



UNC
COLLEGE OF
ARTS & SCIENCES

THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

PPAQ RESEARCH PROGRAM

DEPARTMENT OF PUBLIC POLICY
CAMPUS BOX 3435
ABERNETHY HALL
CHAPEL HILL, NC 27599-3435

T 919.962.6848
F 919.962.5824
david_dill@unc.edu
www.unc.edu/ppaq

Convergence and Diversity: The Role and Influence of University Rankings¹

David D. Dill
Professor of Public Policy

Introduction

Over the last two decades league tables or rankings of universities and academic programs have come to prominence around the world. Following the publication of college and university rankings by *US News and World Report* (USNWR) in 1983, often identified as the first of the national rankings of universities (van Dyke, 2005), league tables have become a minor international industry. National league tables subsequently appeared in Canada, the UK, Australia, Europe, Eastern Europe, Asia, and Latin America. In some cases rankings were produced by academic researchers such as those at the University of Melbourne and the Shanghai Jiao Tong University, or by not for profit organizations such as the Centre for Higher Education Development (CHE) in Germany or the National Academy of Sciences in the US. But in the vast majority of cases league tables are produced by commercial publications. Most of the league tables suggest they are designed to inform student choice and as such provide rankings of entire universities, and/or rankings of academic degree programs, including first degree programs, professional programs such as MBAs and law degrees, and research doctoral programs. The initial *USNWR* rankings were based entirely on reputational surveys of college presidents and deans. Reputational surveys continue to play an important role in most of the available league tables, but they have now been supplemented with data on various measures of university input, process, or output (Dill and Soo, 2005). National research league tables have also been produced in conjunction with government performance funding initiatives inspired by the output-oriented budgeting theories of the New Public Management (NPM) (Kettl, 2005). These include the Research Assessment Exercise

¹ Keynote Address presented at the Consortium of Higher Education Researchers (CHER) 19th Annual Research Conference, 9 September 2006, University of Kassel, Germany.

in the UK and the Quantum Research Fund in Australia. However since these research rankings are intended to inform government funding of research, they are quite different in purpose and design from the commercial and not for profit league tables that are most often oriented toward informing student consumers. Consequently, I will discuss research rankings only indirectly in this review, although there is good evidence that they are having a substantial effect on university behavior (Geuna and Martin, 2003).

As academic league tables have become more common, the orientation of the rankings has also changed. The most recent development is international league tables designed to identify the world's best universities. While the academic profession is particularly exercised by rankings that purport to measure the quality of degree programs or the quality of research, the university league table industry has also become much more catholic in its criteria. For example the Cybernetics Research Group in Spain has created an international league table of universities based not on the quality of education or academic prestige, but rather on the volume of published material on university websites and the measured visibility and impact of these WebPages.² My personal favorite among the new league tables is *The Campus Squirrel Listings* which ranks US colleges and universities by the size, health and behavior of the squirrel population on each campus.³ While many may feel that the number of web pages or the girth of campus squirrels are – all puns fully intended – a particularly “nutty” way to rank universities, these more exotic league tables only reinforce the basic point that the validity of the measures used in most of the available league tables are subject to serious challenge (Dill and Soo, 2005)

The popular belief, which I just cited, that *USNWR* created the first university rankings is in fact incorrect. The first reputational rankings were actually created in the US in 1925 by Raymond Hughes a professor of chemistry and later a university president (Webster, 1992). Responding to a request from the North Central Accrediting Association for a study of graduate schools, Hughes conducted a reputational survey and produced the first published league table, which in this case was a ranking of the quality of graduate level degree programs in the primary academic disciplines in the United States. Hughes' rankings created an important precedent and similar multidisciplinary reputational rankings of the quality of graduate degree programs were repeated first by Hughes himself in 1934, then by Hayward Kinston in 1959, and by Alan Carrter in 1966. This tradition of multidisciplinary rankings of graduate degree programs based upon reputational surveys has been continued in the United States by the National Research Council (NRC), a private, nonprofit institution that provides science, technology and health policy advice to the federal government under a congressional charter. The NRC conducted its first assessment of Research Doctorate Programs in 1982, repeated the assessment in 1993, and is now conducting a third assessment due to be published in

² <http://www.webometrics.info/>, accessed 8/29/06.

³ <http://www.gottshall.com/squirrels/campsq.htm>, accessed 8/29/06.

2007. The inaugural *USNWR* rankings of 1983 therefore broke with this tradition, first by being produced by a commercial publication rather than by members of the academy, and second by producing rankings of whole institutions focused solely on the supposed quality of undergraduate or first-level education. The distinctions I have just drawn among rankings of whole institutions, rankings of first-level education, and rankings of graduate degree programs are important. I will return to this point with a more extended discussion of the NRC rankings, which I believe merit more serious attention than they have thus far received in the growing international literature on university rankings and league tables.

The significant point to draw from this brief history of reputational rankings in the US is the obvious relationship between the development of academic league tables and the structure of higher education systems. Rankings of academic degree programs were a necessary response to the largely unregulated, but highly competitive US market for higher education. Because the US Constitution does not mention education, the federal government took no active role in constraining the rapid proliferation of colleges and universities during the 19th century. The development of higher education in the US was therefore shaped by the Supreme Court decision in the Dartmouth College case of 1819, which established the precedent of private colleges and universities as legal entities independent of the state, by the generally permissive higher education licensing practices of the states, and by the provision of higher education by the states themselves. As a consequence the US system was composed of a very large number of public and private universities of widely varying academic standards all vigorously competing for students and resources. In this competitive market context information on the relative rankings of academic degree programs, particularly doctoral degrees that were not the focus of voluntary institutional accreditation agencies, was very much in the public interest.

In contrast, in the UK and Europe national control of academic institutions and degrees prevented the proliferation of universities and historically dampened or controlled competition among them. European national policies on funding and student access were influenced by the ideal of a common “gold standard” in academic degrees across all universities. Recent studies of the economic benefits of university degrees in the UK (Chevalier and Conlon, 2003) as well as national assessments of research quality and doctoral education in a number of EU countries suggest that the “gold standard” was always something of an ideal rather than a reality. University degrees from supposedly comparable UK universities do not provide similar economic benefits to their graduates and the majority of research and doctoral degrees are concentrated in a smaller number of universities in most EU countries than the concept of a “gold standard” would suggest. However, in fairness, it is nonetheless likely true that state higher education policies in the EU countries produced a lower variance in university degree and research standards than was true in the highly competitive, and largely unregulated US market.

This traditional difference between the structure of the US system of higher education and other national systems is fast disappearing. Under the combined

pressures of massification and globalization most national governments are introducing market competition to their university systems and an international rivalry for students, faculty members, and resources has recently emerged among the leading universities. University rankings, therefore, as in the US, are a visible symptom of the increasing trend toward market competition among universities in both national systems and in the international sphere. Consequently, the development and proliferation of academic league tables over the last 25 years closely tracks the rise of market forces in global higher education. In this new competitive environment I suspect that university league tables, like the poor, will be always with us.

In the discussion to follow I will focus on the roles and influence of university league tables in the national and emerging international system of higher education. I will begin with a discussion of the role and possible influence of the new international university league tables. I will then address what we are learning about the impacts of league tables at the national level, particularly in the UK and the US. In these discussions I will also address some relevant issues in the design of university league tables. In the concluding section, I will suggest the possible implications of what we are learning for public policy.

World League Tables

The most recent league tables are the world rankings of universities developed first by the Shanghai Jiao Tong University and more recently by the *Times Higher Education Supplement (THES)*. *THES* argues that the increasing global mobility of students and growing international rivalry among academic institutions supports the need for “an authoritative, robust, and transparent guide” to the world’s universities. The researchers at the Shanghai University, by contrast, argue that their rankings were motivated by a desire to identify the relative academic standing of China’s developing universities. Although these represent two very different purposes, the focus of the two league tables is quite comparable: both place the heaviest emphasis on research prestige as measured by quality of faculty, amount of university resources, and publication citations. The *THES* also includes a reputational survey, the limitations of which I will subsequently discuss.

Ranking the world’s universities was always a predictable and enjoyable discussion whenever international faculty members gathered at the high tables of Cambridge and Oxford, the paneled seminar rooms of the US Ivy League, and the cafes of Europe. However, the effects of the new more formalized world ranking of universities are unlikely to be so innocuous.

The first influence of world rankings and arguably a positive one, which was already occurring prior to the publication of these two world league tables, is what I would call the “canary in the coal mine” effect. This influence is most similar to that articulated by the Shanghai researchers who seek an indicator of the relative standing and progress of the Chinese university system. Over the last two decades the various national assessments of university academic programs and research as well as informal debates and speculations about the relative rankings of world universities

have sent a clear message to policymakers in the developed countries. That is the realization that their university systems as currently constituted are not providing the type of economic and social contributions to their societies that the policymakers had expected and in which they had long believed. Among the OECD countries universities have been publicly supported in large part because of the belief, strongly confirmed by recent economic studies, that university research undergirds the national innovation systems of their respective countries (Geuna, Salter, and Steinmuller, 2003). This belief was clearly reflected in the priority given to academic research in the sciences, medicine, and engineering in every country. The growing awareness of the relative standing of national universities among policymakers has been a powerful motivator for a number of the higher education policy reforms occurring around the globe. The sharp increases in R&D investment among a number of the Nordic countries, the adoption of performance-based funding for academic research, the reforms in doctoral education sweeping across Europe, and the new German Excellence Initiative would be difficult to understand without reference to debates about the relative standing of the world's universities. This contribution of world rankings to policy reform is clear in the recently published report *The Future of European Universities: Renaissance or Decay?* (Lambert and Butler, 2006) by the Centre for European Reform. The report recommends major changes in the governance, financing, research allocations and admissions policies of EU universities. As one of the authors argued:

Europe's universities, taken as a group, are failing to provide the intellectual and creative energy that is required to improve the Continent's poor economic performance. Too few of them are world-class centers of research and teaching excellence (Lambert, 2006).

To the extent that world university league tables provide a general indicator, somewhat like indicators of world health or education, that help motivate systemic policy analyses of the strengths and weaknesses of existing university systems, rankings can perform a useful canary-like warning function. As I have suggested, this is already occurring among the mature economies. That is the good news. However, to the extent that the specific rankings of world university league tables and particularly their measures are taken seriously and are used to guide university strategic decisions, their influence is likely to provide bad news as well.

Some suggest that this danger stems primarily from the research measures used by the two existing world league tables. Both league tables utilize science citation indices that bias the rankings against scholarship in the humanities and social sciences. However, given as I noted previously, the high priority all national policies assign to university research in the sciences, medicine, and engineering, arguably this bias may not be inconsistent with public preferences.

A more serious problem is that while the Shanghai rankings make no attempt to evaluate the quality of education, the *THES* rankings are defended in part as a guide to student choice of an educational program. The *THES* world rankings appear to share the sentiment expressed by the researchers at the Melbourne Institute (van Dyke, 2005) who suggest that rankings of overall universities can assist student choice because the best research universities generally also have the best academic programs. However, the subject and research assessments in various countries provide little empirical support for this generalization. Furthermore, as the international research on student preferences indicates, students, particularly first degree students, have a quite varied list of criteria for choosing the academic program in which to enroll. As Ron Ehrenberg (2002) of Cornell concluded in an analysis of the *USNWR* ratings:

Indeed, once one realizes that different students may value the characteristics of universities differently, the notion that one can come up with a single number that summarizes the overall ranking of an academic institution seems quite silly. (p. 53)

In sum, overall university rankings as opposed to program rankings are of little real guidance to student choice.

However, the biggest danger of world university rankings, in my view, is that their simplistic measures further encourage at the international level the exceedingly expensive “academic arms race” for prestige that we are now detecting at the national level in competitive higher education systems. Of course, prestige based upon scholarly reputation has long been recognized as the primary goal of universities (Garvin, 1980). But, the designs of most of the existing world and national university league tables, which are not based on any testable theory or model of university performance, have substituted an ephemeral market concept – academic prestige – for the real educational and research outcomes that universities provide to society. As a result the league tables encourage *all* institutions of higher education to pursue prestige based primarily upon research performance, faculty reputation, as well as financial and student inputs. The pernicious effect of this competitive pursuit of academic prestige is that it is a highly costly, zero-sum game, in which most institutions as well as society will be the losers, and which diverts resources as well as administrative and faculty attention away from the collective actions within universities necessary to actually improve student learning (Kuh and Pascarella, 2004).

These generalizations can best be illustrated by examining the design and impacts of national-level university league tables.

National League Tables

In comparison to the two international rankings just discussed, most of the national university league tables have been explicitly designed to provide information

to assist student consumers in choosing the best university and/or program. This function of university league tables appeals to economist's belief that the social benefits of competitive markets will best be realized if economic agents are well informed about both the price and the quality of goods and services. Recent research by William Gormley and David Weimer (1999) on organizational rankings similar to university league tables suggests they can sometimes serve as a useful instrument for public accountability, supplying information to consumers and policymakers on measurable differences in service quality, while also providing an incentive to organizations for quality improvement (Gormley and Weimer, 1999). If university league tables are to perform these functions, several linked behaviors need to occur (Gormley and Weimer, 1999). First, league tables and related consumer information on academic quality need to utilize measures that closely approximate or are clearly linked to valued societal outcomes. Second, league tables must inform and influence student choice of university or encourage universities to act in anticipation of the potential effects of published rankings. Third, universities must respond to student choices and/or to the potential effects of rankings by genuinely improving the educational benefits provided to students.

In the case of rankings designed to inform student choice societally valued student outcomes are those that contribute to what economists term human capital, which in its broadest meaning encompasses not only the contributions that educated graduates make to the economy, but also the non-monetary benefits they contribute to society through improved parenting, healthier lifestyles, greater civic participation, and increased social cohesion (Haveman et al., 2003). During their university education students' develop knowledge, skills, and abilities that over their lifetimes provide private benefits to themselves as well as social benefits or social capital to the larger society. This human capital perspective provides the logic for public subsidies for programs of higher education and is also explicitly reflected in the increasing focus of national higher education quality assurance policies on student learning outcomes -- the specific levels of knowledge, skills, and abilities that students achieve as a consequence of their engagement in a particular university program (Brennan and Shah 2000).

In a recent study (2005) Maarja Soo and I analyzed the validity of measures used in the primary commercial league tables in Australia, Canada, the UK, and the US using Gormley and Weimer's (1999) criteria (Table 1). From the measures utilized in the league tables we would infer that prominent research institutions give the best education, although it is more accurate to conclude that the listed performance indicators do a much better job in assessing the research quality of a university than its teaching quality (Yorke, 1998). The league table rankings are heavily biased toward measures known to be associated with research performance including financial resources, numbers of faculty and research activity, student selectivity, as well as university reputation. Even the average faculty salary, which according to *USNWR* measures a school's commitment to instruction, more likely reflects faculty orientation to research and has been found to be negatively correlated with student learning in research studies in the US (Astin, 1996).

TABLE 1: University League Tables Examined

<i>Country</i>	<i>Name of the League Table Examined</i>	<i>Year Sampled (Regularity)</i>	<i>Web Page</i>
Australia	<i>The Good Universities Guide: 2003 Edition</i>	2002 (annual since 1992)	http://www.thegoodguides.com.au
Canada	<i>The Maclean's Guide to Canadian Universities</i>	2002 (annual since 1991)	Not available
UK	<i>The Times Good University Guide</i>	2002 (annual since 1992)	http://www.thes.co.uk/statistics/main.asp
	<i>The Guardian University Guide</i>	2002 (annual since 1999)	http://education.guardian.co.uk/universityguide/0,10085,488282,00.html
US	<i>US News & World Report America's Best Colleges</i>	2002 (1983, annual since 1987)	http://www.usnews.com/usnews/edu/college/cohome.htm

The rankings also place heavy weight on input measures, although empirical studies show that most input indicators have an irrelevant or very small effect on students' learning. After reviewing over twenty years of empirical research on the impact of college on students Terenzini and Pascarella (1994) concluded that the supposed influence of inputs on student learning was one of the great myths of higher education. That is, after taking into account the characteristics, abilities, and backgrounds they bring with them to college, how much students grow or change has only an inconsistent or trivial relationship with such input measures as educational expenditures per student, student/faculty ratios, faculty salaries, percentage of faculty with the highest degree in their field, research productivity, size of the library, admission selectivity, or prestige rankings.

Recent economic research in both the US and the UK has also emphasized "peer effects" in higher education (Winston and Zimmerman, 2003). That is that the overall quality of students entering a university has an independent influence on graduates' success. The belief in "peer effects" has contributed to the prominence in the league tables we analyzed of measures of the quality of entering students such as average student test scores. While there is certainly evidence to support the influence of peer interaction on student learning (Pascarella and Terenzini, 1991), the positive academic benefits of peers are obviously dependent to some extent on the way that student learning and academic programs are organized within universities. Simply admitting higher ability students will not necessarily increase the learning of all. In support of this point a recent study (Kuh and Pascarella, 2004) on the relationship between admissions selectivity and the presence of educational practices known to be associated with student learning in the US confirms that they are largely independent. That is, in the US a colleges' admissions selectivity offers no guarantee that it provides a more effective learning environment than a less selective school.

Furthermore, the most recent review (Pascarella and Terenzini, 2005) of the peer effects research in higher education casts significant doubt on the supposed relationship between peer effects, as measured by average test scores of entering

students, and graduates' earnings capabilities. First, the research notes that the impact of institutional selectivity on earnings is nonlinear. Only the most selective institutions may have an impact on earnings. Second, the relationship depends on the students' major field of study, which is often not controlled in relevant studies. The academic profiles of universities obviously differ, and some universities therefore offer academic programs with less potential earnings capacity than others. Finally, and most importantly, there is an indication that if researchers control for the *types* of students who apply to more selective institutions – utilizing measures of individual ambition -- the earnings advantage of the more selective schools disappears.

Reputation is an important component of most national league tables, with the exception of those in the UK (van Dyke, 2005). *USNWR* claims that their assessment of college and university reputation using the views of institutional administrators is aimed at measuring “intangibles” such as faculty dedication to “teaching.” The *USNWR*'s reputation score, however, correlates much more closely with high per-faculty federal research and development expenditures than with good graduation-rate performance (Graham and Thompson, 2001). As previously noted another problem with *USNWR*'s reputation survey is that while it may be relevant for ranking the best known schools, even a sample of prominent people is unable to assess accurately the quality of all programs in all schools. Therefore their opinion is likely to be influenced more by the existing reputation of the university (i.e., the “halo effect”) than by actual knowledge of program quality (Clarke, 2002). In contrast to the US and Canadian reliance on reputational surveys, the Australian *GUG* uses multiple objective indicators to assess reputation and in the UK *The Guardian* uses an objective measure of admissions selectivity as a proxy for reputation.

A potentially valid alternative to input indicators would be measures of the teaching and educational process known to be related to student learning (Kuh, 2003). The National Survey on Student Engagement (NSSE) developed in the US can provide information on how effectively colleges are contributing to learning in five areas: level of academic challenge; active and collaborative learning; student/faculty interaction; enriching educational experiences; and supportive campus environment (Kuh, 2003). The indicators utilized in the NSSE are derived from extensive research on factors related to effective student learning in US colleges and universities. *USNWR* provides this survey data on their website, but only for colleges and universities that have given their agreement to do so. With the exception of private Rice University and the public University of Michigan and University of North Carolina at Chapel Hill, none of the other 50 “best” national universities permitted their data to appear in the 2002 *USNWR*.⁴ As a consequence these informative process indicators are not included in *USNWR*'s published college and university rankings.

⁴ The major purpose of the NSSE is not to make university league tables more valid, but to provide information on educational processes that can help colleges and universities improve the quality of student learning. Perhaps more troubling is that few of the most highly ranked colleges and universities in the US even choose to participate in the survey.

Another potentially valuable process measure is the College Experience Questionnaire (CEQ), which is subsidized by the Australian government. The CEQ provides graduates' perceptions of teaching quality, skills learned, and their satisfaction with their education in their academic program.⁵ A similar National Student Survey has been implemented in the UK. *The Times* UK league table has given some weight to Teaching Quality Assessments (TQA) formally conducted by the UK Quality Assurance Agency (QAA). In response to some of the noted weaknesses in *the Times*' rankings *The Guardian* published a league table specifically designed to inform student consumers about teaching quality in academic subjects. While *The Guardian*'s league table makes a serious attempt to lessen the influence of university prestige on academic quality rankings by placing greatest weight on QAA teaching assessments, it is questionable whether they actually succeeded. Studies of the relationship between TQA and Research Assessment scores suggest that TQA assessors have a positive research bias and university research ratings are a strong predictor of favorable TQAs (Drennan and Beck, 2001).

If the validity of input measures is questionable, then potentially output measures offer better indicators. Output measures utilized in the rankings include graduation rates, graduate degree level, and graduate employment. However, while the number of students who graduate from university is certainly a societally valued outcome, the fact that graduation rate can be independently controlled by each university poses a problem. That is, graduation rates can be increased both by more effective teaching and student learning and by lowering academic standards. In fact the issue of university grade inflation and inflation in honors degree awards has been raised in both the US and UK (Rosovsky and Hartley, 2002; Yorke et al., 2002).

Graduate employment measures are attractive output measures, but these indicators are still vulnerable to criticism. Employment information utilized in the U.K. league tables reported the proportion of students that found a job six months after graduation without controlling for the individual's social class background, class of degree, the degree subject studied, or local labor market conditions all of which have been discovered to influence scores (Smith et al., 2000). The data also did not identify whether students were employed on graduate level jobs or are under-employed.⁶ Analysis of the U.K. data (Smith et al., 2000) suggested that there was no statistically significant difference between most U.K universities in the pattern of graduate employment; perhaps only the top 10 and bottom 10 universities have a meaningful difference in their results.

Finally, not only are the measures used in the *USNWR*'s rankings of questionable validity with regard the quality of student learning, but they are also unreliable measures as well. While the Australian and UK university league tables are based upon data collected and verified by government agencies, this is not the case in the US. Virtually all of the published data on colleges and universities in the

⁵ See the policy analysis of the Australian CEQ and GDS surveys available on the Public Policy for Academic Quality (PPAQ) website: www.unc.edu/ppaq

⁶ Performance indicators on graduate employment in the UK published by the HEFCE now provide benchmarks that adjust for a number of these variables.

US, whether collected by government, or by the publishers of guidebooks and commercial rankings, are supplied by the institutions themselves and no independent source of verification exists (Hossler and Litten, 1993). Not surprisingly there have been numerous reported incidents of US colleges and universities manipulating the data submitted to commercial league tables in an attempt to enhance their rankings (Ehrenberg, 2002).

The second necessary condition for effective commercial league tables or organizational reports cards is that the information provided in the rankings is relevant to the needs of consumers and effectively informs student choice.

One indirect measure of the consumer relevance of university report cards is the nature of the readership or purchasers of these league tables. Research in the UK and US suggests that commercial league tables are most often designed for and used by a narrow segment of the potential student market -- students of high achievement and social class (McDonough et al., 1998; Sarrico et al., 1997). Many of these students appear interested in the "prestige" rating of a university as reflected in the future opportunities and incomes of an institution's graduates. But research in Australia, the UK, and US on the preferences of student applicants suggests that the majority of students desire a much more varied list of factors for deciding where to apply than is reflected in most league tables (Connor et al., 1999; James et al., 1999; McDonough et al., 1998; Moogan et al., 1999; Sarrico et al., 1997).

For example, a recent survey on student choice in the UK (Connor et al., 1999) indicates that the most important factors influencing the choices of applicants to full-time university education are the course or subject, academic quality (particularly teaching reputation), entry requirements, employment prospects for graduates, location, available academic and support facilities, social life, and costs of study. Despite the differing structure of American higher education, the extensive US research on college choice suggests that similar factors are important for US students and parents in choosing among colleges (Hossler et al., 1989; Manski and Wise, 1983; Paulsen, 1990; Zemsky and Oedel, 1983).

Information on the academic subject has consistently proven the most influential on student choice in Australia and the UK (James et al., 1999; Moogan et al., 1999) and raises fundamental questions about the utility of league tables that provide rankings and information only for the overall university. First, highly ranked universities may not have the specific subjects sought by a student. Second, entry qualifications may vary across subject fields even within the same university. Finally, and most importantly, the quality of the student learning experience, graduation rates, student satisfaction, employment prospects, and even lifetime earnings are apt to vary significantly by subject field within the same university. Therefore, rankings based upon average data for the university as a whole not only misrepresent the experience for particular subject fields, but fail to provide the type of academic quality information most desired by student consumers.

The third necessary condition for effective academic league tables or report cards is that universities respond to the league table rankings in a manner that is beneficial to society. In short, do the national league tables that are supposedly

designed to enhance student choice encourage the ranked universities to engage in the improvement of teaching and student learning – do they help maximize the production of human capital?

In a national study of the US higher education market researchers at the Rand Corporation (Brewer et al., 2002) discovered that many institutions are attempting to alter their standings in university rankings by “cream skimming” the student market. For example, institutions are *linking* tuition discounts with academic merit and student ability in order to increase the selectivity of their admissions process, which is an important measure in university league tables. These institutions are also investing in student consumption benefits such as comfortable dormitories, attractive eating facilities, and fiber optic computer networks that will help attract higher ability students. However the researchers discovered that this attempt to increase academic prestige by attracting more able students was not associated with actual improvements in the quality of education provided.

In the US research is a revenue market because of the competitive allocation of federal research funds and the funds for university research provided by business and industry. But the amount of external research funding received by a university has also become an influential indicator of academic prestige in university league tables. All of the universities studied by the Rand group were therefore seeking to increase their potential for research funding by investing in PHD programs, in laboratories, libraries, computer facilities, and research management as well as by attracting more research-oriented faculty. There is also increasing evidence of US universities subsidizing their federal research support through increased investment in grant matching funds and/or by attempting to lower their indirect cost rate (Feller, 2000). Since the institutional funds to support these research investments are derived from other revenue markets -- including public financing, student tuition, and private giving -- that are designed to cover the costs of education, this is an example of the means by which US universities use teaching to cross subsidize research in their pursuit of higher rankings in league tables.⁷

This activity is confirmed by a recent analysis (Mumper and Freeman, 2005) of the causes of tuition inflation in US public higher education. In recent decades increases in private and public university tuition in the US have continuously exceeded rises in both the cost of living and average family income. However, during the period 1980 to 2000 current fund expenditures for instruction in public colleges and universities declined by 4.5%, while expenditures for research grew by 2.8%. In real terms the amount expended on research doubled from \$8B to \$16B.

⁷ While there are arguably some educational benefits to the increased emphasis on research and scholarship encouraged by league tables (see Clark, 1997), it is unlikely that the increasing transfer by many institutions of resources and time from teaching to research can be justified by commensurate increases in human capital. Research on student learning suggests that the correlation between research productivity and first level instruction, the demand for which is the primary rationale for the development of mass higher education in all countries, is very small and that teaching and research appear to be more or less independent activities (Coate et al., 2001; Fox, 1992; Marsh and Hattie, 2002; Terenzini and Pascarella, 1994).

Expenditures for administration also grew, but by less than half of the growth in research, and expenditures for scholarships, many of which as I noted are designed to increase the selectivity and prestige of the institutions, increased by 2.8%. Since in the US faculty salaries are included in expenditures for instruction, and since reported faculty time on research also grew significantly during this same period (Fairweather, 1996), these data likely understate the extent to which public monies intended for instruction are increasingly being reallocated to the pursuit of prestige.

League tables and research rankings appear to be having a similar influence on the behavior of universities in the UK. In a study of a representative sample of old and new UK universities Heather Rolfe (2003) explored the effect of the new competitive forces on university strategy and behavior. One new emphasis observed in all the universities studied, which reflected the emerging environment of competition, was marketing for student recruitment with substantial expenditures for marketing staff, consultants, and professional agencies (see also Lindsay and Rogers, 1998). University managers expressed the need to develop a “brand image” using professional advice. They also reported that the new tuition fees had heightened parents’ and students’ desire to get “value for money” in accommodations, sports, and leisure activities. Rolfe (2003) noted that the university managers in each of the universities believed that student applicants relied heavily upon the commercial league tables to assess university quality and therefore administrators focused on enhancing the position of the university in these rankings, particularly by improving the university’s RAE scores and by attracting more high achieving applicants as measured by A level scores. Even though the Higher Education Funding Council for England (HEFCE) provided financial premiums for the enrollment of part-time students, mature students, and students from disadvantaged groups, the principal concern at each of the studied universities, especially the newer universities, was to attract more high quality full-time students.

Rolfe (2003) discovered that each of the universities, even the newer universities with a regional focus, was intent on improving its research position. As a consequence, there was a great emphasis to recruit “research stars” on research-only contracts in order to enhance research ratings and increase research income. This focus on research was also motivated by the growing transfer market among faculty members as experienced and well-qualified staff became harder to recruit and retain because they were seeking positions at universities with high RAE rankings.

Consistent with Rolfe’s (2003) analysis there is increasing evidence that the new competitive market for research funds produced by the tight link between RAE scores and university research funding created stronger incentives for all faculty members to be more research active, particularly in the newer universities (Dolton et al., 1997; Hare, 2003; McNay, 1999).⁸ Research performance is now heavily emphasized in all universities with regard decisions on appointments and promotion.

⁸ Reflecting on the effects of a similar research assessment exercise introduced into the Hong Kong University system by the University Grants Committee (UGC), Massey noted that it produced a “land rush” into research by university faculty members and motivated the UGC to implement an academic audit process designed to reemphasize attention to teaching and student learning (Massy, 2003).

Studies at the academic unit level suggest the increased incentives for research have altered the traditional roles of academic staff, affected the balance between teaching and research, encouraged more individualistic behavior on the part of academic staff, and contributed to a more fragmented educational experience for students (Harley, 2002; Henkel, 2000; Jenkins, 1995; McNay, 1999).

Similar to the US there is growing concern in the UK that the measures in league tables and the influence of RAE rankings may be leading to a cross-subsidization of research by teaching. McNay (1999: 20), for example, reported in his review of the 1992 RAE for the HEFCE “evidence of teaching funds being raided to support research.” Although the 2001 RAE was particularly designed to discourage the reported practice of “poaching” high performing researchers in order to increase RAE scores, there is nonetheless evidence of a growing transfer market in “research stars.”

Taken as a whole, the UK and US experience offer some valuable insights into the academic responses of universities to the new league tables and research rankings. The research suggests that the ideal of academic prestige based primarily upon research reputation and quality of entering students distorts the assumed constructive link between information on academic quality and university efforts to improve human capital. As a consequence, many universities have responded to market competition primarily by emphasizing admissions marketing, “cream skimming” of high achieving student applicants, increased investment in research reputation, with limited attention to actually improving academic standards. In sum the indicators used for academic quality in most university league tables are of questionable validity and appear to be biased toward research reputation and academic prestige rather than student learning. The available research on student choice suggests that commercial league tables have not been very influential on applicants’ selection of a university or degree program except in the case of students of high achievement and social class. Furthermore, the lack of high quality information on the educational value – added by specific subjects and the fact that the available output data do not adjust for differences in unit costs and entering student ability between universities, means that potential students do not have the information necessary to actually promote market efficiency (Coates and Annett, 2003). Not surprisingly there is little evidence that the information from commercial league tables has influenced universities to take actions that genuinely improve human capital.

National Research Council

At the outset I suggested that the research doctoral rankings by the National Research Council (NRC) in the United States offer a somewhat different picture with regard the design and influence of league tables. In a series of well known articles in the higher education literature Martin Trow (1983, 1999) described the extensive changes made in the departmental structures of the biological sciences at the University of California, Berkeley over twenty years. Berkeley radically changed the

means of appointing and promoting faculty members in the university's biological community and redesigned the nature of facilities for the biological sciences. Trow argued that the impetus for these dramatic changes which markedly strengthened biological research at Berkeley came in part from the decline in the rankings of several of the biological sciences departments revealed in the NRC assessment of 1982. Similarly Ron Ehrenberg (Ehrenberg and Hurst 1996; Ehrenberg 2002) has described how administrators at Cornell were able to use the objective measures of the NRC rankings of 1995 to develop a causal model of quality in research doctoral programs that helped to guide the university's strategic research decisions. In Sociology the analysis revealed that the department's low ranking was due to its small size not to its faculty's productivity, therefore the University decided to continue the department and increase its number of faculty. In Biology the assessment led Cornell to devote resources to particular areas in which the university had special strengths and which would likely be important in the coming years.

How do we account for this very different response of US universities to league tables of research-doctoral programs as compared to their response to league tables of the supposed quality of first level academic programs? First, the market for research-doctoral students is a more perfectly competitive market than that for first level degrees. US universities aggressively compete with high paying fellowships for the very best international doctoral students. Doctoral applicants are an older, more educationally experienced set of consumers who are pursuing a degree primarily for vocational reasons. They are therefore less likely to be influenced by consumption benefits and academic prestige indicators and more likely to seek information on concrete measures of academic quality. In addition faculty members are much more psychologically invested in the quality of their doctoral programs than first level academic programs. Doctoral graduates are more visible products of the individual mentor and department – particularly to academic colleagues at other universities -- than are largely invisible first degree recipients.

Furthermore the organization of the NRC rankings is quite different from other league tables (Ostriker and Kuh, 2003). The rankings are subsidized by federal agencies including the National Institutes of Health and the National Science Foundation and the assessments are designed and carried out by some of the leading social scientists in the US. While the NRC rankings include reputational peer judgments, they also include objective data on measures that research and experience has indicated are important determinants of academic quality in research-doctoral programs. These include inputs such as the number of faculty members and doctoral students in each program and crucial process measures such as student time to degree. The measures also include objective output measures such as the number of doctoral graduates each year and the number of faculty publications, as well as significant outcomes, such as the number of times faculty publications were cited and the number of distinguished awards received by the faculty.

Following the 1995 assessment the NRC commissioned a study by leading social scientists of the methodology used in that assessment. The Committee's report (Ostriker and Kuh, 2003), which is based upon pilot studies, quantitative analyses of

the previous assessments, and the best available research on doctoral education offers useful guidelines for all league table designers . Consistent with Gormley and Weimer's (1999) analysis of organizational report cards the committee concluded that valid academic rankings can assist funders and university administrators in program evaluations and are useful to students for graduate program selection. However rankings would be harmful if they were to give a distorted view of the graduate enterprise that encouraged behavior inimical to improving its quality. To guard against this the committee recommended:

- Presenting ratings as ranges rather than rankings to diminish the focus of some administrators on hiring decisions designed purely to “move up in the rankings.”
- Expanding the quantitative measures used in the rankings to include institutional characteristics, doctoral program characteristics, and faculty characteristics that research has shown contribute to a reputation for quality.
- Surveying a sample of advanced graduate students in selected fields regarding their assessment of their educational experience, their research productivity, program practices, and their institutional and program environment in order to encourage a greater focus by programs on education in addition to research.
- Determining whether programs collect and publish employment outcomes of graduates for the benefit of prospective students in order to encourage programs to pay more attention to improving those outcomes.

Of particular interest was the Committee's analysis of the reputational indicators used in the NRC rankings. The reputational measures had traditionally included two questions, one on the scholarly quality of the program faculty and a second on the effectiveness of the doctoral program in training scholars. The reputational survey had been limited to members of the discipline being rated. Nonetheless, the committee concluded that the strong correlation between the two reputational measures in past NRC assessments “suggests that raters have little knowledge of educational programs independent from faculty lists” (Ostriker and Kuh, 2003, p. 36). Therefore while the reputational measure will be continued, it will be limited to scholarly reputation of the program faculty alone. Furthermore the NRC committee determined that because more highly ranked programs were most visible some measure of the rater's familiarity with the program should be included.

Finally, the NRC assessment, unlike most available league tables, presents all its data in an unweighted form. Thus users of the assessment can apply their own preferences to the data and make their own comparative judgments, which is impossible with weighted measures.

Conclusion

Throughout this discussion of university league tables I have been emphasizing the importance of the human capital function of universities. In the new world of globalization the economic future of all developed nations depends upon their ability to efficiently cultivate their stock of human talent through their educational systems. While there is good evidence to support this human capital argument for subsidizing higher education, economists have long noted an alternative explanation for the observed relationship between university education and graduates' lifetime incomes. This is the so-called "signaling" or "screening" hypothesis, in which universities may not actually add to the knowledge and skills of graduates, but simply provide information to the market place as to which individuals possess the native aptitude and behaviors desired by employers (Johnes, 1993). The design of commercial league tables provides incentives for all institutions to become costly screening mechanisms rather than efficient producers of human capital. The indicators of academic prestige utilized by commercial league tables drown out the weaker signals of the quality of teaching and student learning and the aggressive pursuit of prestige by institutions of higher education crowds out activities associated with the improvement of academic standards.

With many goods and services, a market failure due to insufficient information may motivate commercial publishers to provide the necessary information to consumers (Gormley and Weimer, 1999). But the evidence from the countries where league tables are most prominent suggests that commercial guides and league tables will not effectively address existing information deficiencies in the higher education market (Dill and Soo, 2005). The cost and complexity of developing valid indicators of academic quality with relevance to student choice are significant and for-profit publications already enjoy substantial sales and influence among opinion leaders, higher achieving students, and even university personnel by focusing on readily available and/or highly subjective indicators of academic prestige such as reputational surveys.

As I have noted in the case of the NRC assessment of research-doctoral programs, valid league tables that have a positive influence on the educational quality of academic programs can be constructed. Such league tables present information on academic programs rather than universities. They include valid quantitative measures of academic inputs, processes, and outputs, designed to inform student choice. They include information collected from students about the nature of their academic program experience and limit or avoid reputational surveys. They emphasize ratings of relevant indicators rather than rankings and they permit students themselves to apply their own preferences to the available information in order to choose the best program to meet their particular needs. Other examples of league tables that meet the criteria of effective organizational report cards include the German university rankings by the Center for Higher Education Development and the *Good University Guide* in Australia.

Valid and reliable information on academic quality is therefore best understood as a pure public good that will either not be provided or will be under

provided by the private market. In these circumstances government policy must assure that more valid information on academic quality is produced, that the information provided by universities is reliable, and that institutions of higher education have incentives to utilize the available information to improve their academic standards. One example of this approach is the government policy in Australia, which assures the provision and reliability of the academic program information featured in the commercial *Good University Guide* through its subsidy for the Course Experience Questionnaire (CEQ) and the Graduate Destinations Survey (GDS). Government policy also encourages universities to use this information to improve academic programs through a required Academic Audit process and a new competitively allocated Learning and Teaching Performance Fund (LTPF). These Australian policies have limitations and can likely be improved upon,⁹ but they suggest the type of institutional framework that will be necessary to assure the public interest in the new global market of higher education.

In sum, because the higher education market is characterized by inadequate and inappropriate information, an ambiguous conception – “academic prestige” – comes to represent academic quality in the public mind. The distorting influence of prestige in the higher education market means that the educational costs of elite universities provide a “price umbrella” for all of higher education and present spending targets for less elite institutions that wish to compete by raising their prices (Massy, 2005). Commercial university league tables thereby encourage an inefficient academic “arms race” for prestige among all institutions, which rapidly increases the costs of higher education and devalues the improvement of student learning.

References

- Astin, A. W. (1996). ‘Involvement in learning revisited’, *Journal of College Student Development* 40(5), 587-597.
- Brennan, J., and Shah, T. (2000). *Managing Quality in Higher Education: An International Perspective on Institutional Assessment and Change*. Buckingham, UK: OECD, SRHE & Open University Press.
- Brewer, D., Gates, S. M., and Goldman, C. A. (2002). *In Pursuit of Prestige: Strategy and Competition in US Higher Education*. New Brunswick, NJ: Transaction Press.
- Chevalier, A. and Conlon, G. (2003) *Does it Pay to Attend a Prestigious University?* London: Centre for Economics of Education (LSE).
- Clark, B. R. (1997). ‘The modern integration of research activities with teaching and learning’, *Journal of Higher Education* 68(3), 241-255.

⁹ For example, although the results of the Australian CEQ are analyzed by an independent organization, the actual surveys are conducted by each university, which may raise questions about the reliability of the responses. In contrast, the new National Student Survey in the UK is both administered and analyzed by an independent agency.

- Clarke, M. (2002). 'Some guidelines for academic quality rankings', *Higher Education in Europe* 27(4), 443-459.
- Coate, K., Barnett, R. and Williams, G. (2001) 'Relationships between teaching and research in higher education in England', *Higher Education Quarterly* 55(2), 158-174.
- Coates, G. and N. Adnett. (2003) 'Encouraging cream-skimming and dreg-siphoning? Increasing competition between English HEIs', *British Journal of Educational Studies* 51(3), 202-218.
- Connor, H., Burton, R., Pearson, R., Pollard, E., and Regan, J. (1999). *Making the Right Choice: How Students Choose Universities and Colleges*. London: Universities UK.
- Connor, H., R. Burton, R. Pearson, E. Pollard and J. Regan. *Making the Right Choice: How Students Choose Universities and Colleges*. London: Universities UK, 1999.
- Dill, D. D. and Soo, M. (2005). "Academic quality, league tables, and public policy: A cross-national analysis of university ranking systems", *Higher Education* 49(4), 495-533.
- Dolton, P. J., Greenaway, D. and Vignoles, A. (1997). 'Whither higher education? An economic perspective for the Dearing committee of inquiry', *The Economic Journal* 107(442), 710-726
- Drennan, L. T. and Beck, M. (2001). 'Teaching quality performance indicators - Key influences on the UK universities' scores', *Quality Assurance in Education* 9(2), 92-102.
- Ehrenberg, R. G. (2002). *Tuition Rising: Why College Costs so Much*. Cambridge: Harvard University Press.
- Ehrenberg, R. G. and Hurst, P. J. (1996). 'A hedonic model', *Change* 28(3), 46-51.
- Fairweather, J. (1996). *Faculty Work and Public Trust: Restoring the Value of Teaching and Public Service in American Academic Life*. Boston: Allyn & Bacon.
- Feller, I. (2000). 'Social contracts and the impact of matching fund requirements on American research universities', *Educational Evaluation and Policy Analysis* 22(1), 91-98.
- Fox, M. F. (1992). 'Research, teaching, and publication productivity: Mutuality versus competition in academia', *Sociology of Education* 65(4), 293-305.
- Garvin, D. A. (1980). *The Economics of University Behavior*. New York: Academic Press, 1980.
- Geuna, A. and Martin, B. R. (2003) University research evaluation and funding: An international comparison, *Minerva*, 41(4), 277-304.
- Geuna, A., Salter, A. J., and Steinmuller, W. E., (2003) *Science and Innovation: Rethinking the Rationales for Funding and Governance*. Cheltenham, UK: Edward Elgar.
- Gormley, W. T. Jr. and Weimer, D. L. (1999). *Organizational Report Cards*. Cambridge, Mass.: Harvard University Press.

- Graham, A. and Thompson, N. (2001). 'Broken ranks: *US News*' college rankings measure everything but what matters. And most universities don't seem to mind', *Washington Monthly* 33(9), 9-14.
- Hare, P. (2003). 'The UK's research assessment exercise – Its impact on institutions, departments, individuals', *Higher Education Management and Policy* 15(2), 45-67.
- Harley, S. (2002). 'The impact of research selectivity on academic work and identity in UK universities', *Studies in Higher Education* 27(2), 187-205.
- Haveman, R. H., Bershader, A. and Schwabish, J. A.. (2003). *Human Capital in the United States from 1975 to 2000: Patterns of Growth and Utilization*. Kalamazoo, Michigan: W. E. Upjohn Institute for Employment Research.
- Henkel, M. (2000). *Academic Identities and Policy Change in Higher Education*. London: Jessica Kingsley.
- Hossler, D. and Litten, L. H. (1993). *Mapping the Higher Education Landscape*. New York: College Entrance Examination Board.
- Hossler, D., Braxton, J., and Coopersmith, G. (1989). 'Understanding student college choice', in Smart, J.C. (ed.), *Higher Education: Handbook of Theory and Research, Vol. V*. New York: Agathon Press, pp. 231-288.
- James, R., Baldwin, G. and McInnis, C. (1999). *Which University? The Factors Influencing the Choices of Prospective Undergraduates*. Canberra: Australian Government Publishing Service.
- Jenkins, A. (1995). 'The research assessment exercise, funding and teaching quality', *Quality Assurance in Education* 3(2), 4-12
- Johnes, G. (1993). *The Economics of Education*. London: The MacMillan Press.
- Kettl, D. F. (2005) *The Global Public Management Revolution*. Washington DC: Brookings Institution Press.
- Kuh, G. (2003). 'What we're learning about student engagement from NSSE', *Change* 35(2), 24-32.
- Kuh, G. D. and Pascarella, E. T. (2004). 'What does institutional selectivity tell us about educational quality?', *Change* 36(5), 52-58.
- Lambert, R. (2006) Six steps to revitalise Europe's higher education, *Financial Times*, 5 June 2006.
- Lambert, R. and Butler, N. (2006) *The Future of European Universities: Renaissance or Decay?* London: The Centre for European Reform.
- Lindsay, G. and Rodgers, T. (1998). 'Market orientation in the UK higher education sector: The influence of the education reform process 1979-1993', *Quality in Higher Education* 4(2), 159-171.
- Manski, C. F., and Wise, D. A. (1983). *College Choice in America*. Cambridge, MA: Harvard University Press.
- Marsh, H.W. and J. Hattie (2002). 'The relation between research productivity and teaching effectiveness', *Journal of Higher Education* 73(5), 603-641.
- Massy, W. F. (2005). 'Markets in higher education: Do they promote internal efficiency?', in Teixeira, P., Jongbloed, B., Dill, D. and Amaral, A. (eds.),

- Markets in Higher Education: Rhetoric or Reality?* Dordrecht, the Netherlands: Kluwer, 2005, pp. 13-35.
- Massy, W. F. (2003). *Honoring the Trust: Quality and Cost Containment in Higher Education*. Bolton, MA: Anker Publishing.
- McDonough, P.M., Antonio, A. L., and Perez, L. X. (1998). 'College rankings: democratized college knowledge for whom?', *Research in Higher Education* 39(5), 513-537.
- McNay, I. (1999). 'The paradoxes of research assessment and funding', in Henkel, M. and Little, B. (eds.), *Changing Relationships between Higher Education and the State*. London: Jessica Kingsley, pp. 191-203.
- Moogan, Y. J., Baron, S. and Harris, K. (1999) 'Decision-making behaviour of potential higher education students', *Higher Education Quarterly* 53(3), 211-228.
- Mumper, M. and Freeman, M. L. (2005). 'The causes and consequences of public college tuition inflation', in Smart, J. C. (ed.), *Higher Education: Handbook of Theory and Research, Vol. XVIII.* Dordrecht, the Netherlands: Kluwer pp. 307-361.
- Ostriker, J. P. and Kuh, C. (2003) *Assessing Research-Doctorate Programs: A Methodological Study*. Washington DC: National Academies Press.
- Pascarella, E. T. and Terenzini, P. T. (2005). *How College Affects Students: A Third Generation of Research (2nd Edition)*. San Francisco: Jossey-Bass.
- Pascarella, E. T. and Terenzini, P. T. (1991). *How College Affects Students: Findings and Insights from Twenty Years of Research*. San Francisco: Jossey-Bass.
- Paulsen, M. B. (1990). *College Choice: Understanding Student Enrollment Behavior*. ASHE-ERIC Higher Education Report No 6. Washington, DC: The George Washington University, School of Education and Human Development.
- Rolfe, H., (2003). 'University strategy in an age of uncertainty: the effect of higher education funding on old and new universities', *Higher Education Quarterly* 57(1), 24-47.
- Rosovsky, H. And Hartley, M. (2002). *Evaluation and the Academy: Are We Doing the Right Thing?* Cambridge, Mass.: American Academy of Arts and Sciences.
- Sarrico, C. S., Hogan, S. M., Dyson, R. G., and Athanassopoulos, A. D. (1997). 'Data envelope analysis and university selection', *The Journal of the Operational Research Society* 48(12), 1163-1177.
- Smith, J., McKnight, A., and Naylor, R. (2000). 'Graduate employability: Policy and performance in higher education in the UK', *The Economic Journal* 110(June), 382-411.
- Terenzini, P. T. and Pascarella, E. T. (1994). 'Living with myths: Undergraduate education in America', *Change* 26(1), 28-32.
- Trow, M. (1999). 'Biology at Berkeley: A case study of reorganization and its costs and benefits', Center for Studies in Higher Education: Research and Occasional Papers Series, CSHE.1.99: <http://ibb.berkeley.edu/cshe/>

- Trow, M. A. (1983). 'Organizing the biological sciences at Berkeley', *Change* 15(8), 28, 44-53.
- Van Dyke, N. (2005). 'Twenty years of university report cards', *Higher Education in Europe*, 30(2), 103-125.
- Webster, D. S. (1992). 'Reputational rankings of colleges, universities, and individual disciplines and fields of study, from their beginnings to the present. In Smart, J. C. (ed.), *Higher Education: Handbook of Theory and Research, Vol. VIII*. New York: Agathon Press, pp. 234-304.
- Winston, G. C., and Zimmerman, D. J. (2003). 'Peer effects in higher education', NBER Working Paper 9501: <http://www.nber.org/papers/w9501>.
- Yorke, M. (1998). 'The Times "League Table" of universities, 1997: A statistical appraisal', *Quality in Education* 6(1), 58-60.
- Yorke, M., Barnett, G. Bridges, P., Evanson, P., Haines, C., Jenkins, D., Knight, P., Scurry, D., Stowell, M. and Woolf, H. (2002). 'Does grading method influence honours degree classification?', *Assessment & Evaluation in Higher Education* 27(3), 269-279.
- Zemsky, R., and Oedel, P. (1983). *The Structure of College Choice*. New York: College Entrance Examination Board. .