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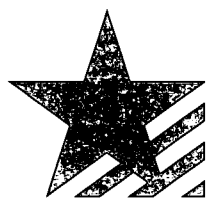
ABSTRACT

In 1999, an external review was conducted of the indicators and methodology that the National Center for Public Policy and Higher Education (NCHEMS) had developed for "Measuring UP 2000: The State-by-State Report Card for Higher Education." The principal purpose of these tests was to understand better the relationships among the indicators and between the indicators and the overall grades for each performance category. This document summarizes the kinds of tests conducted, the principal findings they generated, and the implications of these results for the performance findings in "Measuring Up 2000." A number of tests were conducted relative to data issues. These included: (1) tests related to missing data; (2) tests related to imputing missing values; (3) tests of the relationships among indicators in each category; and (4) statistical averaging over several years. Other tests were conducted to study methodological issues, including weighting, benchmarking, and cut-off scores. Other tests examined the relationships among graded categories, and additional tests were conducted of the relationships between preparation indicators and high school dropout, as well as those of the relationships between income gaps and increased income from having a bachelor's degree. The stability of performance indicators over time and controlling for demographic and background factors were also studied. Four appendixes contain additional details about correlational analyses, distributions, and tests of various measures. (Contains 37 graphs and 112 tables.) (SLD)

A Review of Tests Performed on the Data in *Measuring Up 2000*



THE NATIONAL CENTER FOR
PUBLIC POLICY AND
HIGHER EDUCATION

A Review of Tests Performed on the Data in *Measuring Up 2000*

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National Center for Higher Education Management Systems

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Foreword

In 1999 the National Center for Public Policy and Higher Education (National Center) commissioned the National Center for Higher Education Management Systems (NCHEMS) to conduct the first external review of the methodology and data for *Measuring Up 2000: the State-by-State Report Card for Higher Education*. NCHEMS' testing of the relationships among the various indicators proved so useful and informative that we asked them to perform a wide range of additional tests. This technical report describes the tests they performed, outlines the recommendations they made, and displays the full range of actual tests in an appendix.

The National Center is grateful to Peter Ewell, author of this report, to NCHEMS President Dennis Jones, and to the staff of NCHEMS for the invaluable contributions they made to *Measuring Up 2000*. As this report makes clear, NCHEMS' review of the data and methodology in *Measuring Up 2000* was integral to the development of fair and accurate measures for comparing state performance in higher education.

The National Center welcomes the responses of readers.

Joni Finney
Vice President
National Center for Public Policy
and Higher Education

INTRODUCTION

In June 1999, the National Center for Public Policy and Higher Education (the National Center) asked the National Center for Higher Education Management Systems (NCHEMS) to conduct an external review of the indicators and methodology that the National Center had developed for *Measuring Up 2000: The State-by-State Report Card for Higher Education*. As part of this review, NCHEMS conducted a wide range of statistical tests on the indicators and methodology used to construct the various grades included in the report card. The principal purpose of the tests was to understand better the relationships among the indicators and between the indicators and the overall grades for each performance category. NCHEMS and the National Center believed that the results of such tests would be useful in developing a report card that would most fairly and accurately compare states on their performance in higher education.

Throughout fall 1999 and spring and summer 2000, NCHEMS and the National Center cooperated in conducting a wide range of data tests. The purpose of this document is to summarize the kinds of tests conducted, the principal findings that they generated, and the implications of these results for the performance findings in *Measuring Up 2000*.

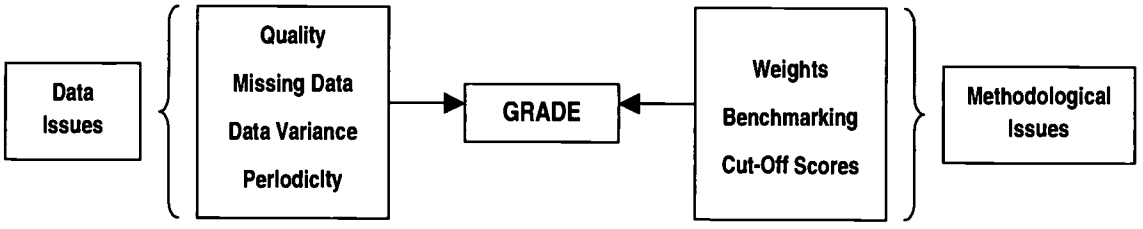
A. OVERVIEW OF TECHNICAL ISSUES INVOLVED IN GRADING STATES

Measuring Up 2000 grades states in five "categories" of higher education performance: preparation, participation, affordability, completion, and benefits. Each performance category, in turn, is made up of several "indicators," or quantitative measures of performance. Grades for each of the five categories are calculated based on each state's performance on the quantitative indicators, compared to the performance of the best-performing states—a process known as benchmarking. (For further information about the grading process, see *Measuring Up 2000* or visit www.highereducation.org.)

Of course, many technical issues can affect the calculation of each grade. Some of these issues are associated with the data used, while others are associated primarily with the methodology of grading (see Figure 1).

Figure 1

Technical Issues Associated with Grading



1. Data Issues

The following are the primary technical issues associated with the data included in *Measuring Up 2000*. Resolving these data issues can, of course, raise significant methodological questions.

Quality. *Measuring Up 2000* employs well known national data sets that have already been used validly and successfully in many comparative contexts. By using the most recent and most valid national data available from nationally recognized sources, *Measuring Up 2000* addresses the issue of data quality in the only way available to a third party.

Missing Data. Some of the source data sets do not include all states. For the most part, this is because sample sizes in some national data sets are too small to draw meaningful inferences for some states and/or because some states chose not to participate in voluntary efforts designed to create valid state-level indicators. In varying degrees, this problem affects three of the principal data sources used: (a) the National Assessment of Educational Progress (NAEP), (b) data on K–12 course-taking patterns collected by the Council of Chief State School Officers (CCSSO), and (c) the National Adult Literacy Survey (NALS). On the one hand, to drop these indicators would eliminate valid information for many states and would weaken the rigor of the resulting performance categories. On the other hand, imputing missing values—and the method used to impute—affects the grade distribution.

Data Variance. The underlying distribution of states on a given indicator may substantially affect the grading process, due to a number of factors. First, the presence of outliers (that is, those states that outperform other states significantly) may decisively influence the benchmarking process. Second, truncated variances on a given indicator may mean that meaningful distinctions among state performances are hard to make, even though a ranking can readily be constructed. Finally, multi-modal or strongly skewed data distributions may affect grade performance.

Periodicity of Data Collection. *Measuring Up 2000* uses the most current data available from nationally recognized organizations. Some measures, however, are not updated by these organizations as frequently as desired. While most of the indicators used in *Measuring Up 2000* are collected annually, a number are collected less frequently, and a few measures may not be updated between successive editions of the report card. This issue chiefly affects the NALS, which was last conducted in 1992 and is rescheduled for 2002, but it also affects the CCSSO Course Taking Survey (conducted every three years) and the NAEP (conducted every four years).

2. Methodological Issues

The methodology used to calculate each state's grade also raises technical issues that affect the performance findings. The most prominent of these technical issues include:

Weighting. For a variety of sound reasons, the National Center weights each indicator used to calculate state grades. Whenever possible, the differing weights are based on research about the importance of the indicator in measuring performance in the overall category—though adjustments in weights are also made for multiple measures drawn from the same data source (e.g., NAEP subscores). Since the weighting can affect a state's grades, questions inevitably arise concerning the relationship between the weighted values and the grade distribution.

Benchmarking. Also for sound reasons, the National Center calculates grades by benchmarking each state's performance to that of the best-performing states. This provides a real-world, yet high standard for judging each state's performance. At least two procedural aspects of the benchmarking process can affect the grade distribution. First, the larger the number of top-performing states used to benchmark the others, the higher the grade distribution will be. Second, the measure used to establish the benchmark (e.g., median or mean) will affect the results, largely because of the different ways these approaches handle outliers.

Cut-Off Scores. The National Center grades states on the same scale that most high schools and colleges use: assigning A to F grades at 10 point intervals in the indexed score range of 60 to 100. "Minus" and "plus" grades are added to the letter grades within smaller ranges of 2 or 3 points. (For more information about the grading scale, see *Measuring Up 2000* or visit www.highereducation.org.) This approach works best when the underlying data distributions are relatively smooth—that is, if states spread out nicely along the resulting final index scores. But questions can arise if state scores cluster around one or more of the arbitrary cut-off points; that is, there might be very little difference in performance between a B– and a C+.

How these data and methodological issues are handled can affect the distribution of state grades. To ensure that the methodology used to calculate grades was as accurate and as fair as possible,

NCHEMS recommended considerable testing of the underlying data in order to clarify the effects of different approaches to addressing these issues. The specific tests conducted, a summary of their results, and the actions recommended are presented in two separate sections below—one focusing on data issues and one on methodological issues.

B. Tests and Results for Data Issues

As noted, primary issues related to data include (1) how (and whether) to address missing data in key indicators, (2) the potential effects on grading of how data are distributed on each indicator and the statistical relationships among indicators within a given grade category, and (3) how to address issues associated with differing schedules of data collection among the indicators. In each case, one or more tests were conducted and a number of conclusions reached.

1. Tests and Recommendations Related to Missing Data

Significant missing data issues arise in only two of the five graded areas: preparation and benefits. In a limited number of cases, the number of missing states on a given indicator is high enough to raise questions about whether the indicator should be included in the category, and if so, how to address the issue of supplying missing values. Given these questions, NCHEMS recommended that several tests be conducted.

During the development of the report card, the National Center was considering the following "hold-harmless" approach for handling missing data: when information is not available for a particular state on a particular indicator, *Measuring Up 2000* would assume that the state is doing neither better nor worse on that particular indicator than on the other indicators in that performance category. That is, the missing score was to be imputed from the weighted average of the index scores that the state earned on the other indicators in that category.

First, NCHEMS ran tests to determine what would happen to the grade distribution among states if all indicators with missing data were simply omitted. This approach would at least have the virtue of simplicity, though it would likely eliminate from consideration a number of powerful variables known to be associated with the area of performance captured in each grade. Second, if indicators with missing data were to be included, it appeared important to explore imputation methods that might simulate the missing values as an alternative to the National Center's proposed hold-harmless methodology for handling missing data.

Dropping All Indicators with Missing Data in the Preparation Category. In the preparation category, data are incomplete for seven indicators, comprising about two-thirds of the category grade. Data are missing in this category because states chose not to participate in the

additional data collection activities needed to create a representative sample—for example, oversampling to obtain valid NAEP score results or reporting course-taking data to the CCSSO. If all NAEP results and reported course-taking indicators are eliminated from the grade calculation, state grades in preparation are based on three indicators: (1) high school completion, (2) the pass rate on Advanced Placement (AP) exams, and (3) college entrance exam scores. Virtually all states do better under this method: most earn an A or a B, and the majority improve their performance by one letter grade over the National Center's baseline, hold-harmless methodology. Eliminating indicators with missing data in this category thus results in an unacceptably inflated grade distribution. At least as consequential is the fact that eliminating NAEP scores and data on course-taking patterns means that the assigned grade does not take into consideration some of the most important preparation-related variables that research has shown to improve student success in college-level programs—and for which there is data available for many states. Instead, the grade would be based largely on high school completion rate—an indicator for which there is little variance across states. The two additional measures, the pass rate on AP exams and the college entrance exam scores, are weighted low in the grading methodology because not all high school students take these exams.

For these reasons, it was recommended that the National Center retain indicators with missing data in the preparation grade. Eliminating these indicators would raise major questions about the nature of performance in this category, and would not provide as clear a picture of state performance in preparing young adults for education and training beyond high school.

Dropping All Indicators with Missing Data in the Benefits Category. In the benefits category, data are incomplete for three of the indicators, comprising less than a third of the category grade. Data are incomplete for all NALS measures (adult literacy) because states chose not to participate in the oversampling needed to obtain valid state-level estimates. If all three literacy indicators are eliminated, state grades in benefits are based on four factors: (1) bachelor's degree attainment among adults, (2) the economic benefit of holding a bachelor's degree, (3) the percentage of the population voting, and (4) the percentage of federal income tax itemizers giving to charity. Virtually all states do better under this method, with most improving their performance by one letter grade over the National Center's baseline, hold-harmless grading method. Overall, this method results in a relatively even grade distribution because about the same number of states earn A's and B's as earn D's and F's. But eliminating adult literacy indicators deletes the only measures in this category that serve as proxies for actual educational outcomes. While measures of actual learning can be addressed in future editions of *Measuring Up* by giving grades in the student learning category—currently all states are given an "incomplete" in this category—dropping these proxies from this category means that state performance in the benefits category is driven

substantially by a process measure (baccalaureate attainment) and three indirect measures (voting, charitable giving, and relative economic benefit) that are related to many factors other than postsecondary performance. For similar reasons as in the preparation category, it was recommended that the National Center retain indicators with missing data in benefits—at least until valid, reliable, and relatively complete direct measures of student learning outcomes can be obtained.

2. Tests and Recommendations Related to Imputing Missing Values

Once the decision was made to retain indicators that include missing values, various methods of imputing the required values needed to be considered. A key benefit of the National Center's baseline grading method is that it holds states harmless for missing data. In some cases, however, other measures correlated with the missing indicators might strongly suggest that a given state's performance on a missing indicator would be higher or lower than its average performance across the category, if such information could be obtained. Given this, two alternative imputation approaches are possible. First, when a missing value is encountered, the national average for the indicator (that is, the mean value of all existing state scores on the indicator) can be imputed. Second, missing values can be simulated using a regression-based model that employs several variables for which the state in question has complete data, and which are statistically related to the missing indicator.

Results of Imputation Based on Mean Values. In the preparation grade, the effects of imputing the national mean for each measure, instead of using the average category index score, are relatively modest. Only four states were affected, all of which lost ground by one letter grade. In the benefits grade, parallel effects are more substantial. Sixteen state results changed at least one letter grade, with the majority (ten) moving downward.

Alternative Imputation Methods. NCHEMS explored the feasibility of a regression-based approach to imputing missing values. NCHEMS examined a range of possible combinations of variables to simulate values for the variables in which missing data occur. The best of these simulation models was able to explain just over 50% of the variance in the target measure ($r = .751$) on approximately 30 cases for which valid values were available. The majority of models tested, however, did not perform at this level, and given small sample sizes, tended to be unstable when applied from year to year. Also, the use of any statistically based imputation model raises major questions of face validity.

The primary recommendation arising from these tests on imputing missing data was to continue to use the National Center's baseline, hold-harmless method for imputing missing values. This method uses all available data (whereas dropping the variables containing missing data would not) while minimizing the impact of missing values one way or the other. Reinforcing this

conclusion, a relatively consistent (though moderate) pattern of positive inter-correlation among most of the individual indicators comprising each grade area implies that states performing well on available measures would likely perform moderately well in missing areas as well (see next section). Moreover, for states not performing well because of nonparticipation in national data collection efforts, this methodology might further induce them to do so in order to improve their scores. All other methods of imputation, in short, would either bias state performance in unacceptable ways or would prove difficult to communicate because of their complexity.

3. Tests of the Relationships among Indicators within Each Category

Underlying the architecture of *Measuring Up 2000* is a presumption that the indicators that comprise each grade define a distinct arena of performance, and consequently, are at least moderately related to one another. If this is not the case—for example, if some indicators within a given category are negatively correlated with others—it is difficult for states to attain a high grade, because good performances on one indicator will likely be accompanied by poor performances on another. To explore these relationships, NCHEMS prepared sets of correlation matrices for all indicators comprising each graded performance category, using both raw scores and index measures. To further examine these relationships, the properties of each grade as a scale were tested, using standard Item-Alpha reliability analyses. Results of these analyses, as described below, suggest that the majority of grades in the report card contain indicators that are moderately and positively related to one another (see Appendix A).

Preparation. Both before and after indexing, the 10 indicators included in this category behave nicely as a scale. With one small exception, all the final indicators used are correlated positively at reasonable levels and the Item-Alpha associated with this indicator as a scale is a healthy .833 (see Appendix A-1). The scale analysis also reveals that each indicator contributes something to the grade as a whole, as overall reliability decreases if almost any one of them is dropped. Earlier versions of this category contained indicators that were not so well associated, such as the percentage of students completing the core coursework sequence in high school. The results of the correlational analysis guided the National Center in its decision to drop this proposed indicator.

Participation. Correlational results for indexed and raw scores for the three indicators that comprise this category are substantially the same (see Appendix A-2). Both results show very strong associations between two of the three indicators—high school freshmen enrolling in college within four years, and the percentage of 18–24 year olds enrolled in college. On the other hand, the third indicator—the percentage of 25–44 year olds enrolled part-time in college—appears essentially unrelated to the other two indicators comprising the grade. This result is further underlined by the Item-Alphas obtained for the reliability analysis, which show a very high value associated with removing the 25-44 year old enrollment indicator

from the implied scale and a very low Item-Alpha for the implied scale as a whole (.392). In short, the 25-44 year old enrollment variable appears to be measuring something different from the others in behavioral terms, though it is certainly conceptually related to "participation." The lack of a negative correlation, though, suggests real independence. A given state could do well on all three indicators, though few actually do. Because of the substantial conceptual value of including a measure of performance for non-traditional-age students, the decision was made to do so, while recognizing that it is statistically unrelated to the other two indicators included in the category.

Affordability. Correlations among the indicators included in this category are in most cases substantial and expected in their raw forms (see Appendix A-3). Reversing the direction of the state aid indicator, of course, reverses the direction of associations between this indicator and all other variables in their indexed forms. This property reveals that the underlying conceptual structure of this graded area is quite different from the others in that its individual components mean little by themselves. Instead, a basic set of affordability indicators—the three "family ability to pay" indicators weighted by enrollment, and the lowest priced colleges relative to income of lowest quintile—essentially drive the grade. Further, the result is "discounted" by the two additional policy indicators—state need-based financial aid, and low student debt. One implication of this construction is that a formal scaling analysis is inappropriate, and therefore one was not conducted. This graded area was redesigned several times in the course of the planning period, and correlational analyses were run for each iteration to help guide the final selection of indicators.

Completion. The four indicators included in this category are of two different kinds (see Appendix A-4). A first set of three indicators is cohort-based, but relies on self-reported institutional data (collected by ACT). These include measures of retention at two- and four-year colleges, and an indicator measuring bachelor's degree completion. The second includes associate's as well as bachelor's degree production per 100 enrolled undergraduate students. This indicator is a ratio measure intended to capture the overall production of degrees on a given enrollment base. This is, by definition, a proxy indicator and is based on cross-sectional rather than longitudinal data; but it is available for all sectors for all states. In both raw and indexed form, all of these analyses are moderately related to one another, with the strengths of the relationships occurring in expected ways. In general, measures using similar methodologies (e.g., cohort-based) are more related to one another than to the single cross-sectional indicator used. Similarly, measures associated with either two-year or four-year sectors tend to cluster more readily. Overall, though, the category works rather well as a scale, with an overall Item-Alpha of .743.

Benefits. This is an enormously diverse group of indicators whose relationships are complicated by missing data in one of its components, NALS. Despite this diversity, its

correlational structure strongly resembles that obtained for preparation: all indicators are moderately or strongly related, and the group works well as a scale. Within this overall pattern, it is clear that the category contains several distinct "clusters" or subcomponents. More specifically, measures drawn from similar sources tend to correlate well with one another, but often do not correlate nearly as well with results obtained from another source. For instance, all the NALS indicators are very strongly related to one another. This is reflected in the scale analysis, where the overall Item-Alpha is a respectable .850.

Taken as a whole, this pattern of correlations within the performance categories suggests that the indicators comprising each category are conceptually reasonable. Negative relationships occur in only a few cases and the indicators involved carry relatively low weights in the overall grading methodology. It is important to note, however, that similar correlational tests run on earlier versions of the proposed report card's data set yielded different results and assisted in the decision to drop or substantially modify a number of measures. This was especially the case in the categories of affordability, completion and benefits.

4. Statistical Averaging over Several Years

NCHEMS' original technical review of the National Center's report card methodology suggested the utility of adopting a standard approach to handling indicators for which annual observations are available. More specifically, NCHEMS recommended considering a three-year rolling average to help buffer the effects of natural statistical fluctuation over which states have little control. Substantial arguments against such an approach also can be raised, however. First, the overall public credibility of *Measuring Up 2000* may depend heavily on the currency of data used to calculate grades, so a powerful case can be made to use only the latest observations. At least as important, averaging will make it more difficult for a state that takes decisive action to make progress on a particular indicator to improve its performance quickly. To help inform this issue, a number of tests were run on the relative effects of using multiyear averaging for those indicators for which annual observations are available, and in virtually all cases these effects were negligible. The resulting recommendation to the National Center was to consider the use of multiyear averaging on a case-by-case basis to obtain the most robust and recent observations available.

C. Tests and Results for Methodological Issues

The primary issues related to the National Center's grading methodology include (a) the sensitivity of each grade to the application of alternative weighting methods, (b) how to benchmark state performance to a criterion value in order to anchor the grading method, and (c) the effects of applying a letter grade system based on ten-point intervals on the final grade

distribution given the properties of the available indicators. Several tests were conducted to investigate each of these issues and several recommendations were advanced.

1. Tests and Recommendations Related to the National Center's Weight Method

NCHEMS recommended that the National Center thoroughly analyze the sensitivity of the grade distribution among states to changes in the weighting methodology. Among the specific tests suggested were (a) eliminating all weights and allowing each indicator an equal contribution to the grade, (b) varying weights incrementally without reversing the underlying relationships among indicators with respect to relative contribution, and (c) varying weights substantially so that they change the relative importance of indicators in each category. Because the use of weights of any kind increases complexity—and therefore the risk of confusion in communicating the results—NCHEMS was particularly interested in the effects of not using weights in any form. As a result, the National Center conducted a number of tests to determine the degree to which changes in the weight method used would influence the ultimate grade distribution in each graded category. Findings from these analyses suggested the following:

Eliminating Weights Entirely. If no weighting is used, all indicators count equally toward a state's grade in a given category. Using this option, more than half the states' grades go down. For example, in the several tests conducted on indicators in the preparation category, over 25 states dropped one letter grade, largely because the indicators on which most states perform best—high school course taking and high school completion rates—become less important in determining a grade. Similar effects were observed for other graded categories.

Small Changes in Weights. Small changes in weights that preserve the previous order of importance among the indicators in a given category do not change grades in a marked or systematic way. States most affected by this procedure, as expected, are those lying near a cut score—for example, the difference between an index score of 79 and one of 80, which separates a C+ from a B– performance. This effect has more to do with the grading scale "cut scores" (see below) than with weighting methodology.

Large Changes in Weights. Changes in weighting methods that significantly alter the ranking of indicators in a given category do have a marked effect on the resulting grade distribution. This is largely because some of the indicators afforded the greatest importance in *Measuring Up 2000*, such as NAEP and NALS scores or high school course taking, also reveal some of the largest overall disparities of state performance. As a result, the National Center's grade methodology, as expected, rewards states for high performance on indicators that research suggests are important.

These results highlight the need for considerable care in establishing and reevaluating the weighting methodology, to make sure that it accurately reflects those policies and priorities that are important in bringing about improved overall performance in higher education.

Given this situation, recommendations resulting from these tests included:

- Wherever possible, base the weighting methodology on established research showing the importance of specific indicators to the overall graded category.
- Convene a group of experts to review the weighting method employed and make further recommendations if warranted.

Both of these recommendations were acted upon in advance of releasing *Measuring Up 2000.*

2. Tests and Recommendations Related to Benchmarking

As noted earlier, the National Center calculates grades within each category based on state performance on specific indicators. States are compared on each indicator based on the best-performing or benchmark states on that indicator. The alternative to this method is to grade each state normatively—that is, assign it a grade "on the curve" relative to the performances of all other states. The National Center chose not to take this approach for a variety of sound reasons. First, establishing a "best practice" standard sends an important policy message: that states should be held to high expectations. Second, highlighting actual state performance sets a realistic standard and is more credible than establishing arbitrary benchmarks. Selecting this approach, though, involves a further set of methodological choices. One is how many top performing states to use in establishing a benchmark. Another is how to aggregate the performances of the top-performing states chosen, in order to construct the benchmark itself. A third is whether to benchmark each indicator that comprises the graded area independently, or to benchmark only the summary score used to define the grade. In the National Center's baseline methodology, five top-performing states were used as the universe for establishing the benchmark, the mean of these five was used to set the benchmark level itself, and individual indicators were benchmarked independently. To test the sensitivity of this approach, several alternative benchmarking approaches were explored. These included:

Expanding the Number of Top Performing States Used to Set the Benchmark. Increasing the number of top-performing states to ten had the expected effect of moving the grades of all states upward because the resulting standard is set at a lower point. If this methodology were adopted, in fact, no state would receive an F grade, except in the affordability category, and very few would receive D's. Most would earn A's or B's on all graded indicators. Skewing the grade distribution upward does tend to preserve the relative ranks among the states, but it either eliminates or severely truncates any differences among top performers.

Substituting the Median for the Mean in Establishing the Benchmark. This approach was proposed in order to minimize the impact of outliers, which on some of the index measures had substantial effect. Using the baseline condition of five top performers, this approach in essence establishes the performance benchmark at the performance level of the third-best-performing state for each indicator. More states earned A's or B's using this approach than in the baseline approach because the effects of very-high-performing outliers on the mean is eliminated. But the resulting grade distribution remained quite credible, with about five or six states earning A's in each category, most states concentrating at the C grade level, and from three to ten earning F's. Moreover, under this method, the relative rankings among states are preserved in all grade areas.

Benchmarking the Summary Grade Index Measure Instead of Each Indicator Independently. In the National Center's baseline methodology, each indicator within each graded category was benchmarked independently. Because of differences in the results of a particular state on different indicators, this method sets a very high standard because it is unlikely that a given state will be among the top five performers on all of the indicators that comprise a given grade. If the indicators inside each grade are not correlated with one another, as indeed some indicators are not, the likelihood of this occurring is even less. In fact, using the independent-results benchmarking strategy results in very few A's being awarded in any graded area—and frequently none at all. The alternative is to benchmark only the summary score used to establish the grade. What this means in practice is taking the index scores for each indicator within a category, multiplying these scores by the weights assigned to them, and adding the resulting scores together to establish a summary score. Top performing states on this overall score are then used to establish an overall benchmark in terms of which to establish the remaining grades. Using this method means that there are at least some A's in every area. Using the mean to benchmark, in contrast, may result in only one state's receiving an A, if this state is a strong outlier. Using the median implies that at least three states will by definition receive A's. Effects of this benchmarking strategy on the overall distribution of states across grades tend to preserve the relative rankings of states at the lower end of the grade distribution, while allowing some states that may have received B's to earn A's instead.

Benchmarking to the 90th Percentile. This approach abandons the notion of using an aggregate of actual state performances to establish the "best practice" benchmark in favor of doing so arbitrarily. In essence, it sets the benchmark standard at that of the fifth-highest-performing state on each indicator (or for each graded area). This is among the most generous benchmarking approaches and resulted in many states earning A's and B's, with only a few F's. By definition, moreover, at least five states will earn A's in any given category if this method is used.

Recommendations resulting from these tests were:

- Continue to use the top five performing states as the universe for benchmarking; this approach establishes a high standard based on actually achieved past performance.
- Use the median to establish the benchmark itself; this dampens the sometimes substantial effects of outliers which would otherwise distort results and artificially result in very few states receiving high grades.
- Benchmark the entire graded category as well as benchmarking each indicator independently; this approach ensures that at least some states will earn A's.

All of these recommendations were followed in the final version of *Measuring Up 2000.*

3. Examining Cut-Off Scores in the Letter Grade System

The National Center adopted the familiar classroom approach to assigning grades to states: after benchmarking, each state's index score is examined in relation to a grading template that sets the cut-off point between each letter grade at ten-point intervals between 60 and 100. All states falling below 60 receive an F, just as students would receive when taking a test. "Pluses" and "minuses" are similarly established at finer intervals within each grade.

At least two potential issues are raised by this approach. First, if the underlying distribution of states on the various indicators that comprise each category are distributed in particular ways (e.g., if they are bimodal, multi-modal, or badly skewed), the resulting grade distribution may be inequitable. Second, if large numbers of states with quite similar values are distributed around a particular cut-off point separating two letter grades, the approach might be considered unfair, since states performing nearly identically would be assigned different grades.

To test these possibilities, NCHEMS plotted all of the indicators comprising each grade to inspect the actual distributions of states that resulted (see Appendix B). This was done for both raw measured values and for the index scores that resulted after benchmarking state performance to high-performing states. Inspection of these distributions suggest (a) that there are no abnormalities in the underlying distributions of states on any indicator that would seriously distort the grading process, and (b) the distributions of states are sufficiently smooth that no alternative placement of the cut-off points used to assign letter grades would be superior to those already being used. These results, together with the ease of comprehending the letter grade method, yielded a recommendation that the National Center's original methodology be retained.

D. Tests of the Relationships among Graded Categories

The National Center's methodology for *Measuring Up 2000* was founded on the premise that states could be graded independently on performance in a number of distinct areas. Developed conceptually, the five graded areas are assumed to constitute relatively independent dimensions of state performance. More significantly, the National Center decided that each state be held accountable for its performance regardless of its circumstances; that is, *Measuring Up 2000* does not attempt to adjust state performance results on the basis of underlying state characteristics like available resources, economic and social conditions, or K–12 conditions. This approach raises questions about the overall relationships among the many indicators used, regardless of the performance categories to which they are assigned. In fact, some states may exhibit characteristics that cut across all the indicators used, and which may be associated with getting good grades in general. Another set of tests, therefore, was designed to explore whether state performances in different graded categories are independent of one another, and whether specific background characteristics would tend to predispose states toward high performance on most of the indicators used (see Appendix C).

1. Relationships among Graded Categories

To examine the relationships among graded categories, a correlation matrix was computed for the final index scores used to assign each grade (see Appendix C-1). NCHEMS found a consistently positive and moderate correlation among *all* of the resulting scales, with the exception of the affordability category. Affordability is not related to preparation, participation or benefits; it is negatively related to completion. On the one hand, this suggests that some states really *do* exhibit higher than average performance on many of these indicators together, and receive a pattern of relatively high grades across the board. On the other hand, most of these performance categories do appear conceptually related, so a pattern of moderate association is to some degree expected. Indeed, it might be surprising if preparation and participation were not related. No particular recommendation arose from these results, since all relationships appear reasonable.

2. Factors that Might Underlie Overall State Performance

To examine the relationships among all indicators used—and more particularly, to determine whether the patterns of relationships among these measures might exhibit a deeper pattern of association—a set of factor analyses was conducted using all indexed indicators together (see Appendix C-2). The resulting factors are artificial in that they do not correspond to any particular *a priori* conception of performance. But the presence of high factor loadings on a particular factor suggest that these measures are strongly associated with it.

Most of the factor models applied to the complete array of indicators produced from six to nine factors, explaining between 75% and 80% of the total variance. The first factor is typically associated with about 25% to 30% of the total variance, the second with about 12% to 15%, the third with 10% to 12%, and so on to a diminishing level. On the one hand, this is reassuring. If only one big factor emerged from this analysis—or if the biggest accounted for most of the variance—the result would suggest that virtually all of the indicators are essentially associated with the same thing. On the other hand, the biggest factor obtained remains large and loads highly on characteristics that suggest more generally educated states. For instance, high loadings on this factor include overall educational attainment, high literacy levels, high chances for college, high levels of college enrollment, high levels of high school education, high levels of appropriate course taking in high school, and high NAEP achievement. To illustrate this result more concretely, the top 10 states that load high on Factor 1 are, in descending order: CT, MA, MD, NJ, NH, VT, MN, RE, PA, and NY. The bottom 10 states loading low on this factor are, in ascending order: WY, SD, LA, AR, MS, AL, NV, NM, WV, and KY. With the exception of affordability, this means that this "general" factor is present to some degree in all graded categories.

Other smaller factors, however, do seem to be tapping distinctively different things. The second, for instance, loads high on loans and the percent voting. A third factor seems centered on literacy scores, while a fourth appears related particularly to AP performance and high school course-taking behavior.

3. Relationships between Graded Indicators and other Measures of State Condition

Measuring Up 2000 includes several contextual measures for each state in conjunction with the report card, clustered around such issues as demography and the state's economy. As a final part of its effort to explore how the indicators that make up the graded categories are structured, NCHEMS ran correlations among these contextual measures, and also between them and the grades states received in each of the five areas (see Appendix C-3).

Regarding the first question, relationships among these background factors are significant and in expected directions. Regarding the second, the pattern of relationships between grades and the state contextual descriptors appears consistent with the results of prior analyses: at least some measures of state performance on *Measuring Up 2000* can be associated with factors related to each state's demographics, economics, and social conditions. This pattern of association is strongest for preparation and benefits (which are themselves positively related) and is weakest for affordability (see Appendix C-3A). At a later point, NCHEMS included race/ethnicity measures in this analysis. Results indicated that this variable yields mixed and weak results when related to any of the indicators in the graded performance categories (see Appendix C-3B).

To explore these relationships further, NCHEMS ran multivariate regressions that attempted to predict grades in each of the five areas on the basis of the ten background factors taken together (see Appendix C-3C). As expected, the strongest predictions here were obtained for preparation and benefits, in which the regression model was able to account for over two-thirds and almost half of the variance in state grades, respectively. In the affordability category, where these predictions were least powerful, the model accounted for about a quarter of the variance in state grades.

Taken together, these tests of the relationships among the graded categories suggest that some states may have an advantage in their relative performance across the performance categories. This overall statistical advantage is probably related to long histories of investment in higher education and relatively high overall educational attainment levels. No particular recommendation arose from this finding.

E. Additional Tests on the Appropriateness of Particular Indicators

In the course of the various review meetings convened by the National Center to discuss report card indicators and methodologies, several additional concerns were raised. For the most part, these centered on presumed relationships between a particular indicator and some other factor that might unduly bias or otherwise influence state performance in an unintended way. The National Center and NCHEMS followed up on these concerns by conducting additional tests of available measures (see Appendix D), as described below.

1. Relationship between Preparation Indicators and High School Dropout

In December 1999, some reviewers questioned whether, in relation to the preparation category, states with high dropout levels in their K–12 systems might artificially perform well on indicators like NAEP, AP, and high school course taking largely because these systems were essentially filtering out low-ability students who would otherwise depress state performance. To test this, the National Center located state-by-state event dropout rates for 38 states. NCHEMS then investigated statistical relationships between dropout rates and the indicators used to calculate the preparation grade (see Appendix D-1). Results of correlational analyses indicated:

- There is a strong negative relationship between high school dropout and virtually all preparation indicators. This suggests that high school dropout is not exerting a filtering effect that would artificially inflate state performance on these indicators. Indeed, the higher the dropout, the worse states do on most indicators in the preparation category.

- This finding is consistent across multiple ways of conducting the analysis, including (a) using raw indicator values as well as index values, and (b) dropping outlier states from the analyses in various combinations.

Based on these results, the indicators in the preparation category appeared to be appropriate.

2. Relationship between Income Gaps and the Increased Income from having a Bachelor's Degree

Some questions were also raised about an indicator used in the benefits category—the increase in total personal income as a result of the percentage of the population holding a bachelor's degree. Because this indicator in essence looks at the income differential between citizens holding a bachelor's degree and those not possessing this degree, some reviewers questioned whether states might unintentionally be rewarded for depressing the incomes of their least-well-educated residents. To investigate this hypothesis, NCHEMS located data on income disparity for the 50 states that compared the incomes of (a) the richest quintile with the middle quintile, and (b) the richest quintile and the poorest quintile. These data are expressed in state rank-order terms, with the highest rank (e.g., "1") representing the greatest income disparity. Together with data on the actual income levels of the poorest quintile, these data were used to examine the degree to which high performance on the indicator in question might be a simple effect of low-end poverty (see Appendix D-2). Among the findings:

- Based on correlational analysis, the indicator for the increased income from having a bachelor's degree is moderately related to income disparity and strongly related to the actual incomes of the lowest quintile. This suggests that both factors are exhibiting an independent influence, but it also suggests that the benefit is indeed a high-end effect that may indeed be attributable to higher levels of education.
- Regression results, which allow these two factors to be investigated simultaneously, confirm their independent effects. The gap between the richest and poorest income quintiles and the actual income of the poorest fifth together explain almost half of the variance ($r = .698$) in this indicator.

These results do not rule out the possibility that some states may have high benefits for their most educated citizens largely because their non-college population is so poor. But the strong relationship between the indicator measuring the increased income from having a bachelor's degree and the measures showing the incomes of the poorest portion of each state's population suggest that this effect, if present, is at least being mitigated by economic conditions and/or social policy. As a result, no change in the indicators in the benefits category appeared warranted.

3. Tests of the Stability of Performance Indicators Over Time

A third issue raised during planning discussions was the extent to which indicators in the performance categories vary from year to year—either naturally or as a result of deliberate public policy. On the one hand, extreme variability from year to year suggests that a given indicator is likely to change for reasons outside the state's control and is therefore not a good candidate for judging performance. On the other hand, indicators that exhibit excessive stability from year to year will not likely show the effects of policy, either quickly or at all.

The ideal way to test for these conditions, of course, would be to entirely reconstruct *Measuring Up* for an earlier time period. Doing so, however, would require assembling a whole new data set for an earlier time period. However, the opportunity for a partial test of this kind arose during the construction of the report card itself, as some updated measures became available to the National Center while *Measuring Up 2000* was under development. At the same time, the methodology of the report card changed during development. Both these conditions allowed an assessment to be undertaken of the volatility of *Measuring Up 2000*'s methodology over time (see Appendix D-3).

In most cases, substantial positive correlations (in the 0.8–0.9 range) among state values for updated measures are present from year to year. This is very much to be expected, and still leaves a fair amount of variability in these indicators. Occasionally, though, the correlations between the same indicators at different times are unexpectedly modest. The correlation between the values for the eligible state residents voting in the 1996 and 1998 national elections, for instance, is only .490—likely due to the fact that one of these years is a presidential and one an off-year election, and also to the likelihood that local issues may well influence turnout. Such results, where obtained, suggest caution in attributing changes in values to state higher education policy.

On the other hand, final grade distributions appear remarkably robust after all weights and changes in methodology are taken into account. Correlations between early and final versions of each grade are extraordinarily high, despite updating and often substantial changes in the indicators used. Once again, however, there is enough variability remaining that states can, with a change in their performance, change their grades. Using the original and the final methodologies for calculating grades, for example, seven of the same states remain in the top ten for preparation, six for participation, seven for affordability, and five each for completion and benefits.

4. Controlling for Demographic and Background Factors

A final question raised by reviewers of the report card methodology was whether some states did better or worse than expected given their respective conditions. As noted earlier, economic and demographic factors in each state are at least moderately correlated with a given state's performance on most of the indicators used to calculate grades in *Measuring Up 2000*—

especially in the preparation and benefits categories. Given this, do some states systematically score better than might be expected on these indicators?

In order to investigate this question, NCHEMS developed a set of regression models to predict state performance in each of the five graded areas (see Appendix D-4). A wide range of models was tested to seek the best conceptual and statistical fit, using two basic strategies. Under the first strategy, an attempt was made to include at least one variable from each of three categories: (a) demography as reflected in the state's race/ethnic mix, (b) the state's economic condition as reflected in variables like median income or gross state product per capita, and (c) the state's fiscal condition as reflected in measures like unmet obligations. This approach had the virtue of using the same set of predictive variables in each graded area. But it had the weakness that a standard set of variables did not always yield the best predictions. In general, under this approach, the variance explained ranged from almost 50% to less than 25% (see Appendix D-4A). The second approach relaxed these constraints and simply sought to identify a model that explained the most variance (see Appendix D-4B). Under this approach, the best-fitting models generally explained over half the variance.

In both cases, individual states were then arrayed in terms of their residual scores. A positive residual meant that a state was "over-achieving" when controlling for background factors, while a negative residual meant that a state was not doing as well as expected given these factors. Overall, this analysis did yield some consistent patterns of state performance—especially on grades in preparation, participation and benefits—with a few states (notably Massachusetts and Connecticut) doing consistently better than expected. Such results should be treated with caution, however, because of the restricted number of cases and likely instability of most regression results.

Appendix A

Correlational Analyses of Measures within Graded Performance Categories

Appendix A-1

Preparation

Correlations – Preparation Raw Scores

		Percent of 18-24 Year-olds with a High School Credential: 1996-1998 (20%)	Percent of Grades 9-12 Students Taking Upper-Level Math: 1998 (15%)	Percent of Grades 9-12 Students Taking Upper-Level Science: 1998 (15%)	Percent of 8th Graders Scoring at or Above Proficient on the NAEP Reading Exam: 1998 (5%)	Percent of 8th Graders Scoring at or Above Proficient on the NAEP Math Exam: 1996 (5%)	Percent of 8th Graders Scoring at or Above Proficient on the NAEP Writing Exam 1998 (5%)	Percent of Low Income 8th Graders Scoring At or Above Proficient on NAEP Math Exam (5%)	Percent of 8th Graders who Have Taken Algebra: 1998 (10%)	Number of AP Exams with Grades 3 or Higher Per 1000 11th and 12th Graders: 1999 (10%)	Number of 1200+ SAT or 26 ACT Scores per 1000 High School Graduates: 1999 (10%)
Percent of 18-24 Year-olds with a High School Credential: 1996-1998 (20%)	Pearson Correlation	1.000	.486**	.487**	.446**	.552**	.287	.442*	.211	.142	.420**
	Sig. (2-tailed)	.	.006	.006	.006	.000	.094	.013	.290	.325	.002
	N	50	30	30	36	40	35	31	27	50	50
Percent of Grades 9-12 Students Taking Upper-Level Math: 1998 (15%)	Pearson Correlation	.486**	1.000	.721**	.443*	.354	.369	.288	.320	.135	.315
	Sig. (2-tailed)	.006	.	.000	.044	.082	.100	.233	.104	.478	.090
	N	30	30	30	21	25	21	19	27	30	30
Percent of Grades 9-12 Students Taking Upper-Level Science: 1998 (15%)	Pearson Correlation	.487**	.721**	1.000	.315	.300	.215	.085	.147	.068	.192
	Sig. (2-tailed)	.006	.000	.	.164	.146	.350	.729	.464	.720	.308
	N	30	30	30	21	25	21	19	27	30	30
Percent of 8th Graders Scoring at or Above Proficient on the NAEP Reading Exam: 19 (5%)	Pearson Correlation	.446**	.443*	.315	1.000	.900**	.827**	.667**	.384	.256	.617**
	Sig. (2-tailed)	.006	.044	.164	.	.000	.000	.000	.095	.132	.000
	N	36	21	21	36	33	35	28	20	36	36
Percent of 8th Graders Scoring at or Above Proficient on the NAEP Math Exam: 1996 (	Pearson Correlation	.552**	.354	.300	.900**	1.000	.757**	.833**	.278	.109	.771**
	Sig. (2-tailed)	.000	.082	.146	.000	.	.000	.000	.209	.504	.000
	N	40	25	25	33	40	33	31	22	40	40
Percent of 8th Graders Scoring at or Above Proficient on the NAEP Writing Exam 1998 (5%)	Pearson Correlation	.287	.369	.215	.827**	.757**	1.000	.377*	.390	.407*	.486**
	Sig. (2-tailed)	.094	.100	.350	.000	.000	.	.048	.089	.015	.003
	N	35	21	21	35	33	35	28	20	35	35
Percent of Low Income 8th Graders Scorin At or Above Proficient on NAEP Math Exar (5%)	Pearson Correlation	.442*	.288	.085	.667**	.833**	.377*	1.000	.225	-.137	.596**
	Sig. (2-tailed)	.013	.233	.729	.000	.000	.048	.	.385	.461	.000
	N	31	19	19	28	31	28	31	17	31	31
Percent of 8th Graders who Have Taken Algebra: 1998 (10%)	Pearson Correlation	.211	.320	.147	.384	.278	.390	.225	1.000	.676**	.205
	Sig. (2-tailed)	.290	.104	.464	.095	.209	.089	.385	.	.000	.305
	N	27	27	27	20	22	20	17	27	27	27
Number of AP Exams with Grades 3 or Hig Per 1000 11th and 12th Graders: 1999 (10	Pearson Correlation	.142	.135	.068	.256	.109	.407*	-.137	.676**	1.000	.092
	Sig. (2-tailed)	.325	.478	.720	.132	.504	.015	.461	.000	.	.525
	N	50	30	30	36	40	35	31	27	50	50
Number of 1200+ SAT or 26 ACT Scores p 1000 High School Graduates: 1999 (10%)	Pearson Correlation	.420**	.315	.192	.617**	.771**	.486**	.596**	.205	.092	1.000
	Sig. (2-tailed)	.002	.090	.308	.000	.000	.003	.000	.305	.525	.
	N	50	30	30	36	40	35	31	27	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations – Preparation Index Scores

		Index - Percent of 18-24 with High School Credential: 1996-1998 (20%)	Index - Percent of 9-12 Upper Level Math: 1998 (15%)	Index - Percent of 9-12 Upper Level Science: 1998 (15%)	Index - Percent of 8th Graders with Algebra: 1998 (10%)	Index - Percent of 8th Graders Scoring at or above Proficient NAEP Math: 1996 (5%)	Index - Percent of 8th Graders Scoring at or above Proficient NAEP Reading: 1998 (5%)	Index - Percent of 8th Graders Scoring at or above Proficient NAEP Writing: 1998 (5%)	Index - Percent of Low Income 8th Graders Scoring at or above Proficient NAEP Math (5%)	Index - Number of 1200+ SAT or 26 ACT Scores per 1000 High School Graduates: 1999 (10%)	Index - Number of AP Exams with Grades 3 or Higher per 1000 11th and 12th Graders: 1999 (10%)
Index - Percent of 18-24 with High School Credential: 1996-1998 (20%)	Pearson Correlation	1.000	.504**	.496**	.255	.544**	.447**	.308*	.456**	.420**	.142
	Sig. (2-tailed)	.	.000	.000	.074	.000	.001	.029	.001	.002	.325
	N	50	50	50	50	50	50	50	50	50	50
Index - Percent of 9-12 Upper Level Math: 1998 (15%)	Pearson Correlation	.504**	1.000	.770**	.394**	.480**	.543**	.450**	.336*	.415**	.211
	Sig. (2-tailed)	.000	.	.000	.005	.000	.000	.001	.017	.003	.142
	N	50	50	50	50	50	50	50	50	50	50
Index - Percent of 9-12 Upper Level Science: 1998 (15%)	Pearson Correlation	.496**	.770**	1.000	.244	.398**	.433**	.331*	.242	.305*	.149
	Sig. (2-tailed)	.000	.000	.	.088	.004	.002	.019	.090	.031	.303
	N	50	50	50	50	50	50	50	50	50	50
Index - Percent of 8th Graders with Algebra: 1998 (10%)	Pearson Correlation	.255	.394**	.244	1.000	.335*	.414**	.407**	.182	.263	.565**
	Sig. (2-tailed)	.074	.005	.088	.	.017	.003	.003	.207	.065	.000
	N	50	50	50	50	50	50	50	50	50	50
Index - Percent of 8th Graders Scoring at or above Proficient NAEP Math: 1996 (5%)	Pearson Correlation	.544**	.480**	.398**	.335*	1.000	.839**	.739**	.798**	.751**	.139
	Sig. (2-tailed)	.000	.000	.004	.017	.	.000	.000	.000	.000	.336
	N	50	50	50	50	50	50	50	50	50	50
Index - Percent of 8th Graders Scoring at or above Proficient NAEP Reading: 1998 (5%)	Pearson Correlation	.447**	.543**	.433**	.414**	.839**	1.000	.834**	.585**	.621**	.269
	Sig. (2-tailed)	.001	.000	.002	.003	.000	.	.000	.000	.000	.059
	N	50	50	50	50	50	50	50	50	50	50
Index - Percent of 8th Graders Scoring at or above Proficient NAEP Writing: 1998 (5%)	Pearson Correlation	.308*	.450**	.331*	.407**	.739**	.834**	1.000	.354*	.512**	.363**
	Sig. (2-tailed)	.029	.001	.019	.003	.000	.000	.	.012	.000	.010
	N	50	50	50	50	50	50	50	50	50	50
Index - Percent of Low Income 8th Graders Scoring at or above Proficient NAEP Math (5%)	Pearson Correlation	.456**	.336*	.242	.182	.798**	.585**	.354*	1.000	.602**	-.081
	Sig. (2-tailed)	.001	.017	.090	.207	.000	.000	.012	.	.000	.578
	N	50	50	50	50	50	50	50	50	50	50
Index - Number of 1200+ SAT or 26 ACT Scores per 1000 High School Graduates: 1999 (10%)	Pearson Correlation	.420**	.415**	.305*	.263	.751**	.621**	.512**	.602**	1.000	.092
	Sig. (2-tailed)	.002	.003	.031	.065	.000	.000	.000	.000	.	.525
	N	50	50	50	50	50	50	50	50	50	50
Index - Number of AP Exams with Grades 3 or Higher per 1000 11th and 12th Graders: 1999 (10%)	Pearson Correlation	.142	.211	.149	.565**	.139	.269	.363**	-.081	.092	1.000
	Sig. (2-tailed)	.325	.142	.303	.000	.336	.059	.010	.578	.525	.
	N	50	50	50	50	50	50	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Reliability Analysis – Preparation

RELIABILITY ANALYSIS – SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	IHIGH	93.7560	4.8416	50.0
2.	IMATH	76.9803	11.4548	50.0
3.	ISCI	76.7852	13.7955	50.0
4.	IALG8	72.6071	26.0659	50.0
5.	IMATHP	69.7166	20.9358	50.0
6.	IREADP	77.1253	14.3958	50.0
7.	IWRITP	75.2660	18.1755	50.0
8.	IMATHPLO	58.0541	27.7681	50.0
9.	ICOLLENT	76.7613	15.3080	50.0
10.	IADP	50.3072	27.1084	50.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
IHIGH	633.6030	14273.6888	.5493	.8320
IMATH	650.3786	13180.5361	.6162	.8169
ISCI	650.5738	13264.1162	.4652	.8239
IALG8	654.7518	11445.5099	.5034	.8241
IMATHP	657.6424	10922.1440	.8163	.7849
IREADP	650.2337	12107.9906	.8262	.7967
IWRITP	652.0930	11810.0754	.7068	.8002
IMATHPLO	669.3049	11233.6401	.4974	.8276
ICOLLENT	650.5977	12523.3079	.6348	.8100
IADP	677.0518	12440.1784	.2906	.8532

Reliability Coefficients

N of Cases = 50.0 N of Items = 10

Alpha = .8328

Appendix A-2

Participation

Correlations – Participation Raw Scores

		High School Students' Chance for College by Age 19: 1996 (40%)	Percent of 18-24 Year-Olds Enrolled in College: 1996-1998 (20%)	Percent of 25-44 Year-Olds who are Enrolled Part-Time in College: 1996-98 (40%)
High School Students' Chance for College by Age 19: 1996 (40%)	Pearson Correlation	1.000	.727**	.018
	Sig. (2-tailed)	.	.000	.901
	N	50	50	50
Percent of 18-24 Year-Olds Enrolled in College: 1996-1998 (20%)	Pearson Correlation	.727**	1.000	.008
	Sig. (2-tailed)	.000	.	.956
	N	50	50	50
Percent of 25-44 Year-Olds who are Enrolled Part-Time in College: 1996-98 (40%)	Pearson Correlation	.018	.008	1.000
	Sig. (2-tailed)	.901	.956	.
	N	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations – Participation Index Scores

		Index Score - HS Chance for College	Index Score - Percent 18-14 Enrolled	Index Score - Percent 25-44 Enrolled Part-time
Index Score - HS Chance for College	Pearson Correlation	1.000	.725**	.018
	Sig. (2-tailed)	.	.000	.901
	N	51	51	51
Index Score - Percent 18-14 Enrolled	Pearson Correlation	.725**	1.000	.009
	Sig. (2-tailed)	.000	.	.949
	N	51	51	51
Index Score - Percent 25-44 Enrolled Part-time	Pearson Correlation	.018	.009	1.000
	Sig. (2-tailed)	.901	.949	.
	N	51	51	51

**. Correlation is significant at the 0.01 level (2-tailed).

Reliability Analysis – Participation

RELIABILITY ANALYSIS – SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	BHSI	74.5750	14.0977	51.0
2.	B1824I	79.5876	11.9238	51.0
3.	B2544I	72.1263	19.8646	51.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
BHSI	151.7139	541.0918	.3870	.0159
B1824I	146.7013	603.3179	.4236	.0330
B2544I	154.1627	584.7503	.0149	.8339

Reliability Coefficients

N of Cases = 51.0 N of Items = 3

Alpha = .3896

Appendix A-3

Affordability

Correlations – Affordability Raw Scores

		Tuition Less Student Aid as a Percent of Income, Community Colleges	Tuition Less Student Aid as a Percent of Income, Public Four Years	Tuition Less Student Aid as a Percent of Income, Private Four Years	State Need-based Grant Aid as a Percent of Federal Pell Grant Aid: 1997-98 (20%)	Average Federal Loan Amount: 1999	Tuition, Lowest Price Institution relative to Median Income, Lowest Quintile: 1997 (20%)
Tuition Less Student Aid as a Percent of Income, Community Colleges	Pearson Correlation	1.000	.700**	.558**	.217	.460**	.636**
	Sig. (2-tailed)	.	.000	.000	.134	.001	.000
	N	49	49	48	49	49	49
Tuition Less Student Aid as a Percent of Income, Public Four Years	Pearson Correlation	.700**	1.000	.665**	.237	.577**	.463**
	Sig. (2-tailed)	.000	.	.000	.097	.000	.001
	N	49	50	49	50	50	50
Tuition Less Student Aid as a Percent of Income, Private Four Years	Pearson Correlation	.558**	.665**	1.000	.295*	.593**	.385**
	Sig. (2-tailed)	.000	.000	.	.040	.000	.006
	N	48	49	49	49	49	49
State Need-based Grant Aid as a Percent of Federal Pell Grant Aid: 1997-98 (20%)	Pearson Correlation	.217	.237	.295*	1.000	.360*	.284*
	Sig. (2-tailed)	.134	.097	.040	.	.010	.046
	N	49	50	49	50	50	50
Average Federal Loan Amount: 1999	Pearson Correlation	.460**	.577**	.593**	.360*	1.000	.129
	Sig. (2-tailed)	.001	.000	.000	.010	.	.372
	N	49	50	49	50	50	50
Tuition, Lowest Price Institution relative to Median Income, Lowest Quintile: 1997 (20%)	Pearson Correlation	.636**	.463**	.385**	.284*	.129	1.000
	Sig. (2-tailed)	.000	.001	.006	.046	.372	.
	N	49	50	49	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations – Affordability Index Scores

		Index Score - Tuition Less Aid for Community Colleges	Index Score - Tuition Less Aid for Public Four-Years	Index Score - Tuition Less Aid, Private Four Years	Index Score - State Need Based as Percent Pell	Index Score - Avg Federal Loan	Index Score - Lowest Price Inst to Median Income, Lowest Quitile
Index Score - Tuition Less Aid for Community Colleges	Pearson Correlation	1.000	.639**	.348*	-.218	.475**	.194
	Sig. (2-tailed)	.	.000	.015	.132	.001	.182
	N	49	49	48	49	49	49
Index Score - Tuition Less Aid for Public Four-Years	Pearson Correlation	.639**	1.000	.603**	-.189	.554**	.149
	Sig. (2-tailed)	.000	.	.000	.188	.000	.302
	N	49	50	49	50	50	50
Index Score - Tuition Less Aid, Private Four Years	Pearson Correlation	.348*	.603**	1.000	-.303*	.480**	.075
	Sig. (2-tailed)	.015	.000	.	.034	.000	.610
	N	48	49	49	49	49	49
Index Score - State Need Based as Percent Pell	Pearson Correlation	-.218	-.189	-.303*	1.000	-.344*	-.199
	Sig. (2-tailed)	.132	.188	.034	.	.014	.166
	N	49	50	49	50	50	50
Index Score - Avg Federal Loan	Pearson Correlation	.475**	.554**	.480**	-.344*	1.000	-.105
	Sig. (2-tailed)	.001	.000	.000	.014	.	.468
	N	49	50	49	50	50	50
Index Score - Lowest Price Inst to Median Income, Lowest Quitile	Pearson Correlation	.194	.149	.075	-.199	-.105	1.000
	Sig. (2-tailed)	.182	.302	.610	.166	.468	.
	N	49	50	49	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Reliability Analysis – Affordability

RELIABILITY ANALYSIS – SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	ASAIDCCI	78.5647	12.1309	48.0
2.	ASAID4I	77.5318	13.7479	48.0
3.	ASAID4PI	58.9280	19.4440	48.0
4.	AGRANTI	32.9033	31.5279	48.0
5.	AFEDI	85.2042	8.6518	48.0
6.	ATUITI	65.3858	30.6456	48.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
ASAIDCCI	319.9532	2265.6867	.3978	-.1707
ASAID4I	320.9862	2021.2653	.5355	-.3166
ASAID4PI	339.5899	2124.0150	.2065	-.1296
AGRANTI	365.6147	3146.9321	-.3587	.5635
AFEDI	313.3137	2614.1903	.2071	-.0159
ATUITI	333.1322	2039.1920	-.0383	.1570

Reliability Coefficients

N of Cases = 48.0 N of Items = 6

Alpha = .0627

Appendix A-4

Completion

Correlations – Completion Raw Scores

		Raw - Students Returning at 2-Year Colleges (10%)	Raw - Students Returning at 4-Year Colleges (10%)	Raw - Bachelor's Degree Completion (30%)	Raw - All Degree Completion (50%)
Retention Rates, 2-Year Colleges, 1999 (10%)	Pearson Correlation	1.000	.255	.413**	.352*
	Sig. (2-tailed)	.	.112	.008	.024
	N	41	40	40	41
Retention Rates, 4-Year Colleges, 1999 (10%)	Pearson Correlation	.255	1.000	.860**	.124
	Sig. (2-tailed)	.112	.	.000	.401
	N	40	48	48	48
5-Year Bachelor's Degree Completion Rates, 1999 (30%)	Pearson Correlation	.413**	.860**	1.000	.285*
	Sig. (2-tailed)	.008	.000	.	.049
	N	40	48	48	48
Bachelor's and Associate's Degree Production per 100 Enrolled Undergraduate Students: 1997-98 (50%)	Pearson Correlation	.352*	.124	.285*	1.000
	Sig. (2-tailed)	.024	.401	.049	.
	N	41	48	48	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations – Completion Index Scores

		Index - Retention Rate 2yr Colleges (10%)	Index - Retention Rate 4yr Colleges (10%)	Index - 5-year BA Completion Rate (30%)	Index - BA/AA per 100 Enrolled UG (50%)
Index - Retention Rate 2yr Colleges (10%)	Pearson Correlation	1.000	.406**	.501**	.427**
	Sig. (2-tailed)	.	.003	.000	.002
	N	50	50	50	50
Index - Retention Rate 4yr Colleges (10%)	Pearson Correlation	.406**	1.000	.748**	.287*
	Sig. (2-tailed)	.003	.	.000	.043
	N	50	50	50	50
Index - 5-year BA Completion Rate (30%)	Pearson Correlation	.501**	.748**	1.000	.321*
	Sig. (2-tailed)	.000	.000	.	.023
	N	50	50	50	50
Index - BA/AA per 100 Enrolled UG (50%)	Pearson Correlation	.427**	.287*	.321*	1.000
	Sig. (2-tailed)	.002	.043	.023	.
	N	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Reliability Analysis – Completion

RELIABILITY ANALYSIS – SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	INEWRET2	80.3743	12.1127	50.0
2.	INEWRET4	89.8328	8.1367	50.0
3.	INEWBACH	73.9597	16.1252	50.0
4.	INEWALDG	81.1444	11.9950	50.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
INEWRET2	244.9369	846.7409	.5674	.6672
INEWRET4	235.4785	994.7753	.6478	.6697
INEWBACH	251.3515	617.0873	.6445	.6327
INEWALDG	244.1668	945.1541	.4128	.7494

Reliability Coefficients

N of Cases = 50.0 N of Items = 4

Alpha = .7431

Appendix A-5

Benefits

Correlations – Benefits Raw Scores

		Percent of Population Age 25-65 With a Bachelor's Degree or Greater: 1996-1998 (30%)	Average Percentage of Eligible Population Voting, November 1996-98 (12.5%)	Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)	Prevalence of Giving: 1997 (12.5%)	Percent of Population with Quantitative Literacy Level 4 or 5: 1992 (6.7%)	Percent of Population with Document Literacy Level 4 or 5: 1992 (6.6%)	Percent of Population with Prose Literacy Level 4 or 5: 1992 (6.7%)
Percent of Population Age 25-65 With a Bachelor's Degree or Greater: 1996-1998 (30%)	Pearson Correlation	1.000	.192	.625**	.451**	.471*	.529**	.503**
	Sig. (2-tailed)	.	.181	.000	.001	.012	.004	.006
	N	50	50	50	50	28	28	28
Average Percentage of Eligible Population Voting, November 1996-98 (12.5%)	Pearson Correlation	.192	1.000	-.183	-.157	.426*	.321	.394*
	Sig. (2-tailed)	.181	.	.203	.277	.024	.095	.038
	N	50	50	50	50	28	28	28
Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)	Pearson Correlation	.625**	-.183	1.000	.498**	.259	.334	.280
	Sig. (2-tailed)	.000	.203	.	.000	.183	.083	.148
	N	50	50	50	50	28	28	28
Prevalence of Giving: 1997 (12.5%)	Pearson Correlation	.451**	-.157	.498**	1.000	.069	.090	.071
	Sig. (2-tailed)	.001	.277	.000	.	.728	.648	.719
	N	50	50	50	50	28	28	28
Percent of Population with Quantitative Literacy Level 4 or 5: 1992 (6.7%)	Pearson Correlation	.471*	.426*	.259	.069	1.000	.941**	.968**
	Sig. (2-tailed)	.012	.024	.183	.728	.	.000	.000
	N	28	28	28	28	28	28	28
Percent of Population with Document Literacy Level 4 or 5: 1992 (6.6%)	Pearson Correlation	.529**	.321	.334	.090	.941**	1.000	.969**
	Sig. (2-tailed)	.004	.095	.083	.648	.000	.	.000
	N	28	28	28	28	28	28	28
Percent of Population with Prose Literacy Level 4 or 5: 1992 (6.7%)	Pearson Correlation	.503**	.394*	.280	.071	.968**	.969**	1.000
	Sig. (2-tailed)	.006	.038	.148	.719	.000	.000	.
	N	28	28	28	28	28	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations – Benefits Index Scores

		Index Score - Percent 25-65 with Bachelors or More	Index Score - Percent Voting	Index Score - Economic Benefit of BA	Index Score - Prevalence of Giving	Index Score - Percent Quant Literacy 4-5	Index Score - Percent Document Literacy 4-5	Index Score - Percent Prose Literacy 4-5
Index Score - Percent 25-65 with Bachelors or More	Pearson Correlation	1.000	.192	.625**	.451**	.529**	.593**	.561**
	Sig. (2-tailed)	.	.181	.000	.001	.000	.000	.000
	N	50	50	50	50	50	50	50
Index Score - Percent Voting	Pearson Correlation	.192	1.000	-.183	-.157	.281*	.331*	.311*
	Sig. (2-tailed)	.181	.	.203	.277	.048	.019	.028
	N	50	50	50	50	50	50	50
Index Score - Economic Benefit of BA	Pearson Correlation	.625**	-.183	1.000	.498**	.373**	.388**	.369**
	Sig. (2-tailed)	.000	.203	.	.000	.008	.005	.008
	N	50	50	50	50	50	50	50
Index Score - Prevalence of Giving	Pearson Correlation	.451**	-.157	.498**	1.000	.145	.144	.138
	Sig. (2-tailed)	.001	.277	.000	.	.314	.320	.341
	N	50	50	50	50	50	50	50
Index Score - Percent Quant Literacy 4-5	Pearson Correlation	.529**	.281*	.373**	.145	1.000	.912**	.965**
	Sig. (2-tailed)	.000	.048	.008	.314	.	.000	.000
	N	50	50	50	50	50	50	50
Index Score - Percent Document Literacy 4-5	Pearson Correlation	.593**	.331*	.388**	.144	.912**	1.000	.961**
	Sig. (2-tailed)	.000	.019	.005	.320	.000	.	.000
	N	50	50	50	50	50	50	50
Index Score - Percent Prose Literacy 4-5	Pearson Correlation	.561**	.311*	.369**	.138	.965**	.961**	1.000
	Sig. (2-tailed)	.000	.028	.008	.341	.000	.000	.
	N	50	50	50	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Reliability Analysis – Benefits

RELIABILITY ANALYSIS – SCALE (ALPHA)

		Mean	Std Dev	Cases
1.	E2565BAI	77.2107	13.1481	50.0
2.	EPOPVOTI	83.7977	9.5505	50.0
3.	EECONI	75.1829	15.2725	50.0
4.	EGIVINGI	95.0508	3.4394	50.0
5.	EQUANTI	80.3303	20.0688	50.0
6.	EDOCUI	74.3180	19.8608	50.0
7.	EPROSEI	77.6514	20.6822	50.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
E2565BAI	486.3310	4979.8261	.6652	.8238
EPOPVOTI	479.7440	5955.4914	.2310	.8690
EECONI	488.3589	5206.6562	.4298	.8541
EGIVINGI	468.4909	6233.2700	.2616	.8684
EQUANTI	483.2114	3820.7944	.8721	.7819
EDOCUI	489.2237	3785.9175	.9029	.7754
EPROSEI	485.8904	3688.0476	.9042	.7749

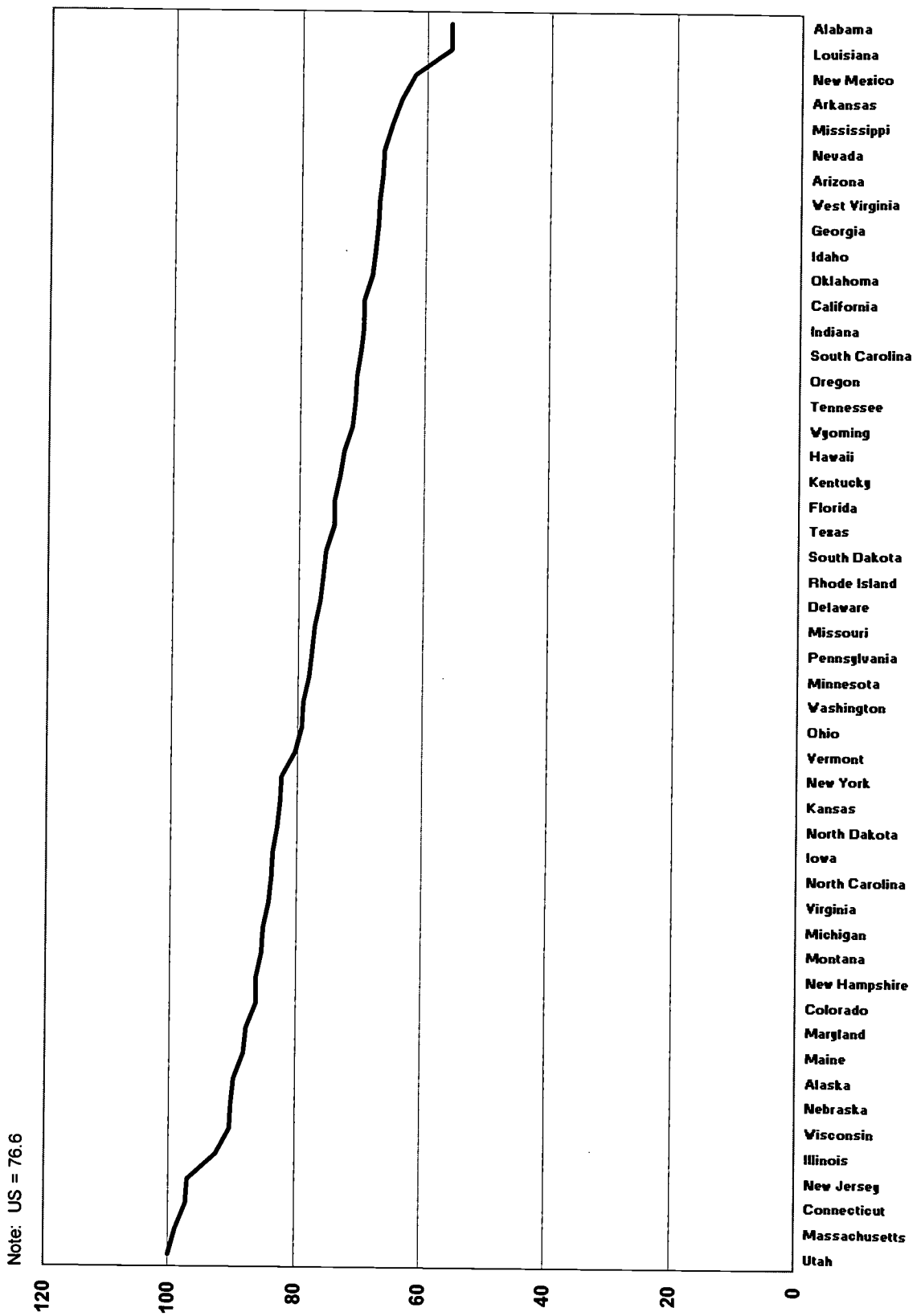
Reliability Coefficients

N of Cases = 50.0 N of Items = 7

Alpha = .8499

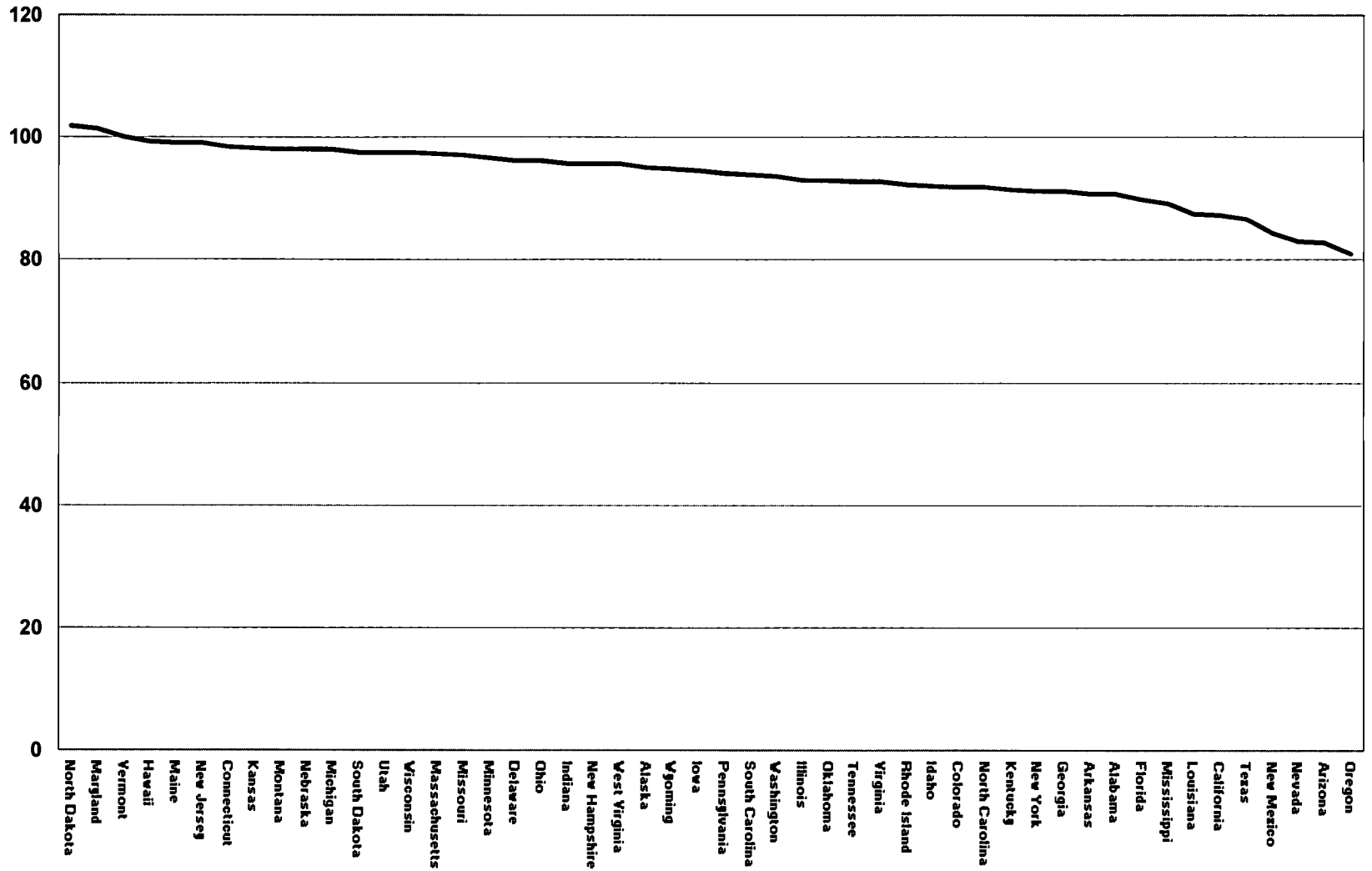
Appendix B

Distributions of all Grade Measures


Final Index Scores - Preparation
Note: US = 76.6
120
100
80
60
40
20
0
Alabama
Louisiana
New Mexico
Arkansas
Mississippi
Nevada
Arizona
West Virginia
Georgia
Idaho
Oklahoma
California
Indiana
South Carolina
Oregon
Tennessee
Wyoming
Hawaii
Kentucky
Florida
Texas
South Dakota
Rhode Island
Delaware
Missouri
Pennsylvania
Minnesota
Washington
Ohio
Vermont
New York
Kansas
North Dakota
Iowa
North Carolina
Virginia
Michigan
Montana
New Hampshire
Colorado
Maryland
Maine
Alaska
Nebraska
Wisconsin
Illinois
New Jersey
Connecticut
Massachusetts
Utah

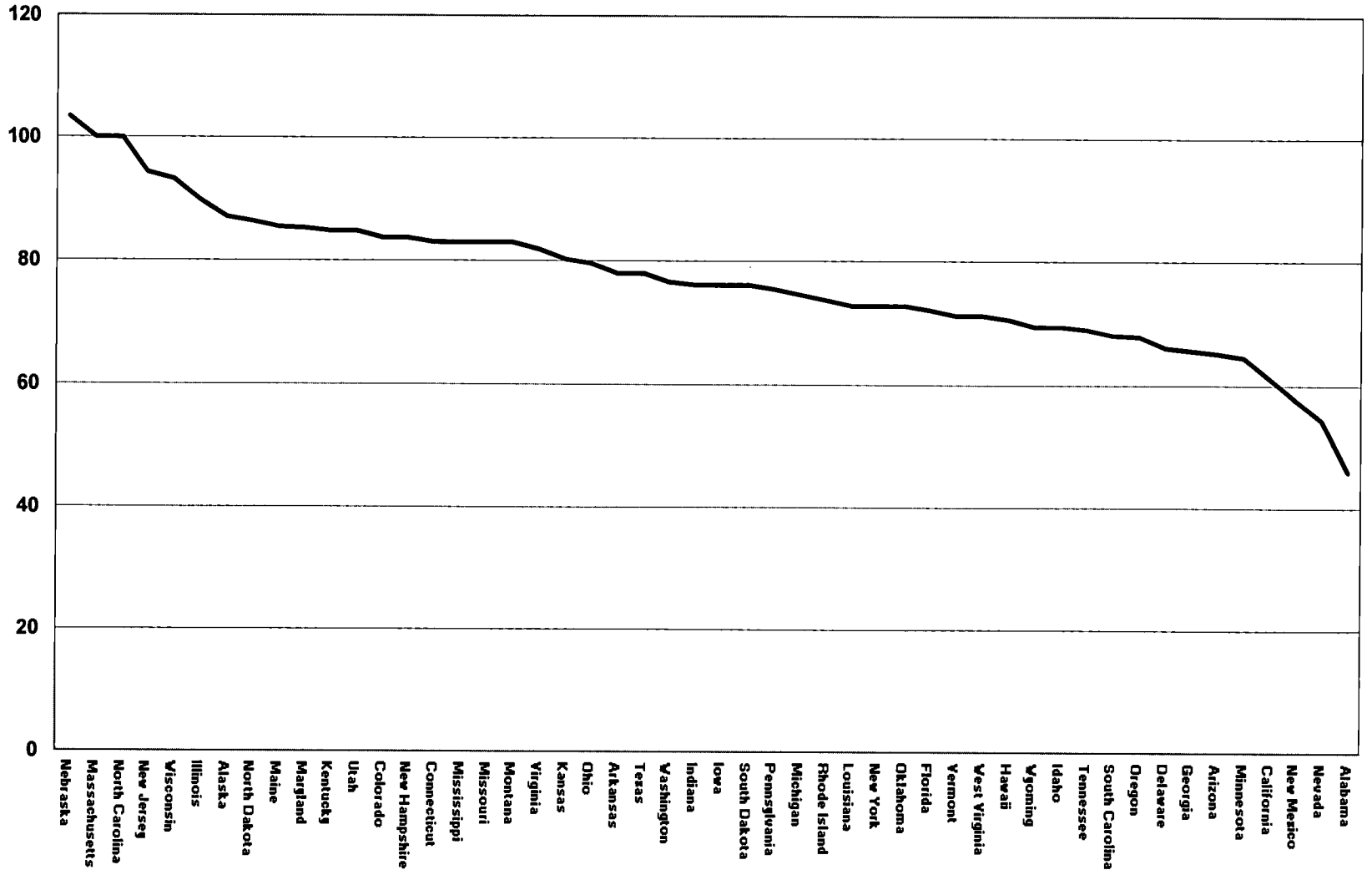
Percent of 18-24 Year-Olds with a High School Credential, 1996-1998
Index Scores

Note: US = 92.1

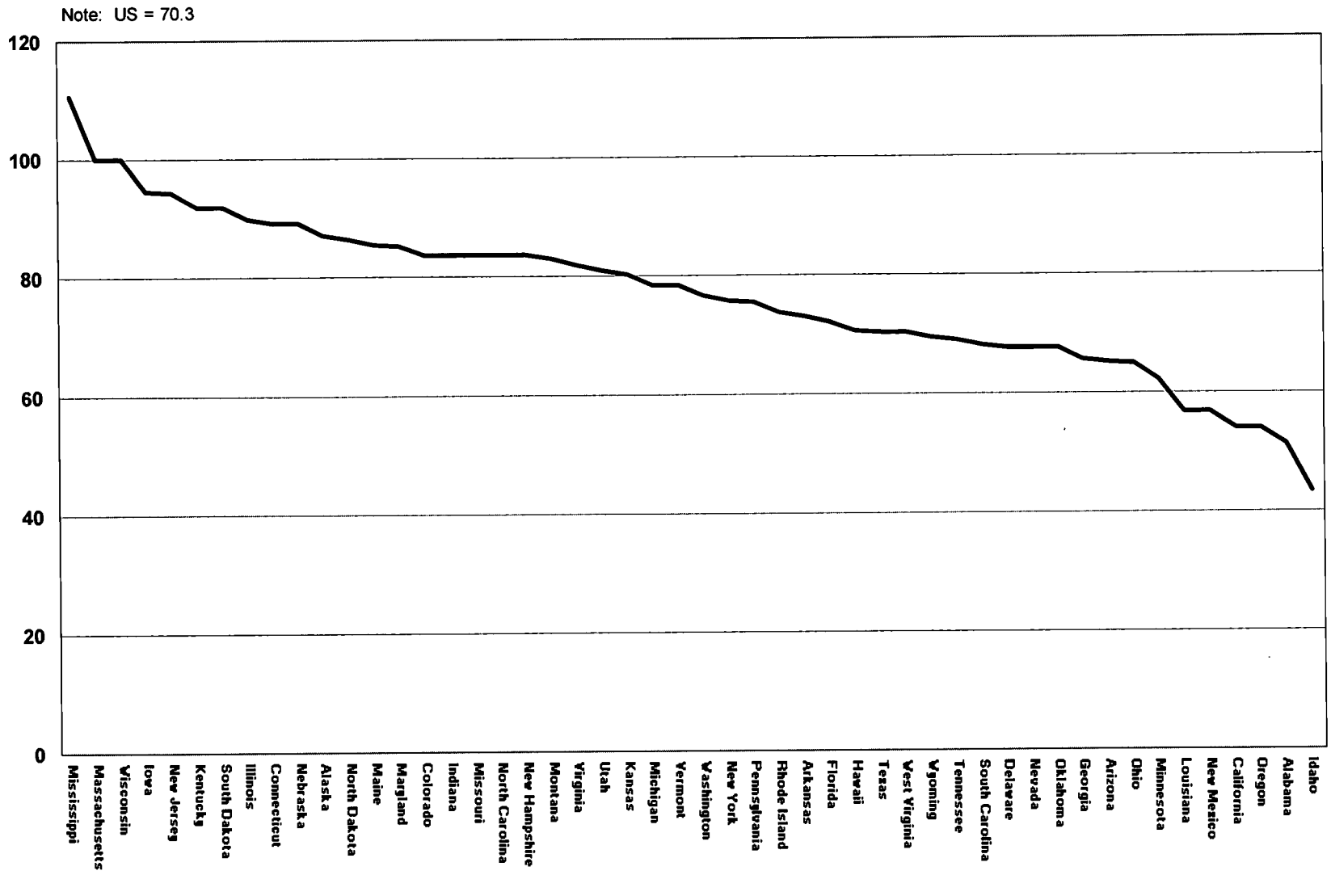


Percent of Students Grades 9-12 Taking Upper-Level Math, 1998
Index Scores

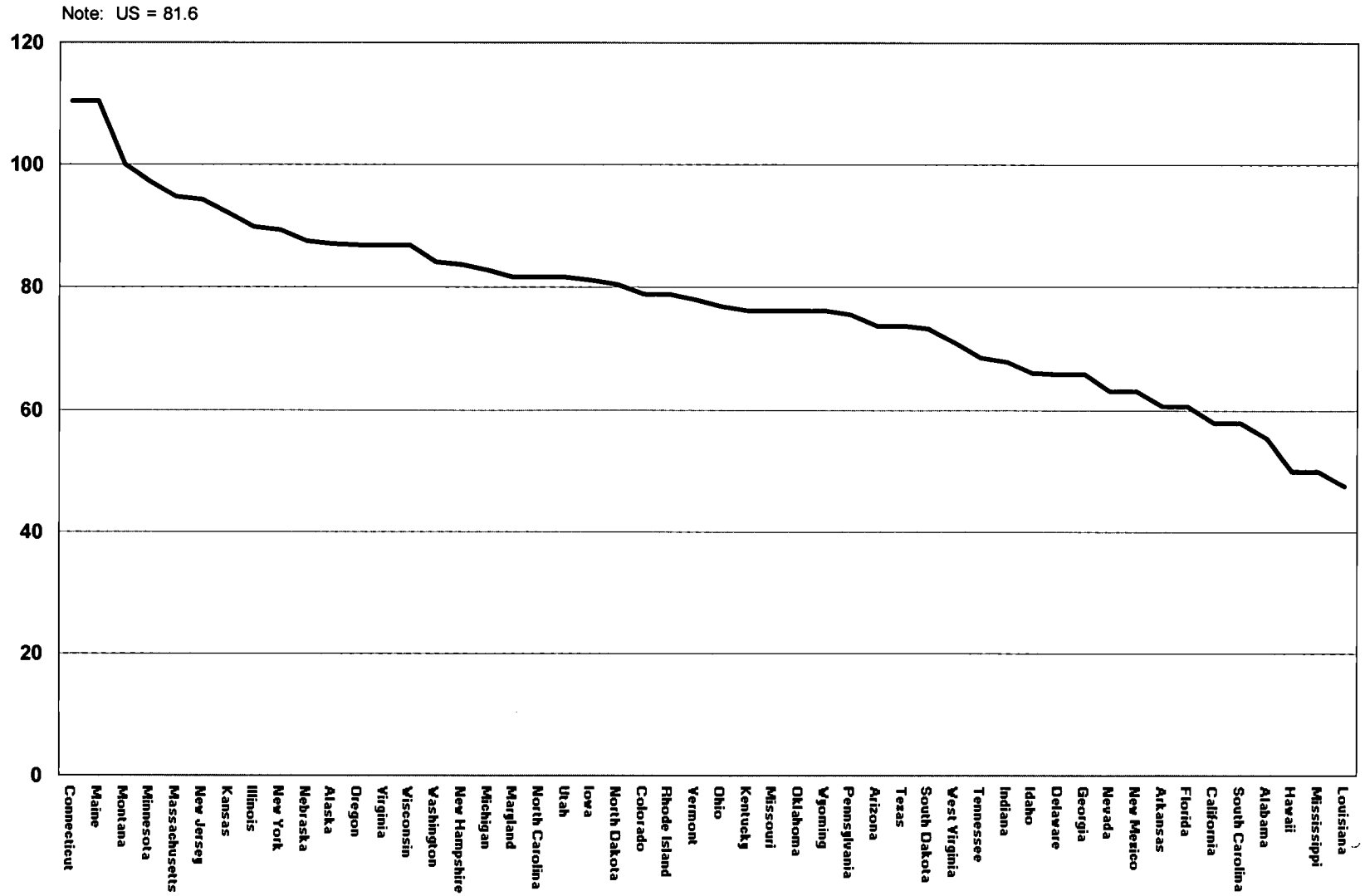
Note: US = 76.3



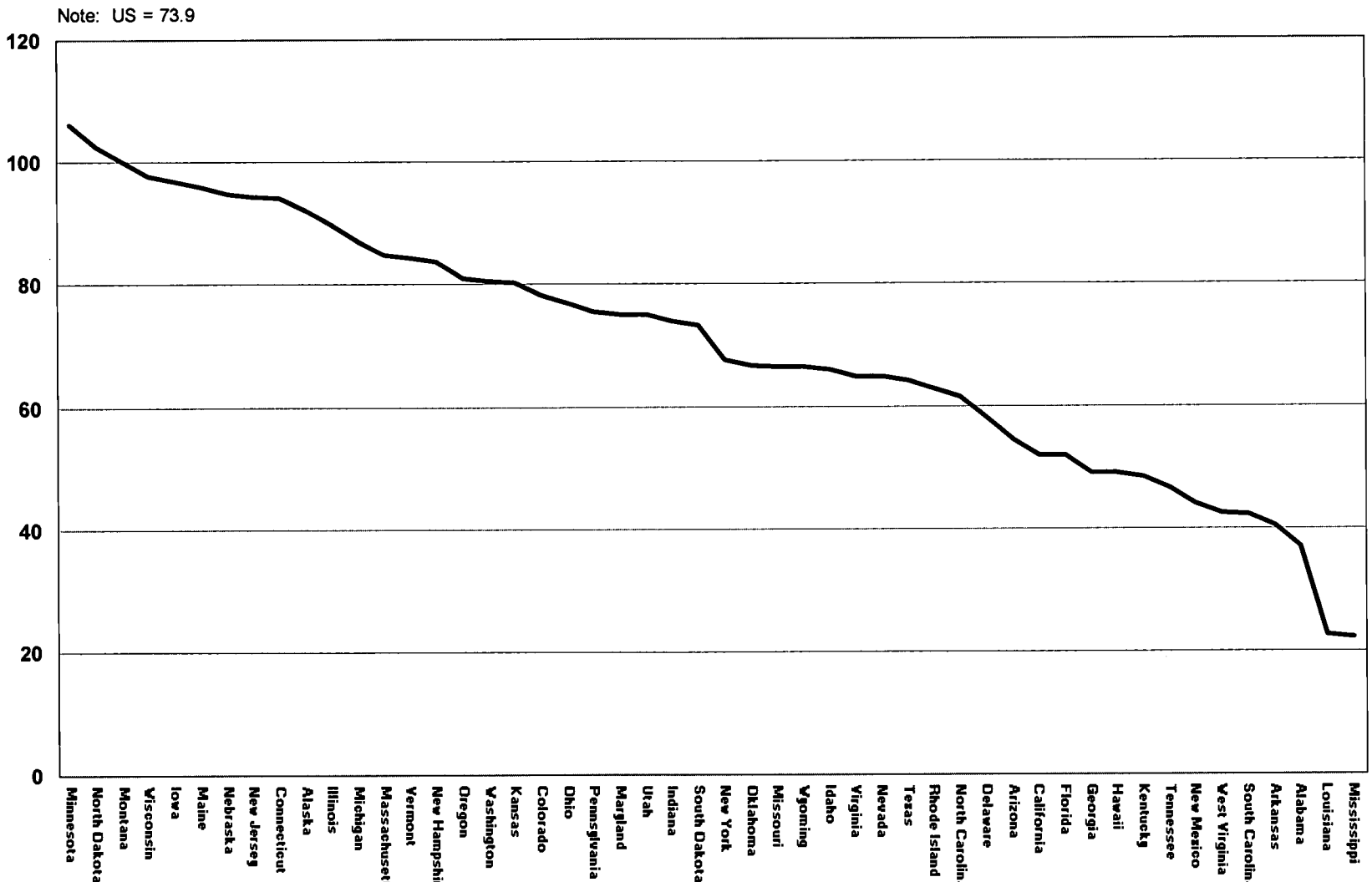
Percent of Students Grades 9-12 Taking Upper-Level Science, 1998
Index Scores



Percent of 8th Graders Scoring at or Above Proficient on the NAEP Reading Exam, 1998 - Index Scores

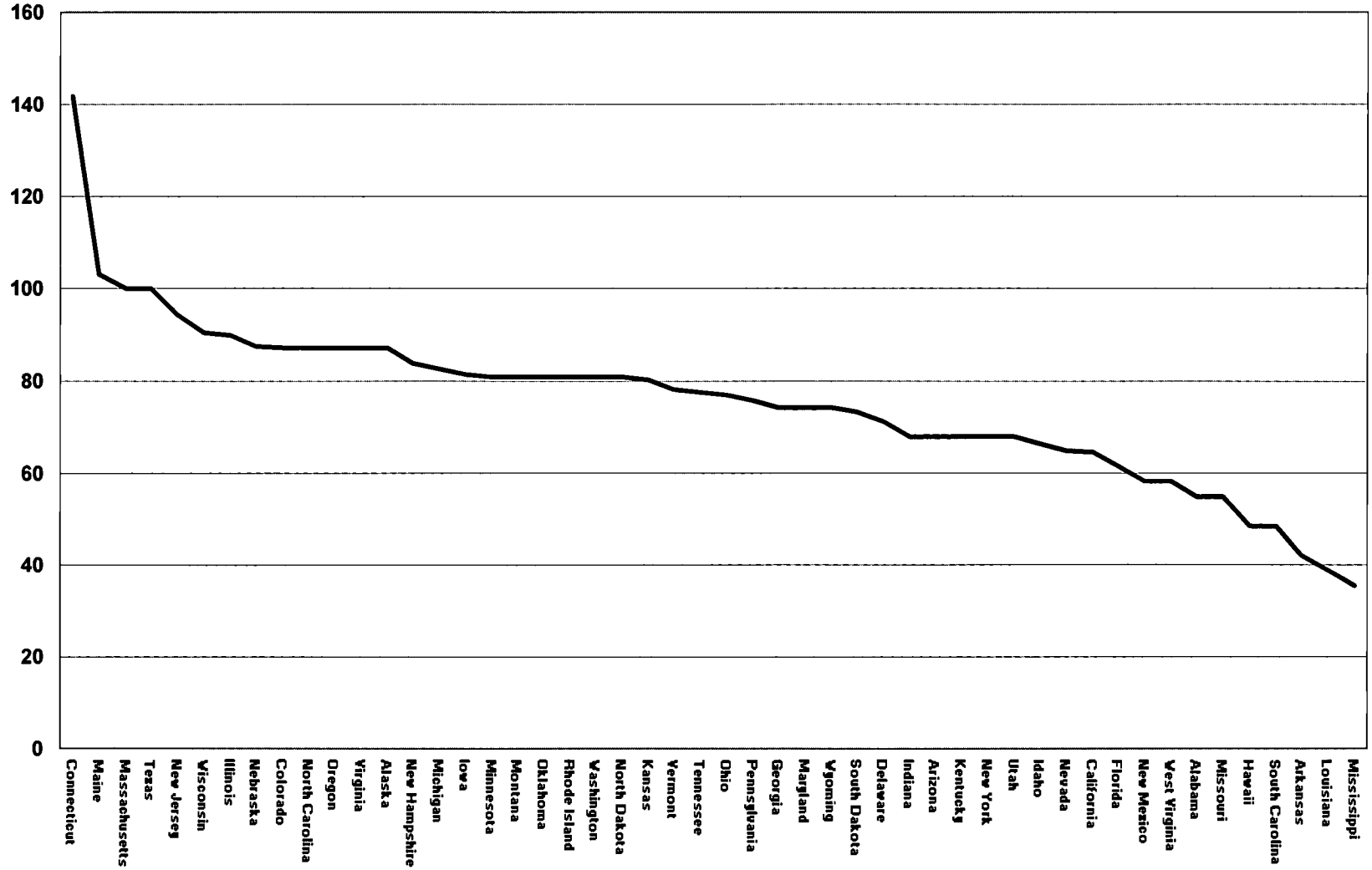


Percent of 8th Graders Scoring at or Above Proficient on the NAEP Math Exam, 1998 - Index Scores

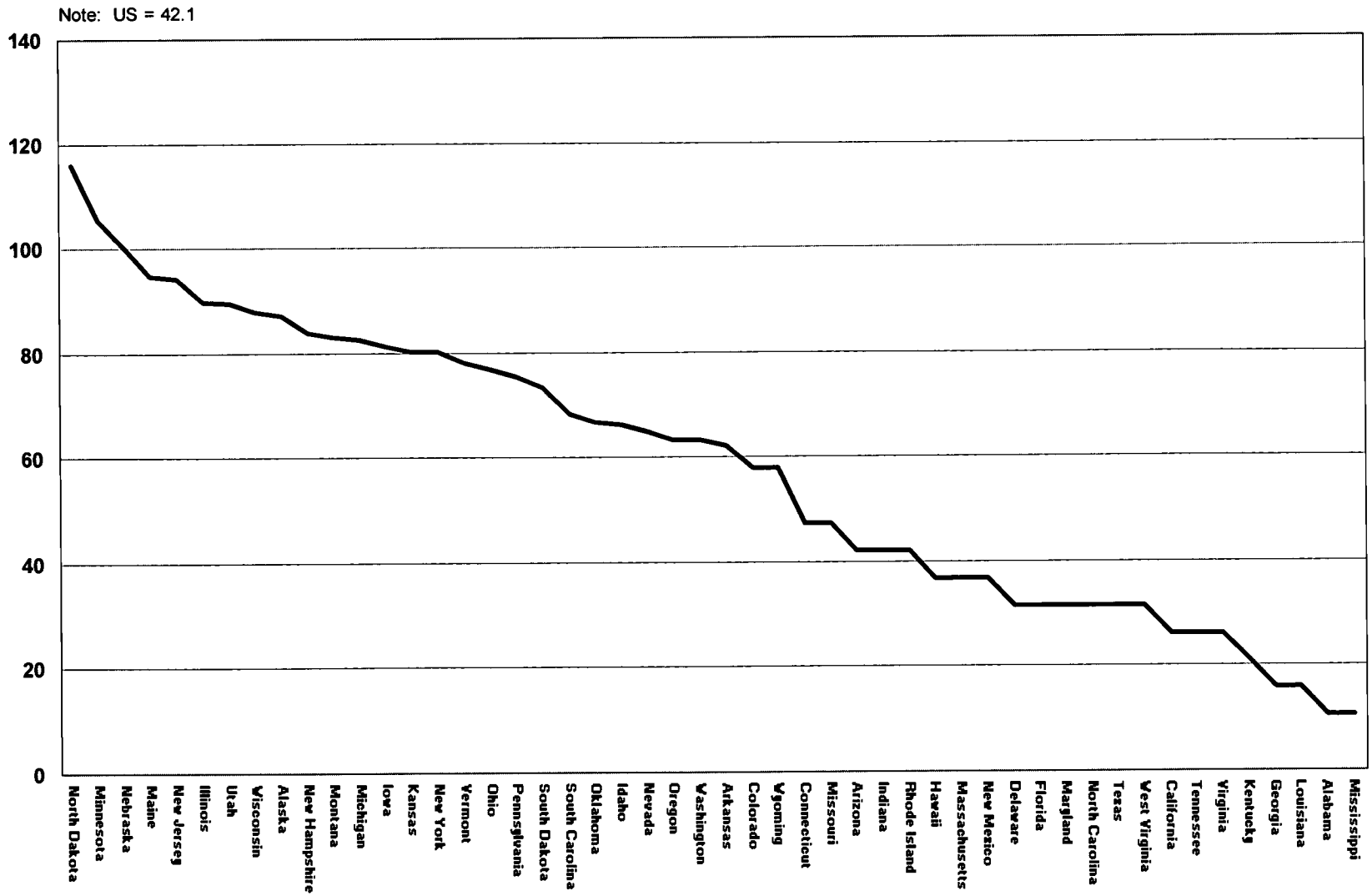


Percent of 8th Graders Scoring at or Above Proficient on the NAEP Writing Exam, 1998 - Index Scores

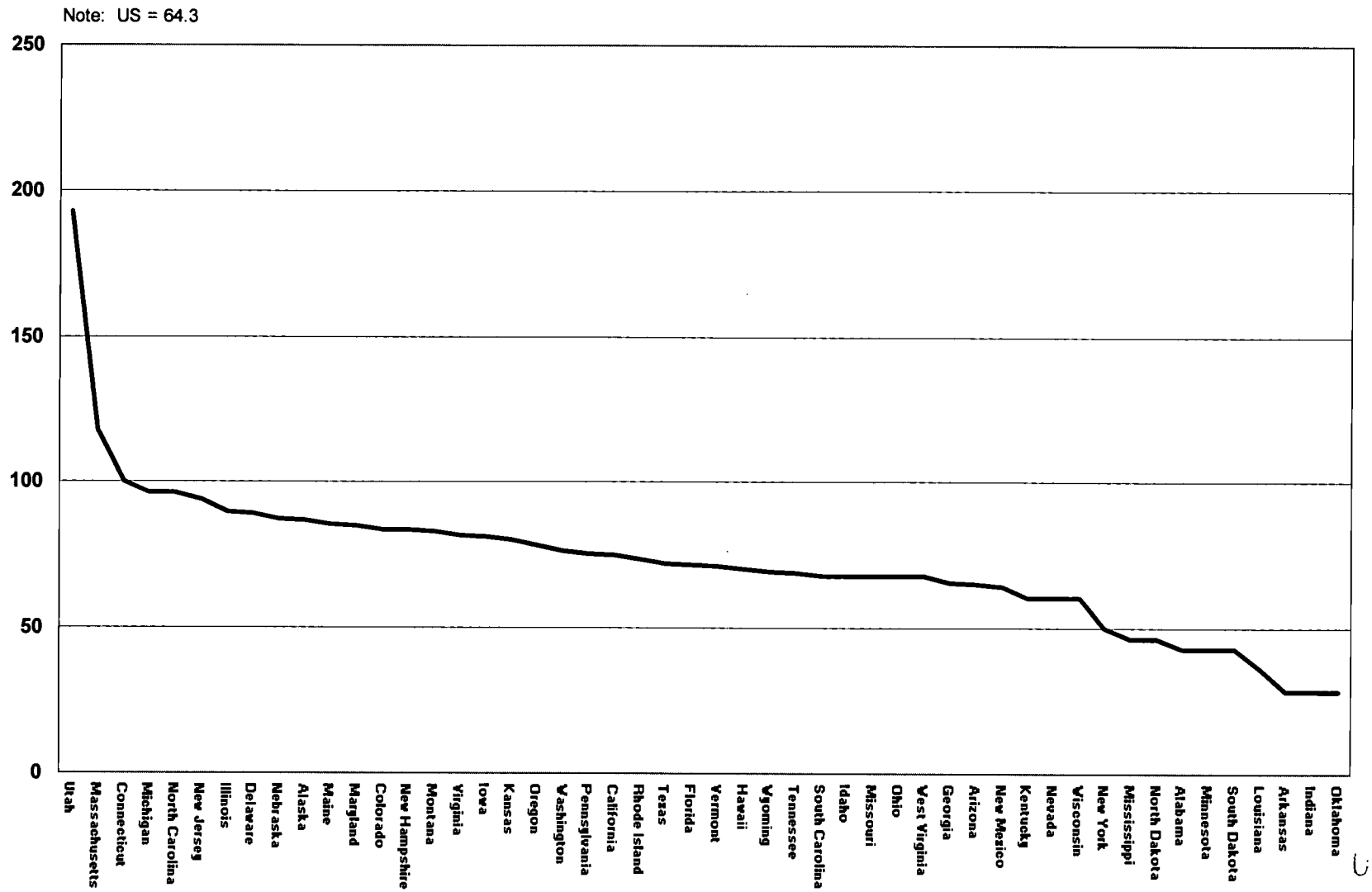
Note: US = 77.4



Percent of Low Income 8th Graders Scoring at or Above Proficient on the NAEP Math Exam - Index Scores

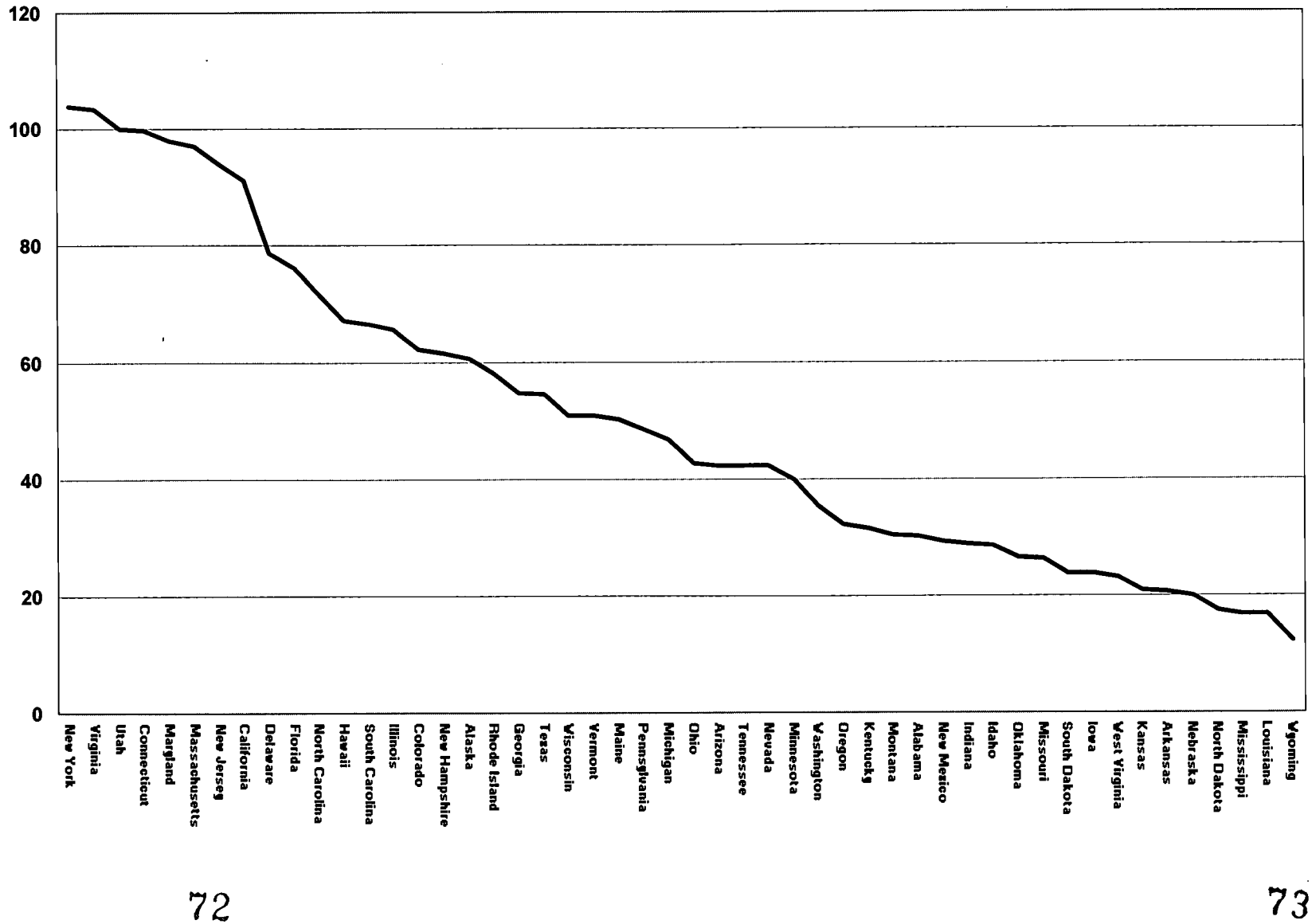


Percent of 8th Graders Who Have Taken Algebra, 1998
Index Scores

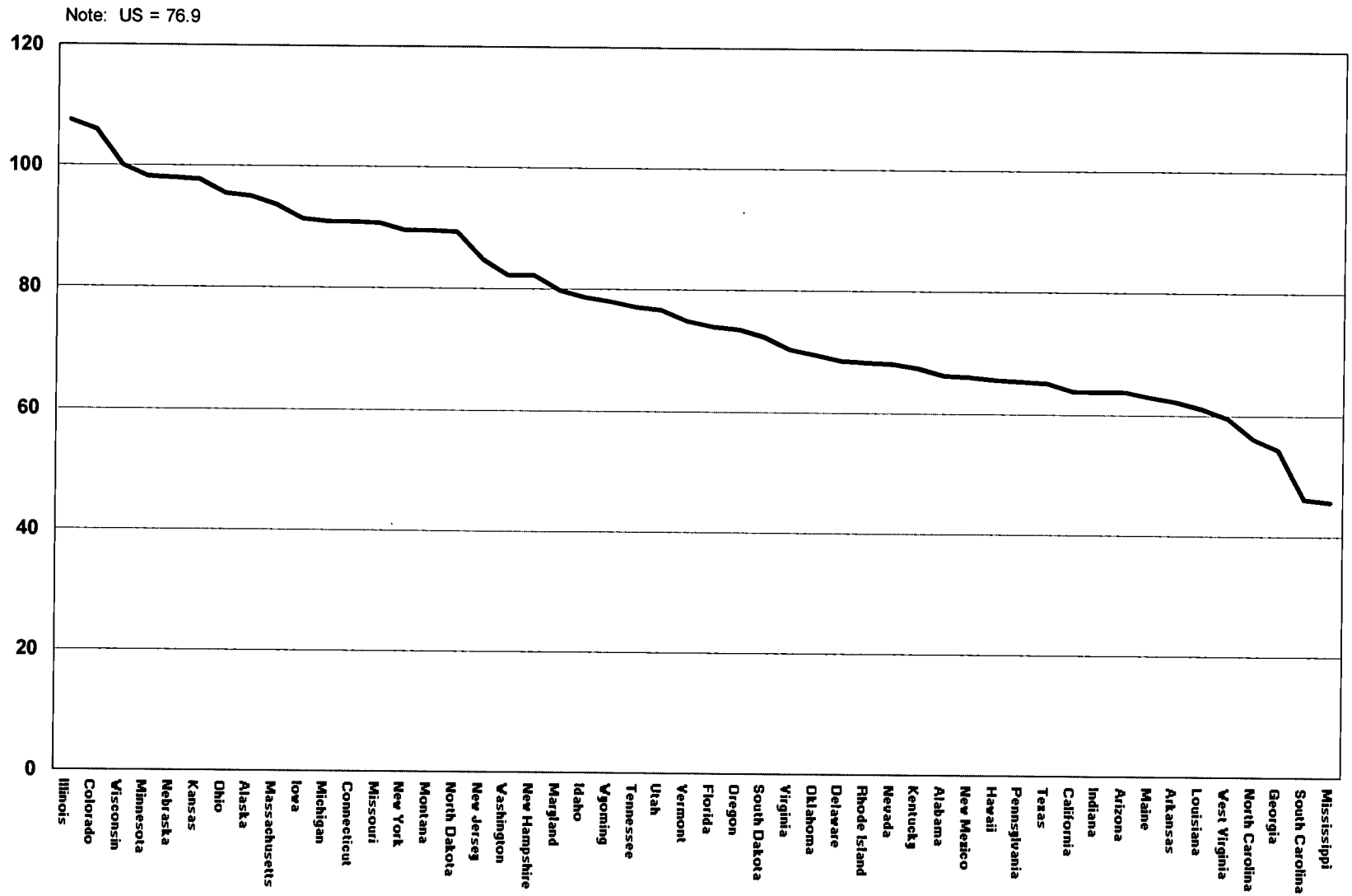


Number of AP Exams with Grades 3 or Higher Per 1000 11th and 12th Graders, 1999 - Index Scores

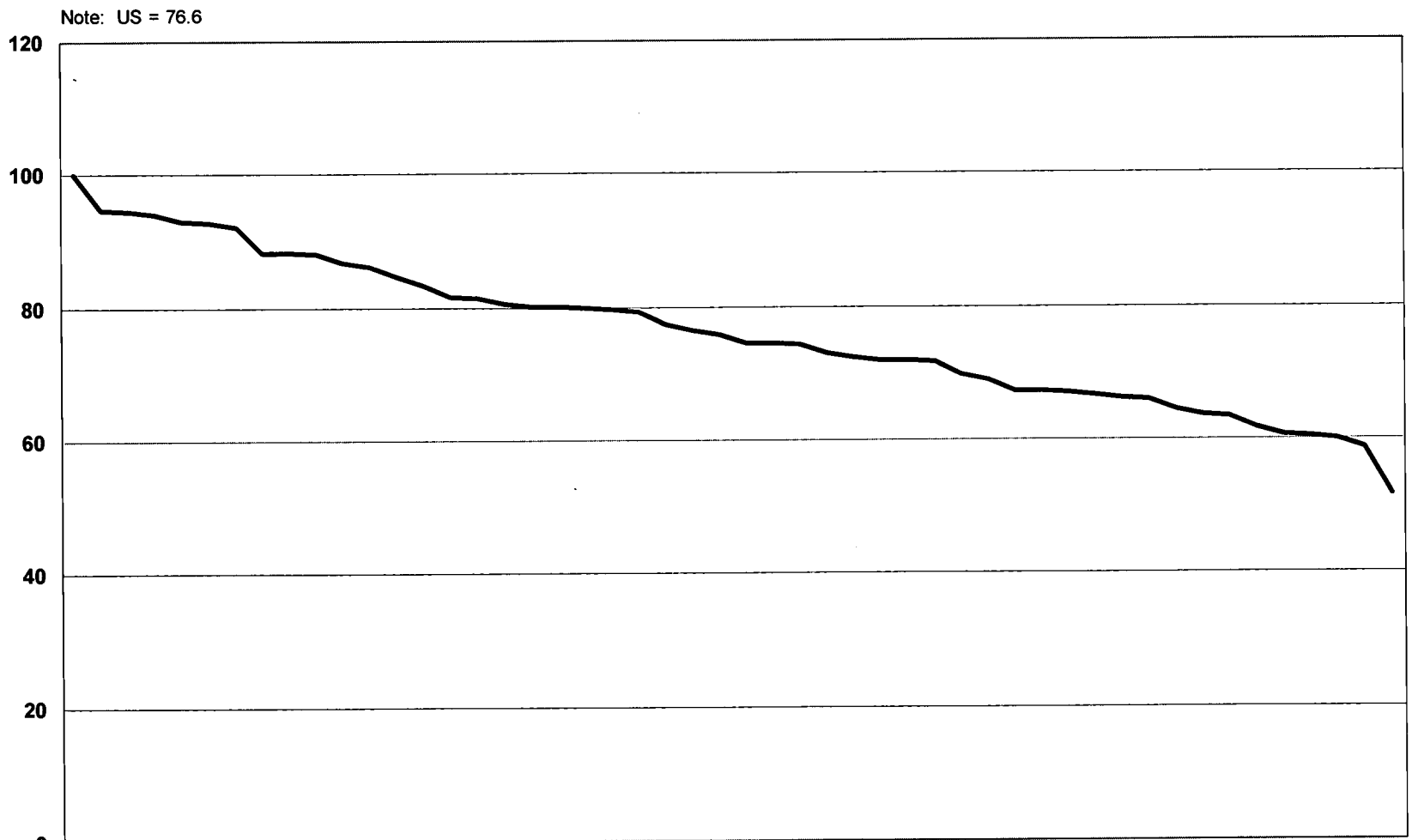
Note: US = 60.7



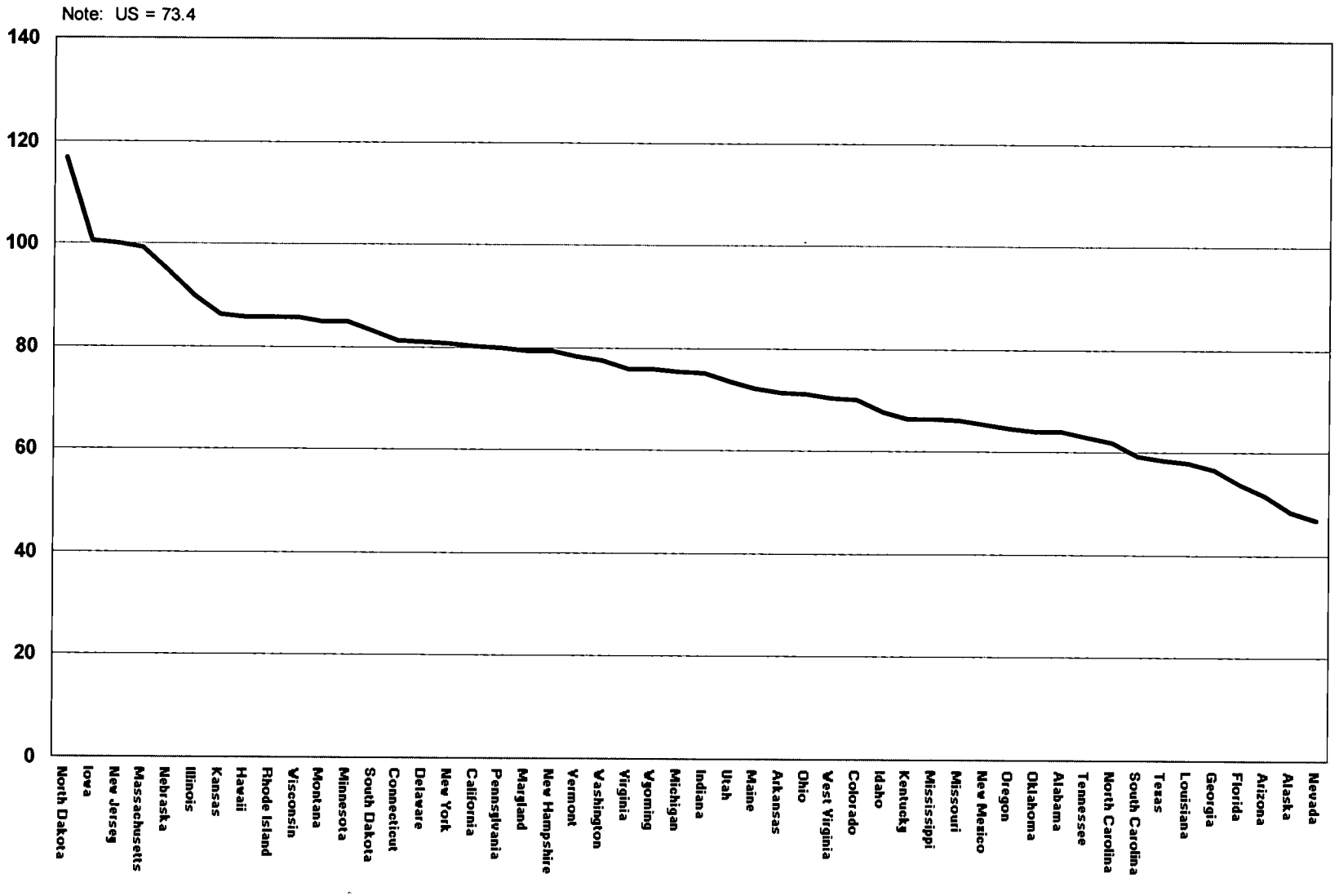
Number of 1200+ SAT or 26+ ACT Scores Per 1000 High School Graduates, 1999 - Index Scores



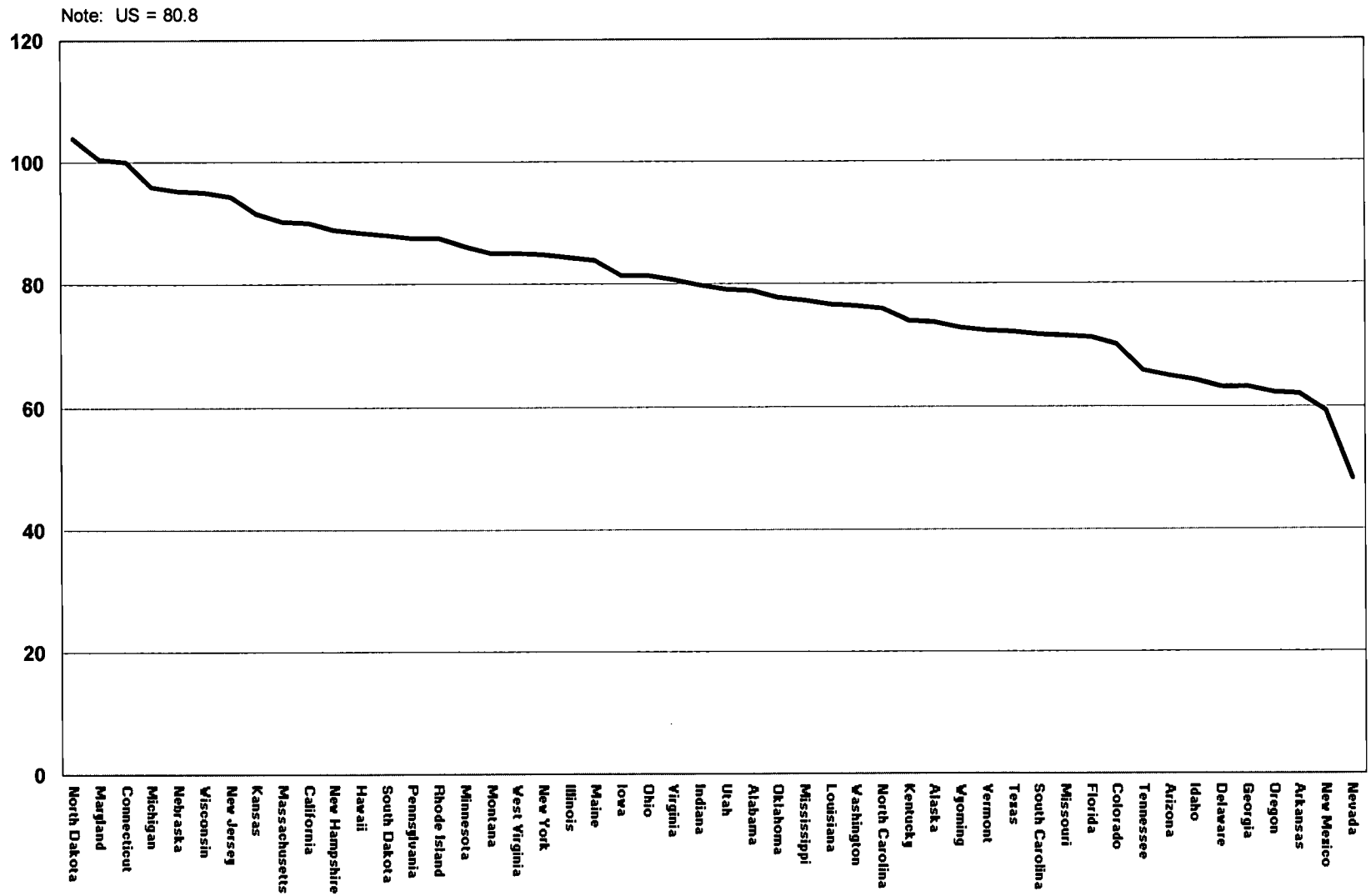
Final Index Scores - Participation



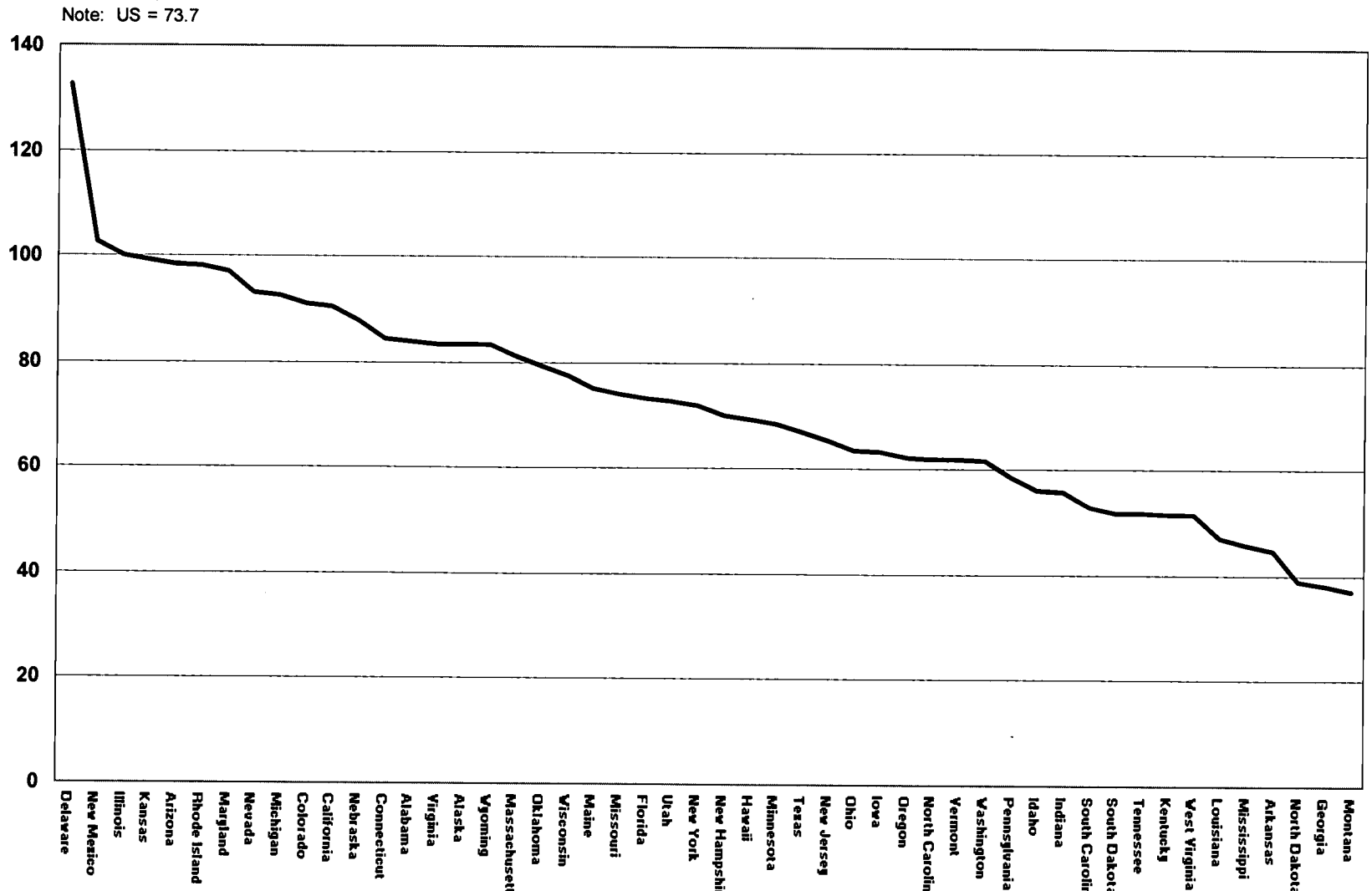
High School Students' Chance for College by Age 19, 1996
Index Scores



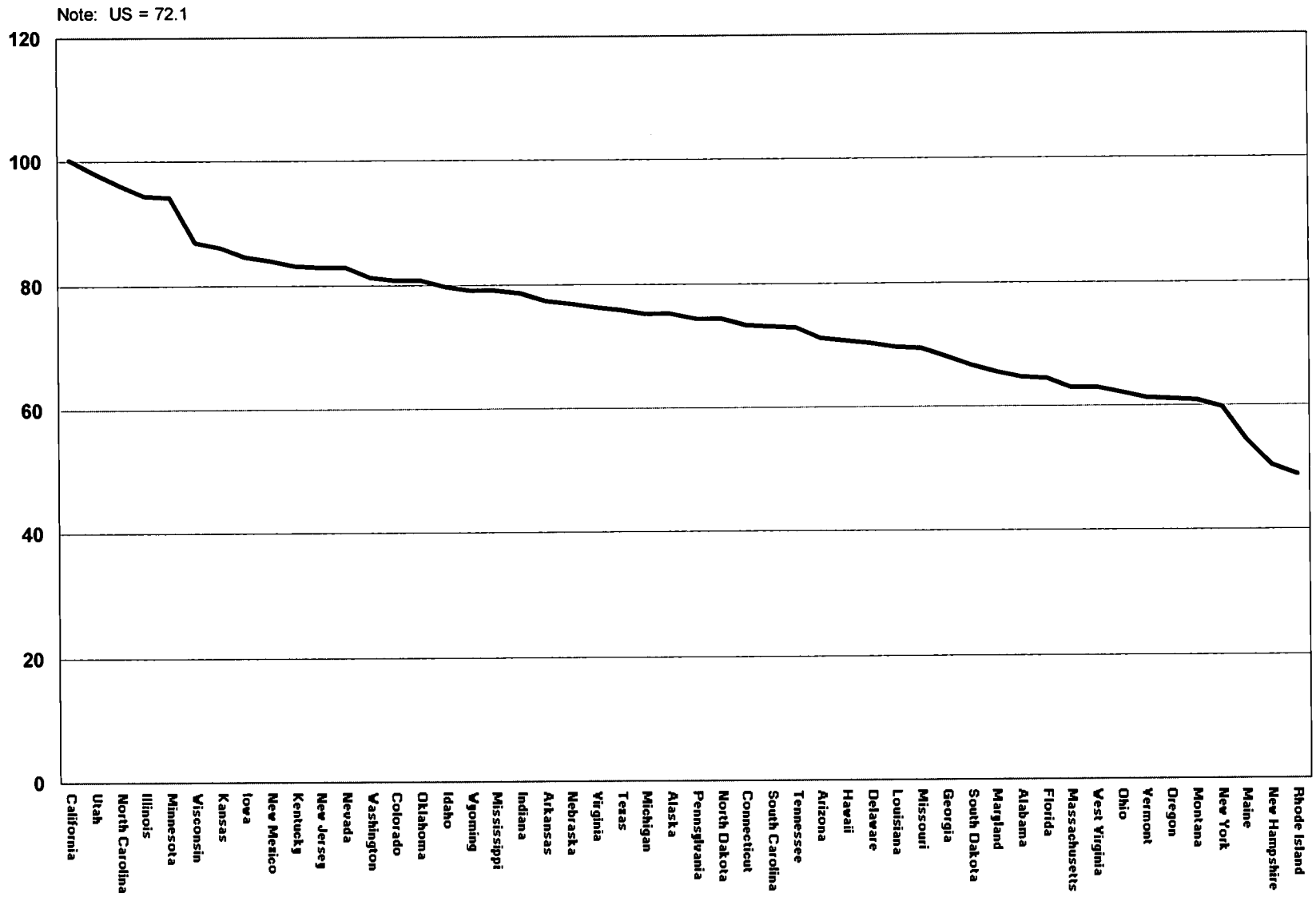
Percent of 18-24 Year-Olds Enrolled in College, 1996-1998
Index Scores



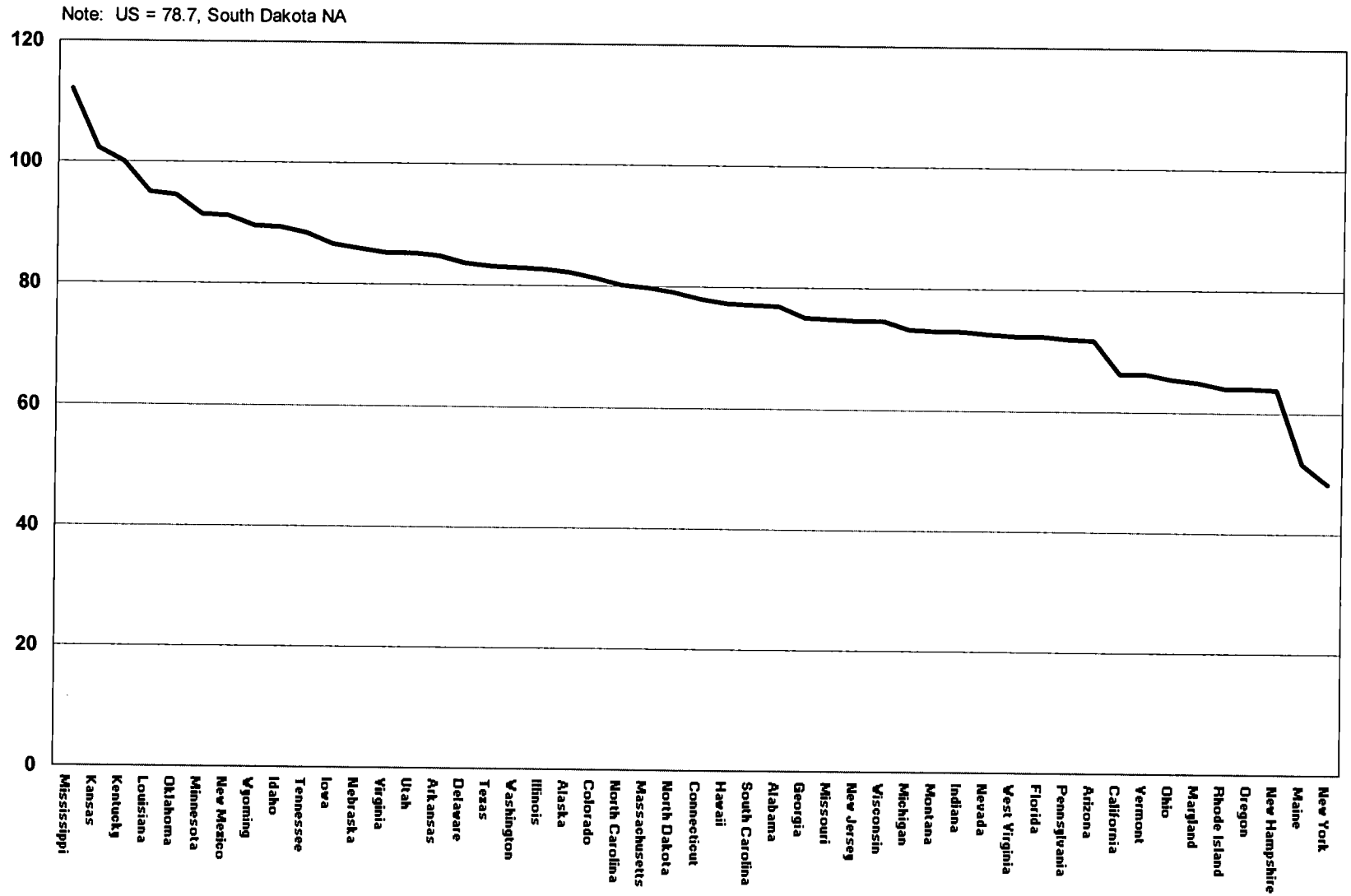
Percent of 25-44 Year-Olds Enrolled in College Part-Time, 1996-1998
Index Scores



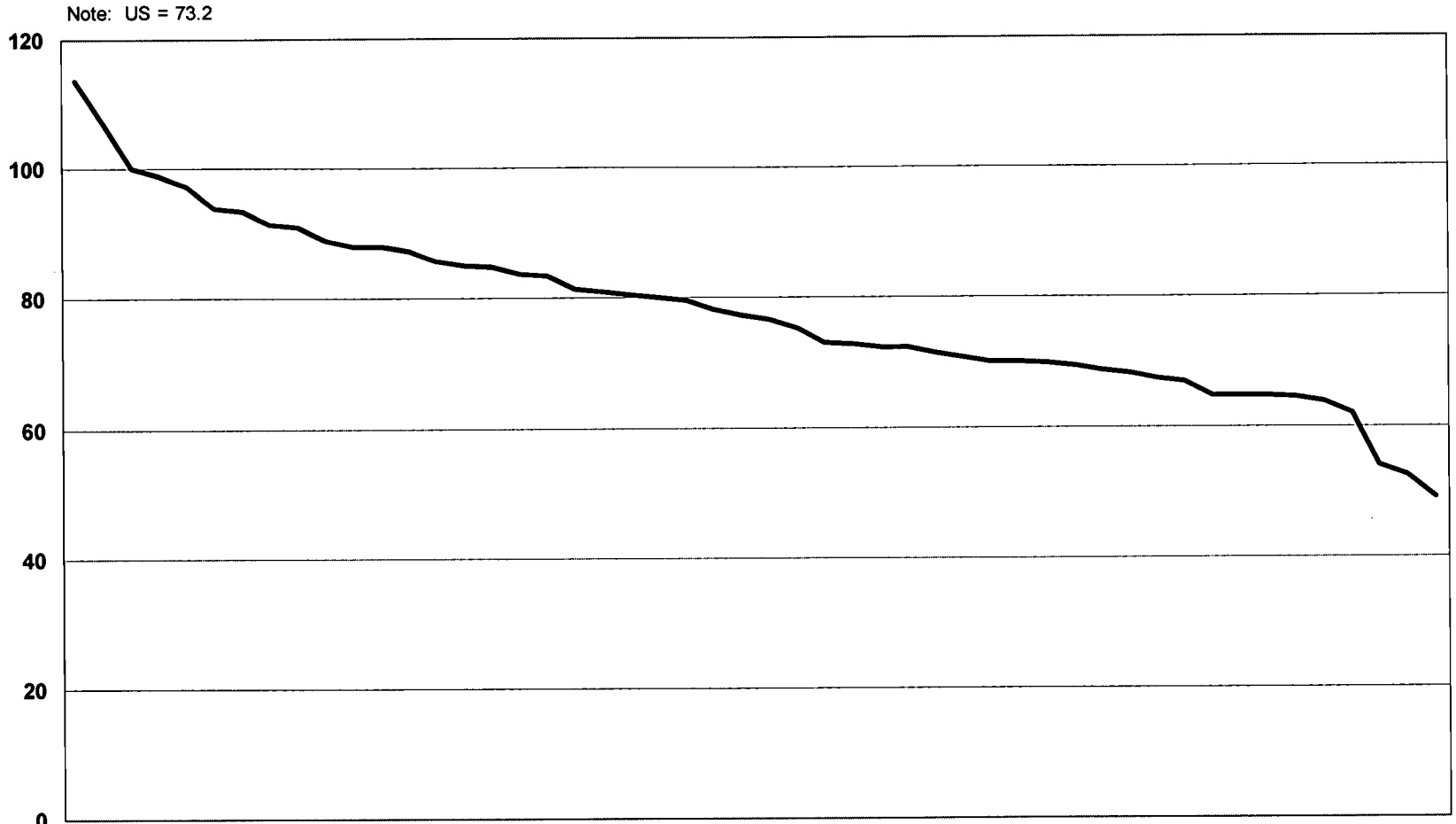
Final Index Scores - Affordability



College Expenses Less Student Aid as a Percent of Income, Community Colleges - Index Scores

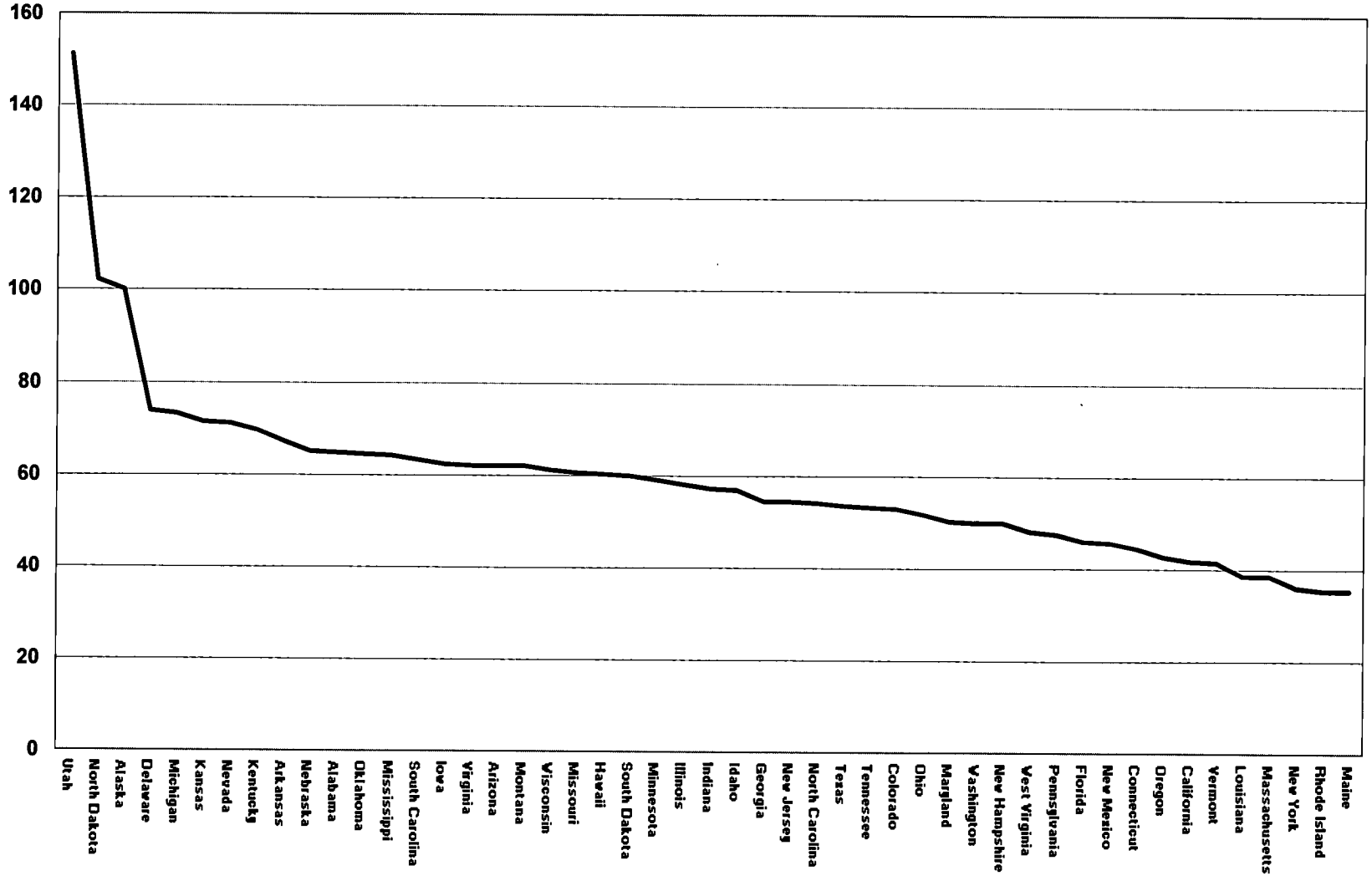


College Expenses Less Student Aid as a Percent of Income, Public 4-Year Institutions - Index Scores

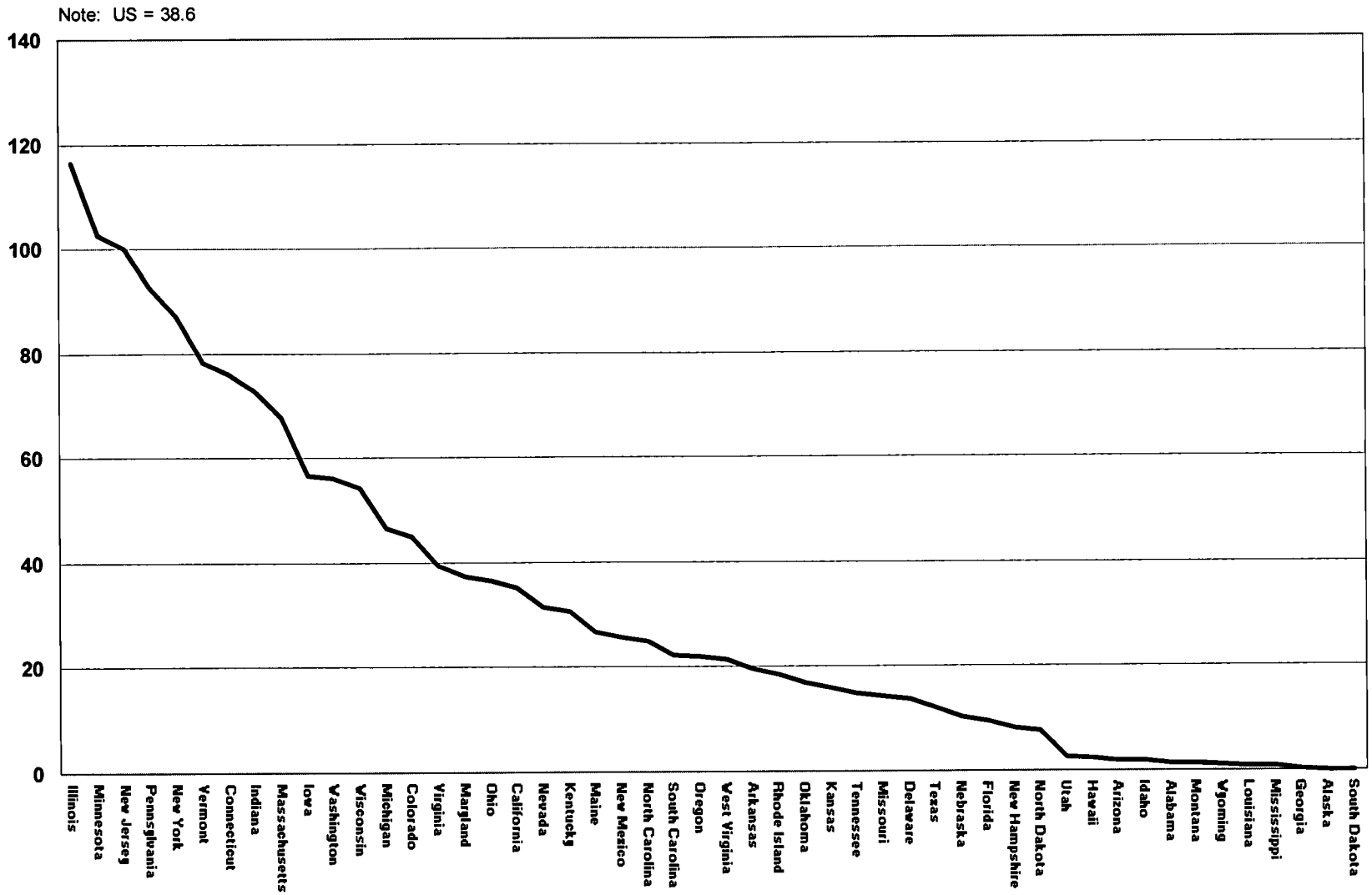


College Expenses Less Student Aid as a Percent of Income, Private 4-Year Institutions - Index Scores

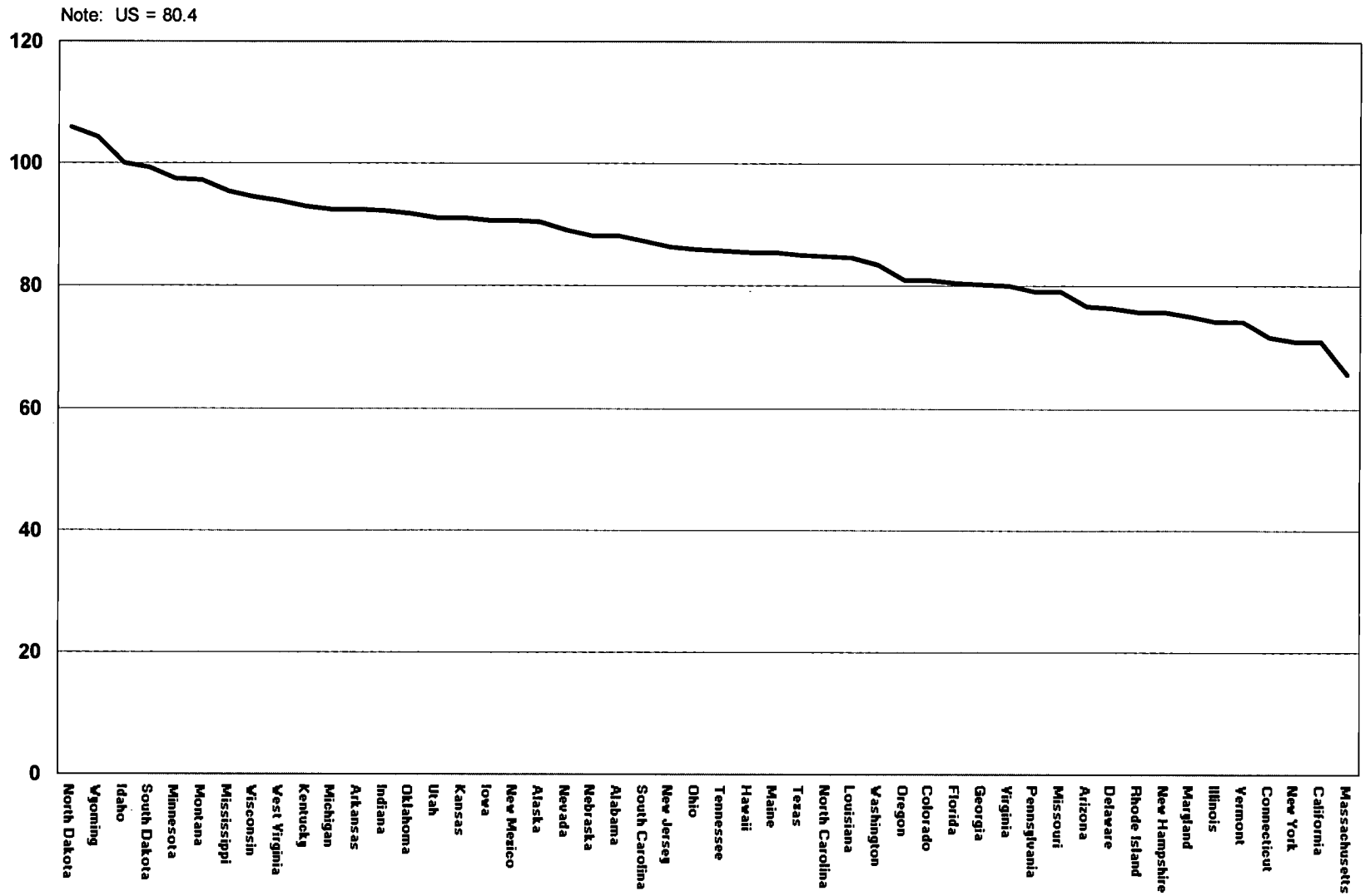
Note: US = 47.1, Wyoming NA



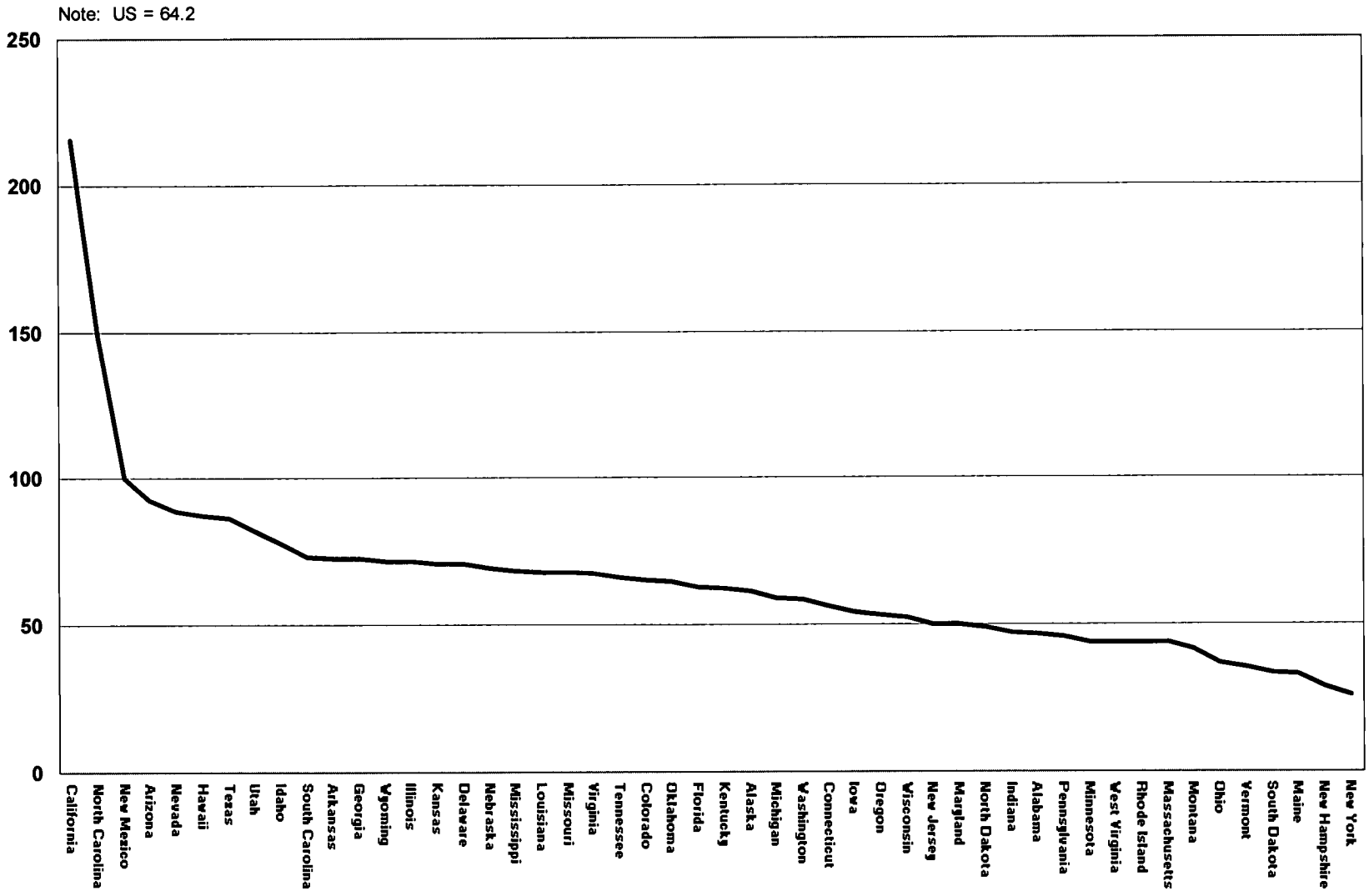
State Need-Based Grant Aid as a Percent of Federal Pell Grant Aid
1997-1998 - Index Scores

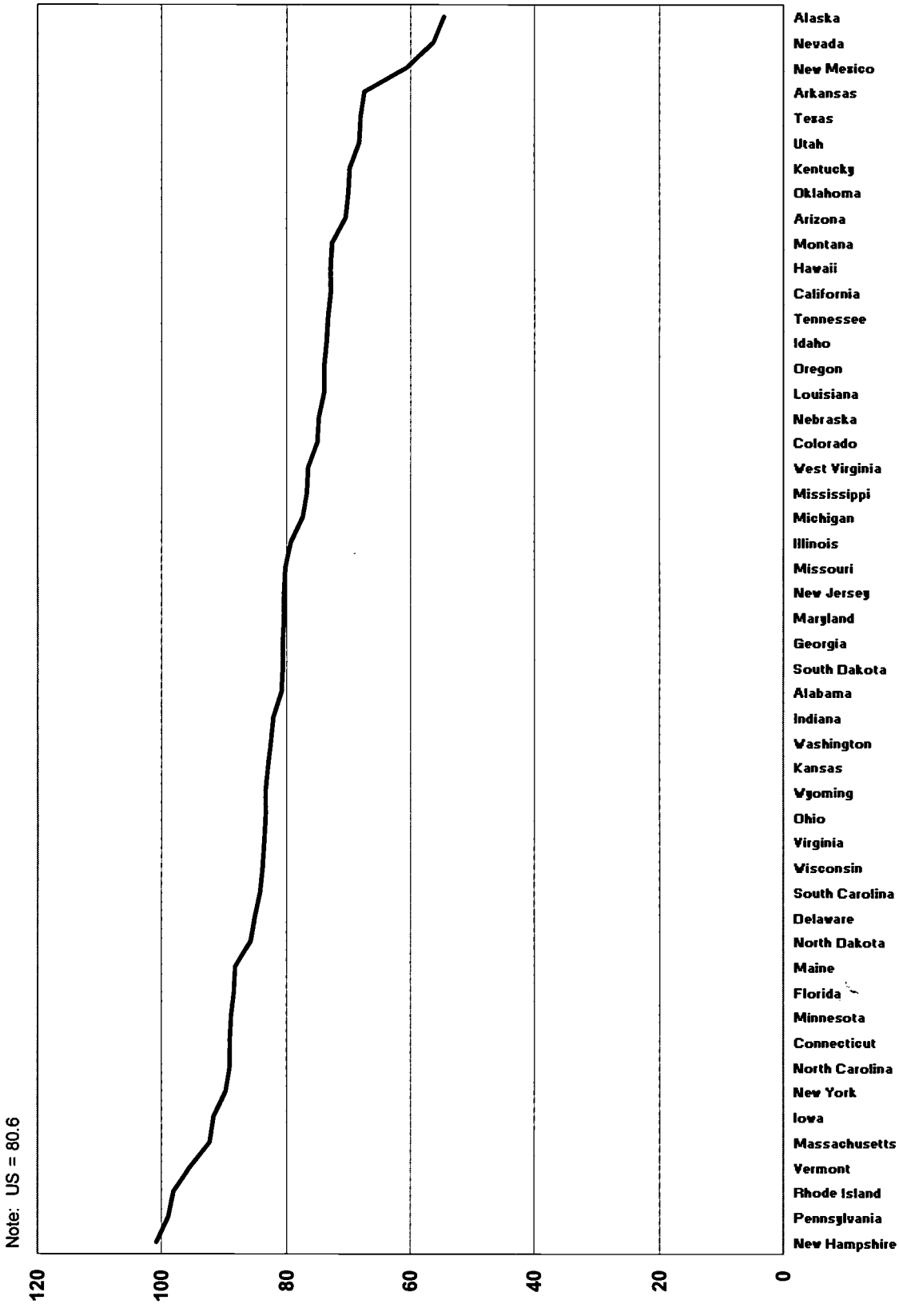


Average Federal Loan Amount 1999
Index Scores

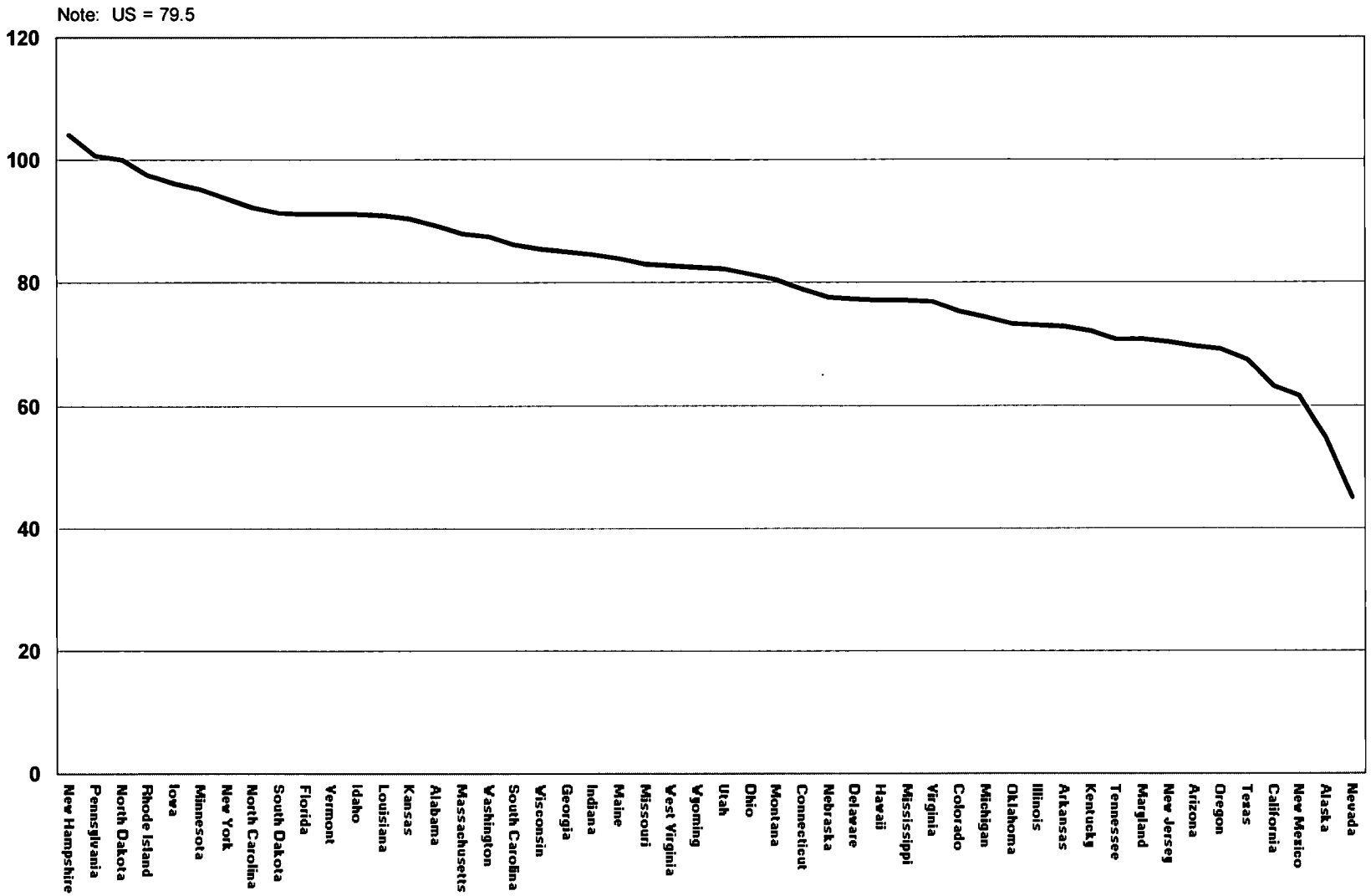


Tuition, Lowest Price Institution Relative to Median Income, Lowest Quintile, 1997 - Index Scores

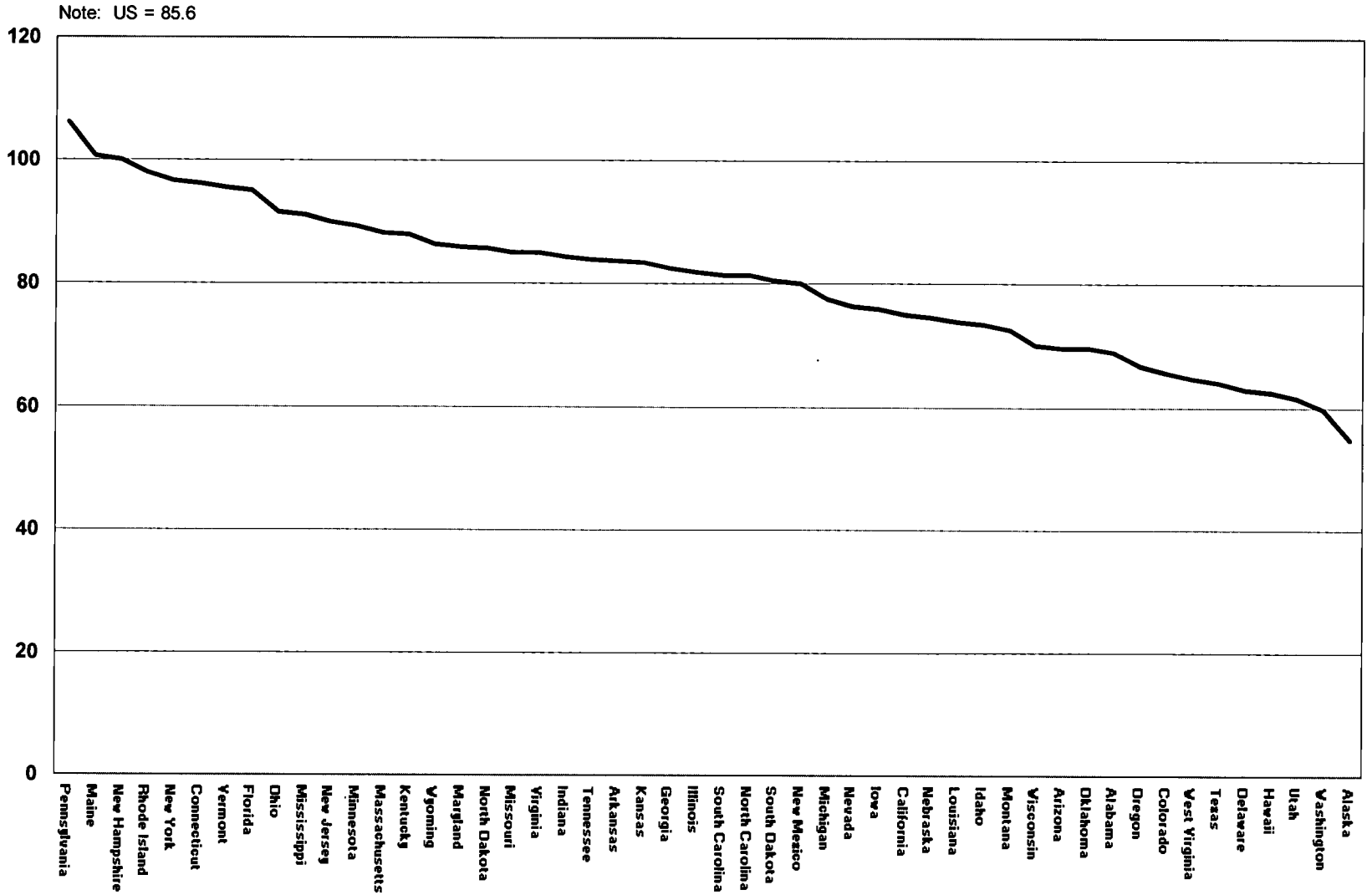



Final Index Scores - Completion
Note: US = 80.6
120
100
80
60
40
20
0
Alaska
Nevada
New Mexico
Arkansas
Texas
Utah
Kentucky
Oklahoma
Arizona
Montana
Hawaii
California
Tennessee
Idaho
Oregon
Louisiana
Nebraska
Colorado
West Virginia
Mississippi
Michigan
Illinois
Missouri
New Jersey
Maryland
Georgia
South Dakota
Alabama
Indiana
Washington
Kansas
Wyoming
Ohio
Virginia
Wisconsin
South Carolina
Delaware
North Dakota
Maine
Florida
Minnesota
Connecticut
North Carolina
New York
Iowa
Massachusetts
Vermont
Rhode Island
Pennsylvania
New Hampshire

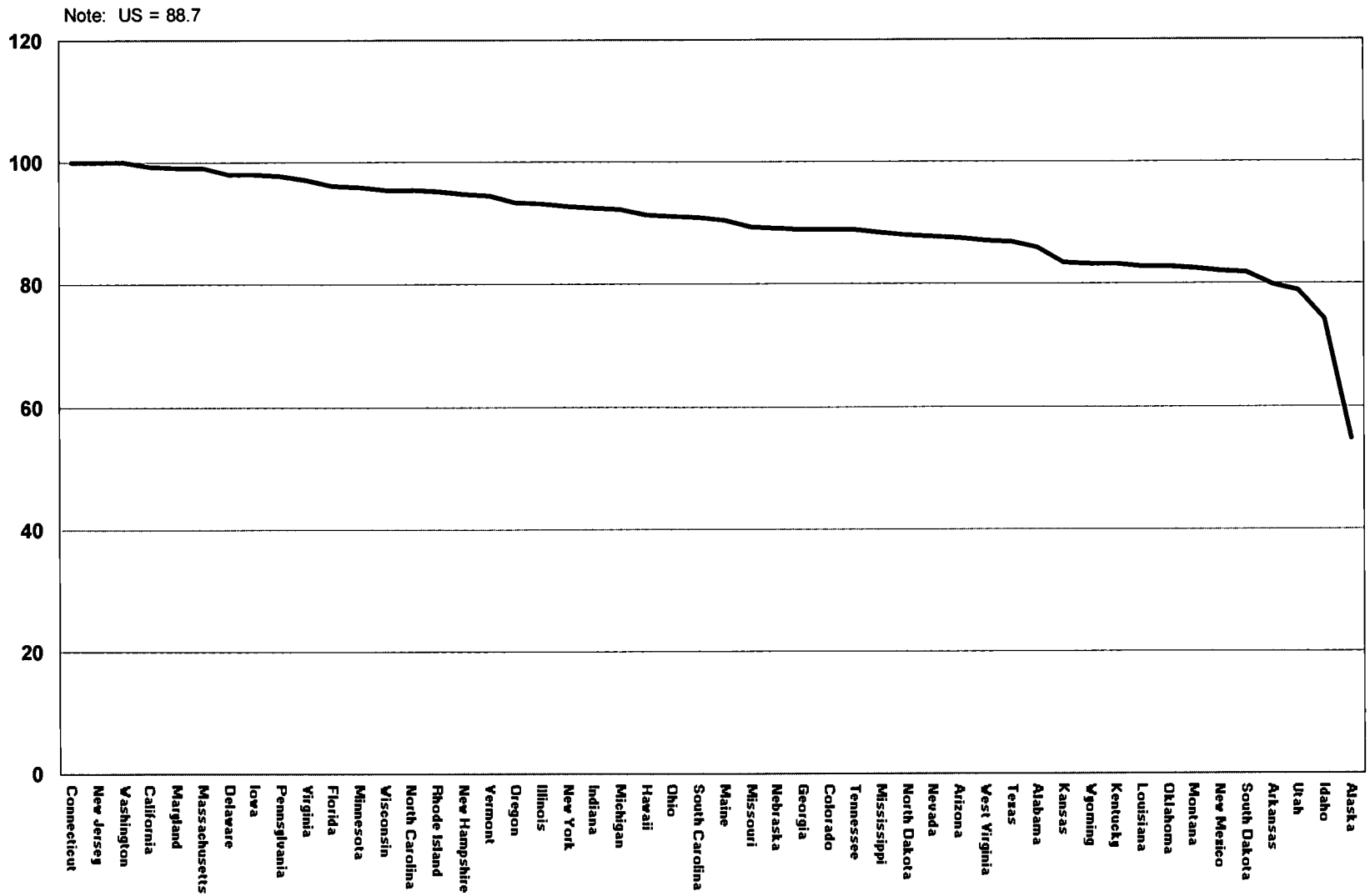
Bachelor's and Associate's Degree Production per 100 Enrolled Undergraduate Students, 1997-1998 - Index Scores



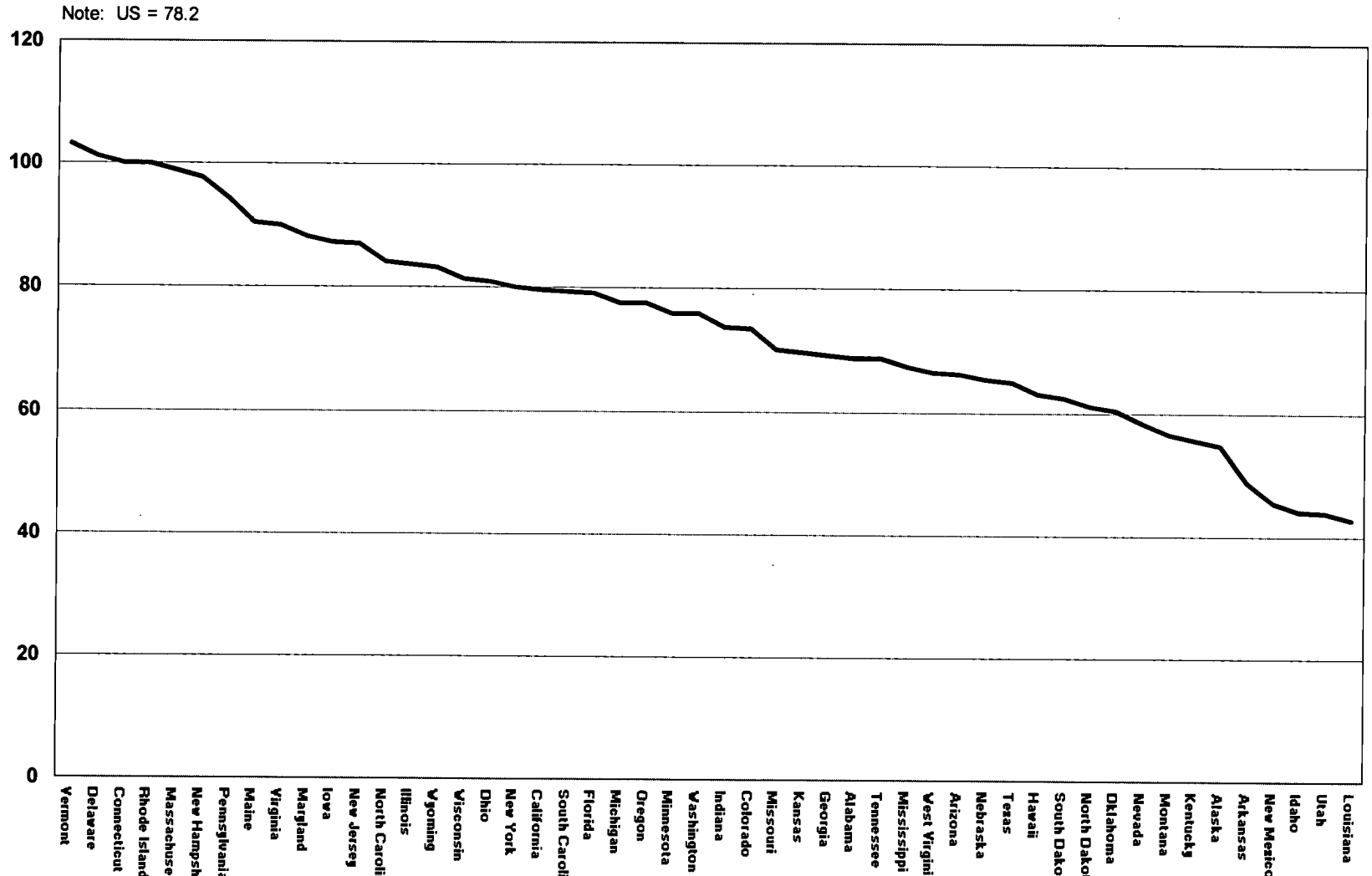
Retention Rates, 2-Year Colleges, 1999
Index Scores



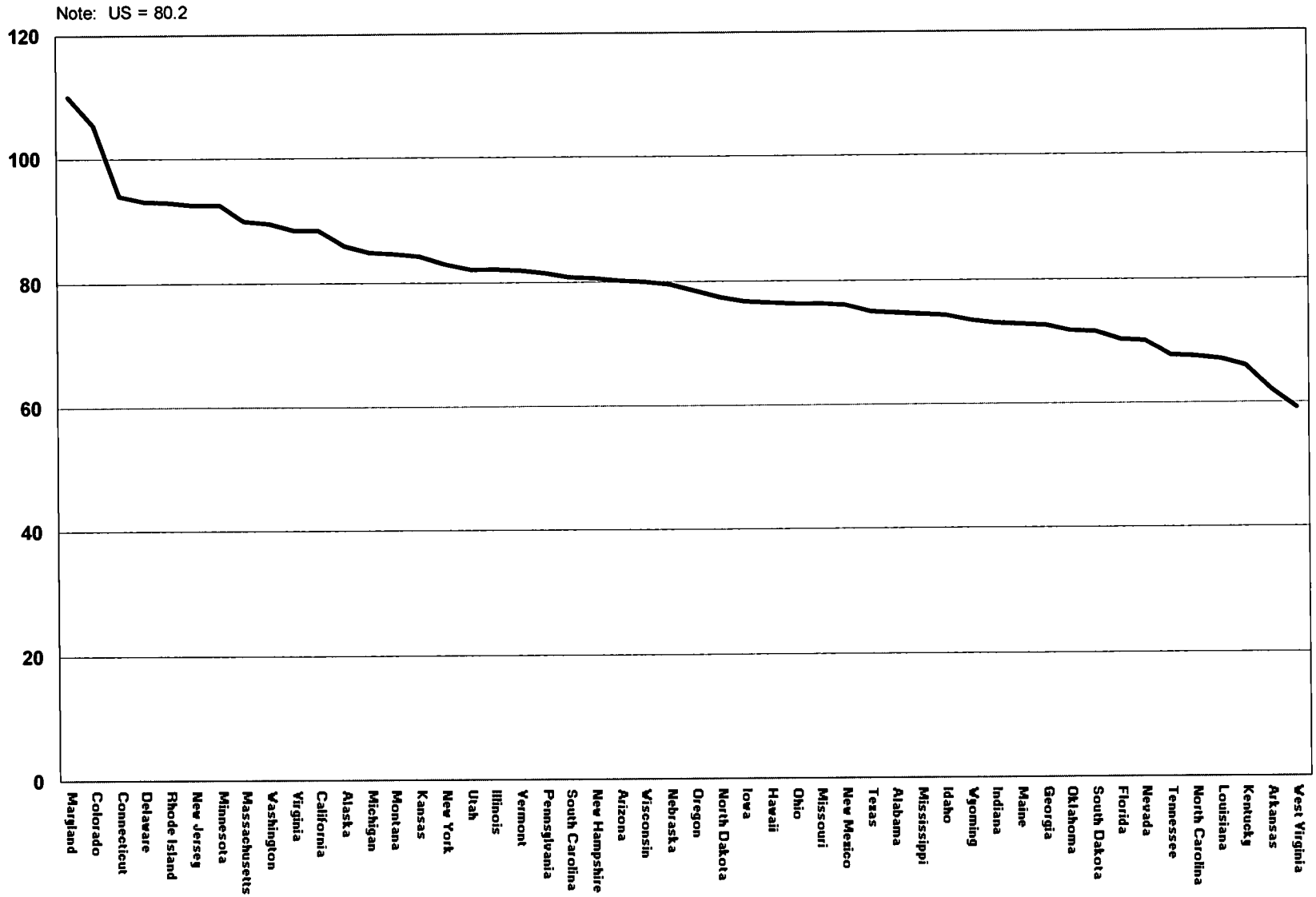
Retention Rates, 4-Year Colleges, 1999
Index Scores



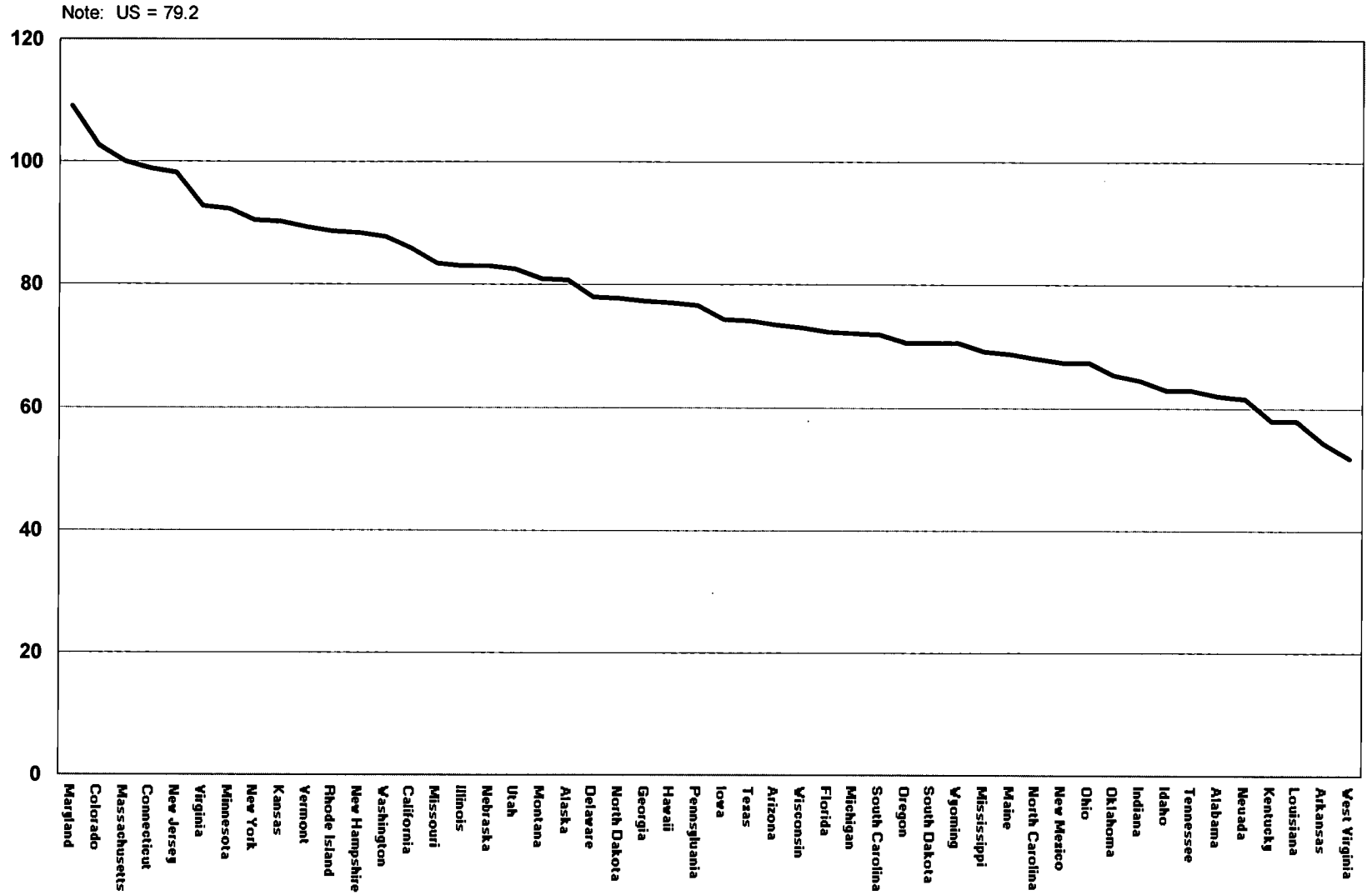
5-Year Bachelor's Degree Completion Rates, 1999
Index Scores



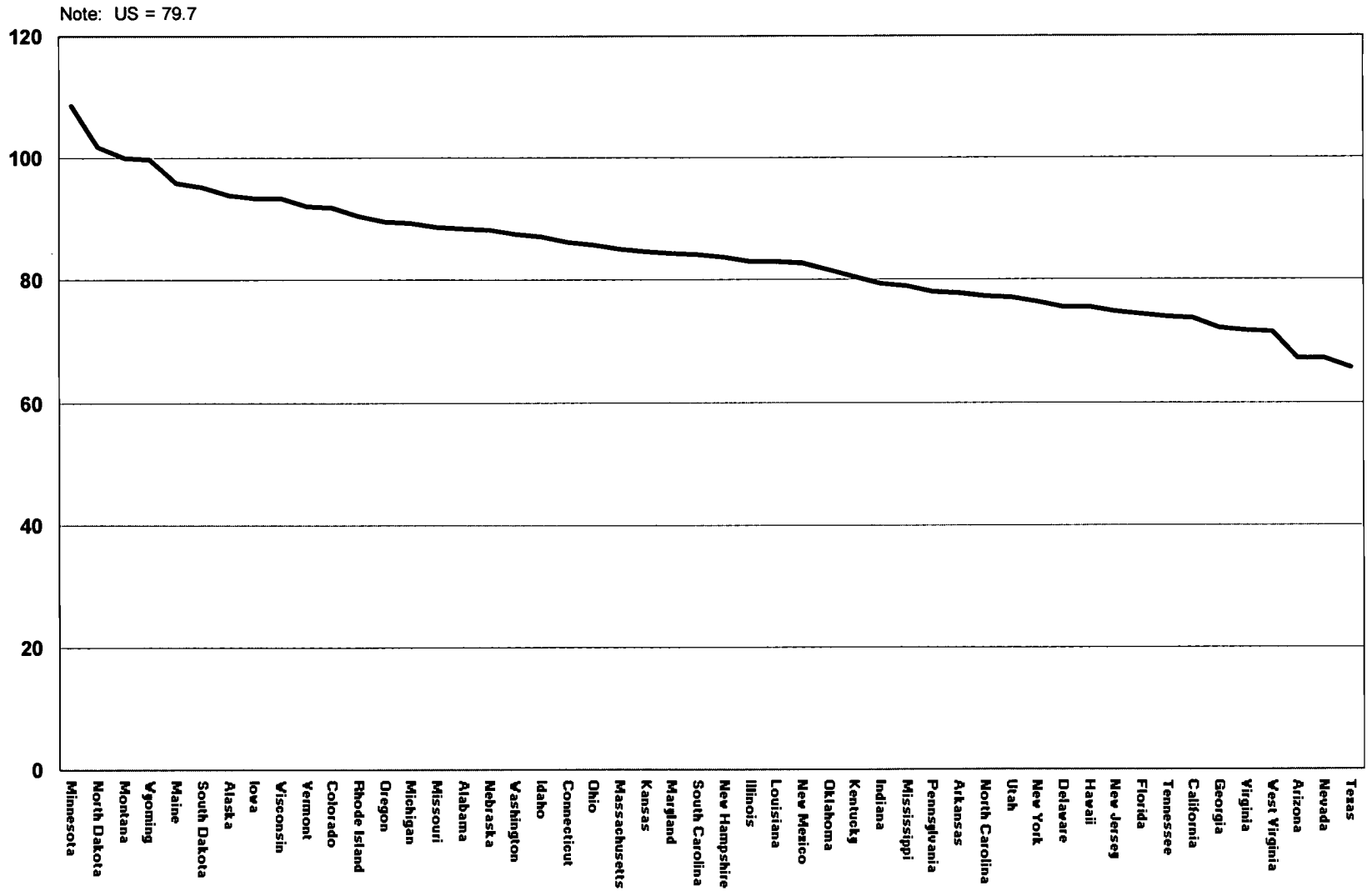
Final Index Scores - Benefits



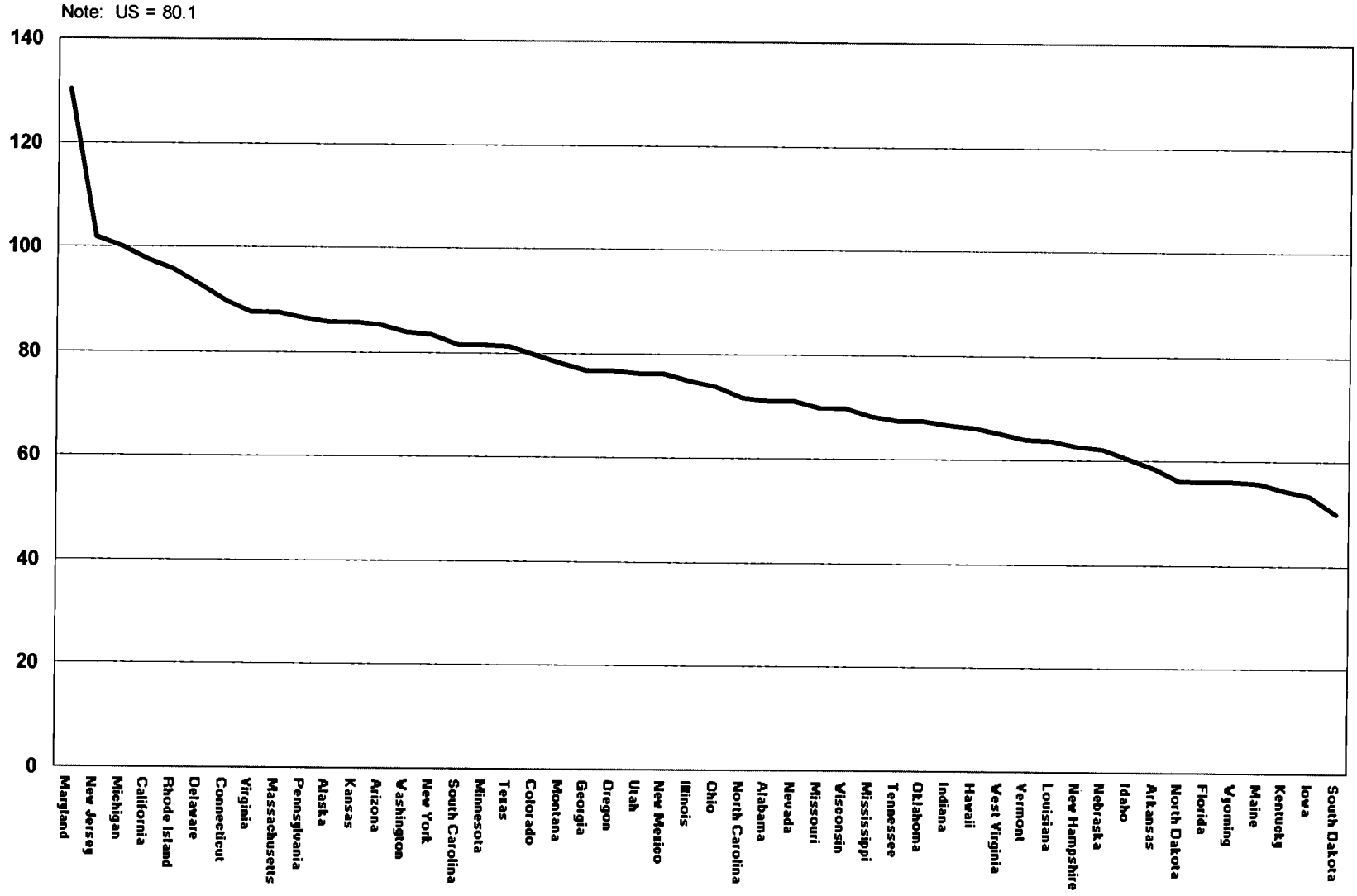
Percent of Population Age 25-65 With a Bachelor's Degree or Greater, 1996-1998 - Index Scores



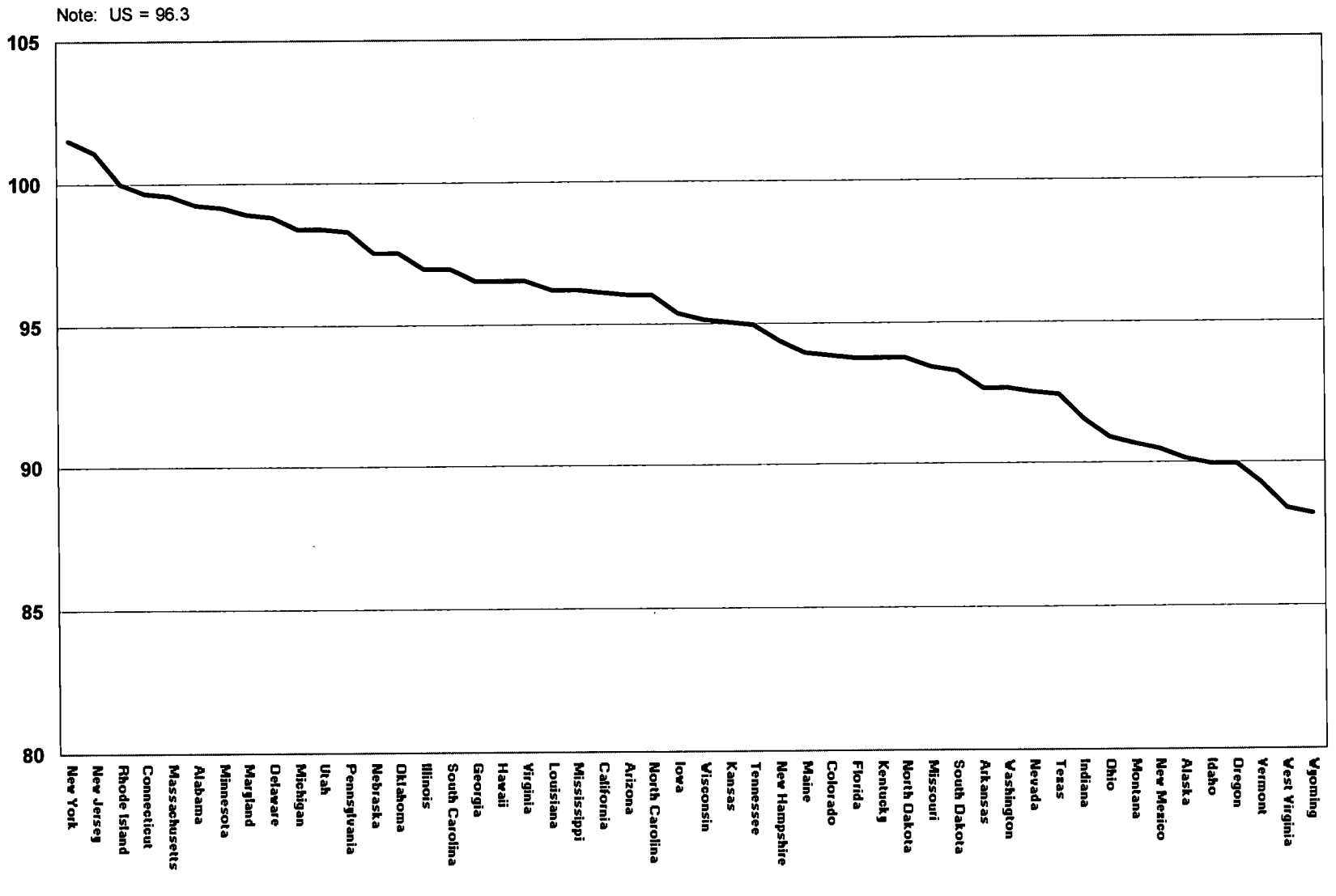
Average Percentage of Eligible Population Voting, November 1996-1998 - Index Scores



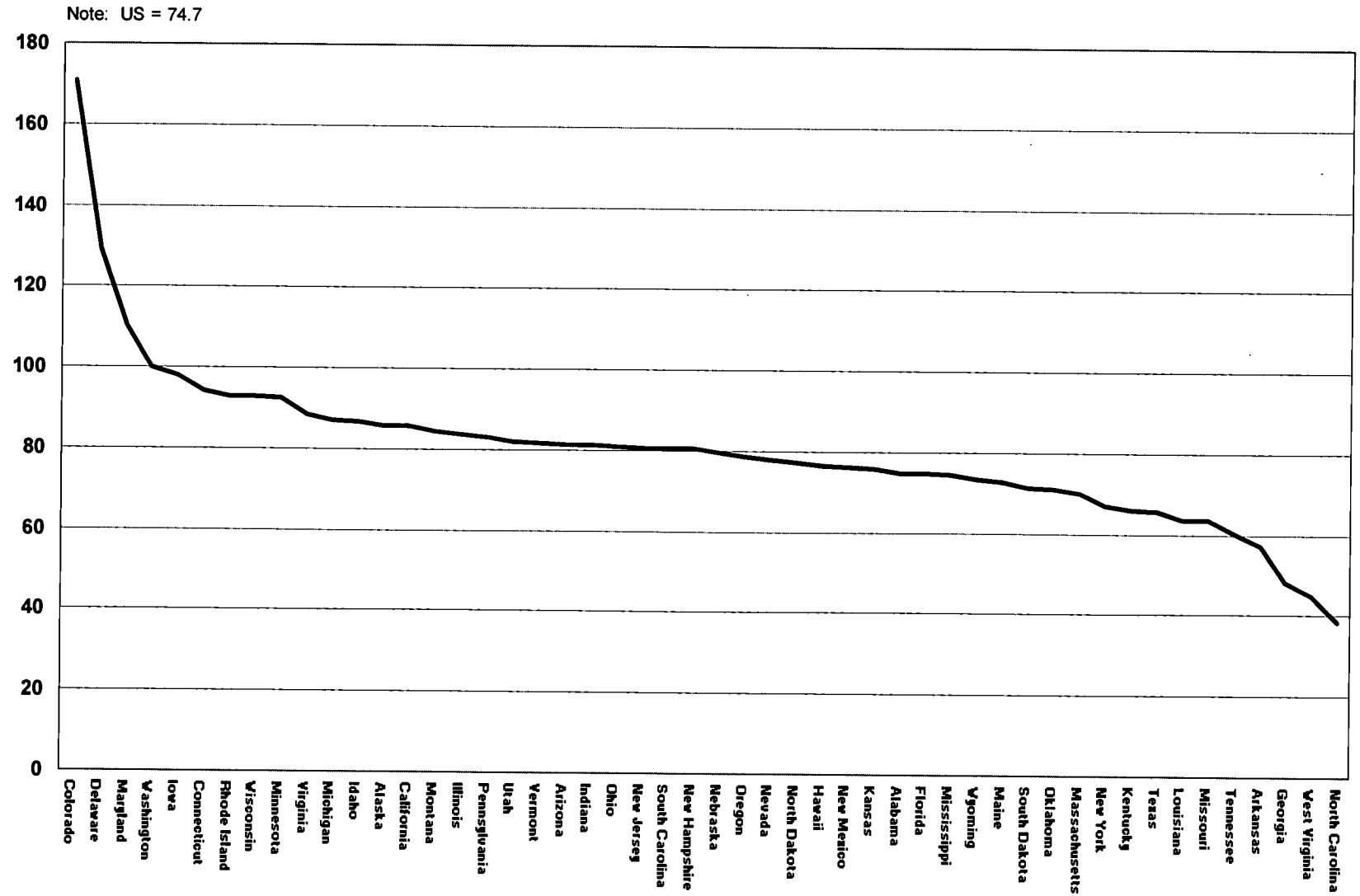
Statewide Economic Benefit from Bachelor's Degree Holders, 1998
Index Scores



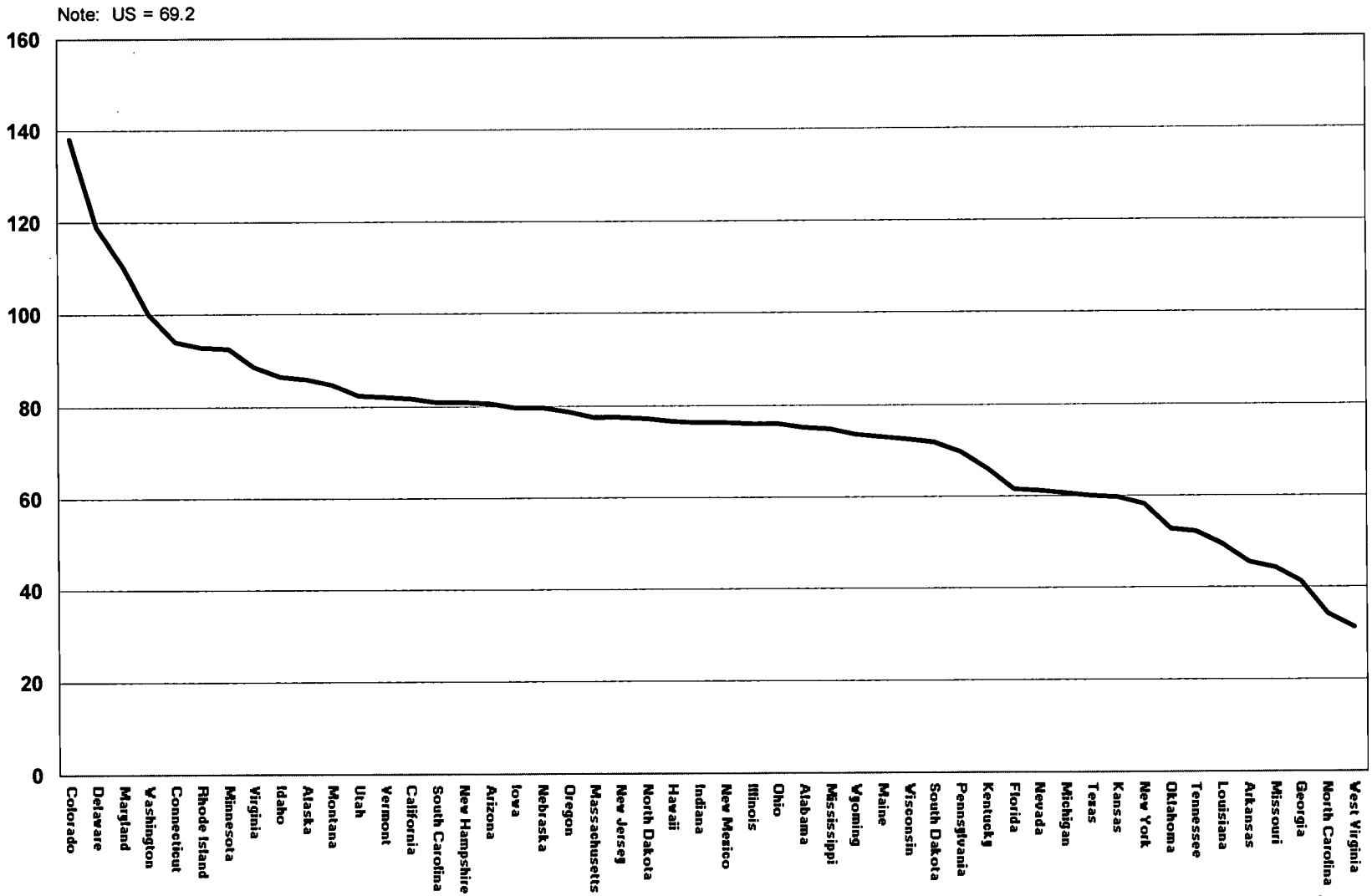
Prevalence of Giving, 1997
Index Scores



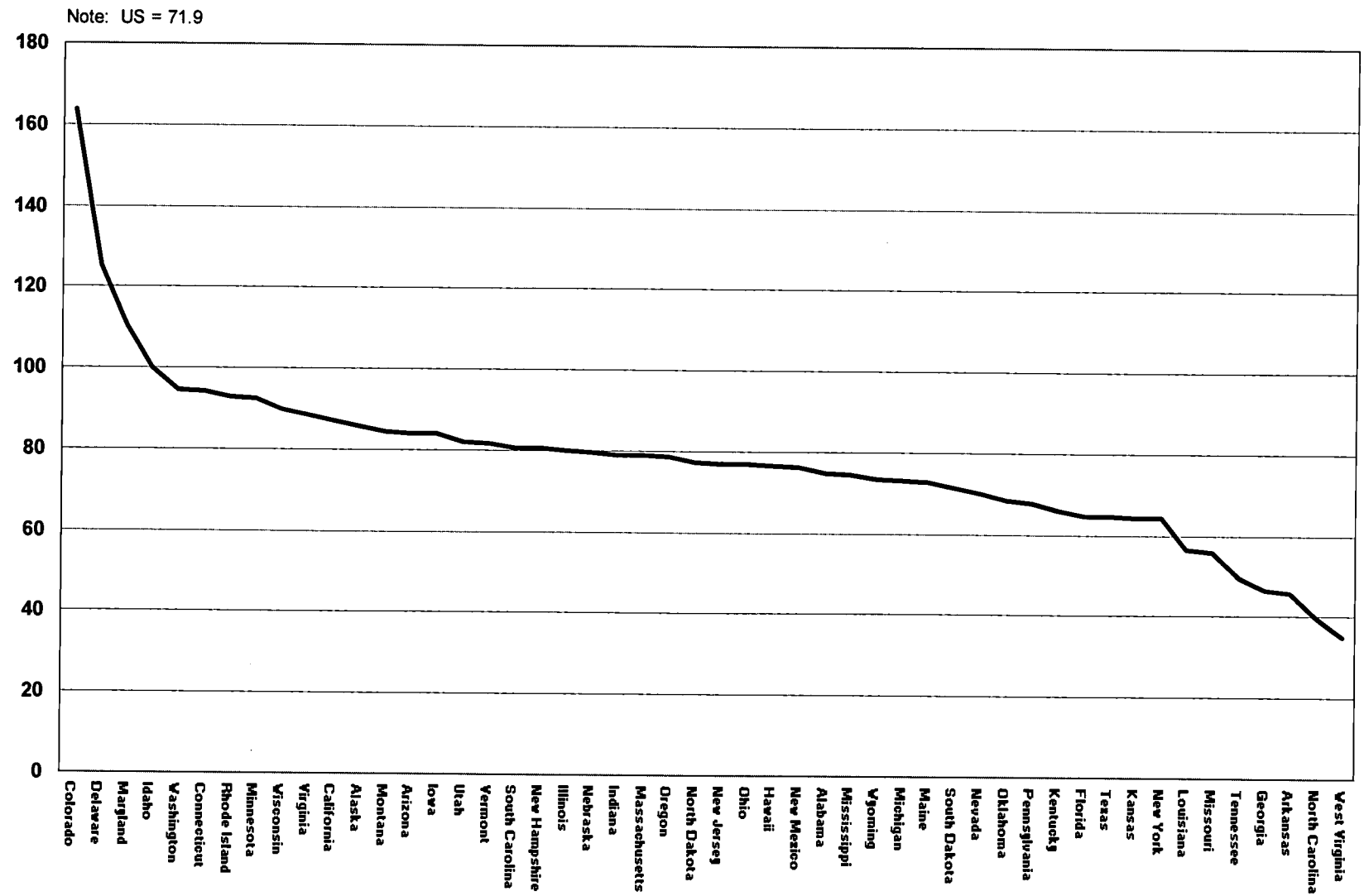
Percent of Population with Quantitative Literacy Level 4 or 5, 1992
Index Scores



Percent of Population with Document Literacy Level 4 or 5, 1992 Index Scores



Percent of Population with Prose Literacy Level 4 or 5, 1992 Index Scores



Appendix C

Analyses of Relationships among Graded Performance Categories and between Graded Performance Categories and State Contextual Measures

Appendix C-1

Relationships among Graded Performance Categories

Correlations – Final Index Scores

		Final Score - Affordability	Final Score - Participation	Final Score - Preparation	Final Score - Completion	Final Score - Benefits
Final Score - Affordability	Pearson Correlation	1.000	.094	.088	-.352*	.015
	Sig. (2-tailed)	.	.514	.543	.012	.919
	N	50	50	50	50	50
Final Score - Participation	Pearson Correlation	.094	1.000	.553**	.316*	.642**
	Sig. (2-tailed)	.514	.	.000	.025	.000
	N	50	50	50	50	50
Final Score - Preparation	Pearson Correlation	.088	.553**	1.000	.305*	.550**
	Sig. (2-tailed)	.543	.000	.	.031	.000
	N	50	50	50	50	50
Final Score - Completion	Pearson Correlation	-.352*	.316*	.305*	1.000	.242
	Sig. (2-tailed)	.012	.025	.031	.	.091
	N	50	50	50	50	50
Final Score - Benefits	Pearson Correlation	.015	.642**	.550**	.242	1.000
	Sig. (2-tailed)	.919	.000	.000	.091	.
	N	50	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix C-2

Results of Factor Analysis

Factor Analysis – Final Index Scores

Communalities

	Initial	Extraction
Final Score - Affordability	1.000	.802
Final Score - Participation	1.000	.747
Final Score - Preparation	1.000	.673
Final Score - Completion	1.000	.709
Final Score - Benefits	1.000	.706

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.348	46.967	46.967	2.348	46.967	46.967
2	1.289	25.777	72.745	1.289	25.777	72.745
3	.573	11.463	84.208			
4	.460	9.208	93.416			
5	.329	6.584	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component	
	1	2
Final Score - Affordability	-1.85E-02	.895
Final Score - Participation	.850	.159
Final Score - Preparation	.807	.146
Final Score - Completion	.535	-.650
Final Score - Benefits	.829	.134

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Factor Analysis – Index Scores

Communalities

	Initial	Extraction
Index - Family Ability to Pay (50%) at Community Colleges	1.000	.722
Index - Family Ability to Pay (50%) at Public 4-Year Colleges	1.000	.756
Index - Family Ability to Pay (50%) at Private 4-Year Colleges	1.000	.775
Index - Need-Based Financial Aid (20%)	1.000	.681
Index - Low-Priced Colleges (20%)	1.000	.528
Index - Low Student Debt (10%)	1.000	.793
Index - High School to College Rate (40%)	1.000	.748
Index - Young Adult Enrollment (20%)	1.000	.742
Index - Working-Age Adult Enrollment (40%)	1.000	.584
Index - High School Credential (20%)	1.000	.743
Index - Math Course Taking (15%)	1.000	.845
Index - Science Course Taking (15%)	1.000	.788
Index - Algebra in 8th Grade (10%)	1.000	.670
Index - Math Proficiency (5%)	1.000	.939
Index - Reading Proficiency (5%)	1.000	.878
Index - Writing Proficiency (5%)	1.000	.772
Index - Math Proficiency among Low-Income (5%)	1.000	.796
Index - College Entrance Exams (10%)	1.000	.745
Index - Advanced Placement Exams (10%)	1.000	.833
Index - Students Returning at 2-Year Colleges (10%)	1.000	.643
Index - Students Returning at 4-Year Colleges (10%)	1.000	.751
Index - Bachelor's Degree Completion (30%)	1.000	.820
Index - All Degree Completion (50%)	1.000	.650
Index - Adults with Bachelor's Degree or Higher (30%)	1.000	.790
Index - Increased Income from Education (25%)	1.000	.688
Index - Population Voting (12.5%)	1.000	.766
Index - Charitable Contributions (12.5%)	1.000	.743
Index - Quantitative Literacy (6.7%)	1.000	.934
Index - Prose Literacy (6.7%)	1.000	.962
Index - Document Literacy (6.6%)	1.000	.934

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.492	28.305	28.305	8.492	28.305	28.305
2	4.591	15.304	43.609	4.591	15.304	43.609
3	3.555	11.850	55.459	3.555	11.850	55.459
4	2.425	8.084	63.543	2.425	8.084	63.543
5	1.673	5.575	69.118	1.673	5.575	69.118
6	1.218	4.059	73.177	1.218	4.059	73.177
7	1.065	3.552	76.729	1.065	3.552	76.729
8	.865	2.882	79.611			
9	.822	2.741	82.352			
10	.731	2.436	84.788			
11	.618	2.060	86.849			
12	.561	1.871	88.720			
13	.539	1.797	90.517			
14	.503	1.676	92.193			
15	.357	1.189	93.382			
16	.306	1.021	94.403			
17	.257	.857	95.260			
18	.243	.810	96.071			
19	.236	.785	96.856			
20	.201	.669	97.525			
21	.178	.592	98.117			
22	.133	.444	98.561			
23	.112	.374	98.935			
24	.104	.347	99.282			
25	7.011E-02	.234	99.516			
26	4.821E-02	.161	99.676			
27	3.550E-02	.118	99.795			
28	3.234E-02	.108	99.903			
29	1.898E-02	6.326E-02	99.966			
30	1.026E-02	3.422E-02	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
Index - Family Ability to Pay (50%) at Community Colleges	-.210	3.808E-02	.326	.231	.257	.663	-.103
Index - Family Ability to Pay (50%) at Public 4-Year Colleges	-.121	.541	.471	.329	.161	.304	3.008E-02
Index - Family Ability to Pay (50%) at Private 4-Year Colleges	-2.97E-02	.311	.540	.466	.237	-.287	.178
Index - Need-Based Financial Aid (20%)	.597	-.148	-.247	-4.14E-02	-.134	.401	.247
Index - Low-Priced Colleges (20%)	-.343	-.391	.280	.328	1.424E-02	.223	.145
Index - Low Student Debt (10%)	-.347	.769	.195	-.109	.143	6.446E-02	8.676E-02
Index - High School to College Rate (40%)	.691	.296	-.168	-2.06E-02	.339	9.723E-02	.173
Index - Young Adult Enrollment (20%)	.674	.226	-.249	.178	.317	-8.74E-02	.184
Index - Working-Age Adult Enrollment (40%)	.321	-.497	.433	-5.96E-02	-.115	.113	.131
Index - High School Credential (20%)	.623	.431	-.126	9.811E-02	.291	-.243	-1.69E-02
Index - Math Course Taking (15%)	.544	.341	-5.96E-02	.508	1.227E-02	7.589E-02	-.407
Index - Science Course Taking (15%)	.523	.302	-.121	.379	.153	8.159E-02	-.484
Index - Algebra in 8th Grade (10%)	.452	-.137	.323	.504	-.115	-.248	-.119
Index - Math Proficiency (5%)	.800	.406	.123	-4.39E-02	-.316	1.738E-02	.131
Index - Reading Proficiency (5%)	.774	.253	-2.75E-02	.127	-.442	4.215E-02	3.398E-03
Index - Writing Proficiency (5%)	.714	3.520E-02	2.198E-02	.129	-.475	.103	-8.44E-02
Index - Math Proficiency among Low-Income (5%)	.516	.588	.111	-7.76E-02	-.222	-8.71E-02	.329
Index - College Entrance Exams (10%)	.675	.332	.290	-6.49E-02	-.192	.184	.140
Index - Advanced Placement Exams (10%)	.506	-.613	2.702E-02	.370	-1.28E-02	-.253	2.188E-02
Index - Students Returning at 2-Year Colleges (10%)	.295	-4.58E-02	-.727	-.111	-7.90E-05	8.571E-02	-7.80E-02
Index - Students Returning at 4-Year Colleges (10%)	.497	-.455	-.432	-6.00E-02	.191	.262	4.679E-02
Index - Bachelor's Degree Completion (30%)	.664	-.392	-.409	-.153	-4.59E-02	6.415E-02	-.165
Index - All Degree Completion (50%)	.259	.306	-.520	-.204	.410	-9.51E-02	2.478E-02
Index - Adults with Bachelor's Degree or Higher (30%)	.825	-.287	.128	2.896E-02	7.876E-02	-5.25E-02	-3.14E-02
Index - Increased Income from Education (25%)	.437	-.613	.206	.140	3.318E-02	-6.93E-02	.230
Index - Population Voting (12.5%)	.401	.603	8.461E-02	-.482	2.790E-02	6.049E-03	2.861E-02
Index - Charitable Contributions (12.5%)	.429	-.381	-.115	.322	.432	5.356E-02	.326
Index - Quantitative Literacy (6.7%)	.521	-.218	.587	-.454	.207	3.645E-02	-.142
Index - Prose Literacy (6.7%)	.525	-.227	.604	-.447	.195	-1.86E-02	-.179
Index - Document Literacy (6.6%)	.556	-.228	.537	-.447	.210	-7.97E-02	-.188

Extraction Method: Principal Component Analysis.

a. 7 components extracted.

Appendix C-3

Relationships between Graded Performance Categories and State Contextual Measures

Appendix C-3A

Correlation Analysis

Correlations – Final Index Scores, State Contextual Measures

		Final Score - Affordability	Final Score - Participation	Final Score - Preparation	Final Score - Completion	Final Score - Benefits
Richest vs. Middle Fifth	Pearson Correlation	.140	.165	.428**	.148	.173
	Sig. (2-tailed)	.332	.253	.002	.306	.229
	N	50	50	50	50	50
Richest vs. Poorest Fifth	Pearson Correlation	.171	.130	.388**	.066	.134
	Sig. (2-tailed)	.235	.367	.005	.649	.352
	N	50	50	50	50	50
High School Event Dropout	Pearson Correlation	.153	-.381*	-.546**	-.466**	-.225
	Sig. (2-tailed)	.360	.018	.000	.003	.174
	N	38	38	38	38	38
Unemployment Rate, 1998	Pearson Correlation	-.108	-.255	-.353*	-.459**	-.165
	Sig. (2-tailed)	.457	.074	.012	.001	.253
	N	50	50	50	50	50
Percent of Population with less than a high school degree, 1998	Pearson Correlation	-.156	-.404**	-.570**	-.066	-.462**
	Sig. (2-tailed)	.281	.004	.000	.650	.001
	N	50	50	50	50	50
State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	Pearson Correlation	.211	-.480**	-.548**	-.454**	-.504**
	Sig. (2-tailed)	.142	.000	.000	.001	.000
	N	50	50	50	50	50
Percent change in Population, 2000-2015	Pearson Correlation	.264	-.204	-.242	-.498**	.027
	Sig. (2-tailed)	.064	.155	.091	.000	.852
	N	50	50	50	50	50
Percent change in number of all high school graduates, 1999- 2010	Pearson Correlation	.132	-.097	-.067	-.241	.142
	Sig. (2-tailed)	.360	.501	.646	.091	.326
	N	50	50	50	50	50
Budget Shortfall, 2000-2008	Pearson Correlation	-.007	.277	.286*	.483**	.052
	Sig. (2-tailed)	.960	.051	.044	.000	.720
	N	50	50	50	50	50
Gross State Product Per Capita	Pearson Correlation	.105	.403**	.398**	.032	.461**
	Sig. (2-tailed)	.467	.004	.004	.826	.001
	N	50	50	50	50	50
Income, Lowest Quintile	Pearson Correlation	.258	.406**	.653**	.108	.585**
	Sig. (2-tailed)	.071	.003	.000	.454	.000
	N	50	50	50	50	50
Children in Poverty	Pearson Correlation	-.012	-.430**	-.617**	-.256	-.435**
	Sig. (2-tailed)	.932	.002	.000	.072	.002
	N	50	50	50	50	50
New Economy Index	Pearson Correlation	.115	.392**	.483**	.097	.665**
	Sig. (2-tailed)	.428	.005	.000	.504	.000
	N	50	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX C-3B

Correlations among State Contextual Measures

Correlations – State Contextual Measures

		Richest vs. Middle Fifth	Richest vs. Poorest Fifth	High School Event Dropout	Unemployment Rate, 1998	Percent of Population with less than a high school degree, 1998	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	Percent change in Population, 2000-2015	Percent change in number of all high school graduates, 1999- 2010	Budget Shortfall, 2000-2008	Gross State Product Per Capita	Income, Lowest Quintile	Children in Poverty	New Economy Index
Richest vs. Middle Fifth	Pearson Correlation	1.000	.842**	-.326*	-.392**	-.511**	-.333*	-.205	-.312*	.103	.130	.556**	-.581**	-.028
	Sig. (2-tailed)	.	.000	.046	.005	.000	.018	.154	.027	.475	.368	.000	.000	.846
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Richest vs. Poorest Fifth	Pearson Correlation	.842**	1.000	-.293	-.455**	-.609**	-.323*	-.119	-.202	-.056	.101	.611**	-.705**	-.040
	Sig. (2-tailed)	.000	.	.074	.001	.000	.022	.409	.159	.698	.487	.000	.000	.785
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
High School Event Dropout	Pearson Correlation	-.326*	-.293	1.000	.274	.176	.384*	.423**	.446**	-.490**	-.011	-.221	.418**	-.081
	Sig. (2-tailed)	.046	.074	.	.096	.290	.017	.008	.005	.002	.950	.181	.009	.630
	N	38	38	38	38	38	38	38	38	38	38	38	38	38
Unemployment Rate, 1998	Pearson Correlation	-.392**	-.455**	.274	1.000	.275	.276	.292*	.045	-.283*	-.023	-.274	.505**	-.081
	Sig. (2-tailed)	.005	.001	.096	.	.053	.052	.040	.756	.046	.874	.054	.000	.576
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Percent of Population with less than a hig school degree, 1998	Pearson Correlation	-.511**	-.609**	.176	.275	1.000	.460**	-.068	-.027	.076	-.386**	-.682**	.773**	-.336*
	Sig. (2-tailed)	.000	.000	.290	.053	.	.001	.638	.853	.600	.006	.000	.000	.017
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
State Obligations (amount needed to brin state spending up to national average for needs for state services) 1994	Pearson Correlation	-.333*	-.323*	.384*	.276	.460**	1.000	.139	-.211	-.008	-.368**	-.554**	.695**	-.487**
	Sig. (2-tailed)	.018	.022	.017	.052	.001	.	.337	.142	.958	.008	.000	.000	.000
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Percent change in Population, 2000-201	Pearson Correlation	-.205	-.119	.423**	.292*	-.068	.139	1.000	.352*	-.713**	.119	-.005	.015	.341*
	Sig. (2-tailed)	.154	.409	.008	.040	.638	.337	.	.012	.000	.411	.974	.919	.015
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Percent change in number of all high sch graduates, 1999- 2010	Pearson Correlation	-.312*	-.202	.446**	.045	-.027	-.211	.352*	1.000	-.468**	.290*	.146	-.019	.462**
	Sig. (2-tailed)	.027	.159	.005	.756	.853	.142	.012	.	.001	.041	.313	.894	.001
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Budget Shortfall, 2000-2008	Pearson Correlation	.103	-.056	-.490**	-.283*	.076	-.008	-.713**	-.468**	1.000	-.189	-.030	.087	-.152
	Sig. (2-tailed)	.475	.698	.002	.046	.600	.958	.000	.001	.	.188	.835	.547	.291
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Gross State Product Per Capita	Pearson Correlation	.130	.101	-.011	-.023	-.386**	-.368**	.119	.290*	-.189	1.000	.473**	-.404**	.569**
	Sig. (2-tailed)	.368	.487	.950	.874	.006	.008	.411	.041	.188	.	.001	.004	.000
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Income, Lowest Quintile	Pearson Correlation	.556**	.611**	-.221	-.274	-.682**	-.554**	-.005	.146	-.030	.473**	1.000	-.699**	.528**
	Sig. (2-tailed)	.000	.000	.181	.054	.000	.000	.974	.313	.835	.001	.	.000	.000
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
Children in Poverty	Pearson Correlation	-.581**	-.705**	.418**	.505**	.773**	.695**	.015	-.019	.087	-.404**	-.699**	1.000	-.364**
	Sig. (2-tailed)	.000	.000	.009	.000	.000	.000	.919	.894	.547	.004	.000	.	.009
	N	50	50	38	50	50	50	50	50	50	50	50	50	50
New Economy Index	Pearson Correlation	-.028	-.040	-.081	-.081	-.336*	-.487**	.341*	.462**	-.152	.569**	.528**	-.364**	1.000
	Sig. (2-tailed)	.846	.785	.630	.576	.017	.000	.015	.001	.291	.000	.000	.009	.
	N	50	50	38	50	50	50	50	50	50	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix C-3C

Regression Analysis

Regression – Preparation Final Score, State Contextual Measures

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Percent change in number of all high school graduates, 1999-2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Preparation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.889[a]	.790	.677	6.5986

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3939.016	13	303.001	6.959	.000[a]
	Residual	1045.002	24	43.542		
	Total	4984.018	37			

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

b. Dependent Variable: Final Score - Preparation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	82.488	19.091		4.321	.000
	Richest vs. Middle Fifth	.130	.166	.163	.782	.442
	Richest vs. Poorest Fifth	-8.327E-02	.193	-.107	-.432	.670
	High School Event Dropout	-166.548	83.416	-.302	-1.997	.057
	Unemployment Rate, 1998	171.561	163.453	.167	1.050	.304
	Percent of Population with less than a high school degree, 1998	-89.955	52.262	-.332	-1.721	.098
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	16.431	28.341	.125	.580	.567
	Percent change in Population, 2000-2015	6.591	42.540	.035	.155	.878
	Percent change in number of all high school graduates, 1999- 2010	8.763	11.344	.136	.772	.447
	Budget Shortfall, 2000-2008	96.970	57.262	.419	1.693	.103
	Gross State Product Per Capita	-8.084E-05	.000	-.034	-.263	.795
	Income, Lowest Quintile	6.645E-04	.001	.110	.540	.594
	Children in Poverty	-33.721	65.266	-.175	-.517	.610
	New Economy Index	.333	.160	.392	2.083	.048

a. Dependent Variable: Final Score - Preparation

Regression – Participation Final Score, State Contextual Measures

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Participation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.774[a]	.600	.383	9.2980

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3108.488	13	239.114	2.766	.015[a]
	Residual	2074.862	24	86.453		
	Total	5183.350	37			

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

b. Dependent Variable: Final Score - Participation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	72.802	26.900		2.706	.012
	Richest vs. Middle Fifth	-.340	.234	-.418	-1.454	.159
	Richest vs. Poorest Fifth	-.124	.272	-.156	-.455	.653
	High School Event Dropout	-10.548	117.540	-.019	-.090	.929
	Unemployment Rate, 1998	-241.145	230.318	-.231	-1.047	.306
	Percent of Population with less than a high school degree, 1998	-46.739	73.642	-.169	-.635	.532
	Percent change in Population, 2000-2015	30.539	59.943	.160	.509	.615
	Percent change in number of all high school graduates, 1999- 2010	-23.925	15.985	-.364	-1.497	.148
	Budget Shortfall, 2000-2008	55.112	80.687	.233	.683	.501
	Gross State Product Per Capita	5.130E-04	.000	.214	1.185	.248
	Income, Lowest Quintile	2.045E-03	.002	.331	1.180	.250
	Unmet Obligations	-61.370	39.934	-.458	-1.537	.137
	Children in Poverty	3.154	91.966	.016	.034	.973
	New Economy Index	-3.351E-02	.226	-.039	-.149	.883

a. Dependent Variable: Final Score - Participation

Regression – Affordability Final Score, State Contextual Measures

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Affordability

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	.520	.260	9.4986

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2344.464	13	180.343	1.999	.069[a]
	Residual	2165.358	24	90.223		
	Total	4509.822	37			

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

b. Dependent Variable: Final Score - Affordability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.297	27.481		.484	.633
	Richest vs. Middle Fifth	-.252	.239	-.333	-1.056	.301
	Richest vs. Poorest Fifth	.349	.277	.473	1.256	.221
	High School Event Dropout	42.513	120.076	.081	.354	.726
	Unemployment Rate, 1998	-283.523	235.287	-.291	-1.205	.240
	Percent of Population with less than a high school degree, 1998	12.704	75.230	.049	.169	.867
	Percent change in Population, 2000-2015	123.831	61.236	.696	2.022	.054
	Percent change in number of all high school graduates, 1999- 2010	6.786	16.330	.111	.416	.681
	Budget Shortfall, 2000-2008	111.235	82.428	.505	1.349	.190
	Gross State Product Per Capita	2.948E-04	.000	.132	.667	.511
	Income, Lowest Quintile	4.202E-03	.002	.730	2.373	.026
	Unmet Obligations	10.227	40.796	.082	.251	.804
	Children in Poverty	80.972	93.950	.443	.862	.397
	New Economy Index	-.235	.230	-.290	-1.018	.319

a. Dependent Variable: Final Score - Affordability

Regression – Completion Final Score, State Contextual Measures

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Completion

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.847[a]	.717	.563	6.8830

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2876.140	13	221.242	4.670	.001[a]
	Residual	1137.027	24	47.376		
	Total	4013.167	37			

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

b. Dependent Variable: Final Score - Completion

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	118.235	19.914		5.937	.000
	Richest vs. Middle Fifth	.121	.173	.169	.698	.492
	Richest vs. Poorest Fifth	-.370	.201	-.532	-1.843	.078
	High School Event Dropout	38.460	87.011	.078	.442	.662
	Unemployment Rate, 1998	-189.292	170.498	-.206	-1.110	.278
	Percent of Population with less than a high school degree, 1998	11.325	54.515	.047	.208	.837
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	-14.301	29.562	-.121	-.484	.633
	Percent change in Population, 2000-2015	-96.582	44.374	-.575	-2.177	.040
	Percent change in number of all high school graduates, 1999- 2010	-18.735	11.833	-.324	-1.583	.126
	Budget Shortfall, 2000-2008	-3.655	59.730	-.018	-.061	.952
	Gross State Product Per Capita	-1.200E-04	.000	-.057	-.375	.711
	Income, Lowest Quintile	-5.658E-04	.001	-.104	-.441	.663
	Children in Poverty	-74.089	68.079	-.429	-1.088	.287
	New Economy Index	.136	.167	.179	.816	.423

a. Dependent Variable: Final Score - Completion

Regression – Benefits Final Score, State Contextual Measures

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Benefits

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.662	.478	7.7349

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2806.275	13	215.867	3.608	.003[a]
	Residual	1435.889	24	59.829		
	Total	4242.164	37			

a. Predictors: (Constant), New Economy Index, Richest vs. Poorest Fifth, Budget Shortfall, 2000-2008, Unemployment Rate, 1998, High School Event Dropout, Gross State Product Per Capita , Unmet Obligations, Percent change in number of all high school graduates, 1999- 2010, Percent of Population with less than a high school degree, 1998, Income, Lowest Quintile , Richest vs. Middle Fifth, Percent change in Population, 2000-2015, Children in Poverty

b. Dependent Variable: Final Score - Benefits

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	60.259	22.378		2.693	.013
	Richest vs. Middle Fifth	-.157	.195	-.213	-.807	.428
	Richest vs. Poorest Fifth	-.216	.226	-.302	-.957	.348
	High School Event Dropout	-10.161	97.780	-.020	-.104	.918
	Unemployment Rate, 1998	-212.002	191.599	-.224	-1.106	.279
	Percent of Population with less than a high school degree, 1998	-44.222	61.262	-.177	-.722	.477
	Percent change in Population, 2000-2015	5.455	49.866	.032	.109	.914
	Percent change in number of all high school graduates, 1999- 2010	-19.213	13.298	-.323	-1.445	.161
	Budget Shortfall, 2000-2008	-28.005	67.123	-.131	-.417	.680
	Gross State Product Per Capita	1.766E-05	.000	.008	.049	.961
	Income, Lowest Quintile	2.723E-03	.001	.488	1.889	.071
	Unmet Obligations	-41.244	33.221	-.340	-1.242	.226
	Children in Poverty	25.757	76.505	.145	.337	.739
	New Economy Index	.252	.188	.321	1.343	.192

a. Dependent Variable: Final Score - Benefits

Appendix D

Additional Tests of Various Measures

Appendix D-1

Relationships between High School Dropout and Preparation Measures

Correlations – High School Dropout and Preparation Raw Scores

		High School Event Dropout	Final Score - Preparation	Percent of 18-24 Year-olds with a High School Credential: 1996-1998 (20%)	Percent of Grades 9-12 Students Taking Upper-Level Math: 1998 (15%)	Percent of Grades 9-12 Students Taking Upper-Level Science: 1998 (15%)	Percent of 8th Graders Scoring at or Above Proficient on the NAEP Reading Exam: 1998 (5%)	Percent of 8th Graders Scoring at or Above Proficient on the NAEP Math Exam: 1996 (5%)	Percent of 8th Graders Scoring at or Above Proficient on the NAEP Writing Exam 1998 (5%)	Percent of Low Income 8th Graders Scoring At or Above Proficient on NAEP Math Exam (5%)	Percent of 8th Graders who Have Taken Algebra: 1998 (10%)	Number of AP Exams with Grades 3 or Higher Per 1000 11th and 12th Graders: 1999 (10%)	Number of 1200+ SAT or 26 ACT Scores per 1000 High School Graduates: 1999 (10%)
High School Event Dropout	Pearson Correlation	1.000	-.546**	-.665**	-.481*	-.529**	-.577**	-.583**	-.518**	-.400	-.242	-.253	-.270
	Sig. (2-tailed)	.	.000	.000	.020	.009	.002	.001	.007	.058	.304	.125	.101
	N	38	38	38	23	23	27	30	26	23	20	38	38
Final Score - Preparation	Pearson Correlation	-.546**	1.000	.615**	.677**	.570**	.770**	.776**	.688**	.523**	.695**	.550**	.653**
	Sig. (2-tailed)	.000	.	.000	.000	.001	.000	.000	.000	.003	.000	.000	.000
	N	38	50	50	30	30	36	40	35	31	27	50	50
Percent of 18-24 Year-olds with a High School Credential: 1996-1998 (20%)	Pearson Correlation	-.665**	.615**	1.000	.486**	.487**	.446**	.552**	.287	.442*	.211	.142	.420**
	Sig. (2-tailed)	.000	.000	.	.006	.006	.006	.000	.094	.013	.290	.325	.002
	N	38	50	50	30	30	36	40	35	31	27	50	50
Percent of Grades 9-12 Students Taki Upper-Level Math: 1998 (15%)	Pearson Correlation	-.481*	.677**	.486**	1.000	.721**	.443*	.354	.369	.288	.320	.135	.315
	Sig. (2-tailed)	.020	.000	.006	.	.000	.044	.082	.100	.233	.104	.478	.090
	N	23	30	30	30	30	21	25	21	19	27	30	30
Percent of Grades 9-12 Students Taki Upper-Level Science: 1998 (15%)	Pearson Correlation	-.529**	.570**	.487**	.721**	1.000	.315	.300	.215	.085	.147	.068	.192
	Sig. (2-tailed)	.009	.001	.006	.000	.	.164	.146	.350	.729	.464	.720	.308
	N	23	30	30	30	30	21	25	21	19	27	30	30
Percent of 8th Graders Scoring at or Above Proficient on the NAEP Readin Exam: 1998 (5%)	Pearson Correlation	-.577**	.770**	.446**	.443*	.315	1.000	.900**	.827**	.667**	.384	.256	.617**
	Sig. (2-tailed)	.002	.000	.006	.044	.164	.	.000	.000	.000	.095	.132	.000
	N	27	36	36	21	21	36	33	35	28	20	36	36
Percent of 8th Graders Scoring at or Above Proficient on the NAEP Math Exam: 1996 (5%)	Pearson Correlation	-.583**	.776**	.552**	.354	.300	.900**	1.000	.757**	.833**	.278	.109	.771**
	Sig. (2-tailed)	.001	.000	.000	.082	.146	.000	.	.000	.000	.209	.504	.000
	N	30	40	40	25	25	33	40	33	31	22	40	40
Percent of 8th Graders Scoring at or Above Proficient on the NAEP Writing Exam 1998 (5%)	Pearson Correlation	-.518**	.688**	.287	.369	.215	.827**	.757**	1.000	.377*	.390	.407*	.486**
	Sig. (2-tailed)	.007	.000	.094	.100	.350	.000	.000	.	.048	.089	.015	.003
	N	26	35	35	21	21	35	33	35	28	20	35	35
Percent of Low Income 8th Graders Scoring At or Above Proficient on NAE Math Exam (5%)	Pearson Correlation	-.400	.523**	.442*	.288	.085	.667**	.833**	.377*	1.000	.225	-.137	.596**
	Sig. (2-tailed)	.058	.003	.013	.233	.729	.000	.000	.048	.	.385	.461	.000
	N	23	31	31	19	19	28	31	28	31	17	31	31
Percent of 8th Graders who Have Tak Algebra: 1998 (10%)	Pearson Correlation	-.242	.695**	.211	.320	.147	.384	.278	.390	.225	1.000	.676**	.205
	Sig. (2-tailed)	.304	.000	.290	.104	.464	.095	.209	.089	.385	.	.000	.305
	N	20	27	27	27	27	20	22	20	17	27	27	27
Number of AP Exams with Grades 3 o Higher Per 1000 11th and 12th Grade 1999 (10%)	Pearson Correlation	-.253	.550**	.142	.135	.068	.256	.109	.407*	-.137	.676**	1.000	.092
	Sig. (2-tailed)	.125	.000	.325	.478	.720	.132	.504	.015	.461	.000	.	.525
	N	38	50	50	30	30	36	40	35	31	27	50	50
Number of 1200+ SAT or 26 ACT Sco per 1000 High School Graduates: 199 (10%)	Pearson Correlation	-.270	.653**	.420**	.315	.192	.617**	.771**	.486**	.596**	.205	.092	1.000
	Sig. (2-tailed)	.101	.000	.002	.090	.306	.000	.000	.003	.000	.305	.525	.
	N	38	50	50	30	30	36	40	35	31	27	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations – High School Dropout and Preparation Index Scores

		High School Event Dropout	Final Score - Preparation	Index Score - Percent 18-24 with High School Credential	Index Score - Percent 9-12 Upper Level Math	Index Score - Percent 9-12 Upper Level Science	Index Score - Above Proficient NAEP Reading	Index Score - Above Proficient NAEP Math	Index Score - Percent Proficient NAEP Writing	Index Score - Percent Proficient NAEP (Low Incime)	Index Score - Percent 8th Grade with Algebra - 1998	Index Score - AP Exams of 3 or More per 11-12 Graders	Index Score - High SAT/ACT per 1000 HS Grads
High School Event Dropout	Pearson Correlation	1.000	-.546**	-.665**	-.448**	-.485**	-.510**	-.490**	-.448**	-.345*	-.239	-.253	-.270
	Sig. (2-tailed)	.	.000	.000	.005	.002	.001	.002	.005	.034	.149	.125	.101
	N	38	38	38	38	38	38	38	38	38	38	38	38
Final Score - Preparation	Pearson Correlation	-.546**	1.000	.615**	.754**	.652**	.792**	.774**	.712**	.547**	.700**	.550**	.653**
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Percent 18-24 with High School Credential	Pearson Correlation	-.665**	.615**	1.000	.504**	.496**	.447**	.544**	.308*	.456**	.255	.142	.420**
	Sig. (2-tailed)	.000	.000	.	.000	.000	.001	.000	.029	.001	.074	.325	.002
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Percent 9-12 Upper Level Math	Pearson Correlation	-.448**	.754**	.504**	1.000	.770**	.543**	.480**	.450**	.336*	.394**	.211	.415**
	Sig. (2-tailed)	.005	.000	.000	.	.000	.000	.000	.001	.017	.005	.142	.003
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Percent 9-12 Upper Level Scienc	Pearson Correlation	-.485**	.652**	.496**	.770**	1.000	.433**	.398**	.331*	.242	.244	.149	.305*
	Sig. (2-tailed)	.002	.000	.000	.000	.	.002	.004	.019	.090	.088	.303	.031
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Above Proficient NAEP Readin	Pearson Correlation	-.510**	.792**	.447**	.543**	.433**	1.000	.839**	.834**	.585**	.414**	.269	.621**
	Sig. (2-tailed)	.001	.000	.001	.000	.002	.	.000	.000	.000	.003	.059	.000
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Above Proficient NAEP Math	Pearson Correlation	-.490**	.774**	.544**	.480**	.398**	.839**	1.000	.739**	.798**	.335*	.139	.751**
	Sig. (2-tailed)	.002	.000	.000	.000	.004	.000	.	.000	.000	.017	.338	.000
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Percent Proficient NAEP Writing	Pearson Correlation	-.448**	.712**	.308*	.450**	.331*	.834**	.739**	1.000	.354*	.407**	.363**	.512**
	Sig. (2-tailed)	.005	.000	.029	.001	.019	.000	.000	.	.012	.003	.010	.000
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Percent Proficient NAEP (Low Incime)	Pearson Correlation	-.345*	.547**	.456**	.336*	.242	.585**	.798**	.354*	1.000	.182	-.081	.602**
	Sig. (2-tailed)	.034	.000	.001	.017	.090	.000	.000	.012	.	.207	.578	.000
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - Percent 8t Grade with Algebra - 19	Pearson Correlation	-.239	.700**	.255	.394**	.244	.414**	.335*	.407**	.182	1.000	.565**	.263
	Sig. (2-tailed)	.149	.000	.074	.005	.088	.003	.017	.003	.207	.	.000	.065
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - AP Exams 3 or More per 11-12 Graders	Pearson Correlation	-.253	.550**	.142	.211	.149	.269	.139	.363**	-.081	.565**	1.000	.092
	Sig. (2-tailed)	.125	.000	.325	.142	.303	.059	.336	.010	.578	.000	.	.525
	N	38	50	50	50	50	50	50	50	50	50	50	50
Index Score - High SAT/ACT per 1000 HS Grads	Pearson Correlation	-.270	.653**	.420**	.415**	.305*	.621**	.751**	.512**	.602**	.263	.092	1.000
	Sig. (2-tailed)	.101	.000	.002	.003	.031	.000	.000	.000	.000	.085	.525	.
	N	38	50	50	50	50	50	50	50	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix D-2

Relationships between Economic Benefit of Bachelor's Degree and Income Gap Measures

Regression – Statewide Economic Benefit of BA, Lowest Income Quintile, Richest vs. Poorest Fifth

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Richest vs. Poorest Fifth, Income, Lowest Quintile[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.698[a]	.488	.466	1.205E-02

a. Predictors: (Constant), Richest vs. Poorest Fifth, Income, Lowest Quintile

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.496E-03	2	3.248E-03	22.356	.000[a]
	Residual	6.829E-03	47	1.453E-04		
	Total	1.333E-02	49			

a. Predictors: (Constant), Richest vs. Poorest Fifth, Income, Lowest Quintile

b. Dependent Variable: Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.877E-02	.012		1.630	.110
	Income, Lowest Quintile	7.952E-06	.000	.831	6.298	.000
	Richest vs. Poorest Fifth	-8.393E-04	.000	-.742	-5.625	.000

a. Dependent Variable: Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)

Correlations – Statewide Economic Benefit of BA and Income Gap Measures

		Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)	Richest vs. Middle Fifth	Richest vs. Poorest Fifth	Income, Lowest Quintile
Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)	Pearson Correlation	1.000	-.103	-.234	.377**
	Sig. (2-tailed)	.	.478	.101	.007
	N	50	50	50	50
Richest vs. Middle Fifth	Pearson Correlation	-.103	1.000	.842**	.556**
	Sig. (2-tailed)	.478	.	.000	.000
	N	50	50	50	50
Richest vs. Poorest Fifth	Pearson Correlation	-.234	.842**	1.000	.611**
	Sig. (2-tailed)	.101	.000	.	.000
	N	50	50	50	50
Income, Lowest Quintile	Pearson Correlation	.377**	.556**	.611**	1.000
	Sig. (2-tailed)	.007	.000	.000	.
	N	50	50	50	50

**. Correlation is significant at the 0.01 level (2-tailed).

Regression – Statewide Economic Benefit of BA, All Income Gap Measures

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Richest vs. Middle Fifth, Income, Lowest Quintile , Richest vs. Poorest Fifth[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.707[a]	.500	.467	1.204E-02

a. Predictors: (Constant), Richest vs. Middle Fifth, Income, Lowest Quintile , Richest vs. Poorest Fifth

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.663E-03	3	2.221E-03	15.333	.000[a]
	Residual	6.663E-03	46	1.448E-04		
	Total	1.333E-02	49			

a. Predictors: (Constant), Richest vs. Middle Fifth, Income, Lowest Quintile , Richest vs. Poorest Fifth

b. Dependent Variable: Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.897E-02	.011		1.650	.106
	Income, Lowest Quintile	7.819E-06	.000	.817	6.173	.000
	Richest vs. Poorest Fifth	-1.028E-03	.000	-.908	-4.459	.000
	Richest vs. Middle Fifth	2.352E-04	.000	.208	1.071	.290

a. Dependent Variable: Statewide Economic Benefit from Bachelor's Degree Holders: 1998 (25%)

Appendix D-3

Stability of Selected Measures Over Time

Table D-3A

Correlations between Original and Updated Values of Selected Report Card Measures

Measure	*Correlation*
Number of AP Exams GT 3 (1997 vs. 1999)	.998
% 18-21 Enrolled in College (1995-1997 vs. 1996-1998)	.829
% 25-44 Enrolled Part-time in College (1995-1997 vs. 1996-1998)	.908
Bachelor and Associate Degrees/100 Enrolled (1995-1996 vs. 1997-1998)	.815
% Eligible Voting (1996 vs. 1998)	.490

Table D-3B

Correlations of Original Grade Measures with Final Grade Measures

	Grade Values	***Scale (Sum of Measures) Values***
Preparation	.924	.934
Participation	.808	.858
Affordability	.911	.983
Completion	.688	.966
Benefits	.659	.965

Appendix D-4

State Grade Performance after Controlling for Contextual Factors

Appendix D-4A

Regression Results Using a Standard Predictive Model for all Graded Performance Categories

Regression – Preparation Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Preparation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.699[a]	.489	.456	7.8793

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Preparation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2734.256	3	911.419	14.680	.000[a]
	Residual	2855.860	46	62.084		
	Total	5590.116	49			

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Preparation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	48.796	8.827		5.528	.000
	Population Percent Black + Hispanic	-12.069	9.945	-.135	-1.214	.231
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	-30.305	16.281	-.240	-1.861	.069
	Income, Lowest Quintile	2.981E-03	.001	.481	3.762	.000

a. Dependent Variable: Final Score - Preparation

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	60.8103	90.8290	78.0977	7.4700	50
Residual	-14.3513	16.9393	-2.34E-14	7.6343	50
Std. Predicted Value	-2.314	1.704	.000	1.000	50
Std. Residual	-1.821	2.150	.000	.969	50

a. Dependent Variable: Final Score - Preparation

Preparation – Percent of Population Black + Hispanic, State Obligations, Lowest Income Quintile

State	Standardized Residual	State	Standardized Residual
Massachusetts	2.14984	Rhode Island	-0.19686
Connecticut	2.09028	Tennessee	-0.22923
Illinois	1.52486	Ohio	-0.24668
New York	1.47722	New Hampshire	-0.24693
Utah	1.3718	West Virginia	-0.26206
New Jersey	1.28113	Vermont	-0.26923
Nebraska	1.21541	California	-0.34401
Montana	1.21317	Georgia	-0.34883
North Carolina	1.11156	Iowa	-0.41858
Texas	0.97584	Washington	-0.50672
North Dakota	0.94197	Arkansas	-0.52818
South Dakota	0.81769	Wyoming	-0.57944
Virginia	0.76616	Oklahoma	-0.59316
Michigan	0.75722	Arizona	-0.82023
Mississippi	0.61491	Minnesota	-0.85957
Maine	0.57652	Louisiana	-0.88285
Kansas	0.44136	Pennsylvania	-0.94807
Kentucky	0.10144	Hawaii	-1.01536
Missouri	0.07393	Idaho	-1.11774
Maryland	0.00854	South Carolina	-1.17939
Wisconsin	-0.04745	Oregon	-1.24935
Colorado	-0.06257	Delaware	-1.44173
Alaska	-0.09513	Alabama	-1.48891
Florida	-0.10001	Indiana	-1.49595
New Mexico	-0.11524	Nevada	-1.82138

Regression – Participation Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Participation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.514[a]	.264	.216	10.0763

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Participation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1674.804	3	558.268	5.498	.003[a]
	Residual	4670.447	46	101.531		
	Total	6345.251	49			

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Participation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	60.052	11.288		5.320	.000
	Population Percent Black + Hispanic	7.515	12.718	.079	.591	.557
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	-51.791	20.821	-.384	-2.487	.017
	Income, Lowest Quintile	1.414E-03	.001	.214	1.396	.169

a. Dependent Variable: Final Score - Participation

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	63.8916	87.2392	76.1611	5.8463	50
Residual	-21.6297	20.3061	1.990E-15	9.7630	50
Std. Predicted Value	-2.099	1.895	.000	1.000	50
Std. Residual	-2.147	2.015	.000	.969	50

a. Dependent Variable: Final Score - Participation

Participation – Percent of Population Black + Hispanic, State Obligations, Lowest Income Quintile

State	Standardized Residual	State	Standardized Residual
Kansas	2.01523	Missouri	-0.18067
Nebraska	1.55987	Maine	-0.18542
New Mexico	1.47079	Mississippi	-0.2924
Connecticut	1.46484	Colorado	-0.32898
Illinois	1.42548	Utah	-0.33369
Delaware	1.34677	Texas	-0.40498
Rhode Island	1.34349	New Hampshire	-0.45981
California	1.32228	Montana	-0.46589
North Dakota	1.26622	Louisiana	-0.51776
Michigan	1.15412	Kentucky	-0.58285
Massachusetts	0.94557	Ohio	-0.61495
Wyoming	0.85031	Washington	-0.66304
South Dakota	0.69268	Indiana	-0.70318
Maryland	0.67472	Vermont	-0.73892
Alabama	0.63604	Pennsylvania	-0.7597
Oklahoma	0.47959	Idaho	-0.83071
New York	0.41738	Arkansas	-0.89352
Iowa	0.26791	North Carolina	-0.8981
Virginia	0.22918	Florida	-1.1227
Wisconsin	0.19264	Alaska	-1.23057
Minnesota	0.10529	Tennessee	-1.27178
Arizona	0.08547	Oregon	-1.2726
West Virginia	-0.00346	Nevada	-1.27609
New Jersey	-0.04064	South Carolina	-1.6628
Hawaii	-0.06407	Georgia	-2.1466

Regression – Affordability Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Affordability

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.533[a]	.284	.237	10.2289

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Affordability

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1906.681	3	635.560	6.074	.001[a]
	Residual	4813.035	46	104.631		
	Total	6719.716	49			

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Affordability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	29.990	11.459		2.617	.012
	Population Percent Black + Hispanic	19.885	12.910	.203	1.540	.130
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	64.808	21.136	.468	3.066	.004
	Income, Lowest Quintile	3.887E-03	.001	.572	3.780	.000

a. Dependent Variable: Final Score - Affordability

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	60.1699	89.7982	74.4713	6.2379	50
Residual	-18.7527	21.3817	-2.13E-15	9.9109	50
Std. Predicted Value	-2.293	2.457	.000	1.000	50
Std. Residual	-1.833	2.090	.000	.969	50

a. Dependent Variable: Final Score - Affordability

Affordability – Percent of Population Black + Hispanic, State Obligations, Lowest Income Quintile

State	Standardized Residual	State	Standardized Residual
North Carolina	2.09032	Pennsylvania	0.07331
California	2.03992	Massachusetts	-0.10719
Minnesota	1.84424	Michigan	-0.10823
Illinois	1.84216	South Dakota	-0.15293
Hawaii	1.01448	West Virginia	-0.41143
Kentucky	0.96328	Texas	-0.42256
Utah	0.94988	Vermont	-0.44274
New Jersey	0.85212	Arizona	-0.45507
Iowa	0.78379	Georgia	-0.47175
Wisconsin	0.77303	Missouri	-0.55008
Arkansas	0.77283	Delaware	-0.58832
Washington	0.7604	Alabama	-0.67957
Nebraska	0.70423	Florida	-0.70078
Kansas	0.686	South Carolina	-0.80363
North Dakota	0.54134	New York	-0.86921
Virginia	0.49358	Montana	-0.89386
Nevada	0.46822	Alaska	-1.01489
Oklahoma	0.45195	Oregon	-1.06591
Wyoming	0.38519	Rhode Island	-1.11409
Mississippi	0.31903	Louisiana	-1.25844
Idaho	0.2998	Ohio	-1.30967
Tennessee	0.29712	Maine	-1.32883
Colorado	0.25253	Connecticut	-1.60584
New Mexico	0.16556	Maryland	-1.73399
Indiana	0.09798	New Hampshire	-1.8333

Regression – Completion Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Completion

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.508[a]	.258	.210	8.9611

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Completion

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1287.551	3	429.184	5.345	.003[a]
	Residual	3693.830	46	80.301		
	Total	4981.381	49			

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Completion

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	96.527	10.039		9.615	.000
	Population Percent Black + Hispanic	-13.611	11.310	-.161	-1.203	.235
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	-63.723	18.516	-.534	-3.441	.001
	Income, Lowest Quintile	-1.359E-03	.001	-.232	-1.508	.138

a. Dependent Variable: Final Score - Completion

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	67.4449	91.1578	79.7729	5.1261	50
Residual	-22.9818	19.1922	1.279E-14	8.6824	50
Std. Predicted Value	-2.405	2.221	.000	1.000	50
Std. Residual	-2.565	2.142	.000	.969	50

a. Dependent Variable: Final Score - Completion

Completion – Percent of Population Black + Hispanic, State Obligations, Lowest Income Quintile

State	Standardized Residual	State	Standardized Residual
Connecticut	2.14173	Maryland	0.11439
Pennsylvania	1.70697	Delaware	0.11379
New Hampshire	1.45179	Virginia	0.08378
North Carolina	1.16779	Washington	0.00272
Iowa	1.09611	Michigan	-0.16737
South Carolina	0.94422	Illinois	-0.18876
Rhode Island	0.93384	California	-0.21653
New York	0.93026	West Virginia	-0.37497
Vermont	0.91181	Texas	-0.37721
Minnesota	0.79603	Idaho	-0.38747
Florida	0.79006	New Jersey	-0.5511
Louisiana	0.7321	Oklahoma	-0.64042
Kansas	0.70604	Utah	-0.68094
Wyoming	0.65342	Colorado	-0.71745
Mississippi	0.60024	Arizona	-0.75222
North Dakota	0.45033	Tennessee	-0.8228
Alabama	0.38297	Kentucky	-0.82285
Indiana	0.36406	New Mexico	-0.83695
Massachusetts	0.35293	Montana	-0.91423
Ohio	0.3194	Oregon	-0.95527
Georgia	0.27878	Nebraska	-1.05132
Maine	0.23723	Arkansas	-1.25104
South Dakota	0.19749	Hawaii	-2.0358
Missouri	0.181	Alaska	-2.51195
Wisconsin	0.17996	Nevada	-2.56462

Regression – Benefits Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Benefits

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688[a]	.473	.438	7.5853

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Benefits

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2372.639	3	790.880	13.746	.000[a]
	Residual	2646.660	46	57.536		
	Total	5019.299	49			

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994

b. Dependent Variable: Final Score - Benefits

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	45.159	8.497		5.314	.000
	Population Percent Black + Hispanic	25.847	9.574	.305	2.700	.010
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	-38.759	15.673	-.324	-2.473	.017
	Income, Lowest Quintile	2.873E-03	.001	.489	3.767	.000

a. Dependent Variable: Final Score - Benefits

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	64.6496	95.4701	79.8047	6.9585	50
Residual	-15.8940	15.8256	-1.07E-14	7.3494	50
Std. Predicted Value	-2.178	2.251	.000	1.000	50
Std. Residual	-2.095	2.086	.000	.969	50

a. Dependent Variable: Final Score - Benefits

Benefits – Percent of Population Black + Hispanic, State Obligations, Lowest Income Quintile

State	Standardized Residual	State	Standardized Residual
Colorado	2.08636	Oklahoma	-0.09957
Maryland	1.94837	Oregon	-0.11125
Rhode Island	1.91644	New Jersey	-0.13106
Montana	1.66645	Texas	-0.31397
Connecticut	1.65315	Alaska	-0.3333
Minnesota	1.35375	Louisiana	-0.42518
Washington	0.96154	Illinois	-0.51835
South Dakota	0.91908	South Carolina	-0.54206
Massachusetts	0.87243	Pennsylvania	-0.58845
California	0.81162	Kentucky	-0.60164
Kansas	0.77654	Utah	-0.61891
North Dakota	0.75581	Hawaii	-0.63486
Mississippi	0.7157	New Hampshire	-0.63673
Virginia	0.70441	Georgia	-0.64767
New York	0.53853	Ohio	-0.70967
Michigan	0.49916	West Virginia	-0.87976
New Mexico	0.37757	Maine	-0.87984
Vermont	0.35325	Tennessee	-0.9665
Alabama	0.23447	Iowa	-0.99268
Arizona	0.22104	Indiana	-1.03429
Delaware	0.06078	Arkansas	-1.03994
Wyoming	0.0039	Wisconsin	-1.27054
Nebraska	-0.02489	North Carolina	-1.59198
Idaho	-0.06809	Florida	-1.60181
Missouri	-0.072	Nevada	-2.09538

Appendix D-4B

Regression Results Using the Best-Fitting Predictive Model for each Graded Performance Category

Regression – Preparation Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Income, Lowest Quintile , Population Percent Black + Hispanic, New Economy Index[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Preparation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.712[a]	.507	.474	7.7440

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, New Economy Index

b. Dependent Variable: Final Score - Preparation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2831.501	3	943.834	15.738	.000[a]
	Residual	2758.615	46	59.970		
	Total	5590.116	49			

a. Predictors: (Constant), Income, Lowest Quintile , Population Percent Black + Hispanic, New Economy Index

b. Dependent Variable: Final Score - Preparation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	43.146	7.766		5.556	.000
	Population Percent Black + Hispanic	-23.760	10.277	-.266	-2.312	.025
	New Economy Index	.240	.105	.298	2.282	.027
	Income, Lowest Quintile	2.609E-03	.001	.421	3.139	.003

a. Dependent Variable: Final Score - Preparation

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	58.4203	93.5021	78.0977	7.6017	50
Residual	-12.3497	14.7504	8.527E-16	7.5032	50
Std. Predicted Value	-2.589	2.026	.000	1.000	50
Std. Residual	-1.595	1.905	.000	.969	50

a. Dependent Variable: Final Score - Preparation

Preparation – Lowest Income Quintile, New Economy Index, Percent of Population Black + Hispanic

State	Standardized Residual	State	Standardized Residual
Illinois	1.90475	Arkansas	-0.24156
New Jersey	1.72879	West Virginia	-0.25615
Massachusetts	1.58267	Tennessee	-0.267
New York	1.51205	Vermont	-0.29312
Nebraska	1.50842	Georgia	-0.29568
Montana	1.41939	Alaska	-0.29683
Connecticut	1.28048	New Hampshire	-0.33882
North Carolina	1.24663	Colorado	-0.36922
North Dakota	1.15562	Hawaii	-0.5344
Mississippi	0.93428	Pennsylvania	-0.60236
Michigan	0.89092	Wyoming	-0.60704
Utah	0.83909	New Mexico	-0.6193
Virginia	0.76606	South Carolina	-0.76517
Texas	0.73835	Oklahoma	-0.79143
Maine	0.72897	Louisiana	-0.91046
South Dakota	0.57193	California	-1.02187
Wisconsin	0.39365	Washington	-1.05308
Maryland	0.36904	Minnesota	-1.10805
Kansas	0.27743	Delaware	-1.12927
Rhode Island	0.17512	Arizona	-1.22652
Iowa	0.12259	Alabama	-1.24836
Florida	0.12078	Indiana	-1.36709
Missouri	-0.01343	Idaho	-1.52288
Ohio	-0.09892	Oregon	-1.53223
Kentucky	-0.16201	Nevada	-1.59474

Regression – Participation Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Budget Shortfall, 2000-2008, Population Percent Black + Hispanic[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Participation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.562[a]	.316	.271	9.7148

a. Predictors: (Constant), State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Budget Shortfall, 2000-2008, Population Percent Black + Hispanic

b. Dependent Variable: Final Score - Participation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2003.886	3	667.962	7.078	.001[a]
	Residual	4341.365	46	94.377		
	Total	6345.251	49			

a. Predictors: (Constant), State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Budget Shortfall, 2000-2008, Population Percent Black + Hispanic

b. Dependent Variable: Final Score - Participation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	77.533	2.646		29.307	.000
	Population Percent Black + Hispanic	10.616	12.370	.112	.858	.395
	Budget Shortfall, 2000-2008	68.725	29.085	.293	2.363	.022
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	-68.779	17.224	-.511	-3.993	.000

a. Dependent Variable: Final Score - Participation

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	61.7139	88.2068	76.1611	6.3950	50
Residual	-22.5335	20.4720	2.558E-15	9.4127	50
Std. Predicted Value	-2.259	1.884	.000	1.000	50
Std. Residual	-2.319	2.107	.000	.969	50

a. Dependent Variable: Final Score - Participation

Participation – Budget Shortfall, State Obligations, Percent of Population Black + Hispanic

State	Standardized Residual	State	Standardized Residual
Kansas	2.1073	Idaho	-0.10884
New Mexico	1.95042	New Jersey	-0.14175
Connecticut	1.66422	New Hampshire	-0.16873
Wyoming	1.40513	Nevada	-0.26992
Delaware	1.37608	New York	-0.27358
California	1.17824	Texas	-0.31349
Illinois	1.17715	Missouri	-0.3372
Nebraska	1.13976	West Virginia	-0.40559
Maryland	1.11547	Montana	-0.42584
Michigan	0.92275	Washington	-0.4603
Rhode Island	0.87706	Indiana	-0.46186
North Dakota	0.8646	Maine	-0.54076
South Dakota	0.61142	Louisiana	-0.70364
Arizona	0.43959	Mississippi	-0.75361
Alabama	0.42606	Vermont	-0.85295
Massachusetts	0.415	Ohio	-0.92704
Oklahoma	0.38522	Pennsylvania	-0.94036
Wisconsin	0.31378	Kentucky	-0.9605
Hawaii	0.31326	North Carolina	-1.06305
Virginia	0.24484	Florida	-1.08753
Utah	0.24039	Tennessee	-1.18714
Alaska	0.0898	Arkansas	-1.33101
Iowa	0.02516	Oregon	-1.61191
Colorado	0.00992	South Carolina	-1.62073
Minnesota	-0.02585	Georgia	-2.3195

Regression – Affordability Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Population Percent Black + Hispanic, Income, Lowest Quintile[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Affordability

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.533[a]	.284	.237	10.2289

a. Predictors: (Constant), State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Population Percent Black + Hispanic, Income, Lowest Quintile

b. Dependent Variable: Final Score - Affordability

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1906.681	3	635.560	6.074	.001[a]
	Residual	4813.035	46	104.631		
	Total	6719.716	49			

a. Predictors: (Constant), State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Population Percent Black + Hispanic, Income, Lowest Quintile

b. Dependent Variable: Final Score - Affordability

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	29.990	11.459		2.617	.012
	Population Percent Black + Hispanic	19.885	12.910	.203	1.540	.130
	Income, Lowest Quintile	3.887E-03	.001	.572	3.780	.000
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	64.808	21.136	.468	3.066	.004

a. Dependent Variable: Final Score - Affordability

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	60.1699	89.7982	74.4713	6.2379	50
Residual	-18.7527	21.3817	1.080E-14	9.9109	50
Std. Predicted Value	-2.293	2.457	.000	1.000	50
Std. Residual	-1.833	2.090	.000	.969	50

a. Dependent Variable: Final Score - Affordability

Affordability – Lowest Income Quintile, New Economy Index, Percent of Population Black + Hispanic

State	Standardized Residual	State	Standardized Residual
North Carolina	2.09032	Pennsylvania	0.07331
California	2.03992	Massachusetts	-0.10719
Minnesota	1.84424	Michigan	-0.10823
Illinois	1.84216	South Dakota	-0.15293
Hawaii	1.01448	West Virginia	-0.41143
Kentucky	0.96328	Texas	-0.42256
Utah	0.94988	Vermont	-0.44274
New Jersey	0.85212	Arizona	-0.45507
Iowa	0.78379	Georgia	-0.47175
Wisconsin	0.77303	Missouri	-0.55008
Arkansas	0.77283	Delaware	-0.58832
Washington	0.7604	Alabama	-0.67957
Nebraska	0.70423	Florida	-0.70078
Kansas	0.686	South Carolina	-0.80363
North Dakota	0.54134	New York	-0.86921
Virginia	0.49358	Montana	-0.89386
Nevada	0.46822	Alaska	-1.01489
Oklahoma	0.45195	Oregon	-1.06591
Wyoming	0.38519	Rhode Island	-1.11409
Mississippi	0.31903	Louisiana	-1.25844
Idaho	0.2998	Ohio	-1.30967
Tennessee	0.29712	Maine	-1.32883
Colorado	0.25253	Connecticut	-1.60584
New Mexico	0.16556	Maryland	-1.73399
Indiana	0.09798	New Hampshire	-1.8333

Regression – Completion Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	New Economy Index, Population Percent Black + Hispanic, Budget Shortfall, 2000-2008[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Completion

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.548[a]	.300	.254	8.7059

a. Predictors: (Constant), New Economy Index, Population Percent Black + Hispanic, Budget Shortfall, 2000-2008

b. Dependent Variable: Final Score - Completion

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1494.949	3	498.316	6.575	.001[a]
	Residual	3486.431	46	75.792		
	Total	4981.381	49			

a. Predictors: (Constant), New Economy Index, Population Percent Black + Hispanic, Budget Shortfall, 2000-2008

b. Dependent Variable: Final Score - Completion

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	79.874	4.814		16.592	.000
	Population Percent Black + Hispanic	-16.780	10.652	-.199	-1.575	.122
	Budget Shortfall, 2000-2008	98.918	26.253	.477	3.768	.000
	New Economy Index	.150	.096	.197	1.568	.124

a. Dependent Variable: Final Score - Completion

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	64.9900	90.0382	79.7729	5.5235	50
Residual	-16.2677	20.2277	1.137E-14	8.4351	50
Std. Predicted Value	-2.676	1.858	.000	1.000	50
Std. Residual	-1.869	2.323	.000	.969	50

a. Dependent Variable: Final Score - Completion

Completion – Budget Shortfall, New Economy Index, Percent of Population Black + Hispanic

State	Standardized Residual	State	Standardized Residual
New Hampshire	2.32346	Washington	0.06134
Rhode Island	1.87567	Wisconsin	0.01221
Pennsylvania	1.79071	Kansas	-0.00557
Florida	1.69961	New Jersey	-0.09839
Vermont	1.45133	Tennessee	-0.15057
North Carolina	1.16831	Louisiana	-0.19869
Wyoming	1.136	Ohio	-0.22329
South Carolina	0.93059	Missouri	-0.28196
New York	0.80379	Illinois	-0.37197
Virginia	0.64919	Arizona	-0.40798
Georgia	0.622	Texas	-0.53589
Alabama	0.61779	West Virginia	-0.62363
Iowa	0.55726	Colorado	-0.62543
Maryland	0.45231	Montana	-0.63334
Indiana	0.41054	Michigan	-0.75562
Delaware	0.35215	New Mexico	-0.89834
Hawaii	0.32188	Nevada	-0.99282
Massachusetts	0.26457	California	-1.01087
Connecticut	0.22918	Arkansas	-1.27364
Mississippi	0.20599	Nebraska	-1.31501
Maine	0.19029	Oklahoma	-1.3306
Minnesota	0.14311	Oregon	-1.4894
South Dakota	0.13299	Kentucky	-1.73157
North Dakota	0.1014	Utah	-1.77761
Idaho	0.09708	Alaska	-1.86859

Regression – Benefits Final Score

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Population Percent Black + Hispanic, Income, Lowest Quintile[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Final Score - Benefits

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.688[a]	.473	.438	7.5853

a. Predictors: (Constant), State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Population Percent Black + Hispanic, Income, Lowest Quintile

b. Dependent Variable: Final Score - Benefits

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2372.639	3	790.880	13.746	.000[a]
	Residual	2646.660	46	57.536		
	Total	5019.299	49			

a. Predictors: (Constant), State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994, Population Percent Black + Hispanic, Income, Lowest Quintile

b. Dependent Variable: Final Score - Benefits

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	45.159	8.497		5.314	.000
	Population Percent Black + Hispanic	25.847	9.574	.305	2.700	.010
	Income, Lowest Quintile	2.873E-03	.001	.489	3.767	.000
	State Obligations (amount needed to bring state spending up to national average for all needs for state services) 1994	-38.759	15.673	-.324	-2.473	.017

a. Dependent Variable: Final Score - Benefits

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	64.6496	95.4701	79.8047	6.9585	50
Residual	-15.8940	15.8256	4.405E-15	7.3494	50
Std. Predicted Value	-2.178	2.251	.000	1.000	50
Std. Residual	-2.095	2.086	.000	.969	50

a. Dependent Variable: Final Score - Benefits

Benefits – State Obligations, Lowest Income Quintile, Percent of Population Black + Hispanic

State	Standardized Residual
Colorado	2.08636
Maryland	1.94837
Rhode Island	1.91644
Montana	1.66645
Connecticut	1.65315
Minnesota	1.35375
Washington	0.96154
South Dakota	0.91908
Massachusetts	0.87243
California	0.81162
Kansas	0.77654
North Dakota	0.75581
Mississippi	0.7157
Virginia	0.70441
New York	0.53853
Michigan	0.49916
New Mexico	0.37757
Vermont	0.35325
Alabama	0.23447
Arizona	0.22104
Delaware	0.06078
Wyoming	0.0039
Nebraska	-0.02489
Idaho	-0.06809
Missouri	-0.072

State	Standardized Residual
Oklahoma	-0.09957
Oregon	-0.11125
New Jersey	-0.13106
Texas	-0.31397
Alaska	-0.3333
Louisiana	-0.42518
Illinois	-0.51835
South Carolina	-0.54206
Pennsylvania	-0.58845
Kentucky	-0.60164
Utah	-0.61891
Hawaii	-0.63486
New Hampshire	-0.63673
Georgia	-0.64767
Ohio	-0.70967
West Virginia	-0.87976
Maine	-0.87984
Tennessee	-0.9665
Iowa	-0.99268
Indiana	-1.03429
Arkansas	-1.03994
Wisconsin	-1.27054
North Carolina	-1.59198
Florida	-1.60181
Nevada	-2.09538

ABOUT THE AUTHOR

Peter Ewell is senior associate at the National Center for Higher Education Management Systems (NCHEMS), where his work focuses on institutional effectiveness, student assessment, program review, enrollment management, student retention, and the outcomes of college. He has consulted with hundreds of colleges and universities and 24 state systems of higher education, and has authored several books and many articles on improving undergraduate instruction through the assessment of student outcomes. Among his publications are *The Self-Regarding Institution: Information for Excellence* and *Assessing Educational Outcomes*. Prior to joining NCHEMS in 1981, Dr. Ewell was coordinator for long-range planning at Governors State University. A graduate of Haverford College, he received his Ph.D. in political science from Yale University in 1976.

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Measuring Up 2000: The State-by-State Report Card for Higher Education (November 2000, #00-3). This first-of-its-kind report card grades each state on its performance in higher education. The report card also provides comprehensive profiles of each state and brief states-at-a-glance comparisons. Visit **www.highereducation.org** to download *Measuring Up 2000* or to make your own comparisons of state performance in higher education. Printed copies are available for $25.00 by calling 888-269-3652 (discounts available for large orders).

Some Next Steps for States: A Follow-up to Measuring Up 2000, by Dennis Jones and Karen Paulson (June 2001, #01-2). Now that *Measuring Up 2000* has been released, what are the next steps states can take to improve performance in higher education? This report provides an introduction to the kinds of actions states can take to bridge the gap between the performance areas identified in *Measuring Up 2000* and the formulation of effective policy.

Assessing Student Learning Outcomes: A Supplement to Measuring Up 2000, by Peter Ewell and Paula Ries (December 2000, #00-5). National survey of state efforts to assess student learning outcomes in higher education.

Recent State Policy Initiatives in Education: A Supplement to Measuring Up 2000, by Aims McGuinness, Jr. (December 2000, #00-6). Highlights education initiatives that states have adopted since 1997–98.

Technical Guide Documenting Methodology, Indicators and Data Sources for Measuring Up 2000 (November 2000, #00-4).

A Review of Tests Performed on the Data in Measuring Up 2000, by Peter Ewell (June 2001, #01-1). Describes the statistical testing performed on the data in *Measuring Up 2000* by the National Center for Higher Education Management Systems.

A State-by-State Report Card on Higher Education: Prospectus (March 2000, #00-1). Summarizes the goals of the National Center's report card project.

Great Expectations: How the Public and Parents—White, African American and Hispanic—View Higher Education, by John Immerwahr with Tony Foleno (May 2000, #00-2). This report by Public Agenda finds that Americans overwhelmingly see higher education as essential for success. Survey results are also available for the following states:

Great Expectations: How Pennsylvanians View Higher Education (May 2000, #00-2b)
Great Expectations: How Floridians View Higher Education (August 2000, #00-2c)
Great Expectations: How Coloradans View Higher Education (August 2000, #00-2d)
Great Expectations: How Californians View Higher Education (August 2000, #00-2e)
Great Expectations: How New Yorkers View Higher Education (October 2000, #00-2f)
Great Expectations: How Illinois Residents View Higher Education (October 2000, #00-2h)

State Spending for Higher Education in the Next Decade: The Battle to Sustain Current Support, by Harold A. Hovey (July 1999, #99-3). This fiscal forecast of state and local spending patterns finds that the vast majority of states will face significant fiscal deficits over the next eight years, which will in turn lead to increased scrutiny of higher education in almost all states, and to curtailed spending for public higher education in many states.

South Dakota: Developing Policy-Driven Change in Higher Education, by Mario Martinez (June 1999, #99-2). Describes the processes for change in higher education that government, business and higher education leaders are creating and implementing in South Dakota.

Taking Responsibility: Leaders' Expectations of Higher Education, by John Immerwahr (January 1999, #99-1). Reports the views of those most involved with decision-making about higher education, based on a survey and focus groups conducted by Public Agenda.

The Challenges and Opportunities Facing Higher Education: An Agenda for Policy Research, by Dennis Jones, Peter Ewell, and Aims McGuinness (December 1998, #98-8). Argues that due to substantial changes in the landscape of postsecondary education, new state-level policy frameworks must be developed and implemented.

Higher Education Governance: Balancing Institutional and Market Influences, by Richard C. Richardson, Jr., Kathy Reeves Bracco, Patrick M. Callan, and Joni E. Finney (November 1998, #98-7). Describes the structural relationships that affect institutional effectiveness in higher education, and argues that state policy should strive for a balance between institutional and market forces.

Federal Tuition Tax Credits and State Higher Education Policy: A Guide for State Policy Makers, by Kristin D. Conklin (December 1998, #98-6). Examines the implications of the federal income tax provisions for students and their families, and makes recommendations for state higher education policy.

The Challenges Facing California Higher Education: A Memorandum to the Next Governor of California, by David W. Breneman (September 1998, #98-5). Argues that California should develop a new Master Plan for Higher Education.

Tidal Wave II Revisited: A Review of Earlier Enrollment Projections for California Higher Education, by Gerald C. Hayward, David W. Breneman and Leobardo F. Estrada (September 1998, #98-4). Finds that earlier forecasts of a surge in higher education enrollments were accurate.

Organizing for Learning: The View from the Governor's Office, by James B. Hunt Jr., chair of the National Center for Public Policy and Higher Education, and former governor of North Carolina (June 1998, #98-3). An address to the American Association for Higher Education concerning opportunity in higher education.

The Price of Admission: The Growing Importance of Higher Education, by John Immerwahr (Spring 1998, #98-2). A national survey of Americans' views on higher education, conducted and reported by Public Agenda.

Concept Paper: A National Center to Address Higher Education Policy, by Patrick M. Callan (March 1998, #98-1). Describes the purposes of The National Center for Public Policy and Higher Education.

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