



JOB QUALITY: 2004 UPDATE

March 2006

Tom Rex, M.B.A.

**Associate Director, Center for Competitiveness and Prosperity Research;
and Manager of Research Initiatives, Office of the University Economist**

JOB QUALITY: 2004 UPDATE

A Report from the Productivity and Prosperity Project (P3), Supported by the Office of the University Economist

March 2006

Tom Rex, M.B.A.

Associate Director, Center for Competitiveness and Prosperity Research;
and Manager of Research Initiatives, Office of the University Economist

Center for Competitiveness and Prosperity Research
L. William Seidman Research Institute
W. P. Carey School of Business
Arizona State University
Box 874011
Tempe, Arizona 85287-4011

(480) 965-5362
FAX: (480) 965-5458
EMAIL: Tom.Rex@asu.edu
wpcarey.asu.edu/research/competitiveness-prosperity-research
economist.asu.edu



TABLE OF CONTENTS

Summary	1
Introduction	3
Data	3
Methodology	5
Results for the United States	8
Change in Industrial Job Quality, 2001-04	8
Change in Occupational Job Quality, 2001-04	8
Results for Arizona	13
Industrial Mix, 2004	13
Occupational Mix, 2004	16
Change in Industrial Job Quality, 2001-04	19
Change in Occupational Job Quality, 2001-04	23
Results for All States	27
Industrial Job Quality	27
Occupational Job Quality	33
Overall Job Quality	38
Average Wage After Adjusting for Job Quality	41

LIST OF TABLES

1. 2001-04 Change in Job Quality Scores by Sector: United States	9
2. 2001-04 Change in Job Quality Scores by Industry: United States	10
3. 2001-04 Change in Job Quality Scores by Occupational Group: United States	11
4. 2001-04 Change in Job Quality Scores by Occupation: United States	12
5. 2004 Industrial Mix by Sector: Arizona	14
6. 2004 Industrial Mix by Industry: Arizona	15
7. 2004 Occupational Mix by Occupational Group: Arizona	17
8. 2004 Occupational Mix by Occupation: Arizona	18
9. 2001-04 Change in Industrial Job Mix and Change in Industrial Job Quality Relative to the Nation by Sector: Arizona	20
10. 2001-04 Change in Industrial Job Mix by Industry: Arizona	21
11. 2001-04 Change in Job Quality Scores By Industry: Arizona and the United States	22
12. 2001-04 Change in Occupational Job Mix and Change in Occupational Job Quality Relative to the Nation by Occupational Group: Arizona	24
13. 2001-04 Change in Occupational Job Mix by Occupation: Arizona	25
14. 2001-04 Change in Job Quality Scores by Occupation: Arizona and the United States	26
15. Industrial Job Quality by State	28
16. 2004 Industrial Mix Ranked by State	30
17. 2001-04 Change in Industrial Mix Ranked by State	32
18. Occupational Job Quality By State	34
19. 2004 Occupational Mix Ranked by State	36
20. 2001-04 Change in Occupational Mix Ranked by State	37
21. 2004 Overall Job Quality Ranked by State	39
22. 2001-04 Change in Overall Job Quality Ranked by State	40
23. 2004 Average Wage and Job Quality by State	42
24. 2001-04 Change in Average Wage and Job Quality by State	44

SUMMARY

The long-term trend toward lower-quality jobs in the United States continued between 2001 and 2004. Industrial job quality fell 1.6 percent nationally between 2001 and 2004. The decrease in occupational job quality was not quite as great at 0.9 percent. Thus, overall U.S. job quality dropped 2.5 percent during the three years, causing the U.S. average wage to be 2.5 percent less than it otherwise would have been.

Historically, most of the losses in job quality have occurred during economic recessions and in the recovery phase following recessions. The economic recession of 2001 was followed by a slow recovery that extended into 2003. In conjunction with this economic cycle, job quality nationally decreased at a relatively rapid rate in 2002 and 2003, but the rate of decline slowed in 2004.

The decrease in national job quality between 2001 and 2004 was widespread industrially. Job quality fell in 16 of the 20 sectors, was flat in two sectors, and rose only marginally in the other two sectors. The most significant decreases occurred in accommodation and food services (a low-paying sector whose employment grew faster than average), information (a high-paying sector whose employment sectoral share fell), and manufacturing (a somewhat high-paying sector whose employment dropped substantially).

In contrast to the widespread but small decreases in job quality by industrial sector, the reduction in national occupational job quality between 2001 and 2004 was concentrated in just one of the 22 major occupational groups. The decrease in the management group was greater than the decline in the overall occupational figure. The highest paying of the groups, management had the largest decrease in employment share.

Arizona's job quality fell between 2001 and 2004 at a pace worse than the national average. Relative to the national average, the industrial and occupational job mixes each slipped a bit more than 0.3 percent during the three years, for an overall decline of 0.7 percent. Among the states, Arizona ranked 42nd on the change in industrial mix, 30th on the change in occupational mix, and 44th overall. Historically, the state usually falls further behind the nation during periods of economic weakness, as experienced in 2002 into 2003. However, job quality also fell by more than the national average in 2004.

A loss of jobs in the high-paying semiconductor manufacturing industry was primarily responsible for Arizona's weakening industrial mix between 2001 and 2004, both overall and in relation to the national average. Even in 2004, a disproportionate amount of the decline in industrial job quality relative to the U.S. average originated in this industry. Despite its recent problems, semiconductor manufacturing remained a large positive force on the state's 2004 job mix.

In Arizona, job quality in 2004 was 2.0 percent below the national average, but Arizona ranked 23rd among all states. The level of industrial job quality in 2004 was 1.6 percent less than the national average, ranking 23rd, and occupational job quality was 0.5 percent below average, also ranking 23rd. Thus, Arizona's job mix being tilted toward low-paying industries and occupations

accounted for 2 percentage points of the nearly 7 percent shortfall in Arizona's average wage from the national average.

Three sectors largely were responsible for the state's subpar industrial mix. The shares of employment in the low-paying administrative support sector and the very low-paying accommodation and food services sector were larger in Arizona than the U.S. average, while the high-paying professional, scientific and technical services sector was disproportionately smaller in Arizona than nationally. Occupationally, the higher-than-average proportion of workers in Arizona in the very low-paying food preparation and serving group had the greatest negative effect on the state's job quality.

Only the District of Columbia and Rhode Island experienced an improvement in overall job quality between 2001 and 2004. However, 31 states did better than the national average, having a positive change in overall job quality relative to the U.S. average between 2001 and 2004. In only 16 states was the change at least 1 percent more than the national average. Six states had a decrease at least 1 percent more than the national average. The change in job quality did not have a strong regional pattern, though most of the northern tier of states did better than the national average while decreases were considerably greater than the national average in the area encompassing Louisiana, Texas, New Mexico, Colorado, and Arizona.

The level of job quality in 2004 was greater than the national average in only 18 states. The strongest job quality was in the District of Columbia and seven states that border the Atlantic Ocean from Massachusetts to Virginia, each with job quality raising the state's average wage by at least 6 percent relative to the national average. Outside of this region, the strongest job quality was in Illinois and Colorado. In the West and the Great Lakes regions, job quality varied by state from below to above the national average. Job quality was almost uniformly weak in the Great Plains and South.

INTRODUCTION

The methodology and datasets used to produce the measures of job quality presented in this report are summarized in this section. For a more complete discussion, including a literature review, see the original job quality reports produced in 2005, available at <http://economist.asu.edu/p3/job-quality>.

Data

The Bureau of Labor Statistics (BLS), part of the U.S. Department of Labor, is the main source of workforce data. The BLS produces various employment series.

A limitation to all government data is the withholding of data that violates the federal government's disclosure restrictions. To prevent the identification of data for a specific company, data are withheld if too few companies are represented in a given industry or occupation or if one company dominates the category. Data for a second category must be withheld, even if its disclosure restriction is not violated, so that the data for the first category cannot be calculated from available data.

For this project, categories with withheld data were combined by sector or occupational group — the data for these aggregations of withheld categories could be calculated from the figures at the next higher level of industrial or occupational detail and figures for other categories at the same level.

The withholding of data has two significant effects on the calculation of job quality. First, the quality of the results is compromised as missing industries (or occupations) have to be combined with other missing industries that may have considerably different average wages and/or changes in employment. The disclosure restriction has little effect on national data but a considerable impact on published data for most subnational areas. For example, more than half of the industrial or occupational data are withheld in the least populous states. By metropolitan area, the proportion withheld is even greater except in the largest areas.

Second, processing time is very substantially increased due to the withholding of data. The dataset for every state in every year is unique in terms of the industries (or occupations) disclosed, limiting the degree to which the processing of the data can be fully computerized. In order to accurately compare each state to the national average, the national dataset is adjusted for every state in every year so that the undisclosed categories match those in the state. For this report, 51 industrial datasets were created for each of two years for the states. This number is doubled for the matching national dataset and doubled again for the occupational datasets, resulting in a total of 408 individual datasets.

Thus, while it would be desirable to produce year-by-year data (annual industrial data back to 1990 could be examined), the man-hours required for such an analysis are tremendously large. Similarly, no attempt has been made to calculate job quality by metro area, both because of the time requirements and because of the very substantial amount of undisclosed data in most metro areas.

Occupational Data

Occupational data generally are perceived to be superior to industrial data when examining job quality. The Occupational Employment Statistics program (OES) is the only source of occupational data by state and metropolitan area other than the decennial census. OES data are adjusted to full-time-equivalent status, but are based on a sample of employers. Moreover, a limited history of occupational data is available by state, with a discontinuity in 1999 when the Standard Occupation Classification (SOC) system was adopted. The BLS currently conducts the OES survey semiannually; previously the data were collected annually. However, since employers are contacted only once every three years, fully comparable data exist only for three-year comparisons. Thus, the latest data for 2004 — which were released in November 2005 — were compared to those for 2001 for this project.

The SOC defines 733 occupations, which are combined into 22 major occupational groups. However, some data are withheld even at the national level, so that the national number of occupations (including aggregations of withheld occupations by occupational group) available in both 2001 and 2004 was 721. The number by state ranged from 681 in California to 377 in Alaska and 336 in the District of Columbia.

Industrial Data

The Quarterly Census of Employment and Wages (CEW) — previously referred to as the unemployment insurance or ES-202 program — provides data for the nation, states, metropolitan areas and counties. The CEW data are a census of all workers covered by the unemployment insurance program and provide the most detailed industrial data. However, the wages of part-time workers or those who work more than 40 hours per week are not adjusted to full-time-equivalent status. Annual data for 2004 were released in October 2005.

Industrially, workforce data currently are categorized by the North American Industry Classification System (NAICS). The NAICS presents data hierarchically. The most detailed data are for industries (5- or 6-digit NAICS code). These are totaled into industry groups (4-digit), then into subsectors (3-digit), and finally into 20 (2-digit) sectors. To match the data available by occupation, the latest industrial data for 2004 were compared to those for 2001 for this project. For the nation and Arizona, the three-year analysis was supplemented by a comparison of 2003 and 2004 data.

Full industrial detail is available from the CEW program, but considerable data are withheld and workers not covered by the unemployment insurance program are not included. The national CEW dataset includes 1,170 industries, but the number available by state in both 2001 and 2004 ranged from 1,076 in California to only 334 in Alaska and Wyoming and 297 in the District of Columbia. The number by state includes an aggregation of multiple industries with withheld data within each of the 20 sectors.

The goal of this project was to retain as much detail as possible, so six-digit industries are the unit of analysis. However, because of the intensive data collection and manipulation that was necessary, a compromise was made in that all withheld six-digit industries were combined for each two-digit NAICS sector, rather than using the intermediate three-digit and four-digit subsector and industry group data.

In a few states, even 2-digit sectoral data were withheld. In these states, the undisclosed sectoral total was combined with the unclassified category (which also was withheld). Otherwise, the unclassified category was excluded from the analysis.

Methodology

In this report, job quality is presented both as a level as of a given year (for 2004, the latest year) and as a change over time (between 2001 and 2004). By state, the level — referred to as the “job mix” — is expressed relative to the national average; the level cannot be calculated for the nation. The change over time in job quality can be calculated in various ways. Regardless of the method used, results can vary substantially depending on the amount of categorical detail used (for example, 6-digit industries versus 2-digit sectors). Conceptually, the more detailed the data, the more robust the results will be.

Job quality is calculated independently from the industrial and occupational datasets. Using industrial data, the job mix is referred to as the “industrial mix” and the change over time is the change in industrial job quality. Using occupational data, the job mix is referred to as the “occupational mix” and the change over time is the change in occupational job quality. The occupational and industrial results are combined to create an overall measure of job quality.

Subnational Job Mix (Level of Job Quality)

The job mix (either industrial mix or occupational mix) is calculated from formula 1, which is applied to every industry or occupation. Sectoral totals are the cumulation of all industries within the sector; occupational group totals are the cumulation of all occupations within the group. The overall job mix is calculated by summing over all categories (industries or occupations):

$$1 \quad \frac{\text{(difference in share of employment between subnational area and nation)}}{\text{* (ratio of national categorical average wage to overall national average wage - 1)}} * 100.$$

To isolate the effect of geographic differences in the employment structure, the average wage is held constant in the calculation of job mix by using national wage data. Since local wages are not used, geographic differences in living costs and other factors that affect local wage levels do not distort the analysis.

The job mix value of individual occupations or industries can be used to identify the major contributors to the overall level of job quality. A larger share of employment in the local area than the national average in a higher-than-average-paying category results in a positive job mix value, as does a smaller-than-average share in a lower-than-average-paying category.

The overall job mix value indicates the impact of differences in job quality on the average wage. A job mix value of 2.5, for example, indicates that the job mix in the local area raises the area’s average wage by 2.5 percent relative to the national average.

Change in National Job Quality Over Time

The change in job quality (sometimes referred to as the “score” in this report) for the nation is calculated from formula 2, summing over all categories (industries or occupations):

2 (change over time in categorical share of national employment) * (ratio of national categorical average wage to overall national average wage – 1) * 100.

The mid-point of the change in job quality score is zero; that is, categorical employment change that is exactly proportionate to employment shares results in a score of zero. A negative score indicates a deterioration in job quality while a positive score signals an improvement in job quality. The multiplication by 100 in the formula converts the results to percentages. For example, a job quality score of -0.5 indicates that deterioration in job quality had a downward effect of 0.5 percent on the overall average wage.

The wage data used in this calculation can be for either the first or last year of the time period being analyzed. (The first year has been used in this paper.) For short time periods (such as the three-year period reported in this paper), the choice of year has only a modest effect on the results, but the differences may be significant when analyzing a long time period. An alternative for longer time periods in which annual data are available is to calculate the annual change in job quality, then to cumulate the annual scores. When annual data exist, the cumulation of annual scores is the preferred method since it allows the average wage data to be updated each year, rather than held constant.

The job quality scores of individual categories can be used to identify the major contributors to the overall change in job quality. Faster-than-average growth in a higher-than-average-paying category results in a positive score, as does slower-than-average growth in a lower-than-average-paying category.

Change in Subnational Job Quality Over Time

The change in subnational job quality over time can be computed using any of three calculations. The simplest technique is to calculate the difference in job mix over time by using formula 1 to calculate the job mix value in each of two years and taking the difference between the two job mix values. Geographic differences in living costs and other factors that affect local wage levels do not distort this calculation. Thus, it is the preferred method when the focus is to compare states.

An alternative is to calculate the change in subnational job quality using formula 2, substituting subnational employment for national employment. Since national wages are used, geographic differences in living costs and other factors that affect local wage levels also do not distort this calculation. The advantage of this alternative is that the change in subnational job quality can be compared directly to the change in national job quality. The difference in change in job quality between the local area and the nation using formula 2 is not the same as that calculated from formula 1 in part because formula 2 uses the average wage in just one year while formula 1 uses the wage data in each year.

A third alternative can be employed if the focus is to examine one subnational area's performance over time. This alternative also uses formula 2 to calculate the change in subnational job quality, substituting both the subnational employment and subnational average wage for the national figures. When looking at only one geographic area, this method has the

advantage of acknowledging the unique wage structure of the area. However, this technique should not be used to compare job quality across geographic areas because differences in living costs and other factors implicit in the local wage structure distort the results. In addition, especially in categories with little employment in a subnational area, the mix of jobs within the category (even at the industrial or occupational level) may be substantially different from that of other areas, causing the local average wage to be different from that in the comparison area.

RESULTS FOR THE UNITED STATES

Job quality fell at a relatively fast pace nationally between 2001 and 2004, related to the economic cycle: though the recession ended in 2001, little recovery was recorded in 2002 and economic growth as measured by employment remained slow well into 2003. Historically, job quality has dropped the most during the recessionary and early recovery phases of the cycle.

Declines in industrial job quality caused the average wage to fall 1.6 percent between 2001 and 2004. The decrease in occupational job quality was not quite as great at 0.9 percent. Thus, overall U.S. job quality dropped 2.5 percent during the three years.

Industrial data for 2003 and 2004 indicate that job quality fell 0.3 percent in 2004, a lesser rate of decline than the 1.3 percent drop in the two prior years combined — in line with the historical record. During the expansionary phase of the cycle, annual changes in industrial job quality typically range from marginal improvements to declines of about 0.3 percent.

Change in Industrial Job Quality, 2001-04

The decrease in national industrial job quality between 2001 and 2004 was widespread across the industries. Aggregating the changes at the industrial level to the 20 sectors reveals that job quality fell in 16 of the sectors, was flat in two sectors, and rose only marginally in the other two sectors (see Table 1). Most of the sectors, however, experienced only a modest change in job quality. The most significant decreases occurred in accommodation and food services (a low-paying sector whose employment grew faster than average), information (a high-paying sector whose employment sectoral share fell), and manufacturing (a somewhat high-paying sector whose employment dropped substantially).

Only three industries experienced a change in job quality of at least 0.1 over the three years. The largest decline was in securities brokerage, part of the finance and insurance sector. The other two industries with the greatest drops were full-service and limited-service restaurants. Three industries in the information sector had a decrease in job quality score of at least 0.05: wired telecommunications carriers, software publishers, and internet service providers. Two manufacturing industries were on the list: semiconductors and related devices, and electronic computers (see Table 2).

Change in Occupational Job Quality, 2001-04

In contrast to the widespread but small decreases in job quality by industrial sector, the reduction in national occupational job quality between 2001 and 2004 was centered on just one of the 22 major occupational groups. The management group had a score of -1.0, a greater decline than the overall occupational figure (see Table 3). The highest paying of the groups, management had the largest decrease in employment share. Otherwise, the most significant decrease occurred in food preparation and serving (a low-paying group whose employment grew faster than average). This decline largely was offset by a gain in business and financial operations (a high-paying group whose employment sectoral share rose).

Only four occupations experienced a change in job quality of at least 0.1 over the three years. The three largest declines all were in very high-paying occupations within the management group: general and operations managers, chief executives, and management occupations not

specified. Financial managers, another management occupation, experienced a slightly lesser decrease. The other occupation with a drop of 0.1 was low-paying waiters and waitresses. The combined food preparation and serving occupation also was on the list of largest negative values (see Table 4).

TABLE 1
2001-04 CHANGE IN JOB QUALITY SCORES BY SECTOR: UNITED STATES

Sector	Score*	2001 Average Wage Ratio**	2001-04 Change in Sectoral Share**/***
Retail Trade	0.02	0.63	-0.06
Real Estate and Rental and Leasing	0.01	0.91	0.04
Agriculture, Forestry, Fishing and Hunting	0.00	0.56	0.00
Administrative and Support and Waste Mgt	0.00	0.67	0.09
Mining	-0.01	1.65	-0.01
Arts, Entertainment, and Recreation	-0.02	0.70	0.06
Management of Companies	-0.02	1.90	-0.02
Utilities	-0.03	1.81	-0.02
Educational Services	-0.03	0.89	0.15
Government	-0.03	1.01	0.40
Transportation and Warehousing	-0.05	1.00	-0.09
Wholesale Trade	-0.05	1.35	-0.06
Other Services	-0.06	0.64	0.07
Construction	-0.08	1.06	0.12
Finance and Insurance	-0.09	1.76	0.15
Health Care and Social Assistance	-0.10	0.91	0.83
Professional, Scientific and Technical Services	-0.11	1.62	-0.06
Accommodation and Food Services	-0.28	0.38	0.42
Information	-0.28	1.58	-0.38
Manufacturing	-0.39	1.19	-1.61
TOTAL	-1.59		

* Formula 2: (Change over time in industrial share of national employment) * (ratio of national industrial average wage to overall national average wage – 1) * 100. The sectoral figures are calculated as the sum of the industrial scores within each sector.

** The average wage and change in sectoral share are for the entire sector, but calculations of the job quality score used the average wage and change in employment share of each industry. In some sectors, the average wage and the change in share vary widely by industry. This variation makes it possible, for example, for a high-wage sector with an increase in share, such as finance and insurance, to post a negative score.

*** The sectoral shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

TABLE 2
2001-04 CHANGE IN JOB QUALITY SCORES BY INDUSTRY: UNITED STATES
Industries with a Score of at Least 0.05

Industry	Score*	2001 Average Wage Ratio	2001-04 Change in Sectoral Share**
Positive Score			
Real Estate Credit	0.07	1.80	0.08
Offices of Physicians	0.07	1.64	0.11
Wholesale Trade Agents	0.06	1.60	0.09
Department Stores except Discount Stores	0.06	0.49	-0.11
Negative Score			
Securities Brokerage	-0.17	4.38	-0.06
Full-Service Restaurants	-0.16	0.36	0.25
Limited-Service Restaurants	-0.10	0.29	0.14
Wired Telecommunications Carriers	-0.09	1.64	-0.14
Warehouse Clubs and Superstores	-0.07	0.49	0.13
Semiconductor & Related Devices Manufacturing	-0.06	2.18	-0.06
Computer Equipment & Software Merchant Whlsl	-0.06	2.44	-0.04
Electronic Computer Manufacturing	-0.05	2.62	-0.03
Software Publishers	-0.05	2.89	-0.03
Internet Service Providers	-0.05	2.31	-0.04
Subtotal of Industries with a Score of >= 0.05	0.26		
Subtotal of Industries with a Score of <= -0.05	-0.86		
Industries Not Shown	-0.99		
TOTAL	-1.59		

* Formula 2: (Change over time in industrial share of national employment) * (ratio of national industrial average wage to overall national average wage – 1) * 100.

** The sectoral shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

TABLE 3
2001-04 CHANGE IN JOB QUALITY SCORES BY OCCUPATIONAL GROUP:
UNITED STATES

Occupational Group	Score*	2001 Average Wage Ratio**	2001-04 Change in Occupational Share**/**
Business and Financial Operations	0.22	1.49	0.41
Production	0.17	0.81	-0.91
Education, Training, and Library	0.09	1.15	0.19
Computer and Mathematical	0.09	1.77	0.06
Life, Physical, and Social Science	0.05	1.46	0.05
Legal	0.04	2.03	0.04
Office and Administrative Support	0.03	0.80	-0.30
Health Practitioners and Technical	0.02	1.47	0.23
Arts, Design, Entertainment, Sports and Media	0.02	1.17	0.10
Construction and Extraction	0.02	1.04	0.01
Farming, Fishing, and Forestry	-0.00	0.58	-0.01
Building, Grounds Cleaning and Maintenance	-0.00	0.60	0.01
Community and Social Services	-0.00	1.01	0.11
Installation, Maintenance, and Repair	-0.01	1.03	-0.10
Protective Service	-0.02	0.96	0.06
Transportation and Material Moving	-0.03	0.78	0.08
Architecture and Engineering	-0.04	1.66	-0.10
Healthcare Support	-0.05	0.64	0.12
Sales and Related	-0.09	0.85	0.13
Personal Care and Service	-0.12	0.62	0.25
Food Preparation and Serving	-0.25	0.49	0.49
Management	-1.03	2.08	-0.92
TOTAL	-0.91		

* Formula 2: (Change over time in occupational share of national employment) * (ratio of national occupational average wage to overall national average wage – 1) * 100. The occupational group figures are calculated as the sum of the occupational scores within each group.

** The average wage and change in occupational share are for the entire group, but calculations of the job quality score used the average wage and change in employment share of each occupation.

*** The sectoral shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

TABLE 4
2001-04 CHANGE IN JOB QUALITY SCORES BY OCCUPATION: UNITED STATES
Occupations with a Score of at Least 0.05

Occupation	Score*	2001 Average Wage Ratio	2001-04 Change in Occupational Share**
Positive Score			
Miscellaneous Production	0.08	0.79	-0.38
Computer Software Engineers, Applications	0.07	2.13	0.06
Computer Software Engineers, Systems	0.05	2.19	0.05
Negative Score			
General and Operations Managers	-0.34	2.16	-0.29
Chief Executives	-0.21	3.17	-0.10
Miscellaneous Management	-0.19	1.96	-0.20
Waiters and Waitresses	-0.10	0.45	0.18
Retail Salespersons	-0.09	0.62	0.24
Financial Managers	-0.08	2.22	-0.07
Miscellaneous Architects and Engineers	-0.08	1.76	-0.10
Hand Laborers	-0.08	0.62	0.21
Combined Food Preparation and Service	-0.07	0.44	0.11
Computer Programmers	-0.07	1.85	-0.08
Personal Aides	-0.06	0.49	0.11
Subtotal of Occupations with a Score of ≥ 0.05	0.20		
Subtotal of Occupations with a Score of ≤ -0.05	-1.37		
Occupations Not Shown	0.26		
TOTAL	-0.91		

* Formula 2: (Change over time in occupational share of national employment) * (ratio of national occupational average wage to overall national average wage – 1) * 100.

** The sectoral shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

RESULTS FOR ARIZONA

In 2004, job quality in Arizona was inferior to the national average. The industrial job mix caused the state's average wage to be nearly 1.6 percent less than the U.S. average, while the occupational job mix had a negative effect on the average wage of 0.5 percent. Thus, Arizona's average wage was 2 percent less than the national average due to its job mix being tilted toward low-paying industries and occupations. Though Arizona's job mix was below the national average, Arizona ranked among the middle of the states at 23rd on each measure: industrial mix, occupational mix, and total job mix.

Arizona's job mix fell further behind the national average between 2001 and 2004. The industrial and occupational job mixes each slipped a bit more than 0.3 percent during the three years (using formula 1), for an overall decline of 0.7 percent relative to the national average. Arizona ranked 42nd on the change in industrial mix, 30th on the change in occupational mix, and 44th overall. Historically, the state usually falls further behind during periods of economic weakness as experienced in 2002 into 2003. An examination of 2003 and 2004 industrial data reveals that the industrial job mix in Arizona slipped 0.1 percent relative to the national average in 2004, about the same rate of decline as in the two prior years.

Declines between 2001 and 2004 in Arizona's job quality as measured by formula 2 were not quite as great as those from formula 1, with industrial job quality falling 0.1 percent and occupational job quality dropping 0.2 percent. Thus, the state's overall job quality score went down 0.3 percent relative to the national average during the three years. *Not* expressed relative to the national average, job quality in Arizona fell 2.8 percent between 2001 and 2004, with an industrial job quality score of -1.7 and an occupational score of -1.2. Looking only at the 2003-to-2004 change calculated by formula 2, industrial job quality in Arizona dropped 0.3 percent, the same as the national average. Thus, while job quality in 2004 eroded at a lesser pace than in the two prior years, nationally and in Arizona, the state's performance relative to the national average was hardly different in 2004 than in the two prior years.

Industrial Mix, 2004

Aggregating the job mix values at the industrial level to the 20 sectors reveals that nearly half of the sectors had a positive industrial mix value in 2004 despite the overall figure being -1.6 (see Table 5). Among the nine sectors with a positive value, only two were significant, exceeding 0.4 in the health care and social assistance sector and in the manufacturing sector.

Three sectors had an industrial mix value worse than -0.4. The share of total employment in the very low-paying accommodation and food services sector was larger in Arizona than the U.S. average. The low-paying administrative support sector was considerably larger in Arizona than the U.S. average. In contrast, the high-paying professional, scientific and technical services sector was smaller in Arizona than nationally.

Industries with a job mix value in 2004 of at least 0.1 (positive or negative) are listed in Table 6, divided into four groupings dependent on the size of their sectoral share relative to the U.S. average and whether their average wage was greater or less than the overall average wage (using national wages). Only two low-paying industries that had an employment sectoral share smaller

TABLE 5
2004 INDUSTRIAL MIX BY SECTOR: ARIZONA

Sector	Job Mix Value*	Ratio of Average Wage to Total, U.S.**	Arizona – U.S. Sectoral Share**/**
Health Care and Social Assistance	0.49	0.93	-1.38
Manufacturing	0.42	1.22	-3.53
Other Services	0.24	0.64	-0.57
Arts, Entertainment and Recreation	0.17	0.70	-0.15
Transportation	0.12	0.99	-0.36
Wholesale Trade	0.09	1.35	-0.30
Real Estate	0.06	0.95	0.33
Utilities	0.01	1.84	0.05
Mining	0.01	1.69	-0.05
Government	-0.02	1.03	-0.20
Educational Services	-0.04	0.90	-0.29
Retail Trade	-0.07	0.62	0.64
Construction	-0.18	1.03	2.80
Finance and Insurance	-0.19	1.78	0.53
Information	-0.21	1.54	-0.36
Agriculture	-0.22	0.57	0.34
Management of Companies	-0.34	2.03	-0.36
Accommodation and Food Services	-0.46	0.37	0.77
Professional, Scientific and Technical Services	-0.63	1.59	-0.59
Administrative Support	-0.78	0.61	2.66
TOTAL	-1.55		

* Formula 1: (Arizona – U.S. industrial employment share) * (ratio of national industrial average wage to overall U.S. average wage - 1) * 100. The sector totals are calculated as the sum of the industrial values within each sector.

** The average wage and change in sectoral share are for the entire sector, but calculations of the job quality score used the average wage and change in employment share of each industry. In some sectors, the average wage and the change in share vary widely by industry. This variation makes it possible, for example, for a high-wage sector with an increase in share, such as finance and insurance, to post a negative score.

*** The sectoral shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

TABLE 6
2004 INDUSTRIAL MIX BY INDUSTRY: ARIZONA
Industries with a Job Mix Value of at Least 0.1

Industry	Job Mix Value*	Ratio of Average Wage to Total, U.S.	Arizona – U.S. Sectoral Share**
Sectoral Share Larger in Arizona & Above Average Wage			
Semiconductor Manufacturing	0.92	2.23	0.75
Search and Navigation Instrument Manufacturing	0.27	2.03	0.26
Electronics Parts Wholesale	0.21	1.83	0.25
Management Consulting Services	0.19	1.97	0.19
Real Estate Credit	0.16	1.86	0.19
Aircraft Engine Manufacturing	0.15	1.70	0.21
Sports Teams	0.14	3.89	0.05
Financial Transactions Processing	0.14	1.37	0.38
Credit Card Issuing	0.14	1.77	0.18
Other Credit Intermediation	0.12	1.38	0.33
Sectoral Share Smaller in Arizona & Below Average Wage			
Nursing Care Facilities	0.28	0.62	-0.75
Private Households	0.18	0.39	-0.30
Sectoral Share Larger in Arizona & Below Average Wage			
Professional Employer Organizations	-0.37	0.73	1.39
Hotels and Motels	-0.31	0.55	0.69
Temporary Help Services	-0.21	0.54	0.45
Farm Labor Contractors	-0.19	0.35	0.29
Limited Service Restaurants	-0.16	0.29	0.23
Sectoral Share Smaller in Arizona & Above Average Wage			
Corporate and Regional Managing Offices	-0.36	1.98	-0.37
Investment Banking	-0.27	4.58	-0.08
Research & Development in Sciences	-0.26	2.05	-0.25
Portfolio Management	-0.24	4.63	-0.07
Offices of Lawyers	-0.19	1.75	-0.25
Pharmaceutical Preparation Manufacturing	-0.16	2.16	-0.14
Custom Computer Programming	-0.14	2.05	-0.13
Motion Picture Production	-0.10	1.86	-0.12
Subtotal with a Positive Job Mix Value	2.90		1.74
Subtotal with a Negative Job Mix Value	-2.96		1.64
Industries Not Shown	-1.49		-3.38
TOTAL	-1.55		0.00

* Formula 1: (Arizona – U.S. industrial employment share) * (ratio of national industrial average wage to overall U.S. average wage - 1) * 100.

** The sectoral shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

in Arizona than the national average made the list of positive contributors: nursing care facilities and private households (for example, a butler employed by a family).

The job mix value of the semiconductor manufacturing industry stands out, a result of its high wages and strong presence in Arizona. Two other high-paying high-technology industries had job mix values greater than 0.2: search and navigation instrument manufacturing and wholesaling of electronic parts. Aircraft engine manufacturing also had a positive value. These high-tech manufacturing industries were responsible for the positive industrial mix value for the manufacturing sector, offsetting the small size of most manufacturing industries in Arizona.

Several industries had a job mix value of -0.2 or worse, including the low-paying tourism-related industry of hotels and motels. This industry along with the limited-service restaurants industry accounted for the low job mix value in the accommodation and food services sector. Much of the low value in the administrative support sector resulted from the below-average-paying professional employer organizations (previously called employee leasing) and temporary help services industries. Arizona employers utilize contract and temporary workers more than the national average.

Industries paying above-average wages but of relatively small size in Arizona included corporate and regional managing offices. Research and development in the sciences and offices of lawyers accounted for much of the negative job mix value in the professional, scientific and technical services sector. Two very high-paying finance industries — investment banking and portfolio management — also appear on the list.

Occupational Mix, 2004

Thirteen of the 22 major occupational groups had a negative job mix value in 2004; the overall figure was -0.5 . The largest negative effect came from the large size in Arizona of the low-paying food preparation and serving group. The smaller-than-average sizes of the high-paying health practitioners and technical group and computer and mathematical group also contributed to the overall negative value. In contrast, the larger-than-average size of the high-paying architecture and engineering group and the relatively small size of the below-average-paying production group had sizable positive effects on the state's occupational job mix (see Table 7).

No occupation had a job mix value as large as 0.15 in 2004 (see Table 8). Electrical and electronics engineers were primarily responsible for the positive impact of the architecture and engineering group. Three occupations had a negative value worse than 0.2 . General and operations managers had a value of -0.4 , but this was largely offset by the positive contributions of three other occupations in the management group: sales managers, financial managers, and chief executives. The negative value in the registered nurses occupation partially explained the negative value in the health practitioners group.

TABLE 7
2004 OCCUPATIONAL MIX BY OCCUPATIONAL GROUP: ARIZONA

Occupational Group	Job Mix Value*	Ratio of Average Wage to Total, U.S.**	Arizona – U.S. Sectoral Share**/**
Architecture and Engineering	0.49	1.68	0.56
Production	0.47	0.79	-2.64
Healthcare Support	0.16	0.63	-0.34
Transportation and Material Moving	0.14	0.75	-0.90
Management	0.13	2.33	0.19
Personal Care and Service	0.09	0.59	-0.01
Sales and Related	0.07	0.86	0.11
Business and Financial Operations	0.05	1.53	0.05
Community and Social Services	0.03	0.99	-0.25
Protective Service	-0.01	0.94	0.31
Installation, Maintenance, and Repair	-0.06	1.01	0.03
Arts, Design, Entertainment, Sports and Media	-0.07	1.17	-0.22
Building, Grounds Cleaning and Maintenance	-0.07	0.58	0.22
Office and Administrative Support	-0.10	0.79	0.98
Farming, Fishing, and Forestry	-0.10	0.55	0.17
Education, Training, and Library	-0.11	1.14	-0.55
Legal	-0.12	2.17	-0.10
Life, Physical, and Social Science	-0.13	1.54	-0.24
Construction and Extraction	-0.18	1.01	2.67
Computer and Mathematical	-0.29	1.77	-0.20
Health Practitioners and Technical	-0.39	1.56	-0.75
Food Preparation and Serving	-0.52	0.47	0.91
TOTAL	-0.50		

* Formula 1: (Arizona – U.S. occupational employment share) * (ratio of national occupational average wage to overall U.S. average wage - 1) * 100. The occupational group totals are calculated as the sum of the occupational values within each group.

** The average wage and change in occupational share are for the entire group, but calculations of the job quality score used the average wage and change in employment share of each occupation. This variation makes it possible, for example, for a group with an above average wage and an increase in share, such as construction and extraction, to post a negative score.

*** The sectoral shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

TABLE 8
2004 OCCUPATIONAL MIX BY OCCUPATION: ARIZONA
Occupations with a Job Mix Value of at Least 0.1

Occupation	Job Mix Value*	Ratio of Average Wage to Total, U.S.	Arizona – U.S. Occupational Share**
Occupational Share Larger in Arizona & Above Average Wage			
Sales Representatives, Technical and Scientific	0.14	1.81	0.17
Sales Managers	0.13	2.59	0.08
Electrical Engineers	0.13	2.02	0.12
Financial Managers	0.11	2.52	0.07
Chief Executives	0.11	3.76	0.04
Electronics Engineers	0.11	2.10	0.10
Management Analysts	0.10	1.96	0.11
Occupational Share Smaller in Arizona & Below Average Wage			
Miscellaneous Production Occupations	0.14	0.76	-0.57
Nursing Aides	0.14	0.58	-0.33
Janitors	0.12	0.56	-0.27
Occupational Share Larger in Arizona & Below Average Wage			
Customer Service Representative	-0.18	0.78	0.81
Landscapers, Groundskeepers	-0.15	0.59	0.37
Combined Food Preparation and Serving	-0.14	0.41	0.24
Food Preparation	-0.13	0.48	0.25
Farm Workers	-0.11	0.46	0.21
Occupational Share Smaller in Arizona & Above Average Wage			
General and Operations Managers	-0.41	2.50	-0.27
Registered Nurses	-0.23	1.49	-0.47
Miscellaneous Business and Financial Operations	-0.21	1.57	-0.37
Miscellaneous Education, Training and Library	-0.15	1.32	-0.48
Lawyers	-0.12	2.95	-0.06
Computer Systems Analysts	-0.10	1.86	-0.12
Subtotal with a Positive Job Mix Value	1.23		-0.48
Subtotal with a Negative Job Mix Value	-1.93		0.11
Occupations Not Shown	0.20		0.37
TOTAL	-0.50		0.00

* Formula 1: (Arizona – U.S. occupational employment share) * (ratio of national occupational average wage to overall U.S. average wage - 1) * 100.

** The occupational shares are presented as percentages (multiplied by 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

Change in Industrial Job Quality, 2001-04

Between 2001 and 2004, Arizona's industrial job mix fell 0.3 percent relative to the nation even though not quite half of the 20 sectors had a negative value. The manufacturing sector was the cause of the decline, with a decrease of more than 0.5 in its job mix value. The next largest change was the positive value in accommodation and food services, resulting from the slump in this low-paying sector.

The job mix value (relative to the national average, calculated from formula 1) is compared to the difference in the job quality score between Arizona and the nation (calculated from formula 2) in Table 9. The difference in the value is slight in each of the sectors. Also shown in Table 9 is Arizona's job quality score *not* compared to the national average. Manufacturing accounted for half of the overall decrease, with most of the other sectors also having a negative value, but of a small magnitude.

Looking only at the 2003-to-2004 change, none of the 20 sectors had a change in industrial mix value (relative to the national average) as large as 0.1 in either direction in Arizona. The value for manufacturing still was negative. Manufacturing accounted for the majority of the decrease in job quality score (not relative to the nation) both in Arizona and nationally.

The industries with the largest change in job mix (positive or negative) between 2001 and 2004 are shown in Table 10. The only industry with a value greater than ± 0.2 was semiconductor manufacturing, which accounted for all of the negative value in the manufacturing sector. Despite its decline of -0.6 , the semiconductor industry's job mix value in 2004 still was a strong 0.9 (as shown in Table 6).

The 2001-04 change in the alternative measure of the job quality score (using formula 2) is shown in Table 11 for those industries with a difference of at least 0.05 between the Arizona and national score. The decrease in the semiconductor industry was far greater in Arizona than nationally. Otherwise, no industry had a difference from the national average of much more than 0.1 (the -0.2 value in the warehouse clubs industry was offset by the positive score in the discount department store industry). Between 2003 and 2004, the semiconductor industry had a decline in score of more than 0.1, accounting for more than one-third of the overall decrease, both nationally and in Arizona.

TABLE 9
2001-04 CHANGE IN INDUSTRIAL JOB MIX AND CHANGE IN INDUSTRIAL
JOB QUALITY RELATIVE TO THE NATION BY SECTOR: ARIZONA

Sector	Arizona Job Mix*	Arizona – U.S. Job Quality Score**	Arizona Job Quality Score***
Accommodation and Food Services	0.23	0.22	-0.06
Professional, Scientific, Technical	0.13	0.14	0.03
Administrative Support	0.13	0.08	0.08
Other Services	0.07	0.08	0.03
Finance and Insurance	0.05	0.05	-0.04
Management of Companies	0.04	0.09	0.07
Real Estate and Leasing	0.02	0.01	0.02
Information	0.02	0.01	-0.26
Agriculture	0.02	0.01	0.02
Utilities	0.02	0.02	-0.00
Government	0.01	-0.00	-0.03
Arts, Entertainment and Recreation	-0.01	-0.02	-0.03
Transportation and Warehousing	-0.01	0.00	-0.04
Educational Services	-0.02	-0.01	-0.04
Wholesale Trade	-0.04	-0.02	-0.07
Health Care and Social Assistance	-0.05	0.00	-0.10
Mining	-0.05	-0.05	-0.06
Retail Trade	-0.17	-0.15	-0.13
Construction	-0.17	-0.13	-0.21
Manufacturing	-0.55	-0.48	-0.85
TOTAL	-0.34	-0.12	-1.66

* The difference in the 2001 and 2004 job mix values, with the value for each year calculated from formula 1: (difference in industrial share of employment between Arizona and the nation) * (ratio of national industrial average wage to U.S. overall average wage – 1) * 100. The sector totals are calculated as the sum of the industrial values within each sector.

** The difference between the value in the third column and the value calculated for the nation from formula 2: (Change over time in industrial share of national employment) * (ratio of national industrial average wage to U.S. overall average wage – 1) * 100. The sector totals are calculated as the sum of the industrial values within each sector.

*** Formula 2: (Change over time in industrial share of Arizona employment) * (ratio of national industrial average wage to U.S. overall average wage – 1) * 100. The sector totals are calculated as the sum of the industrial values within each sector.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

TABLE 10
2001-04 CHANGE IN INDUSTRIAL JOB MIX BY INDUSTRY: ARIZONA
All Industries with a Change in Job Mix of at Least 0.05

Industry	Change in Job Mix*	Ratio of 2004 Average Wage to Total, U.S.	Change in Sectoral Share, Difference from U.S.
Gain in Sectoral Share & Above Average Wage			
Search and Navigation Instrument Manufacturing	0.14	2.04	0.12
Management Consulting	0.14	1.97	0.14
Offices of Non-Bank Holding Companies	0.10	3.23	0.04
Real Estate Credit	0.08	1.86	0.09
Credit Card Issuing	0.08	1.77	0.08
Investment Banking	0.07	4.58	0.01
Custom Computer Programming	0.07	2.05	0.05
Computer and Software Wholesale	0.07	2.32	0.05
Loss in Sectoral Share & Below Average Wage			
Discount Department Stores	0.16	0.46	-0.28
Temporary Help Services	0.11	0.54	-0.25
Full-Service Restaurants	0.08	0.36	-0.13
Food Service Contractors	0.07	0.46	-0.13
Hotels and Motels	0.06	0.55	-0.11
Gain in Sectoral Share & Below Average Wage			
Warehouse Clubs	-0.20	0.51	0.39
Grocery Stores	-0.05	0.51	0.10
Loss in Sectoral Share & Above Average Wage			
Semiconductor Manufacturing	-0.58	2.23	-0.53
Securities Brokerage	-0.10	4.20	-0.03
Other Electronic Parts Wholesale	-0.09	1.83	-0.09
Corporate and Regional Managing Offices	-0.06	1.98	-0.01
Portfolio Management	-0.06	4.63	-0.01
Direct Health Insurance Carriers	-0.05	1.52	-0.04
Human Resources Consulting	-0.05	1.65	-0.08
Subtotal with a Positive Change in Job Mix	1.23		-0.32
Subtotal with a Negative Change in Job Mix	-1.24		-0.30
Industries Not Shown	-0.33		0.62
TOTAL	-0.34		0.00

* The difference in the 2001 and 2004 job mix values, with the value for each year calculated from formula 1: (difference in industrial share of employment between Arizona and the nation) * (ratio of national industrial average wage to U.S. overall average wage – 1) * 100.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

TABLE 11
2001-04 CHANGE IN JOB QUALITY SCORES BY INDUSTRY:
ARIZONA AND THE UNITED STATES
All Industries with a Difference in Score of at Least 0.05
Between the Nation and Arizona

Industry	Arizona*	Nation**	Difference
Positive Difference			
Discount Department Stores	0.16	-0.00	0.16
Management Consulting	0.15	0.00	0.15
Temporary Help Services	0.11	-0.01	0.12
Search and Navigation Instrument Manufacturing	0.11	0.00	0.11
Offices of Non-Bank Holding Companies	0.08	-0.02	0.10
Miscellaneous Manufacturing	-0.04	-0.14	0.10
Full-Service Restaurants	-0.08	-0.16	0.08
Real Estate Credit	0.14	0.07	0.07
Food Service Contractors	0.06	-0.01	0.07
Computer and Software Wholesale	0.02	-0.06	0.07
Custom Computer Programming	0.02	-0.05	0.06
Investment Banking	0.02	-0.05	0.06
Hotels and Motels	0.06	0.01	0.05
Negative Difference			
Semiconductor Manufacturing	-0.69	-0.06	-0.62
Warehouse Clubs	-0.27	-0.07	-0.20
Professional Employer Organizations	-0.10	-0.01	-0.10
Securities Brokerage	-0.27	-0.17	-0.10
Other Electronic Parts Wholesale	-0.11	-0.03	-0.08
Other Credit Intermediation	-0.06	0.00	-0.06
Grocery Stores	-0.02	0.03	-0.05
Miscellaneous Mining	-0.06	-0.01	-0.05
Human Resources Consulting	-0.06	-0.01	-0.05
Subtotal with a Positive Difference	0.81	-0.42	1.20
Subtotal with a Negative Difference	-1.64	-0.33	-1.31
Industries Not Shown	-0.83	-0.79	-0.01
TOTAL	-1.66	-1.54	-0.12

* Formula 2: (Change over time in industrial share of Arizona employment) * (ratio of the national industrial average wage to U.S. overall average wage – 1) * 100.

** Formula 2: (Change over time in industrial share of U.S. employment) * (ratio of the national industrial average wage to U.S. overall average wage – 1) * 100. Since the list of industries was limited to those available for Arizona, these figures do not match those from the section "Results for the United States."

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

Change in Occupational Job Quality, 2001-04

None of the 22 major occupational groups had much of a change in the occupational job mix between 2001 and 2004 (see Table 12). Twelve of the groups had a decrease, contributing to the overall decline of -0.35 . The computer and mathematical group had the largest decrease, with management posting the greatest increase.

The slightly lower overall job mix value (calculated from formula 1) than difference from the nation in the job quality score (calculated from formula 2) largely resulted from lower job mix values in the construction and extraction and health practitioners and technical groups. *Not* compared to the nation, Arizona's overall job quality score was -1.2 , with most of the decline occurring in the management group (which relative to the nation had the strongest change in job mix and change in job quality). The food preparation and serving group had the next worst job quality score, but it was largely offset by the gain in business and financial operations.

The management group's increase in job mix between 2001 and 2004 resulted from several of its occupations posting gains, most notably financial managers and sales managers. In contrast, the change in job mix was negative in the general and operations managers occupation (see Table 13). The job mix decline in the computer and mathematical group largely resulted from the systems analysts and systems software engineers occupations. Despite an overall decrease in the job mix in the food preparation and serving group, combined food preparation and serving — a part of this group — had the largest gain in value of any occupation. Its positive value was offset by three other food group occupations shown in the table: food preparation, counter attendants, and fast-food cooks.

Table 14 compares the change in job quality scores (calculated from formula 2) by occupation in Arizona and the nation. As with the job mix calculation, the largest difference was in the combined food preparation and serving occupation.

TABLE 12
2001-04 CHANGE IN OCCUPATIONAL JOB MIX AND CHANGE IN OCCUPATIONAL
JOB QUALITY RELATIVE TO THE NATION BY OCCUPATIONAL GROUP:
ARIZONA

Occupational Group	Arizona Job Mix*	Arizona – U.S. Job Quality Score**	Arizona Job Quality Score***
Management	0.25	0.23	-0.81
Business and Financial Operations	0.11	0.09	0.31
Healthcare Support	0.09	0.09	0.04
Health Practitioners and Technical	0.07	0.14	0.15
Farming, Fishing, and Forestry	0.07	0.07	0.07
Personal Care and Service	0.02	0.03	-0.09
Building, Grounds Cleaning and Maintenance	0.01	0.00	0.00
Community and Social Services	0.01	0.01	0.01
Education, Training, and Library	-0.01	0.00	0.05
Arts, Design, Entertainment, Sports and Media	-0.01	-0.01	0.01
Transportation and Material Moving	-0.01	-0.03	-0.09
Protective Service	-0.02	-0.02	-0.03
Life, Physical, and Social Science	-0.02	-0.00	0.04
Legal	-0.02	-0.01	0.03
Architecture and Engineering	-0.04	-0.06	-0.12
Installation, Maintenance, and Repair	-0.06	-0.06	-0.07
Construction and Extraction	-0.07	0.04	0.06
Food Preparation and Serving	-0.11	-0.09	-0.34
Sales and Related	-0.12	-0.11	-0.21
Office and Administrative Support	-0.14	-0.13	-0.09
Production	-0.14	-0.20	-0.04
Computer and Mathematical	-0.20	-0.18	-0.09
TOTAL	-0.35	-0.20	-1.18

* The difference in the 2001 and 2004 job mix values, with the value for each year calculated from formula 1: (difference in occupational share of employment between Arizona and the nation) * (ratio of national occupational average wage to U.S. overall average wage – 1) * 100. The occupational group totals are calculated as the sum of the occupational values within each group.

** The difference between the value in the third column and the value calculated for the nation from formula 2: (Change over time in occupational share of national employment) * (ratio of national occupational average wage to U.S. overall average wage – 1) * 100. The occupational group totals are calculated as the sum of the occupational values within each group.

*** Formula 2: (Change over time in occupational share of Arizona employment) * (ratio of national occupational average wage to U.S. overall average wage – 1) * 100. The occupational group totals are calculated as the sum of the occupational values within each group.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

TABLE 13
2001-04 CHANGE IN OCCUPATIONAL JOB MIX BY OCCUPATION: ARIZONA
All Occupations with a Change in Job Mix of at Least 0.05

Occupation	Change in Job Mix*	Ratio of 2004 Average Wage to Total, U.S.	Change in Occupational Share, Difference from U.S.
Gain in Occupational Share & Above Average Wage			
Financial Managers	0.10	2.52	0.06
Miscellaneous Health Professionals and Technicians	0.08	2.81	0.08
Miscellaneous Managers	0.08	2.17	0.07
Elementary School Teachers	0.08	1.24	0.32
Mechanical Engineers	0.08	1.86	0.09
General Physicians	0.07	3.69	0.03
Insurance Sales Agents	0.06	1.50	0.13
Sales Managers	0.06	2.59	0.02
Electrical Engineers	0.06	2.02	0.05
Loss in Occupational Share & Below Average Wage			
Combined Food Preparation and Serving	0.22	0.41	-0.40
Farmworkers	0.06	0.46	-0.12
Home Health Aides	0.06	0.51	-0.13
Child Care Workers	0.06	0.48	-0.12
Team Assemblers	0.06	0.69	-0.18
Security Guards	0.05	0.60	-0.13
Amusement and Recreation Attendants	0.05	0.45	-0.10
Landscaping and Groundskeeping	0.05	0.59	-0.15
Gain in Occupational Share & Below Average Wage			
Hand Laborers	-0.10	0.51	0.25
Food Preparation Workers	-0.09	0.48	0.17
Customer Service Representatives	-0.08	0.78	0.32
Counter Attendants, Food Services	-0.08	0.44	0.16
Personal and Home Care Aides	-0.07	0.47	0.15
Shipping Clerks	-0.07	0.70	0.25
Cooks, Fast Food	-0.06	0.41	0.11
Miscellaneous Construction Workers	-0.05	0.91	0.31
Loss in Occupational Share & Above Average Wage			
Computer Systems Analysts	-0.11	1.86	-0.12
General and Operations Managers	-0.09	2.50	-0.00
Sales Representatives, Technical and Scientific	-0.08	1.81	-0.11
Construction Supervisors	-0.07	1.46	-0.15
Registered Nurses	-0.07	1.49	-0.08
Computer Software Engineers, Systems	-0.06	2.23	-0.05
Miscellaneous Architects and Engineers	-0.05	1.68	-0.10
Industrial Engineers	-0.05	1.81	-0.06
Subtotal with a Positive Change in Job Mix	1.28		-0.48
Subtotal with a Negative Change in Job Mix	-1.18		1.05
Occupations Not Shown	-0.45		-0.57
TOTAL	-0.35		0.00

* The difference in the 2001 and 2004 job mix values, with the value for each year calculated from formula 1: (difference in occupational share of employment between Arizona and the nation) * (ratio of national occupational average wage to U.S. overall average wage – 1) * 100.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

TABLE 14
2001-04 CHANGE IN JOB QUALITY SCORES BY OCCUPATION:
ARIZONA AND THE UNITED STATES
Occupations with a Difference in Score of at Least 0.05
Between the Nation and Arizona

Occupation	Arizona*	Nation**	Difference
Positive Difference			
Combined Food Preparation and Serving	0.16	-0.07	0.23
Miscellaneous Health Professionals and Technicians	0.11	0.01	0.10
Elementary School Teachers	0.08	-0.01	0.09
Mechanical Engineers	0.09	0.01	0.08
Miscellaneous Management	-0.11	-0.19	0.07
Financial Managers	-0.01	-0.08	0.07
General Physicians	0.01	-0.05	0.06
Farmworkers	0.06	-0.01	0.06
Child Care Workers	0.02	-0.04	0.06
Landscaping and Groundskeeping	0.03	-0.03	0.06
Electrical Engineers	0.05	-0.00	0.06
Home Health Aides	0.04	-0.02	0.06
Team Assemblers	0.04	-0.01	0.05
Insurance Sales Agents	0.06	0.00	0.05
Amusement and Recreation Attendants	0.04	-0.01	0.05
Security Guards	0.06	0.00	0.05
Negative Difference			
Computer Systems Analysts	-0.08	0.03	-0.11
Hand Laborers	-0.18	-0.08	-0.10
Food Preparation Workers	-0.09	-0.00	-0.09
Counter Attendants, Food Services	-0.11	-0.02	-0.08
Sales Representatives, Scientific and Technical	-0.08	0.01	-0.08
Personal and Home Care Aides	-0.13	-0.06	-0.07
Shipping Clerks	-0.06	0.01	-0.07
Construction Supervisors	-0.06	0.01	-0.07
Janitors and Cleaners	-0.07	-0.01	-0.06
Computer Software Engineers, Systems	-0.01	0.05	-0.06
Customer Service Representatives	-0.08	-0.02	-0.06
Cooks, Fast Food	-0.08	-0.02	-0.06
Miscellaneous Architects and Engineers	-0.16	-0.10	-0.06
Industrial Engineers	-0.04	0.01	-0.05
Subtotal with a Positive Difference	0.73	-0.50	1.20
Subtotal with a Negative Difference	-1.23	-0.19	-1.02
Occupations Not Shown	-0.68	-0.30	-0.38
TOTAL	-1.18	-0.99	-0.20

* Formula 2: (Change over time in occupational share of Arizona employment) * (ratio of the national occupational average wage to U.S. overall average wage – 1) * 100.

** Formula 2: (Change over time in occupational share of U.S. employment) * (ratio of the national occupational average wage to U.S. overall average wage – 1) * 100. Since the list of occupations was limited to those available for Arizona, these figures do not match those from the section “Results for the United States.”

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

RESULTS FOR ALL STATES

This section presents the overall results for industrial, occupational, and total job mix, both for 2004 and the change between 2001 and 2004. The states (including the District of Columbia) are ranked on each of these measures. The U.S. average is quite different from the value for the median (26th) state on some of the measures because of the wide differences in size among the states. For example, employment in California is greater than the combined employment of the 21 smallest states.

Industrial Job Quality

The various measures of industrial job quality are summarized by state in Table 15. The values in the three columns related to industrial mix — all expressed relative to the national average — are calculated from formula 1 while the values in the other three columns are calculated from formula 2. The change in industrial mix and difference in score from U.S. columns — both expressed relative to the U.S. average — represent the alternative ways of measuring the change in industrial job quality relative to the nation between 2001 and 2004. In 40 of the states, the values are within 0.3 of each other. The two columns providing the state score are not expressed relative to the nation. They show the total change in the industrial job quality score over the three years. As seen in the state score (U.S. wage) column, only two states — Wyoming and Nebraska — experienced an improvement in industrial job quality between 2001 and 2004. Since the calculation of the state score (state wage) is affected by factors other than the change in job quality (such as living costs), the last column of the table should not be used to compare states on job quality.

Industrial Mix in 2004

The states are ranked on industrial mix in 2004 (expressed relative to the national average) in Table 16. Only 14 states — including several of the most populous — had an industrial mix in 2004 that had a positive effect on the state's average wage relative to the national average. The median state — Alabama — had a value of -2.0.

The seven states with the strongest industrial mixes in 2004 are located along the northern-to-central Atlantic Coast stretching from Massachusetts to Virginia. Maryland, ranked 11th, also is in this region. The only other states with a positive industrial mix value were Colorado, Texas, California and Utah in the West; and Illinois and Minnesota in the mid-section of the country. States with the weakest industrial mixes were scattered around the country. The states with the lowest job quality were Nevada and Hawaii, both with a high percentage of low-paying tourism-related jobs. Other states with weak figures were in the northern Rocky Mountains, northern Great Plains, northern New England, and the South.

The impact on the overall industrial mix varied widely among the 20 sectors. The median industrial mix value among the 51 states was positive in only six of the 20 sectors. Most of the sectors with an average wage close to the overall average wage — including construction, educational services, transportation, and real estate — accounted for little of the state-to-state variation in the overall industrial job mix. However, if a wide range in average wage by industry within a sector existed and if the geographic distribution of jobs was not evenly distributed across the country, even these sectors with an average wage close to the overall figure could account for some of the geographic variation in the industrial mix. This was true of the

TABLE 15
INDUSTRIAL JOB QUALITY BY STATE

	Industrial Mix*		2001-04 Change	Difference in Score from U.S.**	State Score (U.S. Wage)***	State Score (State Wage)****
	2001	2004				
Alabama	-2.72	-1.97	0.76	0.73	-0.82	-1.01
Alaska	-2.24	-1.98	0.26	-0.08	-1.31	-2.46
Arizona	-1.20	-1.55	-0.34	-0.12	-1.66	-1.23
Arkansas	-4.13	-2.85	1.28	1.13	-0.27	-0.01
California	2.15	1.06	-1.08	-0.93	-2.52	-2.44
Colorado	3.01	1.79	-1.22	-0.76	-2.34	-2.20
Connecticut	4.00	4.61	0.62	0.09	-1.42	-0.87
Delaware	4.76	5.90	1.15	0.33	-1.08	-3.92
District of Columbia	17.25	21.37	4.12	1.24	-0.18	-1.78
Florida	-5.49	-4.76	0.73	0.89	-0.70	-0.45
Georgia	0.61	-0.05	-0.66	-0.33	-1.91	-1.74
Hawaii	-9.78	-8.56	1.22	1.17	-0.24	-0.14
Idaho	-3.46	-3.75	-0.30	-0.22	-1.74	-2.06
Illinois	1.72	1.68	-0.04	-0.15	-1.75	-1.53
Indiana	-3.66	-2.78	0.88	0.51	-1.05	-0.99
Iowa	-6.13	-4.62	1.50	1.37	-0.15	-0.33
Kansas	-0.63	-0.59	0.04	-0.13	-1.62	-1.43
Kentucky	-3.32	-2.61	0.72	0.58	-0.94	-1.17
Louisiana	-2.03	-1.79	0.24	0.37	-1.18	-1.42
Maine	-4.83	-4.86	-0.03	-0.19	-1.61	-1.39
Maryland	0.89	1.55	0.66	0.76	-0.82	-0.74
Massachusetts	8.56	6.51	-2.06	-2.19	-3.76	-3.25
Michigan	-1.19	-0.67	0.53	0.39	-1.18	-1.46
Minnesota	1.53	1.62	0.10	-0.00	-1.55	-1.32
Mississippi	-7.13	-6.43	0.70	0.72	-0.76	-0.77
Missouri	-1.50	-0.94	0.57	0.36	-1.16	-1.36
Montana	-8.46	-7.59	0.88	0.85	-0.58	-0.81
Nebraska	-4.08	-2.34	1.74	1.66	0.17	0.33
Nevada	-9.97	-9.66	0.31	0.64	-0.84	0.12
New Hampshire	-0.45	-1.31	-0.87	-0.51	-2.05	-1.79
New Jersey	6.37	5.16	-1.21	-1.24	-2.81	-2.44
New Mexico	-3.87	-3.58	0.29	0.23	-1.23	-0.85
New York	6.55	5.41	-1.14	-1.15	-2.71	-3.15
North Carolina	-3.40	-2.66	0.74	0.76	-0.77	-1.17
North Dakota	-3.77	-2.32	1.44	1.20	-0.23	-0.02
Ohio	-2.36	-1.58	0.77	0.54	-1.04	-1.12
Oklahoma	-2.56	-1.25	1.31	1.20	-0.29	-0.58
Oregon	-2.77	-3.22	-0.45	-0.42	-2.01	-1.38
Pennsylvania	-0.89	-0.30	0.59	0.32	-1.25	-1.12
Rhode Island	-3.12	-1.99	1.13	0.99	-0.37	-1.88
South Carolina	-6.00	-5.56	0.44	0.52	-0.92	-1.23
South Dakota	-6.18	-5.13	1.05	0.55	-0.87	-0.98
Tennessee	-3.56	-2.60	0.96	0.71	-0.81	-0.60
Texas	1.44	1.34	-0.10	0.07	-1.52	-1.87
Utah	1.04	0.73	-0.31	-0.09	-1.65	-1.19
Vermont	-6.45	-6.21	0.23	0.38	-0.96	-1.29
Virginia	3.00	3.34	0.34	0.62	-0.95	-1.12
Washington	-0.89	-1.25	-0.36	0.31	-1.27	-1.22
West Virginia	-3.69	-2.62	1.06	0.82	-0.59	-1.59
Wisconsin	-4.28	-2.93	1.35	1.10	-0.48	-0.66
Wyoming	-4.82	-2.60	2.22	2.36	1.00	-3.20

(continued on next page)

TABLE 15 (continued)
INDUSTRIAL JOB QUALITY BY STATE

- * Formula 1: Sum over all industries of $((\text{state} - \text{U.S. employment share}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.
- ** The figures in this column are an alternative to those in the column to the left (2001-04 change in industrial mix). This column is calculated as the difference between the value in the column to the right (the state score calculated using national wages) and the national score calculated from formula 2: Sum over all industries of $((\text{change over time in sectoral share of U.S. employment}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.
- *** Formula 2: Sum over all industries of $((\text{change over time in sectoral share of state employment}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.
- **** States should not be compared on the basis of this column, calculated from formula 2: Sum over all industries of $((\text{change over time in sectoral share of state employment}) * (\text{ratio of state average wage to overall state average wage} - 1) * 100)$.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

TABLE 16
2004 INDUSTRIAL MIX* RANKED BY STATE

1.	District of Columbia	21.4	27.	Alaska	-2.0
2.	Massachusetts	6.5	28.	Rhode Island	-2.0
3.	Delaware	5.9	29.	North Dakota	-2.3
4.	New York	5.4	30.	Nebraska	-2.3
5.	New Jersey	5.2	31.	West Virginia	-2.6
6.	Connecticut	4.6	32.	Tennessee	-2.6
7.	Virginia	3.3	33.	Wyoming	-2.6
8.	Colorado	1.8	34.	Kentucky	-2.6
9.	Illinois	1.7	35.	North Carolina	-2.7
10.	Minnesota	1.6	36.	Indiana	-2.8
11.	Maryland	1.6	37.	Arkansas	-2.9
12.	Texas	1.3	38.	Wisconsin	-2.9
13.	California	1.1	39.	Oregon	-3.2
14.	Utah	0.7	40.	New Mexico	-3.6
15.	Georgia	-0.1	41.	Idaho	-3.8
16.	Pennsylvania	-0.3	42.	Iowa	-4.6
17.	Kansas	-0.6	43.	Florida	-4.8
18.	Michigan	-0.7	44.	Maine	-4.9
19.	Missouri	-0.9	45.	South Dakota	-5.1
20.	Washington	-1.3	46.	South Carolina	-5.6
21.	Oklahoma	-1.3	47.	Vermont	-6.2
22.	New Hampshire	-1.3	48.	Mississippi	-6.4
23.	Arizona	-1.6	49.	Montana	-7.6
24.	Ohio	-1.6	50.	Hawaii	-8.6
25.	Louisiana	-1.8	51.	Nevada	-9.7
26.	Alabama	-2.0			

* Formula 1: Sum over all industries of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

government sector, due to the geographic clustering of high-wage federal government employment, and of the health practitioners and technical sector, due to a wide disparity in wages within the sector and the geographic clustering of some of the very highly paid specialty jobs.

Some sectors with an average wage considerably different from the national average had little effect on the state-to-state variation in the overall industrial mix because of a small sectoral share of employment that did not vary substantially across states. Agriculture; other services; and arts, entertainment and recreation were low-paying sectors with little impact, while utilities was a high-paying sector with little effect, on the variation in the overall industrial mix.

Those sectors with a strong geographic concentration and with wages considerably different from the overall average were largely responsible for the state-to-state variations in industrial mix. The low-paying administrative support, retail trade, and accommodation and food services sectors had a moderate effect on the geographic variation in the overall industrial mix. Most of the extreme state values in the administrative support sector were positive, indicating that a number of states had relatively little employment in this low-paying sector. The high-paying wholesale trade and mining sectors also had a moderate effect. Other high-paying sectors had a larger effect: manufacturing; information; management of companies; professional, scientific and technical services; and finance and insurance. In each of these, far more states had a large negative value than a large positive value, showing that many states have little employment in these high-paid sectors. It is these high-paying sectors — which employ many highly educated workers, many in high-technology positions — that account for most of the geographic variation in the industrial job mix.

Change in Industrial Mix between 2001 and 2004

Thirty-six states experienced an increase in industrial mix value between 2001 and 2004, as seen in Table 17; several populous states were among the minority with a decline. Most of the states with the greatest improvement over the three years still had below-average values in 2004 while many of the states with a negative change in job quality over the three years still had a positive industrial mix in 2004. Some significant exceptions to this general pattern of inverse change in industrial mix relative to level included Maine, Idaho and Oregon, each with an industrial mix considerably below average but without improvement between 2001 and 2004. In contrast, some states with the strongest industrial mixes had a positive change over the three years, including the District of Columbia, Delaware, Connecticut and Virginia. Nearly every state not in the West or along the East Coast experienced a gain in industrial mix.

A half-dozen high-paying mostly high-technology sectors caused most of the state-to-state variation in the 2001-04 change in industrial mix: manufacturing; information; finance and insurance; professional, scientific and technical services; management of companies; and mining. The very low-paying accommodation and food services sector also added noticeably to the geographic variation.

TABLE 17
2001-04 CHANGE IN INDUSTRIAL MIX* RANKED BY STATE

1.	District of Columbia	4.1	27.	Michigan	0.5
2.	Wyoming	2.2	28.	South Carolina	0.4
3.	Nebraska	1.7	29.	Nevada	0.3
4.	Iowa	1.5	30.	Virginia	0.3
5.	North Dakota	1.4	31.	New Mexico	0.3
6.	Wisconsin	1.4	32.	Alaska	0.3
7.	Oklahoma	1.3	33.	Louisiana	0.2
8.	Arkansas	1.3	34.	Vermont	0.2
9.	Hawaii	1.2	35.	Minnesota	0.1
10.	Delaware	1.2	36.	Kansas	0.0
11.	Rhode Island	1.1	37.	Maine	-0.0
12.	West Virginia	1.1	38.	Illinois	-0.0
13.	South Dakota	1.1	39.	Texas	-0.1
14.	Tennessee	1.0	40.	Idaho	-0.3
15.	Montana	0.9	41.	Utah	-0.3
16.	Indiana	0.9	42.	Arizona	-0.3
17.	Ohio	0.8	43.	Washington	-0.4
18.	Alabama	0.8	44.	Oregon	-0.5
19.	North Carolina	0.7	45.	Georgia	-0.7
20.	Florida	0.7	46.	New Hampshire	-0.9
21.	Kentucky	0.7	47.	California	-1.1
22.	Mississippi	0.7	48.	New York	-1.1
23.	Maryland	0.7	49.	New Jersey	-1.2
24.	Connecticut	0.6	50.	Colorado	-1.2
25.	Pennsylvania	0.6	51.	Massachusetts	-2.1
26.	Missouri	0.6			

* Formula 1: The difference in the two years of the sum over all industries of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages.

Occupational Job Quality

The various measures of occupational job quality are summarized by state in Table 18. The values in the three columns related to occupational mix — all expressed relative to the national average — are calculated from formula 1 while the values in the other three columns are calculated from formula 2. The change in occupational mix and difference in score from U.S. columns — both expressed relative to the U.S. average — represent the alternative ways of measuring the change in occupational job quality relative to the nation between 2001 and 2004. Differences between the two measures are more substantial than in the industrial data. The two columns providing the state score are not expressed relative to the nation. They show the total change in the occupational job quality score over the three years. As seen in the state score (U.S. wage) column, eight states experienced an improvement in occupational job quality between 2001 and 2004, with six by at least 0.5. Since the calculation of the state score (state wage) column is affected by factors other than the change in job quality (such as living costs), the last column of the table should not be used to compare states on job quality.

Occupational Mix in 2004

Only 20 states had an occupational mix in 2004 that had a positive effect on the state's average wage relative to the national average, with only 14 having a value of at least 1. The states with the strongest occupational mixes in 2004 are disproportionately located along the northern-to-central Atlantic Coast, filling nine of the top 15 positions (see Table 19). Outside of this region, the states with a strong occupational mix were geographically scattered: Alaska, Idaho, Colorado, Minnesota, Illinois and Georgia. States in the South and Upper Midwest disproportionately had the weakest occupational mixes, but the worst figure was in Nevada and the fifth-worst was in Hawaii.

As with the industrial mix, a minority of occupational groups caused most of the geographic variation in the occupational mix in 2004. The high-paying management, computer and mathematical, and business and financial operations occupational groups were significant sources of the variation across states in the occupational mix value in 2004. Most of the extreme state values in the latter two groups were negative. The architecture and engineering group also contributed to the geographic variation. Among the low-paying groups, production had the greatest impact, with food preparation and serving, and transportation also contributing to the geographic variation. Though its overall average wage was not that much less than the overall figure, the sales group also was a source of considerable geographic variation. This group has a mixture of high- and low-paying occupations.

Change in Occupational Mix between 2001 and 2004

Twenty-four states experienced an increase in occupational mix value between 2001 and 2004, though only 11 had a gain of at least 1 (see Table 20). Unlike the industrial mix, in which the change between 2001 and 2004 was inversely related to the 2004 level in most states, the change in occupational mix was positively related to its level. The states with the greatest improvements in occupational mix are scattered across the country, though several states in New England or along the central Atlantic Coast experienced gains.

In many states, large changes occurred in the occupational mix between 2001 and 2004 in the management occupational group. The only other groups that contributed even moderately to the

TABLE 18
OCCUPATIONAL JOB QUALITY BY STATE

	Occupational Mix*		2001-04 Change	Difference in Score from U.S.**	State Score (U.S. Wage)***	State Score (State Wage)****
	2001	2004				
Alabama	-2.31	-3.21	-0.90	-0.45	-1.38	-1.54
Alaska	3.21	5.39	2.18	1.21	0.14	0.27
Arizona	-0.15	-0.50	-0.35	-0.20	-1.18	-1.02
Arkansas	-5.86	-6.38	-0.52	0.22	-0.75	-0.61
California	0.58	1.32	0.74	0.51	-0.43	-0.10
Colorado	3.01	3.30	0.29	0.17	-0.79	-0.97
Connecticut	3.08	3.99	0.92	0.68	-0.28	-0.29
Delaware	2.45	0.92	-1.53	-1.64	-2.62	-2.81
District of Columbia	26.92	31.96	5.04	1.47	0.58	0.35
Florida	-2.62	-3.67	-1.05	-0.80	-1.71	-1.87
Georgia	-0.84	0.90	1.74	1.48	0.58	0.66
Hawaii	-6.02	-5.03	0.99	1.27	0.32	0.83
Idaho	0.00	2.37	2.37	1.93	0.84	0.55
Illinois	3.21	2.68	-0.54	-0.92	-1.87	-1.41
Indiana	-4.70	-4.39	0.31	0.90	-0.10	-0.30
Iowa	-3.77	-4.88	-1.11	-0.39	-1.40	-1.26
Kansas	-0.92	-1.48	-0.56	-0.27	-1.26	-1.47
Kentucky	-3.57	-3.62	-0.05	0.24	-0.74	-0.95
Louisiana	-1.33	-2.62	-1.29	-1.10	-2.05	-1.97
Maine	-2.10	-1.88	0.23	0.30	-0.70	-0.73
Maryland	6.00	6.48	0.48	-0.17	-1.12	-0.73
Massachusetts	5.79	7.61	1.82	0.91	-0.07	-0.02
Michigan	-1.05	0.63	1.68	1.71	0.75	0.42
Minnesota	0.15	2.07	1.92	1.80	0.81	0.62
Mississippi	-6.56	-6.19	0.37	0.95	-0.06	-0.23
Missouri	-0.59	-2.58	-1.98	-1.72	-2.68	-2.51
Montana	-2.00	-2.77	-0.76	-0.74	-1.78	-1.35
Nebraska	-1.82	-2.91	-1.08	-0.57	-1.51	-0.98
Nevada	-9.66	-10.20	-0.55	0.40	-0.59	-0.27
New Hampshire	0.75	1.91	1.17	0.78	-0.21	-0.05
New Jersey	0.95	1.85	0.91	0.79	-0.17	-0.16
New Mexico	0.56	-1.37	-1.93	-1.87	-2.87	-2.56
New York	1.01	2.21	1.20	0.85	-0.05	0.15
North Carolina	-1.68	-2.10	-0.42	-0.18	-1.13	-1.20
North Dakota	-4.06	-5.12	-1.06	-0.59	-1.58	-1.33
Ohio	-1.50	-1.78	-0.28	-0.02	-0.96	-1.06
Oklahoma	-0.89	-0.45	0.44	0.31	-0.58	-0.80
Oregon	-1.34	-0.72	0.61	0.70	-0.30	-0.10
Pennsylvania	0.52	-0.93	-1.45	-1.33	-2.28	-2.20
Rhode Island	-1.88	-0.20	1.68	1.63	0.79	1.26
South Carolina	-3.09	-3.67	-0.58	-0.36	-1.27	-1.07
South Dakota	-6.61	-6.85	-0.24	0.61	-0.40	-0.52
Tennessee	-2.79	-2.38	0.41	0.44	-0.50	-0.49
Texas	1.62	0.20	-1.42	-1.39	-2.32	-2.24
Utah	-0.29	0.16	0.45	0.63	-0.32	0.18
Vermont	-3.19	-3.33	-0.14	0.60	-0.38	-0.50
Virginia	3.53	3.13	-0.40	-0.25	-1.18	-1.31
Washington	1.19	0.19	-1.00	-0.57	-1.52	-1.57
West Virginia	-2.61	-3.80	-1.20	-0.65	-1.66	-1.73
Wisconsin	-3.90	-4.12	-0.22	0.46	-0.54	-0.77
Wyoming	-1.68	-1.44	0.24	0.47	-0.49	-0.13

(continued on next page)

TABLE 18 (continued)
OCCUPATIONAL JOB QUALITY BY STATE

- * Formula 1: Sum over all occupations of $((\text{state} - \text{U.S. employment share}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.
- ** The figures in this column are an alternative to those in the column to the left (2001-04 change in occupational mix). This column is calculated as the difference between the value in the column to the right (the state score calculated using national wages) and the national score calculated from formula 2: Sum over all occupations of $((\text{change over time in occupational share of U.S. employment}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.
- *** Formula 2: Sum over all occupations of $((\text{change over time in occupational share of state employment}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.
- **** States should not be compared on the basis of this column, calculated from formula 2: Sum over all occupations of $((\text{change over time in occupational share of state employment}) * (\text{ratio of state average wage to overall state average wage} - 1) * 100)$.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

TABLE 19
2004 OCCUPATIONAL MIX* RANKED BY STATE

1.	District of Columbia	32.0	27.	Wyoming	-1.4
2.	Massachusetts	7.6	28.	Kansas	-1.5
3.	Maryland	6.5	29.	Ohio	-1.8
4.	Alaska	5.4	30.	Maine	-1.9
5.	Connecticut	4.0	31.	North Carolina	-2.1
6.	Colorado	3.3	32.	Tennessee	-2.4
7.	Virginia	3.1	33.	Missouri	-2.6
8.	Illinois	2.7	34.	Louisiana	-2.6
9.	Idaho	2.4	35.	Montana	-2.8
10.	New York	2.2	36.	Nebraska	-2.9
11.	Minnesota	2.1	37.	Alabama	-3.2
12.	New Hampshire	1.9	38.	Vermont	-3.3
13.	New Jersey	1.9	39.	Kentucky	-3.6
14.	California	1.3	40.	South Carolina	-3.7
15.	Delaware	0.9	41.	Florida	-3.7
16.	Georgia	0.9	42.	West Virginia	-3.8
17.	Michigan	0.6	43.	Wisconsin	-4.1
18.	Texas	0.2	44.	Indiana	-4.4
19.	Washington	0.2	45.	Iowa	-4.9
20.	Utah	0.2	46.	Hawaii	-5.0
21.	Rhode Island	-0.2	47.	North Dakota	-5.1
22.	Oklahoma	-0.5	48.	Mississippi	-6.2
23.	Arizona	-0.5	49.	Arkansas	-6.4
24.	Oregon	-0.7	50.	South Dakota	-6.9
25.	Pennsylvania	-0.9	51.	Nevada	-10.2
26.	New Mexico	-1.4			

* Formula 1: Sum over all occupations of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

TABLE 20
2001-04 CHANGE IN OCCUPATIONAL MIX* RANKED BY STATE

1. District of Columbia	5.0	27. Wisconsin	-0.2
2. Idaho	2.4	28. South Dakota	-0.2
3. Alaska	2.2	29. Ohio	-0.3
4. Minnesota	1.9	30. Arizona	-0.4
5. Massachusetts	1.8	31. Virginia	-0.4
6. Georgia	1.7	32. North Carolina	-0.4
7. Rhode Island	1.7	33. Arkansas	-0.5
8. Michigan	1.7	34. Illinois	-0.5
9. New York	1.2	35. Nevada	-0.6
10. New Hampshire	1.2	36. Kansas	-0.6
11. Hawaii	1.0	37. South Carolina	-0.6
12. Connecticut	0.9	38. Montana	-0.8
13. New Jersey	0.9	39. Alabama	-0.9
14. California	0.7	40. Washington	-1.0
15. Oregon	0.6	41. Florida	-1.1
16. Maryland	0.5	42. North Dakota	-1.1
17. Utah	0.5	43. Nebraska	-1.1
18. Oklahoma	0.4	44. Iowa	-1.1
19. Tennessee	0.4	45. West Virginia	-1.2
20. Mississippi	0.4	46. Louisiana	-1.3
21. Indiana	0.3	47. Texas	-1.4
22. Colorado	0.3	48. Pennsylvania	-1.5
23. Wyoming	0.2	49. Delaware	-1.5
24. Maine	0.2	50. New Mexico	-1.9
25. Kentucky	-0.1	51. Missouri	-2.0
26. Vermont	-0.1		

* Formula 1: The difference in the two years of the sum over all occupations of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Occupational Employment Statistics.

interstate variation were health practitioners and technical, business and financial operations, and legal. Thus, the management group accounted for much of the interstate variation.

Overall Job Quality

Overall job quality in 2004 is approximated by combining multiplicatively the industrial mix and occupational mix values. In all but five states, the 2004 industrial mix and occupational mix values both were either stronger or weaker than the national average. Alaska was the biggest exception, with a below-average industrial mix but the fourth-strongest occupational mix in the country. In some states, the combined effect of the industrial and occupational mixes was substantial. As seen in Table 21, job quality in Massachusetts had a positive effect of more than 14 percent on its overall average wage relative to the national average; the job mix in five states had a depressing effect on the average wage of at least 10 percent.

Job quality was greater than the national average in only 18 states. The strongest job quality in 2004 was in the District of Columbia and seven states that border the Atlantic Ocean from Massachusetts to Virginia. Outside of this region, the strongest job quality was in Illinois and Colorado. Job quality was almost uniformly weak in the Great Plains and South. In the West and the Great Lakes region, job quality varied by state from below to above the national average.

The change in industrial mix was not correlated to the change in occupational mix between 2001 and 2004. Other than most of the states with the strongest change in overall job quality, most of the states experienced a gain in one measure but a loss in the other measure. Thus, the overall change in job quality was small in most states. Eight states experienced a gain of at least 2, but no state had a decline of that magnitude.

Thirty-one states had a positive change in overall job quality between 2001 and 2004, though the gain was 1 percent or more in only 16 states (see Table 22). Six states had a loss of at least 1 percent. The change in job quality did not a strong regional pattern, though most of the northern tier of states posted a gain while losses were sizeable in Louisiana-Texas-New Mexico-Colorado, extending to Arizona.

TABLE 21
2004 OVERALL JOB QUALITY RANKED BY STATE

		Total*	Ind Mix**	Occ Mix^			Total*	Ind Mix**	Occ Mix^
1.	District of Columbia	60.2	21.4	32.0	27.	Missouri	-3.5	-0.9	-2.6
2.	Massachusetts	14.6	6.5	7.6	28.	Oregon	-3.9	-3.2	-0.7
3.	Connecticut	8.8	4.6	4.0	29.	Wyoming	-4.0	-2.6	-1.4
4.	Maryland	8.1	1.6	6.5	30.	Louisiana	-4.4	-1.8	-2.6
5.	New York	7.7	5.4	2.2	31.	North Carolina	-4.7	-2.7	-2.1
6.	New Jersey	7.1	5.2	1.9	32.	New Mexico	-4.9	-3.6	-1.4
7.	Delaware	6.9	5.9	0.9	33.	Tennessee	-4.9	-2.6	-2.4
8.	Virginia	6.6	3.3	3.1	34.	Alabama	-5.1	-2.0	-3.2
9.	Colorado	5.1	1.8	3.3	35.	Nebraska	-5.2	-2.3	-2.9
10.	Illinois	4.4	1.7	2.7	36.	Kentucky	-6.1	-2.6	-3.6
11.	Minnesota	3.7	1.6	2.1	37.	West Virginia	-6.3	-2.6	-3.8
12.	Alaska	3.3	-2.0	5.4	38.	Maine	-6.6	-4.9	-1.9
13.	California	2.4	1.1	1.3	39.	Wisconsin	-6.9	-2.9	-4.1
14.	Texas	1.5	1.3	0.2	40.	Indiana	-7.1	-2.8	-4.4
15.	Utah	0.9	0.7	0.2	41.	North Dakota	-7.3	-2.3	-5.1
16.	Georgia	0.9	-0.1	0.9	42.	Florida	-8.3	-4.8	-3.7
17.	New Hampshire	0.6	-1.3	1.9	43.	South Carolina	-9.0	-5.6	-3.7
18.	Michigan	0.0	-0.7	0.6	44.	Arkansas	-9.0	-2.9	-6.4
19.	Washington	-1.1	-1.3	0.2	45.	Iowa	-9.3	-4.6	-4.9
20.	Pennsylvania	-1.2	-0.3	-0.9	46.	Vermont	-9.3	-6.2	-3.3
21.	Idaho	-1.5	-3.8	2.4	47.	Montana	-10.1	-7.6	-2.8
22.	Oklahoma	-1.7	-1.3	-0.5	48.	South Dakota	-11.6	-5.1	-6.9
23.	Arizona	-2.0	-1.6	-0.5	49.	Mississippi	-12.2	-6.4	-6.2
24.	Kansas	-2.1	-0.6	-1.5	50.	Hawaii	-13.2	-8.6	-5.0
25.	Rhode Island	-2.2	-2.0	-0.2	51.	Nevada	-18.9	-9.7	-10.2
26.	Ohio	-3.3	-1.6	-1.8					

* Total is calculated multiplicatively. For example, for the District of Columbia, $((1.214 * 1.320) - 1) * 100$. However, the calculation was made with unrounded values.

** Industrial mix: Formula 1: Sum over all industries of $((\text{state} - \text{U.S. employment share}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.

^ Occupational Mix: Formula 1: Sum over all occupations of $((\text{state} - \text{U.S. employment share}) * (\text{ratio of U.S. average wage to overall U.S. average wage} - 1) * 100)$.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages and Occupational Employment Statistics.

TABLE 22
2001-04 CHANGE IN OVERALL JOB QUALITY RANKED BY STATE

		Total*	Ind Mix**	Occ Mix^			Total*	Ind Mix**	Occ Mix^
1.	District of Columbia	11.3	4.1	5.0	27.	Montana	0.2	0.9	-0.8
2.	Rhode Island	2.8	1.1	1.7	28.	Oregon	0.1	-0.5	0.6
3.	Wyoming	2.4	2.2	0.2	29.	Utah	0.1	-0.3	0.5
4.	Alaska	2.4	0.3	2.2	30.	New York	0.1	-1.1	1.2
5.	Michigan	2.2	0.5	1.7	31.	Vermont	0.1	0.2	-0.1
6.	Hawaii	2.1	1.2	1.0	32.	Virginia	-0.1	0.3	-0.4
7.	Minnesota	2.1	0.1	1.9	33.	South Carolina	-0.1	0.4	-0.6
8.	Idaho	2.0	-0.3	2.4	34.	West Virginia	-0.1	1.1	-1.2
9.	Oklahoma	1.7	1.3	0.4	35.	Alabama	-0.1	0.8	-0.9
10.	Connecticut	1.6	0.6	0.9	36.	Nevada	-0.2	0.3	-0.6
11.	Tennessee	1.3	1.0	0.4	37.	Massachusetts	-0.3	-2.1	1.8
12.	Maryland	1.2	0.7	0.5	38.	New Jersey	-0.3	-1.2	0.9
13.	Indiana	1.1	0.9	0.3	39.	Florida	-0.3	0.7	-1.1
14.	Wisconsin	1.1	1.4	-0.2	40.	California	-0.3	-1.1	0.7
15.	Georgia	1.1	-0.7	1.7	41.	Delaware	-0.4	1.2	-1.5
16.	Mississippi	1.0	0.7	0.4	42.	Kansas	-0.5	0.0	-0.6
17.	South Dakota	0.8	1.1	-0.2	43.	Illinois	-0.6	-0.0	-0.5
18.	Arkansas	0.7	1.3	-0.5	44.	Arizona	-0.7	-0.3	-0.4
19.	Nebraska	0.7	1.7	-1.1	45.	Pennsylvania	-0.9	0.6	-1.5
20.	Kentucky	0.6	0.7	-0.1	46.	Colorado	-1.0	-1.2	0.3
21.	Ohio	0.5	0.8	-0.3	47.	Louisiana	-1.0	0.2	-1.3
22.	Iowa	0.4	1.5	-1.1	48.	Washington	-1.4	-0.4	-1.0
23.	North Dakota	0.4	1.4	-1.1	49.	Missouri	-1.4	0.6	-2.0
24.	North Carolina	0.3	0.7	-0.4	50.	Texas	-1.5	-0.1	-1.4
25.	New Hampshire	0.3	-0.9	1.2	51.	New Mexico	-1.6	0.3	-1.9
26.	Maine	0.2	-0.0	0.2					

* Total is calculated as the difference between total job quality in 2004 (Table 21) and total job quality in 2001.

** Industrial mix: The difference in the 2001 and 2004 job mix values calculated from Formula 1: Sum over all industries of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100).

^ Occupational Mix: The difference in the 2001 and 2004 job mix values calculated from Formula 1: Sum over all occupations of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages and Occupational Employment Statistics.

Average Wage After Adjusting for Job Quality

The annual average wage reported in the Census of Employment and Wages is considerably different from that reported in the Occupational Employment Survey nationally and in most states. While the CEW is a census of all covered employers, the average wage is not adjusted for the number of hours worked. The OES does make that adjustment, but its average wage is subject to survey error.

Nationally, the CEW average wage in 2004 of \$39,354 was 5.1 percent higher than the OES figure of \$37,440. Assuming no survey error or other methodological difference, this suggests that the net impact on the average wage of those working more than 40 hours per week is greater than the effect of those working fewer than 40 hours per week. However, in 21 states, the CEW average wage was less than the OES figure, suggesting a larger impact from those working part time and/or seasonally. Most of the 21 states with a lower CEW than OES figure are located in the West (but not California, Nevada and Arizona) or Great Plains regions.

In 40 states, job quality accounted for a portion of the average wage differential from the national average, whether the differential was positive or negative. In particular, in 26 of these states, the average wage according to both the CEW and OES measures was less than the national average but the negative differential became smaller after adjusting for job quality. In several states, the differential from the national average became greater after adjusting for job quality while in a few states the sign of the differential changed.

Job quality is just one of several factors that affect wage levels. Major factors other than job quality that affect the average wage include

- Productivity: the greater the productivity of a state's workforce, the higher the wages.
- Cost of living: the higher the cost of living, the higher the wages.
- The desirability of the area: the more desirable the area, the lower the wages.

While both the average wage and the average wage adjusted for job quality are affected by the cost of living, it would be misleading to fully adjust the average wage figures for living costs even if reliable cost-of-living indexes were available by state, since geographic variations in living costs are not the only factor causing the average wage figures to vary by state. Dumond et. al. (1999) suggested that 40 percent of the variation in average wage can be attributed to the cost of living.

Substantial differences in the average wage exist across states even after controlling for the effects of job quality (see the two rightmost columns in Table 23). Given the lack of state-level data for each of the factors affecting the average wage adjusted for job quality and the interrelated nature of each of these factors, it is not possible to provide much insight into the reasons for the geographic variations in the average wage after adjustment for job quality. However, the results suggest that cost of living plays a significant role. For example, most of the 17 states with an OES average wage greater than the national average after adjustment for job quality are located in the West (particularly along the Pacific Coast) or along the Atlantic Coast from Massachusetts to Maryland, the regions of the country generally recognized as being the most costly.

TABLE 23
2004 AVERAGE WAGE AND JOB QUALITY BY STATE
Expressed as a Percentage Point Difference from the National Average

See following page for description of columns	Average Wage		Job Quality		Average Wage after Adjustment for Job Quality	
	CEW	OES	Indust Mix	Occup Mix	CEW	OES
Alabama	-15.1	-14.7	-2.0	-3.2	-10.5	-10.1
Alaska	-0.7	12.6	-2.0	5.4	-3.9	9.0
Arizona	-6.9	-6.8	-1.6	-0.5	-4.9	-4.9
Arkansas	-23.1	-21.0	-2.9	-6.4	-15.5	-13.2
California	13.4	12.1	1.1	1.3	10.8	9.5
Colorado	2.3	6.4	1.8	3.3	-2.7	1.1
Connecticut	29.6	18.6	4.6	4.0	19.1	9.0
Delaware	8.0	4.3	5.9	0.9	1.0	-2.4
District of Columbia	62.3	54.9	21.4	32.0	1.4	-3.3
Florida	-10.6	-9.9	-4.8	-3.7	-2.5	-1.7
Georgia	-3.8	-4.3	-0.1	0.9	-4.6	-5.1
Hawaii	-10.6	-1.8	-8.6	-5.0	3.0	13.0
Idaho	-24.1	-12.5	-3.8	2.4	-23.0	-11.2
Illinois	7.4	3.0	1.7	2.7	2.9	-1.3
Indiana	-11.8	-9.7	-2.8	-4.4	-5.2	-2.8
Iowa	-18.4	-14.6	-4.6	-4.9	-10.1	-5.8
Kansas	-16.8	-9.8	-0.6	-1.5	-15.1	-7.9
Kentucky	-15.7	-14.1	-2.6	-3.6	-10.2	-8.5
Louisiana	-19.0	-16.6	-1.8	-2.6	-15.3	-12.8
Maine	-18.9	-10.6	-4.9	-1.9	-13.2	-4.2
Maryland	8.2	10.5	1.6	6.5	0.0	2.2
Massachusetts	24.3	21.0	6.5	7.6	8.5	5.5
Michigan	2.6	5.7	-0.7	0.6	2.6	5.8
Minnesota	2.7	6.4	1.6	2.1	-1.0	2.6
Mississippi	-27.5	-23.5	-6.4	-6.2	-17.4	-12.9
Missouri	-11.5	-8.0	-0.9	-2.6	-8.3	-4.6
Montana	-29.3	-20.2	-7.6	-2.8	-21.3	-11.2
Nebraska	-19.9	-11.7	-2.3	-2.9	-15.6	-6.9
Nevada	-5.7	-8.4	-9.7	-10.2	16.2	12.9
New Hampshire	-0.5	0.0	-1.3	1.9	-1.0	-0.5
New Jersey	22.1	15.0	5.2	1.9	14.0	7.3
New Mexico	-20.2	-11.9	-3.6	-1.4	-16.1	-7.3
New York	26.9	16.4	5.4	2.2	17.8	8.1
North Carolina	-11.6	-8.9	-2.7	-2.1	-7.2	-4.4
North Dakota	-26.3	-18.2	-2.3	-5.1	-20.5	-11.8
Ohio	-7.4	-4.1	-1.6	-1.8	-4.2	-0.8
Oklahoma	-21.9	-16.8	-1.3	-0.5	-20.5	-15.4
Oregon	-9.5	-1.2	-3.2	-0.7	-5.8	2.8
Pennsylvania	-2.0	-3.9	-0.3	-0.9	-0.8	-2.7
Rhode Island	-4.3	2.1	-2.0	-0.2	-2.2	4.4
South Carolina	-19.1	-14.7	-5.6	-3.7	-11.1	-6.2
South Dakota	-28.1	-22.3	-5.1	-6.9	-18.7	-12.1
Tennessee	-11.3	-12.6	-2.6	-2.4	-6.7	-8.1
Texas	-2.1	-5.7	1.3	0.2	-3.6	-7.1
Utah	-18.3	-8.9	0.7	0.2	-19.0	-9.7
Vermont	-15.4	-7.5	-6.2	-3.3	-6.7	2.1
Virginia	3.0	4.5	3.3	3.1	-3.4	-1.9
Washington	0.0	9.1	-1.3	0.2	1.1	10.3
West Virginia	-22.8	-18.6	-2.6	-3.8	-17.6	-13.1
Wisconsin	-11.7	-5.9	-2.9	-4.1	-5.1	1.1
Wyoming	-20.7	-13.2	-2.6	-1.4	-17.4	-9.5

(continued on next page)

TABLE 23 (continued)
2004 AVERAGE WAGE AND JOB QUALITY BY STATE

Description of Columns:

Average Wage – CEW: Using the Census of Employment and Wages, the percentage difference in the state average wage from the national average wage. This average wage is based on a census of all covered employers, but is not adjusted for the number of hours worked.

Average Wage – OES: Using the Occupational Employment Survey, the percentage difference in the state average wage from the national average wage. This average wage is adjusted for the number of hours worked but is based on a survey of employers.

Job Quality – Industrial Mix: Formula 1: Sum over all industries of (state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100.

Job Quality – Occupational Mix: Formula 1: Sum over all occupations of (state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100.

Average Wage after Adjustment for Job Quality – CEW: Uses the average wage from the Census of Employment and Wages. Calculated using ratios of the national average: average wage divided by industrial mix divided by occupational mix. For example, for Alabama: $0.849/0.980/0.968 = 0.895$, or – 10.5 percent (using unrounded data).

Average Wage after Adjustment for Job Quality – OES: Uses the average wage from the Occupational Employment Survey. Calculated using ratios of the national average: average wage divided by industrial mix divided by occupational mix. For example, for Alabama: $0.853/0.980/0.968 = 0.899$, or –10.1 percent (using unrounded data).

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Census of Employment and Wages and Occupational Employment Statistics.

Relative to the national average, the 2001-to-2004 change in OES average wage after adjusting for job quality was positive in 15 states (see Table 24). No strong regional pattern existed.

TABLE 24
2001-04 CHANGE IN AVERAGE WAGE AND JOB QUALITY BY STATE
Expressed as a Percentage Point Difference from the National Average

See following page for description of columns	Average Wage		Job Quality		Average Wage after Adjustment for Job Quality	
	CEW	OES	Indust Mix	Occup Mix	CEW	OES
Alabama	2.3	-1.9	0.8	-0.9	2.0	-1.4
Alaska	-0.7	-2.0	0.3	2.2	-2.9	-4.6
Arizona	1.0	-1.6	-0.3	-0.4	1.5	-0.7
Arkansas	2.3	-0.5	1.3	-0.5	1.1	-1.0
California	-0.7	1.2	-1.1	0.7	-0.3	1.5
Colorado	-2.6	0.4	-1.2	0.3	-1.4	1.3
Connecticut	-0.2	1.0	0.6	0.9	-1.9	-0.6
Delaware	1.9	-1.1	1.2	-1.5	2.2	-0.5
District of Columbia	5.6	7.2	4.1	5.0	-2.4	-0.9
Florida	2.8	-0.9	0.7	-1.1	2.8	-0.5
Georgia	-0.9	0.3	-0.7	1.7	-1.8	-0.7
Hawaii	3.9	1.2	1.2	1.0	1.2	-1.4
Idaho	-1.1	-1.3	-0.3	2.4	-2.4	-2.9
Illinois	-0.5	0.2	-0.0	-0.5	0.1	0.7
Indiana	0.5	-1.2	0.9	0.3	-0.7	-2.3
Iowa	2.6	-1.0	1.5	-1.1	1.8	-1.3
Kansas	-0.1	-1.2	0.0	-0.6	0.4	-0.5
Kentucky	1.8	-3.0	0.7	-0.1	0.9	-3.2
Louisiana	0.7	-2.1	0.2	-1.3	1.5	-0.7
Maine	2.0	0.8	-0.0	0.2	1.5	0.6
Maryland	2.6	2.4	0.7	0.5	1.3	1.1
Massachusetts	0.1	3.8	-2.1	1.8	0.3	3.7
Michigan	-1.0	-0.2	0.5	1.7	-3.0	-2.5
Minnesota	1.7	2.8	0.1	1.9	-0.4	0.6
Mississippi	1.4	-1.2	0.7	0.4	0.1	-1.9
Missouri	-1.2	-1.0	0.6	-2.0	0.3	0.5
Montana	1.8	-1.8	0.9	-0.8	1.2	-1.6
Nebraska	2.3	0.5	1.7	-1.1	1.2	-0.2
Nevada	3.3	-1.4	0.3	-0.6	3.8	-1.1
New Hampshire	1.7	3.9	-0.9	1.2	1.3	3.1
New Jersey	-0.3	0.3	-1.2	0.9	0.1	0.6
New Mexico	0.7	0.1	0.3	-1.9	2.0	1.6
New York	-1.8	1.2	-1.1	1.2	-2.1	1.1
North Carolina	-0.1	-1.4	0.7	-0.4	-0.3	-1.5
North Dakota	4.1	1.1	1.4	-1.1	2.6	0.6
Ohio	0.8	-0.2	0.8	-0.3	0.2	-0.7
Oklahoma	1.0	-1.3	1.3	0.4	-0.6	-2.5
Oregon	-1.4	-0.9	-0.5	0.6	-1.3	-0.9
Pennsylvania	1.5	-2.0	0.6	-1.5	2.3	-0.9
Rhode Island	3.3	1.4	1.1	1.7	0.2	-1.6
South Carolina	0.1	-2.4	0.4	-0.6	0.3	-1.9
South Dakota	1.8	-2.0	1.1	-0.2	0.6	-2.3
Tennessee	2.1	-1.8	1.0	0.4	0.5	-2.8
Texas	-1.9	-0.9	-0.1	-1.4	-0.2	0.7
Utah	-1.7	-1.1	-0.3	0.5	-1.4	-1.0
Vermont	1.3	-1.1	0.2	-0.1	1.1	-1.1
Virginia	1.6	3.0	0.3	-0.4	1.5	2.7
Washington	-3.6	-1.6	-0.4	-1.0	-2.0	-0.1
West Virginia	-0.1	-1.1	1.1	-1.2	0.1	-0.7
Wisconsin	1.5	-0.5	1.4	-0.2	0.2	-1.6
Wyoming	2.6	0.2	2.2	0.2	-0.1	-2.1

(continued on next page)

TABLE 24 (continued)
2001-04 CHANGE IN AVERAGE WAGE AND JOB QUALITY BY STATE

Description of Columns:

Average Wage – CEW: Using the Census of Employment and Wages, the percentage difference in the change in the state average wage from the national average wage. This average wage is based on a census of all covered employers, but is not adjusted for the number of hours worked.

Average Wage – OES: Using the Occupational Employment Survey, the percentage difference in the change in the state average wage from the national average wage. This average wage is adjusted for the number of hours worked but is based on a survey of employers.

Job Quality – Industrial Mix: Formula 1: Sum over all industries of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100) for 2004 less 2001.

Job Quality – Occupational Mix: Formula 1: Sum over all occupations of ((state – U.S. employment share) * (ratio of U.S. average wage to overall U.S. average wage – 1) * 100) for 2004 less 2001.

Average Wage after Adjustment for Job Quality – CEW: Uses the average wage from the Census of Employment and Wages. The difference between 2004 and 2001 in the adjusted average wage.

Average Wage after Adjustment for Job Quality – OES: Uses the average wage from the Occupational Employment Survey. The difference between 2004 and 2001 in the adjusted average wage.

Source: Calculated from U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages and Occupational Employment Statistics.

THE PRODUCTIVITY AND PROSPERITY PROJECT

The Productivity and Prosperity Project: An Analysis of Economic Competitiveness (P3) is an ongoing initiative begun in 2005, sponsored by Arizona State University President Michael M. Crow. P3 analyses incorporate literature reviews, existing empirical evidence, and economic and econometric analyses.

Enhancing productivity is the primary means of attaining economic prosperity. Productive individuals and businesses are the most competitive and prosperous. Competitive regions attract and retain these productive workers and businesses, resulting in strong economic growth and high standards of living. An overarching objective of P3's work is to examine competitiveness from the perspective of an individual, a business, a region, and a country.

THE CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH

The Center for Competitiveness and Prosperity Research is a research unit of the L. William Seidman Research Institute in the W. P. Carey School of Business, specializing in applied economic and demographic research with a geographic emphasis on Arizona and the metropolitan Phoenix area. The Center conducts research projects under sponsorship of private businesses, nonprofit organizations, government entities and other ASU units. In particular, the Center administers both the Productivity and Prosperity Project, and the Office of the University Economist.

**CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH
L. WILLIAM SEIDMAN RESEARCH INSTITUTE
W. P. CAREY SCHOOL OF BUSINESS
AT ARIZONA STATE UNIVERSITY**

P. O. Box 874011 – Tempe, AZ 85287-4011
Phone (480) 965-5362 – FAX (480) 965-5458
wpcarey.asu.edu/research/competitiveness-prosperity-research