would seem likely that the regression fits would be similar for public and private schools. A decomposition of the residuals reveals some of the limitations of the fixed effects model (1.2) used in this article. No attempts are made in the model to control for any effects other than college rankings on outcomes. For example, the model does not account for state effects, such as all of the California public universities in the sample increasing their percentages of students from the top 10% of their high school class to over 90%. It also does not account for possible shifts in the percentage of in-state and out-of-state students at public schools. These factors may create more unexplained variability in admission outcomes at public schools, which results in lower R^2 values. As long as these unexplained effects are uncorrelated with the *USNWR* rankings for both public and private schools, the model should produce consistent coefficients.

A final result from the first set of regressions is that it is indeterminable whether the *USNWR* rankings affect small schools any differently than larger schools. The F statistic from the regression using acceptance rate as the dependant variable across small schools indicates that the entire regression is insignificant. While movements within the top 25 no longer have a statistically significant impact on the percentage of students in the top 10% of their high school class at small schools, movements between the first and second quartile have a greater effect. Overall, it seems likely that the results across small schools may be biased somewhat by the presence of a higher percentage of private schools among the small school sample. Therefore, no definitive statement can be made about whether smaller schools are impacted differently by the *USNWR* rankings.

The second set of regressions in this article tested the effects of changes in *USNWR* ranking on a school's demographics and gifts received. If schools alter net tuition to compensate for movements in the *USNWR* rankings, it is expected that this might affect their socioeconomic composition. Specifically, schools that fall in rank, and thus lower their net tuition, may attract more low-income students. Measuring how the amount of Pell Grants received by an institution's students varied with respect to movements in the *USNWR* rankings tested this. It also seems possible that certain minority groups may be more sensitive to college rankings than others. Thus, it was tested whether the percentage of African American, Hispanic, or Asian students varied with changes in the *USNWR* rankings. Finally, given that Toma and Cross (1998) found a positive relationship between athletic success and alumni giving patterns, it was thought that improvement in the *USNWR* rankings may also increase the amount of gifts received by the university. This was tested by measuring how the percentage of private gifts, grants, and contracts received by institutions varied in response to movements in the *USNWR* rankings. The results from all five of these regressions are presented in Table 6.

The second set of regressions reveal that changes in the *USNWR* rankings do appear to impact the socioeconomic composition of schools at the top of the rankings. The coefficient on the effects of movement within the top 25 on standardized Pell Grants indicate that the amount of Pell Grants increases as a school drops in the rankings. This result is significant at the 95% level. None of the other coefficients in the Pell Grant regression are statistically significant. The increase in the amount of Pell Grants, and hence the number of low-income students a school enrolls, in response to a drop in *USNWR* rank within the top 25, supports Monks and Ehrenberg's (1999) conclusion that top institutions vary net tuition to combat movements in the *USNWR* rankings. The lack of significant impact on lower ranked institutions may be an indication that only elite

TABLE 6. Effects of the *USNWR* Rank on Demographics and Private Gifts, Grant, and Contracts (fixed effects regression using Model 1.2)

Variable	Percentage Asian[a] (N =1,704)	Percentage Hispanic (N = 1,704)	Percentage Black (N = 1,704)	Percentage Total Pell Grants[b] (N = 1,144)	Log GG&C (N = 1,175)
R^2	0.01	0.01	0.01	0.08	0.01
F statistic	5.91***	5.42***	1.51	18.65***	17.68***
Mean value	8.92	5.63	8.84	0.12	16.33
(std. deviation)	(10.58)	(6.10)	(11.73)	(0.08)	(1.32)
Constant	11.08***	10.15***	8.56***	0.0017	16.67***
(std. error)	(1.46)	(1.72)	(1.40)	(.004)	(.300)
Lagged negative rank	0.112*	0.092**	–0.009	–0.0025**	0.000
	(.059)	(.038)	(.057)	(.001)	(.012)
Top 25 dummy variable	0.515	0.126	0.268	–0.0100	0.009
	(.575)	(.371)	(.552)	(.009)	(.115)
Quartile Two dummy variable	0.314	–0.098	–0.139	–0.0033	–0.057
	(.349)	(.225)	(.335)	(.005)	(.065)
Quartile Three dummy variable	0.500	–0.206	0.316	–0.0027	–0.041
	(.425)	(.274)	(.408)	(.006)	(.080)
Quartile Four dummy variable	1.244***	–0.253	0.149	–0.0002	–0.030
	(.493)	(.318)	(.473)	(.007)	(.091)

[a]Regressions use ethnicity data from 1991–1998, and include unreported time dummy variables. Excluded Group: 1998, non-top 25, Quartile One. Descriptive statistics are listed in Table 1.
All Demographics—1,704 observations at 231 colleges; observations per group [2, 8], mean = 7.4.
[b]Regressions use Pell Grant and Private Gifts, Grants, and Contracts. Data from 1991–1996, and include unreported time dummy variables. Excluded Group: 1996, non-top 25, Quartile One. Descriptive statistics are listed in Table 1.
Pell Grants—1,144 observations at 228 colleges; observations per group [1, 6], mean = 5.0.
Private Gift, Grants, and Contracts—1,175 observations at 229 colleges; observations per group [1, 6], mean = 6.0.
*Significant at the 90% level; **Significant at the 95% level; ***Significant at the 99% level.

institutions have the ability to adjust tuition in response to changes in rank. If only highly ranked schools are inversely adjusting net tuition in response to changes in rank, then only the numerical rankings coefficients will be biased downward from the effects of pricing policies. This provides a second possible explanation of why movements between the first and second quartiles appear to have a large effect on admission outcomes relative the movements within the top 25.

The results from the demographic regressions also demonstrate that movements at the top of the *USNWR* rankings may impact the enrollment decisions of minority students. The coefficients on the changes in the percentage of Asian and Hispanic students with respect to changes in a school's rank within the top

25 are significant at the 90% and 95% level respectively. A one-rank drop in the *USNWR* is shown to decrease the number of Asians in an incoming class by 0.11%, the number of Hispanics by 0.09%, but leave African American enrollment essentially unchanged. None of the coefficients outside the top 25 are significant in the racial regressions. While these results indicate that improvement in rank may help top schools recruit more minority students, the R^2 statistics from the racial regressions create some cause for concern. In all three regressions, the R^2 statistic indicates the fixed effects model (1.2) explains only 1% of the variation. A more complex model may be necessary to obtain more conclusive results on the effects of the *USNWR* rankings on university demographics.

The last regression in the second set attempted to test how changes in the *USNWR* rankings impacted the amount of gifts a university received. The natural log of private gifts, grants, and contracts was used as the dependant variable, so that the regression would measure how the percentage change in private gifts, grants, and contracts varied with respect to changes in the *USNWR* ranking. The regression provided no evidence that rankings impact the amount of gifts a university received. None of the coefficients are statistically significant. Additional unreported regressions that tested whether changes in rank affected public and private school differently also have no significant coefficients. The lack of significant coefficients may be a result of the dependent variable being too broad of a measure. The dependent variable used includes corporate support and research grants in addition to alumni donations. It seems likely that the *USNWR* rankings would impact alumni donations more than corporate support or research grants. It is speculated that a data series that isolates only alumni donations may demonstrate a stronger relationship to *USNWR* ranking.

CONCLUSION

The results shown in this article are consistent with the findings of Monks and Ehrenberg (1999) that the *USNWR* college rankings affect admission outcomes. Movements within the top 25 and between the first two quartiles all had a significant impact on admission outcomes. In particular, moving in or out of the first quartile, and hence the first page of the rankings, had a particularly large impact on admission outcomes. The large benefit from being ranked in the first quartile suggests that potential applicants may not be responding rationally to the information that the *USNWR* rankings provide. This claim is supported by the regressions that indicate that the creation of the new numerical rankings of 26–50 in 1996 did not reduce, but actually increased the benefits in admission outcomes from being listed in the first quartile.

The results in this article also demonstrate that *USNWR* rankings appear to have a greater effect on admission outcomes at public schools. One possible explanation is that private schools may have more flexibility to adjust net tuition in response to changes in *USNWR* rank. There is also evidence that highly ranked schools may have a greater ability to adjust tuition in response to changes in *USNWR* rank. At schools ranked in the top 25, it was found that the amount of Pell Grants decreased as rank improved. Since students receiving Pell Grants typically require greater financial aid, this supports the idea that schools within the top 25 adjust pricing policies in response to changes in *USNWR* rank. Movements between quartiles, however, did not result in a statistically significant change in the amount of Pell Grants. This suggests that Monks and Ehrenberg's (1999) conclusion that schools adjust net tuition to compensate for changes in *USNWR* rank may only be valid at highly ranked private institutions; thus providing an alternative explanation of why the impact of movements between the first and the second quartiles are large relative to movements within the top 25.

An important question to ask when interpreting the results from this article is whether potential applicants are being correctly informed by changes in quality by the *USNWR* rankings. Descriptions by Ehrenberg (2000) of Cornell's simple maneuvering to raise its *USNWR* rank, and the subsequent positive response in its admission outcomes, make it hard to believe that all of the movement in admission outcomes with respect to the *USNWR* rankings result from changes in quality. Conversely, a significant improvement in the quality of a school, especially in its student body or reputation, should be quickly reflected in its ranking. Given the results indicating that college rankings like the *USNWR* impact admission outcomes at universities, further research needs to be done to test to what extent these rankings are properly informing applicants of changes in quality.

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