

The Top American Research Universities

2011 Annual Report

The Center for Measuring University Performance

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Moving Up: The Marketplace for Federal Research in America*

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Everyone wants to get better, to move up within the hierarchy of American research universities. While the pursuit of the mythical number one is a magical quest, good research universities consistently benchmark their relative performance on a variety of measures to know whether they are getting better faster than their competition. Frequently, universities avoid a comparative assessment, reporting instead any absolute increases in their research and other performance indicators to their various constituencies of alumni, faculty, students, and public officials. Comparative measures are often less satisfying indicators of improvement than absolute increases because institutions may get better but not fast enough to catch a competition that also improves.

Benchmarking allows institutions to see not only how they have improved on their past performance, but also how their performance compares to the competition. We emphasize this because normal ranking methodologies tend to highlight small changes in the relative position of adjacent institutions on an ordered list. These changes can be the result of real improvement or a decline in performance of an institution slightly higher in the list. When the market for university research expands by more than an individual institution's improvement, however, the university can lose market share in spite of doing better.

The Marketplace: Structural Inequality

The indicator most consistently used to measure institutional performance among research universities is the annual expenditures from federal funding sources. The amount of federally funded grant money has increased consistently over the years with the result that institutions can see an increase in their absolute level of federally sponsored research, but this absolute increase does not mean they have increased more than their competitors. An increase in a particular year may put them ahead, behind, or just even with their closest competitors. Figure 1 shows that over the past twenty years, academic science and engineering research expenditures from all sources have increased by \$38.6 billion or 237%. Federal research expenditures show a similar rate of growth, increasing by nearly \$23 billion during this period.

Even after adjusting for inflation, Figure 2 illustrates that federal research expenditures in constant 2009 dollars grew by \$13.5 billion or 70%. If a university has not increased their federal research expenditures by more than this, they are not moving up in the competition. As universities continue to invest in research competition, they need to have a clear understanding of the changes in the amount of federal dollars available for research, and the very difficult task of moving up faster than the competition is moving up. We discuss here this structure of the federal research-funding

Fig. 1

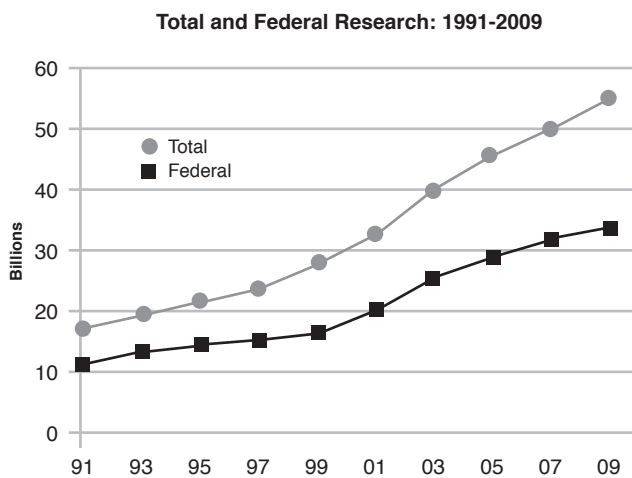
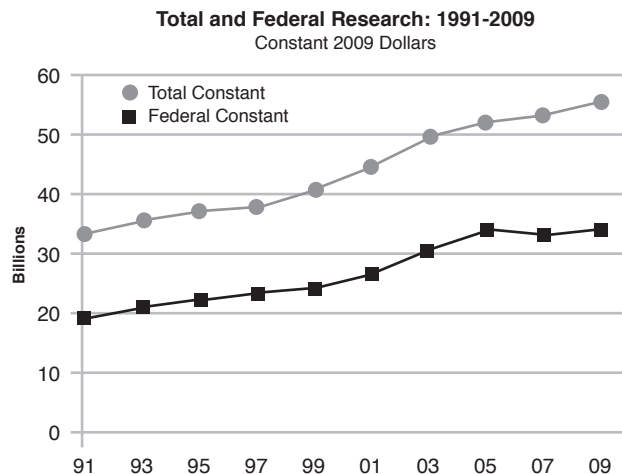


Fig. 2



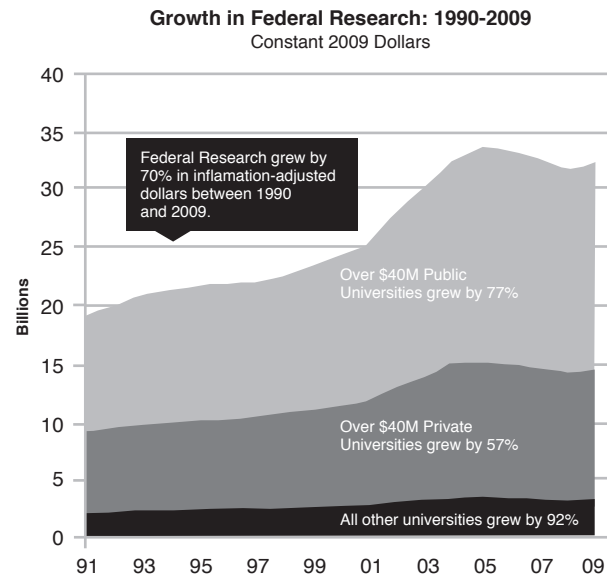
* *The Top American Research Universities (TARU)*, published annually since 2000. Of particular interest for this discussion, see the following essays in previous editions: "Introduction" and "The University," *TARU 2001* (2001) 3-35; "Change over Time," *TARU 2004* (2004), 21-25; "Deconstructing University Rankings: Medicine and Engineering, and Single Campus Research Competitiveness," *TARU 2005*, (2005 Corrected), 3-25; "Introduction," *TARU 2009*, (2010) 2-5. The annual reports and the data for most indicators for the years since at least 1999 are available at [<http://mup.asu.edu>].

marketplace. Institutional improvement is a difficult and challenging task, requires significant investment over time, and a consistent strategy for measuring performance within the competitive marketplace.

Periodically we have reviewed the US federal research marketplace to understand its structure and to assess the mobility of participants within it. The top American research universities, which we now define as those with at least \$40 million in annual federal research expenditures, tend to sustain high levels of performance and maintain their relative position within the marketplace over time. Those much lower on the scale change their relative position much more frequently and significantly. At the higher levels of research performance, the dollar amounts involved are large and improvement sufficient to change rank requires a major increase in research performance. At lower levels, the difference separating nearby institutions is much smaller, and rank change at these lower levels occurs more frequently. A relatively few top performers among research institutions control a large percentage of the market and this concentration remains stable over time. Figure 3 shows the dominance of the top research universities over the past 20 years. Even though as a group the large number of institutions with less than \$40 million grew at a faster pace in percentage terms, these institutions have a small amount of federal research and only control 8% of market.

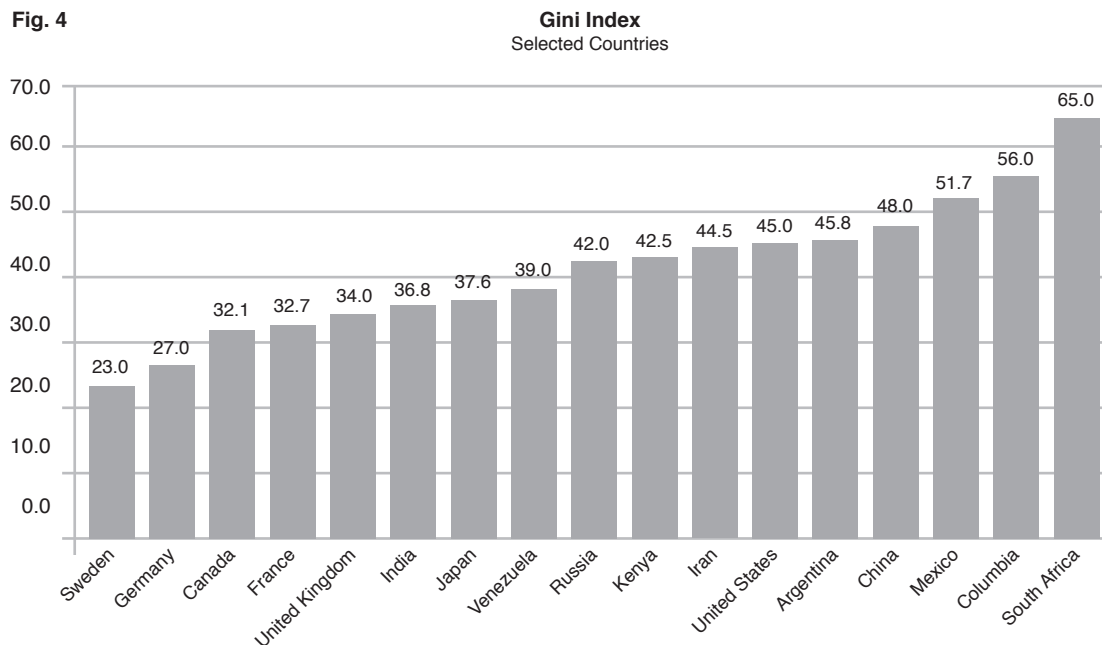
The distribution of federal research expenditures is clearly unequal, with a relatively small number of top performing institutions controlling a high proportion of funding. For a clearer picture of the shape of this distribution, we adopted a well-known tool from the analysis of income inequality,

Fig. 3



the Gini index, to an analysis of the federal research expenditures of the institutions included in the *Top American Research Universities*. The Gini index provides a measure of the relative inequality (or equality) of a distribution of resources among a group of individual units (or people/households in the case of income). An index of 100 means complete inequality, where one member of the group has all the resources and everyone else has none. An index of 0 represents complete equality in the distribution where every member of the group has the same share of the resource measured.

Fig. 4



Source: CIA - The World Factbook

Indexes of this type are sometimes difficult to interpret intuitively, but the Gini index has some real world applications that give familiar reference points. The Gini index frequently appears as an indicator of the inequality of income distribution within national populations, and policy analysis often compares the Gini indexes of different countries. World data on income distributions provide a range of Gini indexes from 23, for Sweden with the most equal distribution of income, to 65 for South Africa, among those countries with the most unequal distributions (Figure 4). By itself, of course, a Gini index does not tell the whole story of any distribution of income, as the data may not capture the total economic benefit, including but not limited to cash payments or government assistance, received by any nation's individuals. With these elements of unrecorded income absent, the Gini index may show a more unequal distribution than is actually the case.

For our purposes, however the data for federal research expenditures are relatively straightforward because universities compete for federal research awards in the same way using the same process. Differences in the success of institutions engaged in this competition have many components well worth examination (and we have looked at some in the past), but the actual inequality in the results of this competition is rather clearly indicated by the analysis of federal research expenditures. As those who follow these reports know, we analyze expenditures rather than awards to focus on the current performance of federally sponsored research rather than the future performance represented by awards.

The Gini index of the federal research expenditures of the approximately 700 institutions that report any federal research expenditures demonstrates the dramatic inequality in this distribution with an index of 82. This distribution is a little more unequal than the most unequal country income distribution in the world. However, this is not particularly useful since a large number of the institutions at the bottom of the research distribution are not significant participants in the competition and have only a token amount of federal research (Table 5).†

By including only the top 200 institutions in 2009 that together include nearly 95% of the federal research expenditures, we get a Gini index of 49 that reflects a more equal distribution. If we narrow the focus somewhat again by concentrating on a top group of 163 institutions with over \$40 million in federal research expenditures in 2009, the inequality among them declines somewhat to a Gini index of 43.

Some of these data may well be susceptible to clearer interpretation if we make some further adjustments to the institutional data set. For example, we know that the presence of a medical school often helps a university achieve a higher rank on federal research expenditures, a reflection of the significant funding available for biologically based and medically related federal research investments over many years. By removing the primarily medical institutions from our data set, and by adjusting the 2009 federal research expenditures reported for universities to exclude medical school research as reported by the Association of American Medical Colleges (AAMC), we can assess the relative distribution of expenditures among the top universities without the possible distortion introduced by medical schools. Within this revised data set, the Gini index of the distribution of federal research expenditures among the top performing universities on non-medical school related research declines only slightly to 42. A final illustration (also shown in Table 5) calculates the Gini index for the medical institutions and the medical school research of universities with medical schools (excluded from the previous analysis). Even among these top performing medically focused institutions, the inequality identified is significant at 45. When we run the analysis to include all medical schools with federal research within the 700 institutions that receive federal funding, the inequality is even greater as evidenced by a Gini index of 56, primarily because many medical schools in this larger group do not specialize in research.

For close observers of the competition for research funding in the United States, this inequality in funding among the participants comes as no surprise. The Gini index analysis provides a statistical measure that identifies a significant

Table 5 Gini Index: Measuring Inequality Distribution of Federal Research Expenditures

	2009
All Institutions	82
Top 200 in 2009 Federal Research	49
Over \$40M in 2009 Federal Research	43
Over \$40M in 2009 Federal Excluding Standalones and Medical Research	42
Over \$40M Standalone Medical Institutions and Medical Research	45
All Standalone Medical Institutions and Medical Research	56

† We include The Johns Hopkins University, a major outlier in the federal research expenditure data, in these analyses because its inclusion has a minor impact on the Gini analysis and does not distort the other discussion of relative institutional performance.

structural characteristic of this marketplace that we have discussed before. Individual institutions competing for federal research dollars need to understand the characteristics of this marketplace to guide their planning and investment.

Although the structural characteristics are significant, the mobility possible within this marketplace is an important consideration for institutions seeking research improvement. To evaluate the competitive challenge of research investment, it is helpful to know the experience of individual institutions as they attempt to improve their position within this competition. Institutions and their constituents want to know whether it is possible to improve a university's performance by increasing its market share of federally funded research, and, if so, by how much and over what time period. Has it been possible, by how much and over what time, to improve an institution's relative performance and increase their market share of federally funded research?

Although the amount of federal funds available has increased each year, the annual federal research competition is a zero sum game. Each year the number of competitors that choose to participate can increase or decrease, but the federal agency budgets substantially fix the amount of federal research available for each annual round of competition. The federal research expenditures of each institution is the cumulative result of several rounds of competition, since the awards in each competition may be for one, two, or as many as five years, and a considerable portion of funding represents renewals of previous awards. When we look at research improvement through federal research expenditures, we automatically include a smoothing function that evens out the variability in awards for each round of the competition. In some years, an individual university will receive a large award, but it may be for a five-year project while another university will receive several smaller awards for two-year projects. By using expenditures we account for this variability in awards, we measure the actual research accomplish by the proxy of the amount spent that year, and we create a better representation of the continuing success of institutions that engage the annual

federal zero-sum research competition.

This competition is constrained by the structural characteristics of the marketplace. Within the top 150 to 200 performers, mostly the same institutions compete every year. This competition is an essential element of their institutional design and mission and they must participate to remain major research universities within the United States. Success in this competition is a function of investment and careful management of institutional subsidies over time. Research is one of the university's loss leaders. Almost no research reflected in this competition pays its full costs. Instead, the federal research expenditures reflect only a partial reimbursement of the institution's investment in that research. Universities need to understand the opportunities and constraints of the research marketplace as they budget funds to subsidize competitive research activities.

Although our previous review of the data indicates considerable stability over time in the relative success of institutions in acquiring federal research funding, we have applied the Gini index analysis to our data as another method for identifying changes in the relative distribution of funding over time. For example, although an institution may improve its performance relative to those above it in the distribution, the changes, if limited to nearby competitors, will produce different rankings for the individual universities but leave the generally unequal distribution of federal research unchanged. Because improvement in this zero sum game generally comes from one institution increasing while another decreases its federal expenditures, this trading places does not necessarily change the structural inequality of the distribution.

To look at the persistence of inequality, we calculated Gini indexes at different times from our data sets on federal research expenditures. The tables included below offer mixed results. For all institutions between 1990 and 2009, the index remains virtually constant at a high inequality value of 80 and 82, respectively. (Table 6) Calculating the index separately for private institutions identified a slight

Table 6 **Gini Index: Federal Research Expenditures**
1990-2009

	1990	1999	2009
All Institutions	80	81	82
All Private Institutions	85	86	88
All Public Institutions	76	76	77
Over \$40M in 2009 Federal Research	50	47	43
Over \$40M Private Institutions	48	45	43
Over \$40M Public Institutions	48	46	41
Standalone Medical Institutions	52	50	50
Universities with a Medical School	60	58	56

increase in inequality while public institutions remained at about the same level over the years. However, if we focus on the top performing institutions with over \$40 million in federal expenditures, a consistent reduction in inequality takes place, with a Gini index of 50 in 1990 declining to a somewhat less unequal distribution of 43 in 2009. In this high performing group, there is little difference in trend by control (public vs. private) of institution. If we look at the two medically related groups of research competitors discussed above, we see some modest change in inequality over time. Standalone medical institutions that are not part of affiliated universities declined slightly in their Gini index since 1990 while university-based medical schools saw a somewhat larger decrease over time. The latter is partly due to fewer universities with medical schools competing for federal dollars in 2009 (119) than competed in 1990 and 1999 (150).

Although the differences in inequality identified here may be of some interest, the analysis generally shows that the university research marketplace is relatively stable over time, with only minor adjustments to the inequality that is one of its primary structural characteristics. As our previous studies have shown, there is considerable movement in the rank order of universities on their federal research expenditures over time, but the structural inequality highlighted by the Gini index analysis illustrates that much of this movement takes place among institutions within the same general band of performance. The changes in rank do

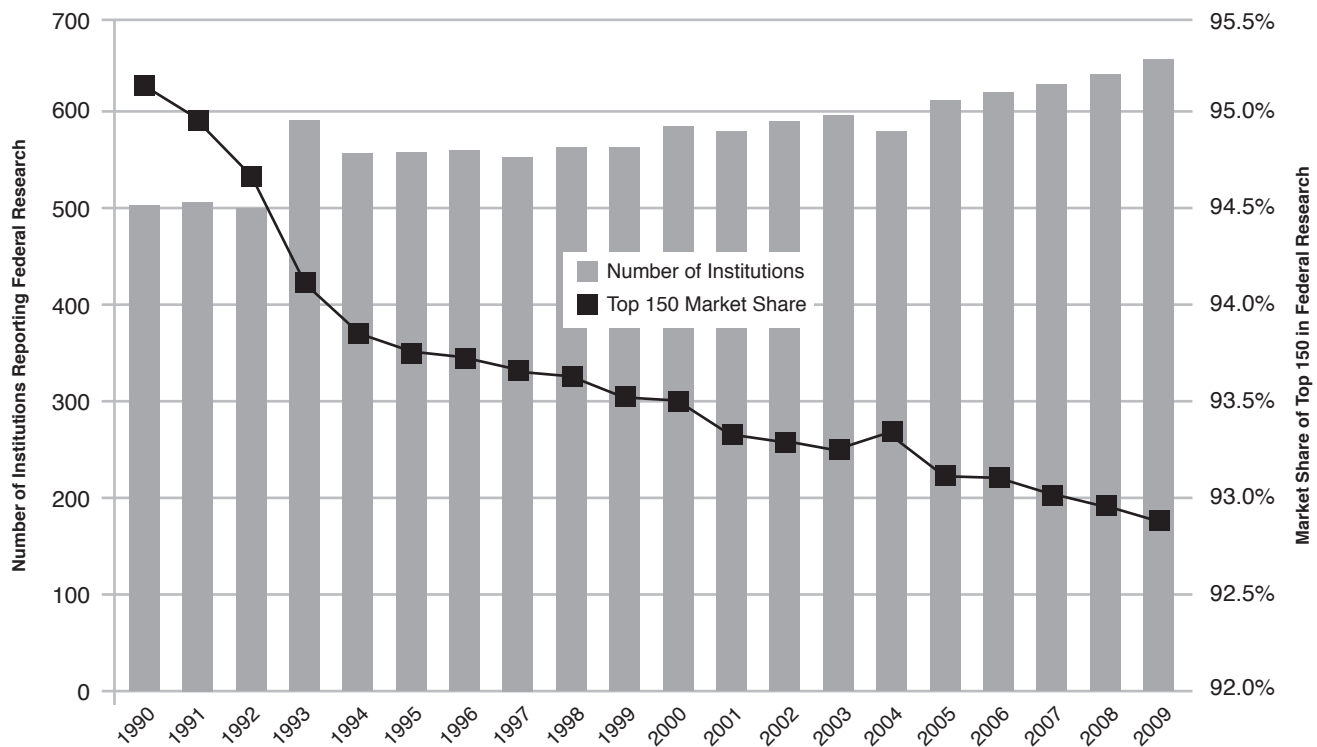
not significantly affect the structural characteristics of the marketplace.

The Marketplace: Stability

To understand the stability of this marketplace we explored another method for illustrating change. We took the data from the group of universities and research centers that had any federal research expenditures between 1990 and 2009. We then removed standalone medical schools and medical centers, specialized institutions, and research centers to leave us with a set of recognizable research universities. We converted the federal research expenditures for each year into constant 2009 dollars. We then ranked the institutions each year on their federal research expenditures. For each year, we sorted the institutions by federal research expenditures (in constant dollars). We focused on the top 150 institutions in each year, dividing them into six groups of 25 in descending order. We then calculated for each year the percent of the total federal research expenditures represented by the top 150 (out of all the research reported by the over 600 reporting) and then calculated the share of the top 150 total controlled by each of the groups of 25. This procedure allows us to see the stability of the distribution of federal research expenditures over time.

As expected, in each year between 1990 and 2009, the top 150 universities, from which we have constructed the six groups of 25, controlled from 95.1% to 92.9% of the

Fig. 7 Market Share of Top 150 Institutions
Federal Research Expenditures



total federal research expenditures. The decline in percentage controlled represents the significant investment by many additional universities in research performance over these years and an increase in the number of universities participating in the federal research competition from 502 to 658. Figure 7 shows the growth in players over time and the market share loss of the top group, but even when numbers of institutions are stable and the research performance of institutions improves there is still a decline in market share. The expansion of the competitive field nonetheless left the top 150 with their overwhelming dominance of the competition.

Individual universities often focus on year-to-year changes in rank or only on absolute improvements in research achievements, but the actual difference in performance between universities of similar rank can be rather small. We focus here on groups of universities that share similar levels of performance. We took the top six groups of 25

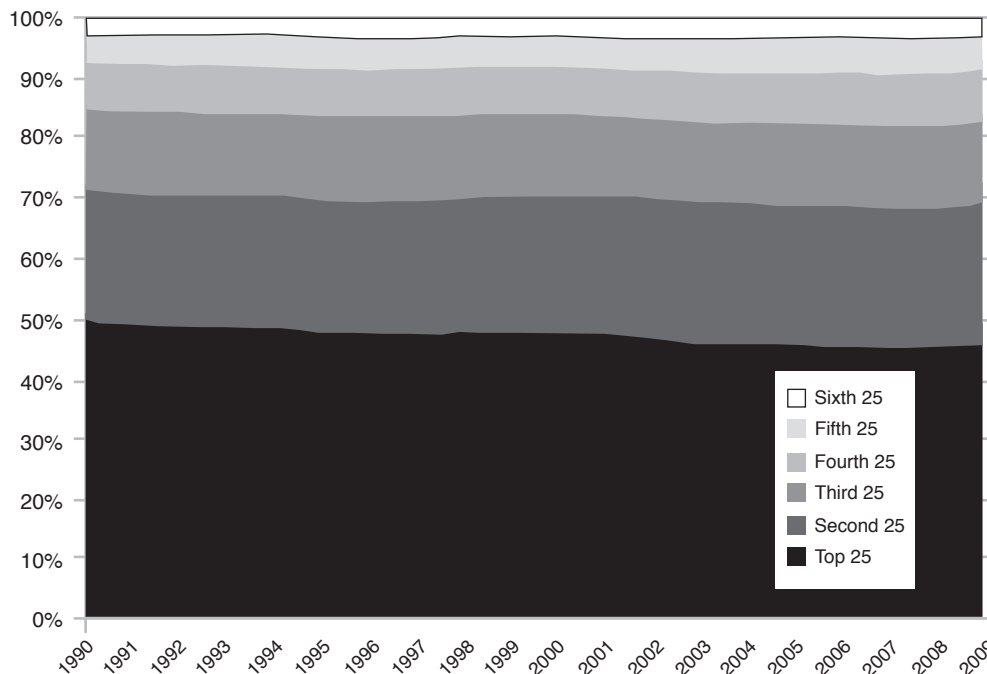
universities and calculated their market shares for each year. Table 8 provides the results of this distribution. Although there are some trends in these data, they reflect relatively small changes in market share. The largest impact is the slightly reduced share captured by the top 25 institutions over these years, declining from a 49.4% to a 45.4% share. The lost share appears to have shifted downward to the second 25, a group that gains two points from 21.8% to 23.9% share. There are also some smaller shifts to lower groups. This may reflect a somewhat broader distribution of federal grants among universities, resulting perhaps from policy initiatives at federal agencies as well as from increased investment in research competition by the universities themselves.

Overall, however, this distribution highlights the stable structural characteristic of this marketplace with the dominance of the top institutions clearly and continuously visible, as is clear in Figure 9. Throughout the 20-year period

Table 8 Market Share of Top 150 by Group of 25

Group within Top 150 Universities	1990	1994	1999	2004	2009
Top 25	49.4%	48.7%	47.7%	46.1%	45.4%
Second 25	21.8%	21.8%	22.8%	23.1%	23.9%
Third 25	13.3%	13.5%	13.6%	13.2%	13.1%
Fourth 25	7.9%	8.1%	7.9%	8.5%	8.6%
Fifth 25	4.8%	5.0%	4.8%	5.5%	5.6%
Sixth 25	2.8%	3.0%	3.1%	3.6%	3.4%

Fig. 9 Market Share of the 150 Top Performers on Federal Research 1990-2009



summarized here, the top 25 institutions control at least 45% of all the federal research expenditures of the top 150 institutions. The next group controls about half as much of the market in the low 20% range, and the third group contains around 13%. Clearly, each group of 25 universities competes for a smaller and smaller percentage of the total amount, and this means that increasingly smaller amounts of change in an individual university's research expenditures will produce equivalent changes in rank order within the groups.

Another way to look at the structure of this distribution is to measure how much it would take to move the middle institution in each group to the midpoint of the group above it. The purpose of this kind of approach is to identify the challenge faced by universities that commit themselves to the investment required to make a major change in their competitive position. For each year, we sorted the 150 top institutions into descending order by constant federal research expenditures, and then divided them into the six groups of 25 as in the previous exercises. For each year, we identified the median constant dollar amount of federal research expenditures for each group and then calculated the percent increase that would be required to move that median institution to the median of the next highest group.

This would represent an increase of 25 positions in the rank order between the median of one group to the median of the next highest group. As Table 10 indicates, this goal of moving from the middle of one group to the middle of another group offers a major challenge.

These data show some considerable variability year to year, but the percent increases required to achieve a major repositioning within this competition are nonetheless large. At the top level, to move from the second tier median to the first tier median takes from 74% in 1999 to 71% in 2009. At most tiers, the percentage growth required today is less than that in 1999 but adjusting for inflation the actual dollar increase needed to move to another tier is much higher in 2009. With the hundreds of millions of dollars involved in these categories, the increase from group two to group one in 2009 would be about \$180 million. A move from the median of group three to the median of group two would take \$118 million additional research expenditures, while moving from the other groups to the one above would take about \$20 to \$46 million more expenditure in 2009. These two reference points indicate the strong structure of this marketplace over the past decade and highlight the major effort needed to move an institution a significant distance within this competitive context.

Table 10
Increase in Federal Research Expenditures
to Move into Next Higher Group

In 2009, to move from:	Requires this approximate increase in federal research (in constant 2009 dollars):	Or an estimated increase of:
Group 2 to Group 1	\$179.5 M	71%
Group 3 to Group 2	\$117.7 M	88%
Group 4 to Group 3	\$45.6 M	51%
Group 5 to Group 4	\$31.8 M	56%
Group 6 to Group 5	\$19.8 M	53%
In 1999, to move from:		
Group 2 to Group 1	\$134.1 M	74%
Group 3 to Group 2	\$71.8 M	66%
Group 4 to Group 3	\$47.3 M	76%
Group 5 to Group 4	\$24.9 M	67%
Group 6 to Group 5	\$13.8 M	59%
In 1990, to move from:		
Group 2 to Group 1	\$132.7 M	100%
Group 3 to Group 2	\$45.6 M	53%
Group 4 to Group 3	\$34.3 M	65%
Group 5 to Group 4	\$23.7 M	82%
Group 6 to Group 5	\$11.9 M	70%

The Marketplace: Changing Places

However, even within this highly structured market, some important changes are visible in Table 10 over a longer period. If we extend the analysis to reach back to 1990, we can see a significant trend towards a broadening of the competition among the top 150 institutions. The percent increase needed to move from the median of group two to the median of group one declines from a high of 100% in 1990 to 71% in 2009. However, the percent increase needed to move from the median of group three to the median of group two increases from 53% in 1990 to 88% in 2009. Thus, the primary broadening of competition takes place among the top 50 institutions; mostly it would appear from a narrowing of the gap between the top 25 and the second 25 institutions. This likely reflects the continued investment by institutions in the second tier to acquire the faculty and infrastructure required for successful competition for federal funds over the past decades. Much academic discussion has accompanied this increased emphasis on research performance, focusing on institutional investment patterns, faculty priorities, and institutional missions. The research game in America's institutions appears to have shifted from a predominantly top 25 competition to top 50 or top 75 competitions.

Further evidence of the behavior of this marketplace comes from an analysis of the movement of individual institutions within the rank ordering of universities by their federal research expenditures. There are various ways to observe the changes in rank order of institutions. We could look at the order in 1990 and see how persistent this rank order remains over the years until 2009. Alternatively, we could take the 2009 rank order and see how many of these institutions' 2009 rank reflects maintenance of their competitive position since 1990 or changes up or down over those years. Since the competition is a current competition, what counts most is where each institution is today, and its actions can only affect what happens in the future. In that context, we looked at the current rank results and then identified rank movement since 1990 that produced the 2009 ranking. This, as our previous analysis suggests, should show relatively little movement in the top 25 category and considerably more movement as we inspect the 150 institutions included in this review. [Table 11].

The mobility of universities over the past two decades varies significantly by group. In the top group of 25 universities, between 1990 and 2009 six universities moved into this elite company from the second 25. This, of course, means that six universities fell out of the top 25 along the way between 1990 and 2008. There is also some movement in relative position within the top 25 among those institutions remaining in that group but none moving by more than nine rank positions up or down within the 20 years reviewed here. This result clearly indicates that even over a long period, significant movement into (and out of) the

top rank of American research universities is difficult to achieve. Indeed, only one institution moved on average more than one rank position a year to reach the top 25, and all but that institution moved into the top group from a relatively high position within the second group.

In the 2009 rankings, the second group of institutions ranked between 26 and 50 had seven universities move into this group from the groups below and six fall out of the group between 1990 and 2009. Of those moving up into the second group, all but one had medical schools. Of those falling out of the first group into this second group, only two had a medical school. Over the past twenty years, most significant university improvement in rank involves moving one group up or down. In these shifts in rank order, we can see examples of institutions that maintained their research volume in constant dollars since 1990 but nonetheless fell significantly in rank order because other institutions increased their performance. As we have observed above, it is never enough to stay even in a marketplace where all competitors seek to increase their share.

The experience reflected in these data clearly indicate that the intense competition for federal research awards and the subsequent reflection of cumulative results of that competition in the annual federal research expenditure produces a constantly changing hierarchy of institutions. Most change, as is visible in Table 11, is relatively small, year-to-year, reflecting upward or downward movement by a position or two in consecutive years. Over longer periods, however, a small number of institutions moved at least 12 places, a distance that would move them from the bottom of one 25-institution group to the median or from the median to the top. At the top level of performance, this amount of improvement represents a major achievement and only three universities moved more than 12 places although two others were close at 12 position improvements. In the second group seven institutions improved by more than 12 places, and in the third group eight achieved this level of improvement. At the same time, institutions in each group declined in performance as well, with four in the second group and five in the third group declining by more than 12 places.

The data for the other groups follow similar patterns with some institutions entering the group from the one above and others from the ones below, but the size of the rank changes are significantly larger, indicating the smaller amount of dollars needed to move up or down at lower levels of research performance.

Although the structure of the federal research marketplace is stable over time, in terms of the aggregate research success of the universities in each of the six groups of 25, the competitive performance of individual institutions varies considerably from year to year throughout the 1990-2009 period. Some institutions rise in the competition while

others fall by widely varying margins. If we focus on the 75 individual institutions in the top three groups in 2009, we see that over the past almost two decades, most of these institutions have moved up and down in the list since 1990. Only four institutions have the same rank in 2009 that they had in 1990. Some 43 institutions ended up in 2009 with at least one position better than they had in 1990 while 28 institutions had a rank in 2009 at least one position worse than in 1990. If we focus on the most recent period from 1999 to 2009, the amount of movement since 1999 reflected in the 2009 ranking on federal research expenditures shows that 36 institutions improved by at least one position, including five that improved by more than 12 positions to arrive at their 2009 position. In the same period, 32 institutions declined one position or more but only two institutions lost more than 12 places in rank. At the extreme ends of the competitive performance, the institution with the largest improvement over these most recent years (1999-2009) moved up in rank by 28 places and the university with the largest decline fell by 23 places.

When we look at the rankings for each institution individually throughout the years 1990 to 2009 we observe a constant movement up and down over the years, with the current 2009 rank simply the momentary observance of a relative position that may well change by one or two places in subsequent years. Although four institutions maintained the same position in 2009 as they had in 1990, three of them nonetheless moved up and down during the intervening years, with the pluses and minuses balancing out. Only Johns Hopkins remained unchanged throughout this period.

In many cases, over the long period surveyed here, there may well be particular circumstances of individual universities that explain significant changes in rank order in the

past two decades, and without a careful individual review of each institution's history, it is probably unwise to draw institutionally specific conclusions in most cases. Nonetheless, as this review would appear to indicate, the characteristics of the American research university marketplace for federal research dollars have remained relatively stable and consistent over at least the last two decades.

The Marketplace: Summary

This is a marketplace characterized by more than 600 competitors, but only 150 significant participants. Among those 150 participants, the top 25 dominate with around 45% market share. The 150 participants demonstrate considerable mobility within this highly structured marketplace, but most of the significant movement occurs in the third through sixth group of 25 institutions. The smaller the market share (the smaller the amount of federal research expenditures) the more institutional mobility is possible because the amount of research improvement or loss required to change rank is much less than in the top two groups. As institutions improve their position within this marketplace, the next improvement becomes harder to achieve, as the distance to the next group grows larger.

Although this marketplace is highly concentrated at the top with much stability in the rankings in the top groups, over the almost two decades of these data, the concentration has declined some as more institutions have entered the competition, and more institutions already in the competition have continued to invest heavily. As we have observed before, the most significant element in research university competition is the amount of money consistently available to invest in research and, we should add from this review, the amount of market share already captured in previous years.

The Top American Research Universities

Table 11 Change among Six Groups of the Top 150 Institutions in 2009 since 1990
 Institutions Reporting Federal Research Expenditures, excluding Standalone Medical and Other Specialized Institutions (in constant 2009 \$000)

Group 1 in 2009	2009	Rk	Grp	2004	Rk	Grp	1999	Rk	Grp	1994	Rk	Grp	1990	Rk	Grp
Johns Hopkins University	1,587,547	1	1	1,481,950	1	1	1,138,147	1	1	1,217,207	1	1	1,189,924	1	1
Univ. of Michigan - Ann Arbor	636,216	2	1	628,422	4	1	493,652	4	1	452,754	6	1	357,971	6	1
Univ. of Washington - Seattle	619,353	3	1	753,638	2	1	543,701	2	1	480,651	2	1	403,391	4	1
Massachusetts Inst. of Tech.	532,618	4	1	515,371	9	1	456,276	5	1	463,009	3	1	463,815	3	1
Univ. of California - San Diego	511,428	5	1	561,269	5	1	431,294	6	1	455,224	5	1	362,134	5	1
Univ. of Wisconsin - Madison	507,898	6	1	523,653	8	1	368,086	10	1	385,507	7	1	354,809	7	1
University of Pennsylvania	499,498	7	1	524,762	7	1	412,102	7	1	318,815	11	1	265,314	13	1
Columbia University	483,111	8	1	490,087	10	1	354,713	11	1	347,364	8	1	309,993	9	1
Stanford University	477,507	9	1	652,925	3	1	522,780	3	1	459,316	4	1	507,472	2	1
U. of California - Los Angeles	467,505	10	1	555,864	6	1	372,203	9	1	325,302	9	1	326,204	8	1
U. of Pittsburgh - Pittsburgh	463,192	11	1	475,463	12	1	287,451	17	1	254,816	18	1	179,922	28	2
Duke University	438,767	12	1	419,354	14	1	275,840	19	1	253,723	20	1	210,377	20	1
U. of North Carolina - Chapel Hill	431,837	13	1	366,688	19	1	270,195	21	1	254,915	17	1	183,429	27	2
Washington Univ. in St. Louis	414,045	14	1	447,255	13	1	322,869	12	1	236,533	23	1	209,794	21	1
U. of Minnesota - Twin Cities	390,602	15	1	370,874	18	1	306,863	14	1	309,631	12	1	285,276	12	1
Penn. St. Univ. - Univ. Park	386,635	16	1	377,526	16	1	258,788	23	1	253,874	19	1	238,554	16	1
Harvard University	385,704	17	1	481,876	11	1	392,910	8	1	325,270	10	1	305,668	10	1
Yale University	378,914	18	1	398,791	15	1	315,198	13	1	293,188	13	1	287,561	11	1
Univ. of Southern California	375,024	19	1	376,795	17	1	294,837	15	1	256,092	15	1	245,411	15	1
Ohio State Univ. - Columbus	339,820	20	1	343,147	20	1	199,714	32	2	193,582	27	2	156,470	32	2
Vanderbilt University	336,405	21	1	315,193	25	1	172,642	40	2	158,098	36	2	132,406	39	2
Georgia Inst. of Technology	322,452	22	1	286,262	28	2	166,696	41	2	166,027	34	2	188,138	24	1
Case Western Reserve Univ.	313,044	23	1	235,686	40	2	207,043	30	2	166,416	33	2	139,881	35	2
University of Texas - Austin	309,125	24	1	283,608	29	2	243,577	25	1	255,837	16	1	217,400	19	1
California Inst. of Technology	305,682	25	1	294,343	26	2	288,463	16	1	192,412	29	2	179,678	29	2
Group 2 in 2009	2009	Rk	Grp	2004	Rk	Grp	1999	Rk	Grp	1994	Rk	Grp	1990	Rk	Grp
University of Chicago	301,159	26	2	276,160	32	2	200,458	31	2	175,357	30	2	191,084	23	1
Northwestern University	300,619	27	2	277,957	31	2	195,920	35	2	143,125	42	2	123,352	46	2
Univ. of Alabama - Birmingham	300,130	28	2	315,410	24	1	244,034	24	1	168,839	32	2	147,758	34	2
University of Rochester	295,963	29	2	278,680	30	2	196,222	33	2	232,366	25	1	209,566	22	1
University of California - Davis	295,924	30	2	267,523	34	2	183,832	36	2	192,782	28	2	153,586	33	2
Emory University	295,831	31	2	293,211	27	2	196,169	34	2	151,763	39	2	103,880	54	3
U. of Ill. - Urbana-Champaign	288,013	32	2	332,565	22	1	274,378	20	1	237,277	22	1	232,426	17	1
University of Arizona	287,889	33	2	342,281	21	1	263,092	22	1	249,184	21	1	184,325	26	2
Univ. of California - Berkeley	262,069	34	2	324,048	23	1	282,144	18	1	260,869	14	1	261,287	14	1
Texas A&M University	261,491	35	2	209,384	47	2	220,296	27	2	234,212	24	1	184,486	25	1
Univ. of Colorado - Denver	256,007	36	2	246,126	39	2	152,571	45	2	108,202	57	3	92,357	59	3
Boston University	255,178	37	2	264,048	36	2	182,247	37	2	124,084	51	3	119,933	47	2
University of Iowa	252,336	38	2	252,971	37	2	181,136	38	2	170,236	31	2	156,804	31	2
U. of Maryland - College Park	246,985	39	2	218,109	46	2	214,285	28	2	147,173	41	2	131,738	40	2
Univ. of Colorado - Boulder	239,687	40	2	250,814	38	2	208,196	29	2	162,304	35	2	138,534	36	2
Cornell University	238,022	41	2	271,008	33	2	228,880	26	2	218,965	26	2	224,206	18	1
University of Florida	232,737	42	2	267,476	35	2	180,631	39	2	136,191	47	2	128,175	42	2
Univ. of Cincinnati - Cincinnati	229,324	43	2	235,011	41	2	148,180	47	2	96,394	64	3	89,199	61	3
University of Virginia	218,499	44	2	226,761	43	2	159,303	44	2	143,101	43	2	116,644	49	2
Colorado State University	211,890	45	2	195,364	49	2	135,800	51	3	113,673	55	3	100,661	56	3
University of Hawaii - Manoa	203,453	46	2	225,452	44	2	137,978	50	2	67,372	82	4	84,635	65	3
New York University	202,535	47	2	218,709	45	2	164,130	43	2	152,239	38	2	160,196	30	2
University of Illinois - Chicago	196,702	48	2	232,431	42	2	127,622	55	3	97,614	62	3	87,219	62	3
University of Utah	192,354	49	2	194,213	50	2	165,005	42	2	138,984	46	2	123,579	45	2
Univ. of South Florida - Tampa	190,949	50	2	152,972	58	3	62,041	89	4	34,052	118	5	60,465	78	4

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Table 11, cont.

Group 3 in 2009	2009	Rk	Grp	2004	Rk	Grp	1999	Rk	Grp	1994	Rk	Grp	1990	Rk	Grp
University of California - Irvine	177,098	51	3	182,009	52	3	111,521	61	3	115,009	54	3	104,128	53	3
Purdue Univ. - West Lafayette	175,302	52	3	173,686	53	3	141,361	48	2	140,498	44	2	127,877	44	2
University of Miami	172,000	53	3	171,098	56	3	150,481	46	2	156,600	37	2	135,177	37	2
Carnegie Mellon University	170,260	54	3	208,363	48	2	133,533	52	3	150,147	40	2	128,048	43	2
Michigan State University	164,198	55	3	172,942	55	3	132,686	53	3	126,314	48	2	115,493	50	2
University at Buffalo	152,146	56	3	173,415	54	3	126,269	56	3	139,926	45	2	132,662	38	2
Rutgers - State University of NJ	151,122	57	3	138,022	63	3	99,463	65	3	103,735	58	3	72,346	70	3
Virginia Polytechnic Inst. & St. U.	148,411	58	3	115,319	73	3	111,345	62	3	125,690	49	2	91,149	60	3
University of Kentucky	145,483	59	3	156,566	57	3	97,754	66	3	83,464	71	3	58,741	81	4
Wake Forest University	144,454	60	3	144,738	61	3	89,053	69	3	62,806	85	4	59,872	79	4
Yeshiva University	137,108	61	3	182,642	51	3	132,457	54	3	120,949	52	3	129,071	41	2
North Carolina State University	135,318	62	3	124,863	68	3	118,925	60	3	119,051	53	3	86,860	64	3
Arizona State University	134,598	63	3	96,284	84	4	79,618	76	4	52,504	94	4	52,747	88	4
Dartmouth College	134,113	64	3	148,396	60	3	69,036	82	4	71,426	77	4	59,779	80	4
U. of New Mexico - Albuquerque	133,334	65	3	135,365	64	3	125,510	57	3	88,559	67	3	50,483	90	4
Princeton University	128,876	66	3	134,324	65	3	107,783	64	3	100,128	61	3	102,278	55	3
Georgetown University	119,925	67	3	115,540	72	3	124,027	58	3	94,053	66	3	71,598	71	3
Indiana U. - Purdue U. - Indianapolis	119,060	68	3	120,718	70	3	90,624	68	3	83,794	70	3	68,027	73	3
Univ. of Missouri - Columbia	118,998	69	3	108,852	78	4	79,573	77	4	53,531	93	4	48,446	91	4
Oregon State University	118,252	70	3	125,694	67	3	120,596	59	3	111,288	56	3	100,264	57	3
Florida State University	117,294	71	3	124,116	69	3	82,219	73	3	68,027	81	4	65,317	75	3
Wayne State University	116,682	72	3	138,259	62	3	85,090	70	3	74,148	75	3	56,512	83	4
U. of California - Santa Barbara	113,837	73	3	111,196	76	4	109,336	63	3	101,482	60	3	94,966	58	3
Tulane University	109,269	74	3	105,975	80	4	75,001	78	4	72,438	76	4	56,200	84	4
U. of South Carolina - Columbia	107,504	75	3	86,615	91	4	71,620	80	4	64,851	83	4	40,838	99	4
Group 4 in 2009	2009	Rk	Grp	2004	Rk	Grp	1999	Rk	Grp	1994	Rk	Grp	1990	Rk	Grp
Stony Brook University	107,396	76	4	148,414	59	3	138,745	49	2	124,293	50	2	110,911	51	3
University of Georgia	106,932	77	4	116,138	71	3	82,830	72	3	94,075	65	3	87,013	63	3
University of Alaska - Fairbanks	105,885	78	4	90,729	89	4	51,174	97	4	69,729	78	4	63,272	76	4
Mississippi State University	102,903	79	4	99,090	83	4	68,722	83	4	58,010	88	4	42,503	97	4
Tufts University	102,330	80	4	112,099	75	3	92,809	67	3	84,954	68	3	75,956	67	3
Virginia Commonwealth Univ.	97,433	81	4	107,360	79	4	71,154	81	4	81,963	72	3	82,534	66	3
University at Albany	96,910	82	4	114,166	74	3	68,299	84	4	40,375	106	5	28,758	115	5
Iowa State University	96,483	83	4	111,180	77	4	80,022	75	3	96,528	63	3	67,531	74	3
Washington State U. - Pullman	95,824	84	4	90,337	90	4	65,889	87	4	78,145	74	3	53,330	86	4
Brown University	93,753	85	4	101,405	81	4	66,873	85	4	63,048	84	4	73,236	68	3
University of Vermont	92,555	86	4	95,245	85	4	53,298	95	4	57,629	89	4	60,612	77	4
Univ. of Tennessee - Knoxville	91,706	87	4	78,502	96	4	62,046	88	4	84,443	69	3	69,798	72	3
George Washington University	88,949	88	4	94,253	86	4	73,767	79	4	41,695	102	5	53,197	87	4
New Mexico St. U. - Las Cruces	88,707	89	4	92,088	88	4	84,004	71	3	101,989	59	3	108,485	52	3
University of Delaware	87,090	90	4	92,313	87	4	51,146	98	4	44,895	97	4	34,889	107	5
Louisiana St. U. - Baton Rouge	86,546	91	4	67,229	104	5	55,079	92	4	42,742	101	5	46,468	92	4
Utah State University	84,082	92	4	130,117	66	3	80,398	74	3	78,893	73	3	116,969	48	2
University of Nebraska - Lincoln	83,702	93	4	80,681	93	4	54,615	93	4	60,666	86	4	45,002	95	4
U. of Massachusetts - Amherst	80,163	94	4	78,896	95	4	58,898	91	4	55,978	91	4	53,582	85	4
U. of New Hampshire - Durham	78,633	95	4	81,867	92	4	45,176	102	5	42,812	100	4	28,674	116	5
Indiana Univ. - Bloomington	78,498	96	4	80,479	94	4	60,417	90	4	55,864	92	4	45,351	93	4
Univ. of California - Santa Cruz	76,085	97	4	64,122	107	5	37,049	114	5	40,709	104	5	27,484	121	5
Naval Postgraduate School	75,825	98	4	61,199	110	5	49,196	99	4	44,853	98	4	34,383	109	5
Rockefeller University	73,906	99	4	99,488	82	4	66,480	86	4	68,395	80	4	72,976	69	3
Univ. of Kansas - Lawrence	73,139	100	4	71,747	100	4	49,001	100	4	39,790	108	5	30,287	112	5

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Group 5 in 2009	2009	Rk	Grp	2004	Rk	Grp	1999	Rk	Grp	1994	Rk	Grp	1990	Rk	Grp
University of Louisville	72,770	101	5	65,665	106	5	22,947	141	6	15,861	155		17,133	138	6
Montana State Univ. - Bozeman	71,620	102	5	70,967	101	5	38,743	112	5	26,917	129	6	17,956	135	6
University of Dayton	70,469	103	5	68,282	102	5	45,425	101	5	68,402	79	4	57,615	82	4
Drexel University	67,620	104	5	66,252	105	5	19,074	153		18,824	142	6	13,412	154	
Temple University	65,126	105	5	60,820	111	5	43,917	104	5	46,418	96	4	51,902	89	4
University of Central Florida	65,042	106	5	53,062	118	5	23,703	137	6	28,304	125	5	18,556	134	6
West Virginia University	64,388	107	5	73,311	99	4	38,792	111	5	59,214	87	4	42,925	96	4
University of Nevada - Reno	63,709	108	5	61,219	109	5	36,315	115	5	32,152	120	5	23,650	128	6
University of Oregon	61,464	109	5	52,596	119	5	40,375	108	5	37,976	110	5	39,974	101	5
New Mexico Inst. of Min. & Tech.	61,178	110	5	16,698	181		15,832	167		12,967	170		11,129	163	
Kansas State University	57,743	111	5	67,608	103	5	41,507	107	5	36,852	114	5	31,047	111	5
University of Notre Dame	57,425	112	5	58,643	113	5	34,878	120	5	27,977	126	6	25,524	126	6
University of Rhode Island	57,148	113	5	58,570	114	5	53,478	94	4	56,483	90	4	40,688	100	4
Rice University	56,270	114	5	61,665	108	5	51,713	96	4	43,907	99	4	39,668	102	5
George Mason University	55,678	115	5	47,924	124	5	28,790	130	6	21,685	134	6	4,947	212	
Clemson University	55,108	116	5	73,608	98	4	39,974	109	5	41,275	103	5	28,210	119	5
Univ. of California - Riverside	53,971	117	5	49,398	122	5	29,531	128	6	40,608	105	5	31,354	110	5
Univ. of Alabama - Huntsville	53,893	118	5	47,742	125	5	37,170	113	5	36,913	113	5	42,362	98	4
U. of Maryland - Baltimore Cty.	53,867	119	5	45,260	128	6	23,077	140	6	10,399	185		8,226	174	
Florida International University	53,647	120	5	57,754	116	5	23,273	139	6	18,704	144	6			
Auburn University	52,911	121	5	59,746	112	5	39,965	110	5	47,456	95	4	29,020	114	5
Univ. of Connecticut - Storrs	51,887	122	5	73,833	97	4	35,246	117	5	35,511	115	5	37,085	105	5
University of North Dakota	49,215	123	5	43,815	133	6	20,109	151		28,494	123	5	28,561	117	5
Rensselaer Polytechnic Inst.	48,216	124	5	44,179	131	6	33,680	122	5	37,781	111	5	45,246	94	4
University of Maine - Orono	47,280	125	5	44,013	132	6	28,304	131	6	19,473	139	6	17,945	136	6
Group 6 in 2009	2009	Rk	Grp	2004	Rk	Grp	1999	Rk	Grp	1994	Rk	Grp	1990	Rk	Grp
North Dakota State University	43,614	126	6	54,695	117	5	18,179	158		18,603	145	6	12,729	157	
San Diego State University	42,736	127	6	36,273	142	6	29,132	129	6	20,982	136	6	29,055	113	5
New Jersey Institute of Tech.	42,656	128	6	37,361	140	6	31,205	125	5	21,502	135	6	5,417	205	
University of Idaho	42,207	129	6	58,540	115	5	35,836	116	5	28,367	124	5	27,399	122	5
Univ. of Oklahoma - Norman	41,900	130	6	46,894	126	6	43,379	106	5	30,761	122	5	17,068	139	6
Univ. of Southern Mississippi	41,517	131	6	38,663	137	6	20,861	148	6	12,470	171		7,824	178	
Brandeis University	40,532	132	6	45,855	127	6	43,458	105	5	36,917	112	5	37,331	104	5
Univ. of Houston - Univ. Park	40,020	133	6	41,548	135	6	30,194	127	6	39,046	109	5	34,864	108	5
Oklahoma St. Univ. - Stillwater	39,517	134	6	52,248	120	5	34,235	121	5	34,959	117	5	35,199	106	5
Univ. of Mississippi - Oxford	38,836	135	6	39,637	136	6	15,477	170		14,897	161		16,336	140	6
U.S. Air Force Academy	38,795	136	6	18,972	173		5,463	227		4,055	246		1,551	289	
Northeastern University	38,178	137	6	36,956	141	6	33,640	123	5	27,428	128	6	20,267	133	6
Jackson State University	37,321	138	6	34,723	144	6	11,705	187		7,217	211		6,707	193	
Univ. of Montana - Missoula	36,631	139	6	41,560	134	6	21,604	144	6	14,837	162		6,879	191	
Saint Louis Univ. - St. Louis	33,644	140	6	44,587	130	6	35,037	119	5	30,991	121	5	27,982	120	5
Univ. of Arkansas - Fayetteville	31,597	141	6	37,473	139	6	23,412	138	6	27,433	127	6	21,485	131	6
Univ. of Nevada - Las Vegas	31,270	142	6	33,767	145	6	15,136	172		16,321	152		26,324	123	5
Howard University	30,599	143	6	48,320	123	5	31,989	124	5	25,990	131	6	25,921	125	5
University of Wyoming	29,479	144	6	27,948	152		28,224	132	6	25,851	132	6	24,215	127	6
University of Texas - El Paso	29,386	145	6	20,371	169		27,017	133	6	15,538	156		10,813	165	
University of Toledo	29,328	146	6	15,946	189		8,392	207		5,995	218		4,168	224	
Loma Linda University	29,114	147	6	32,101	146	6	18,045	159		8,692	197		6,643	194	
Old Dominion University	27,644	148	6	25,768	155		20,244	150	6	13,491	168		13,957	147	6
Michigan Technological Univ.	27,004	149	6	22,583	165		23,790	136	6	18,786	143	6	11,991	160	
Univ. of Texas - San Antonio	26,393	150	6	14,036	197		8,069	209		4,592	236				