KBER Kansas Business & Economic Review

Vol. 25, No. 1 Spring 2002 Policy Research Institute, The University of Kansas

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Thinking About the Future: Education and Training Needs for the Workforce of the Future

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Introduction

We work in a "new economy," and we live in an "information age." Phrases like these are common, and reflect the vast changes in the nature of work and life that are taking place as the result of the diffusion of new technologies, especially in the areas of computing and information technology. How are these developments affecting the skills that workers will need in the future to succeed and prosper? What should educators be doing to help prepare the next generation of workers to facilitate their transition from school to work and enable them to find rewarding careers?

Answering these questions requires looking well into the future. Assuming that there are no major changes in retirement age, high school seniors graduating in 2002 can expect to remain in the work force until about 2050, or nearly half a century. Over such a long time period it is likely that the structure of the economy and the nature of work more generally will change dramatically. To illustrate the magnitude of the potential changes it is useful to look at how the Kansas workforce has changed in the previous half century.

Table 1 shows changes in the distribution of several broad occupational categories within the state between 1950 and 2001, ranked by the size of their change over this period. As the table shows, there has been a huge growth in so-called "white-collar" occupations; the share of professional and technical workers (such as accountants, professors, musicians, teachers, and doctors) has increased by nearly 150 percent and now accounts for more than one of every five workers in the state. The

Table 1. Occupational Composition of the Kansas Workforce, 1950-2001

Occupation	Percent 1950	Percent 1990	Percent 2001	Percent Change
Professional and Technical	0.09	0.20	0.23	148.77
Service Workers (not household)	0.08	0.14	0.15	90.32
Managers, Officials, and Proprietors	0.09	0.12	0.15	63.79
Clerical and Related	0.11	0.18	0.14	34.8
Sales Workers	0.08	0.06	0.06	-20.65
Craftsmen	0.14	0.11	0.11	-23.51
Laborers	0.07	0.04	0.05	-31.31
Operatives	0.13	0.11	0.08	-33.34
Farmers and Farm Laborers	0.22	0.04	0.03	-88.32

Source: U.S. Census Bureau: Census of Population 1950, Census of Population 1990, and Current Population Survey.

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number of managers, officials, and proprietors has also grown, rising from 9 percent of the state's labor force in 1950 to 15 in 2001. Service workers (beauticians, police officers, janitors, nurses aids, guards, and other similar occupations), and clerical workers have also increased their share of the workforce. In contrast, the most dramatic declines have been in a variety of blue-collar or manual occupations. In 1950 farmers and farm laborers were the single largest group in the state's labor force, constituting more than one-fifth of all workers; by 2001, their share of employment had fallen to just 3 percent.

Given the magnitude of the potential changes in the economy over the next fifty years, it is difficult to offer detailed prescriptions about how to prepare the next generation of job-seekers for the longer-term changes that are likely to occur over their working lives, other than to suggest that they will need to be flexible, and have the ability to learn new skills as the structure of the economy changes.

It is easier, however, to offer more specific insight about the likely direction of changes over the next 5 to 10 years, the period in which today's students will enter their first jobs and begin their careers. Over the past twenty years the most important determinants of the changing nature of work, and hence the skills that employers value, have been rising productivity, which is the force behind the upward trend in the American standard of living, and the increasing application of computers throughout the economy. Both of these trends are likely to continue to dominate other factors in the short to medium term, and, as a result, future changes in skill needs will closely resemble the changes that have taken place in the last two decades. As we will see, rising incomes and computerization have increased the value of cognitive skills; this is likely to continue to be true for the immediate future as well.

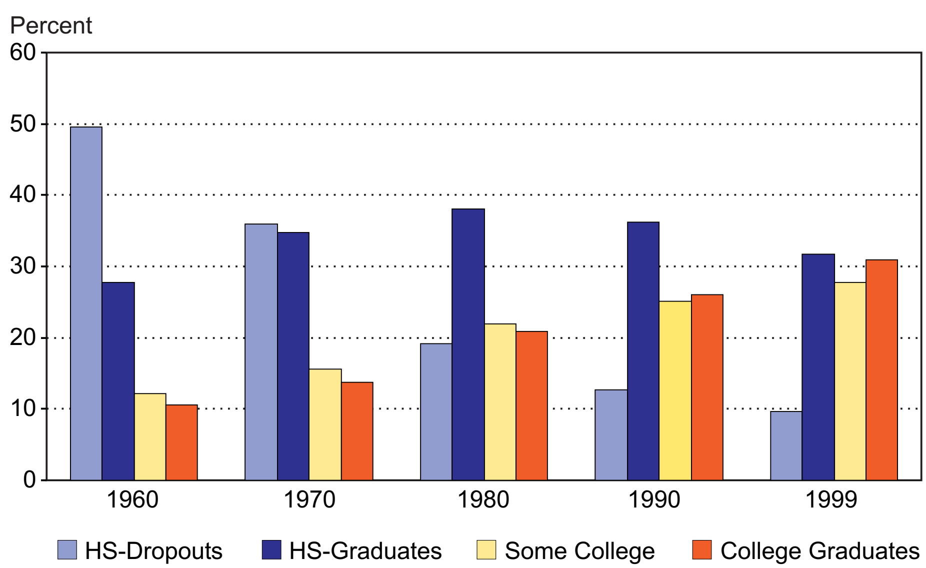
The Human Capital Model of Education and Training

Over the past twenty years one of the most striking changes in the labor market has been the rising premium earned by college educated workers. In 1980, on average college graduates earned about 45 percent more than high school graduates. By the late 1990s this gap had widened to close to 80 percent.[1] Interestingly, real earnings of high school graduates have remained roughly constant over the past two decades, so this growth is almost entirely due to increases in pay for college graduates.

Economists regard education as a form of investment in "human capital." [2] Like other forms of investment in physical capital (such as factories, or equipment), education involves an initial expenditure which raises future productivity and, hence, revenues in the future. In the case of education, individuals incur both direct costs—tuition, books, and other instructional expenses—and indirect costs—income that is foregone because of the time devoted to schooling. To compensate them for these expenses it is reasonable to suppose that better-educated workers would receive higher pay. In the long run the costs of education should determine the premium that more educated workers earn, but in the short run shifts in the supply of or demand for workers with particular skills can cause the college wage premium to diverge from this long-run level.

The available evidence suggests that the rise in pay for college-educated workers is the result of a growing demand for education among employers. In particular, as Figure 1 illustrates, there has been a steady increase in educational attainment in recent years. In 1960, only about one in ten workers was a college graduate. By 1980 this figure had climbed to close to one in five, and by 2000 it was approaching one in three. The combination of rising numbers of college graduates with higher pay for these graduates is indicative of the growing value that employers place on the skills and training that these graduates possess.

Figure 1. Educational Attainment of the Labor Force, 1960-1999



Source: U.S. Census Bureau, Census of Population, 1960, 1970, 1980, 1990, and Current Population Surveys.

Of course, the fact that college graduates earn more than workers with fewer years of education is not conclusive proof that all of the higher pay they receive is the result of additional training.[3] Another interpretation of the higher pay of college graduates is that it reflects at least in part differences in the characteristics of different groups of workers. Among high school graduates, those who complete college possess different characteristics and abilities than those who do not, and it is possible that some of the premium employers are willing to pay is due to this difference rather than the additional training that college graduates have received.

Preferences, Technology, and Changes in the Demand for Labor

Why has the demand for college educated workers grown relatively more quickly than that for less educated workers? To answer this question we need to look more closely at the underlying factors influencing the demand for labor in the economy. At any time, the demand for labor reflects two interrelated forces. The first is preferences; that is, the pattern of goods and services that consumers in this country and elsewhere wish to purchase. The distribution of consumer demand for different goods and services, and its shifts over time, determines what the economy produces and consequently affects the distribution of labor and other resources to these different activities.

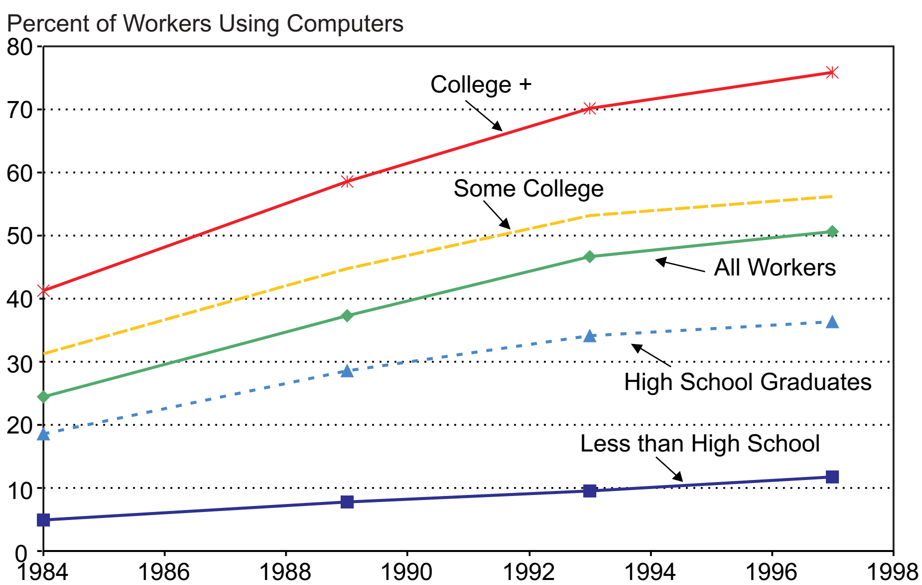
The second factor is technology. Technological progress is one of the hallmarks of our economy. Over the past century, technological advances have increased the efficiency of the average American worker approximately five-fold, while allowing the work week to shrink by nearly 20 hours (from 60 to 40 hours).[4] This progress is the ultimate source of our rising standard of living. Rising living standards affect consumer demand through their impact on purchasing power: as incomes rise, spending on necessities like food and clothing tends to rise more slowly than does spending on discretionary items such as health care and recreation.

In aggregate, technological advances raise the productive efficiency of the economy, thus raising our standard of living. But technology also affects the pattern of labor demand through its impact on the labor required to produce different goods and services. New production processes may affect the mix of skills and tasks required to produce a particular product. For example, the introduction of robots in an auto-mobile assembly line might reduce the need for manual workers while increasing the need for skilled mechanics to build and maintain the robots.

While new technologies change the mix of workers required to produce particular products, differences in the pace of technological progress from one industry to another causes shifts in the relative efficiency of production that require the redistribution of labor across industries. Rapid mechanization in agriculture, for example, has allowed a shrinking number of workers to produce an expanding quantity of output, and contributed to the sector's declining absolute and relative employment in recent decades. More generally, productivity advance in goods producing sectors has been faster than in the service-producing sectors, helping to explain the relative shift of labor from manual occupations to services.

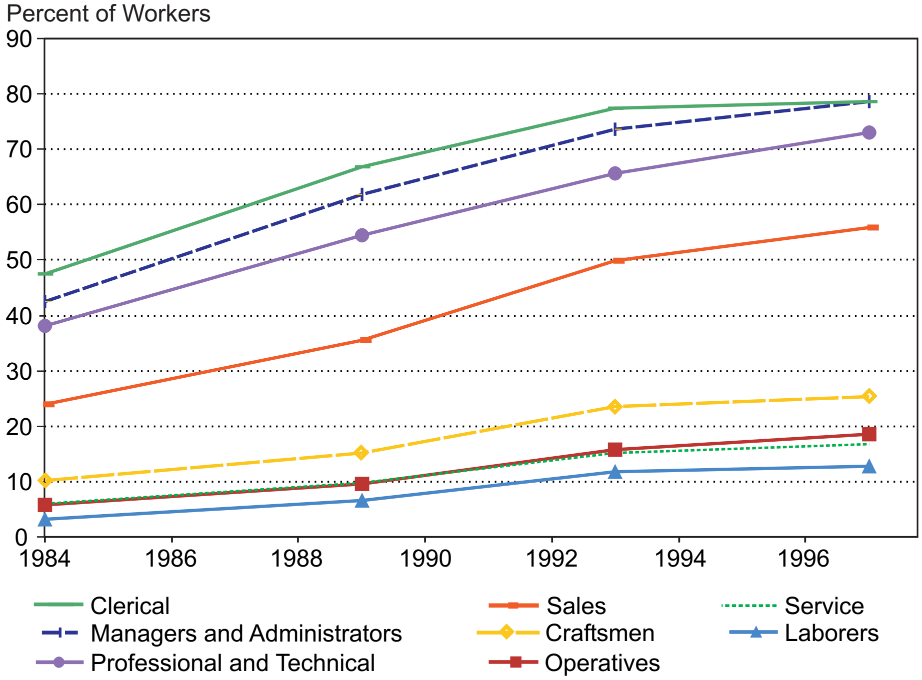
The most important source of technological advance in the American economy over the past few decades has been the sharp decline in the prices of computers, especially adjusted for quality. As anyone who has followed the prices of personal computers has observed, every year prices fall while computing power increases. The resulting fall in the relative costs of computation has led to the widespread adoption of computers throughout the economy. This effect is readily apparent in Figures 2 and 3, which chart the

Figure 2. Computer Use, by Education, 1984-1997



Source: Calculated by Friedberg (2001, p. 24) from data in the U.S. Census Bureau Current Population Surveys.

Figure 3. Computer Use, by Occupation, 1984-1997



Source: Calculated by Friedberg (2001, p. 24) from data in the U.S. Census Bureau Current Population Surveys.

growing number of workers who report using a computer at work, broken down by education level and occupation. Overall computer use at work has approximately doubled since 1984, with close to half of all workers today reporting that they use a computer at work. College educated workers and those in clerical, managerial, and professional and technical jobs are most likely to use computers, but the rise in computer use transcends educational and occupational categories.

The essential feature of computers, according to economists David Autor, Frank Levy and Richard Murnane (2002) is that they perform "tasks that can be expressed using procedural or 'rules-based' logic." As such they are highly effective substitutes for humans in performing routine tasks—such as monitoring the temperature of a steel finishing line—while enhancing the value of humans performing non-routine tasks.

Using available data it is relatively easy to trace the impact of computers on the mix of occupations in the economy. What is harder to detect, however, is the way that the introduction of computers has affected the tasks required of workers within particular occupations. But these changes have also been dramatic and often far-reaching. Thirty years ago, auto manufacturers could rely on the "warm body" approach to hiring workers to staff their assembly lines. As a former Human Resource manager at Ford described the process in the 1960s, "if we had a vacancy, we would look outside in the plant waiting room to see if there were any warm bodies standing there. If someone was there and they looked physically ok and they weren't an obvious alcoholic, they were hired" (quoted in Murnane and Levy 1996, p. 19). Today, potential workers are first subjected to an extensive screening process that tests their ability to complete both paper and pencil tests, along with their interpersonal and communication skills. On the assembly line, they are expected to work in teams to identify the sources of production problems and work together with others to find ways to rectify them (Murnane and Levy 1996, pp. 24-26, 53-58).

In service sector industries like insurance, computerization of records has similarly reduced demand for routine clerical work while enhancing the need for individuals capable of accessing and interpreting the vast amounts of data that computers now make available. This transition is clearly illustrated in the insurance industry, where computerized records have replaced paper files, substantially altering the process of underwriting by making instantly accessible a great deal more information than was previously possible (Murnane and Levy 1996, pp. 58-62).

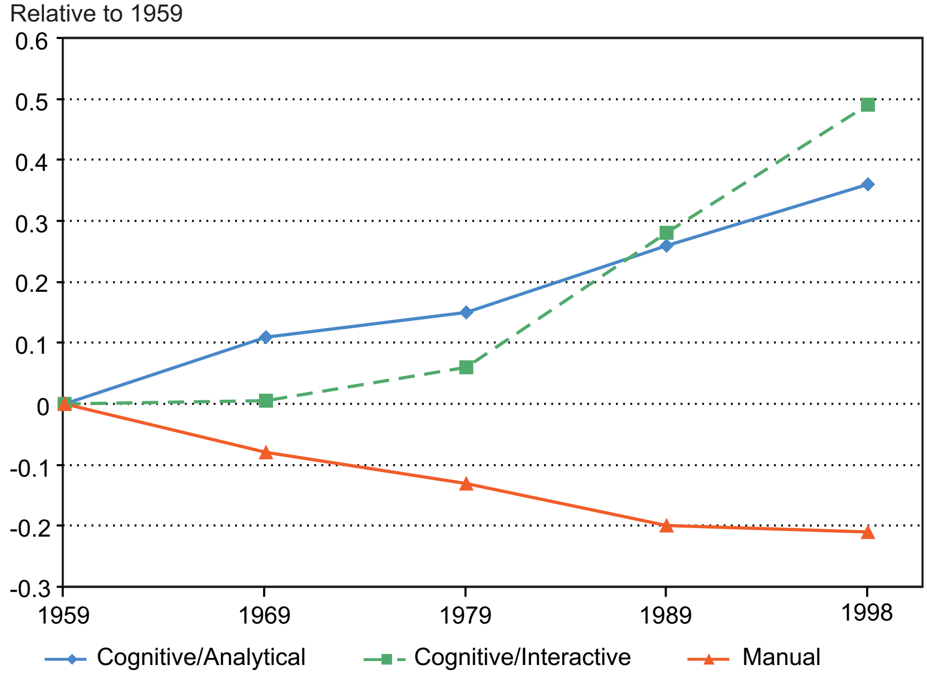
In order to quantify the overall impact of these changes in how jobs are performed a recent paper by Autor, Murnane, and Levy (2002) analyzed the characteristics of 12,000 jobs listed in successive editions of the *Dictionary of Occupational Titles (DOT)*, and matched them to aggregate employment data to trace changes in the mix of tasks that the economy requires over time.[5] Their results reflect a striking shift in job content in the economy, especially since the late 1970s. While the importance of routine, physical, and cognitive tasks has declined, the importance of non-routine analytical and interactive tasks has grown sharply. Their findings are summarized in Figures 4 and 5, which show changes in the relative intensity of different types of tasks over the past 40 years. After rising gradually between 1959 and 1979, the use of cognitive skills (both analytical and interactive) has increased sharply in the past twenty years. In contrast to the steady rise in the non-routine task content of jobs, the importance of routine tasks increased during the 1960s, leveled off in the 1970s, and then fell in the 1980s and 1990s. This drop was especially marked for the routine cognitive skills.

Forecasting Future Demand for Occupations

In the past 20 years the diffusion of computers and other technological innovation has thus contributed to the rising demand for more educated workers, and a shift in job content away from routine tasks and toward non-routine ones. Forecasts of employment changes suggest that these trends are likely to continue into the foreseeable future.

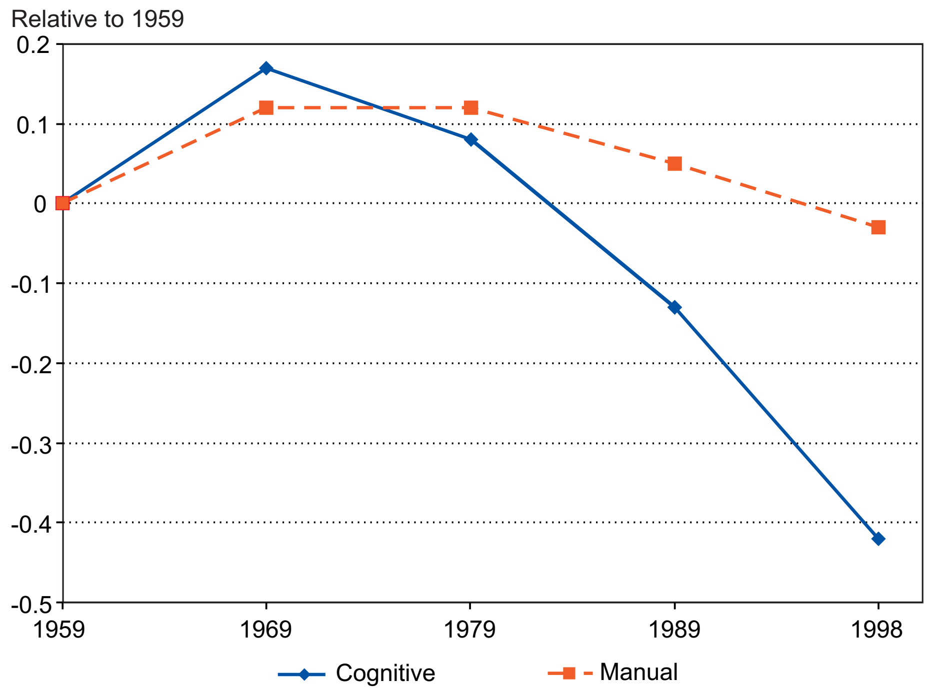
The United States Bureau of Labor Statistics (BLS) regularly prepares forecasts of occupational employment ten years into the future. The most recent such forecasts cover the period from 2000 to 2010.[6] The basic procedure that the BLS uses starts with forecasts of demand for different goods and services based on anticipated changes in population size and demographic composition, along with expectations about the rate of growth of real disposable income. These are then mapped into demand for particular occupations based on a matrix of occupational employment in different industries and sectors. This matrix is derived from the existing patterns of occupational employment, but it is adjusted based on expectations about the impact of expected technological changes on the different occupations. For instance, in 1985, forecasters assumed that advances in computing would reduce the employment of clerical and secretarial workers over the next decade. They were correct in this

Figure 4. Changes in Economy-Wide Job Requirements for Non-Routine Tasks, 1959-1998



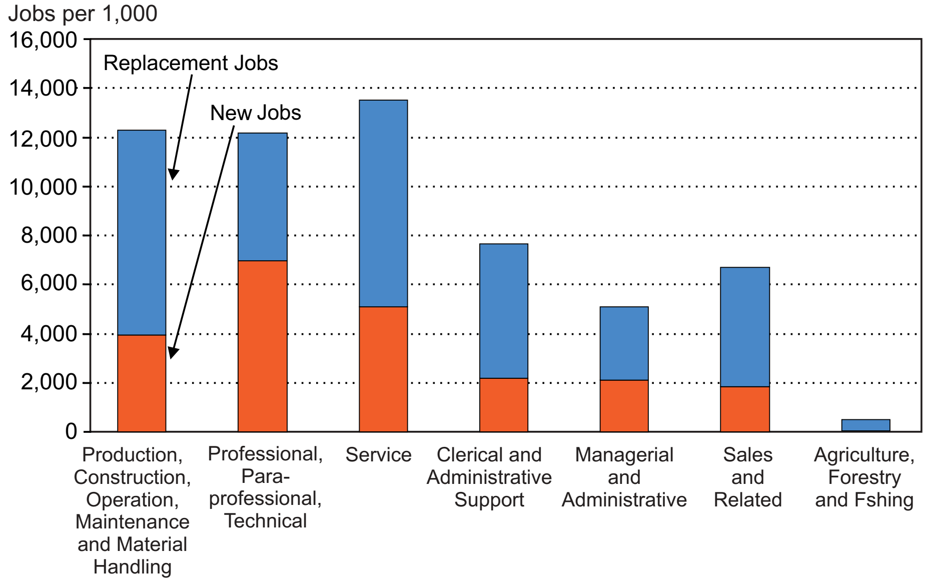
Source: Autor, Murnane, and Levy (2002, Table 4).

Figure 5. Changes in Job Requirements for Routine Tasks, 1959-1998



Source: Autor, Murnane, and Levy (2002, Table 4).

Figure 6. Forecasts of Job Growth for the United States from 2000 to 2030



Source: U.S. Bureau of Labor Statistics (2001-2002, p.12).

projection, but underestimated the extent of the resulting declines leading to an overestimate of the number of clerical workers in 1995 compared to the actual situation (Andreassen 1997, Rosenthal 1999).

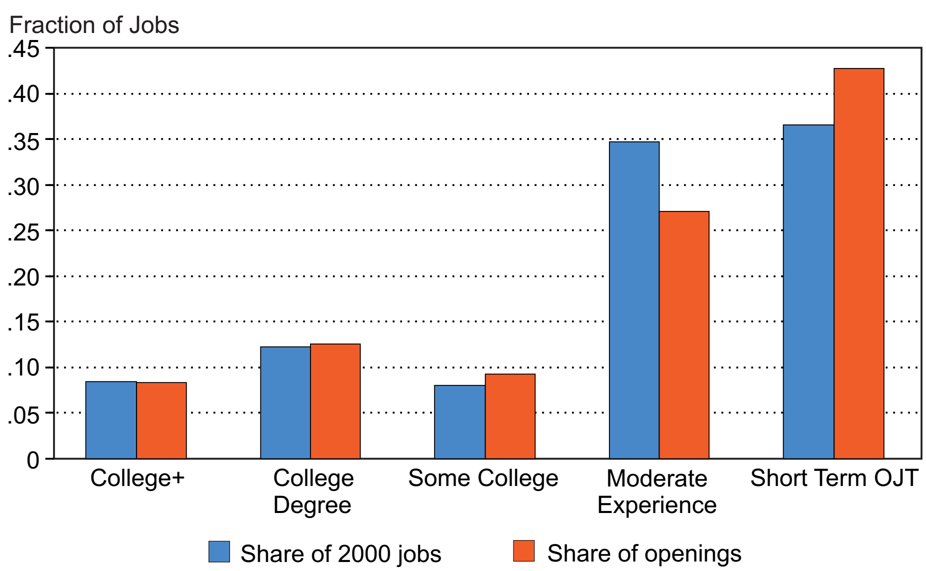
Similar procedures are employed to produce employment forecasts for individual states. For Kansas, these estimates are produced by the Kansas Department of Human Resources and are reported in *Kansas Occupational Outlook*.[7] The most recent forecasts for Kansas predict employment growth through 2006 and reflect somewhat older data. But both forecasts depict very similar trends.

The most important of the underlying assumptions embedded in the BLS forecast are that the relatively rapid productivity growth that characterized the 1990s will continue, that the aging of the population will boost demand for medicine and health care, that continued advances in computers will lower the price of products relying on microprocessors and increase demand for these products, and that higher incomes will encourage more spending on recreation and leisure activities.

Figure 6 summarizes the anticipated number of jobs that will be created in different broad occupational categories, ordered by current levels of employment. Job growth includes both newly created jobs and replacement jobs created by the retirement of current workers. The greatest growth numerically will be in services and professional, para-professional and technical jobs. There will be considerable growth in production, construction and other blue-collar jobs as well, but this growth will be less than proportionate to the current share of such jobs in the economy, leading to a relative decline in their overall importance.

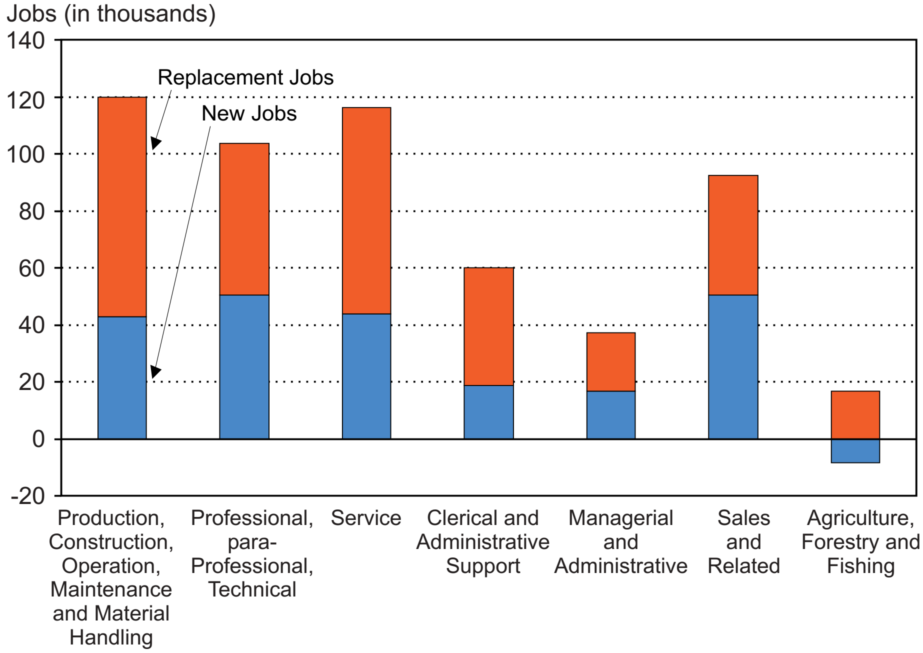
Figure 7 depicts the implications of these predicted job trends in terms of skills and training needs. In this figure the fraction of job openings between 2000 and 2010 requiring each level of education or training is compared to the fraction of existing jobs in 2000 requiring that level of education or training. Most job growth will occur in occupations requiring only moderate experience or short-term on-the-job training, but there will be more emphasis on on-the-job training and less on prior experience than is true today. Also, compared to

Figure 7. Education and Training Requirements for All Jobs in 2000, and for Projected New Jobs in 2010



Source: Hecker (2001, p. 83).

Figure 8. Forecasts of Job Growth for Kansas from 1996 to 2006



Source: Kansas Dept. of Human Resources, *The Kansas Occupational Outlook, 1996-2006*, January, 2000.

the situation today, future job openings will be somewhat more likely to require some college or a college degree. But these changes are relatively small.

Figure 8 shows forecast job growth in Kansas through 2006. Comparing Figures 6 and 8, the pattern of job growth is qualitatively quite similar. There are, however, some notable differences. Agriculture is still more important in Kansas than in the nation as a whole, and agriculture will create more jobs in Kansas than in the nation as a whole. All of this growth will come through replacement jobs, however, as continued advances in production continue to produce a decline in new jobs in this sector. Job growth in blue-collar occupations, and in sales and related occupations is also predicted to be somewhat greater in Kansas than is true nationally. In contrast, growth in the professional and technical and managerial categories is anticipated to be somewhat slower in Kansas than the nation as a whole.

From Jobs to Skills: What Do Future Workers Need to Know?

The effects of technology and preferences on the economy have tended to increase the value of cognitive skills in the workplace. In particular, employers have placed increased weight on the ability of workers to: (1) read, write, and do math at the high school level, (2) solve semi-structured problems, (3) work in teams, (4) communicate effectively, and (5) use computers to perform everyday tasks.

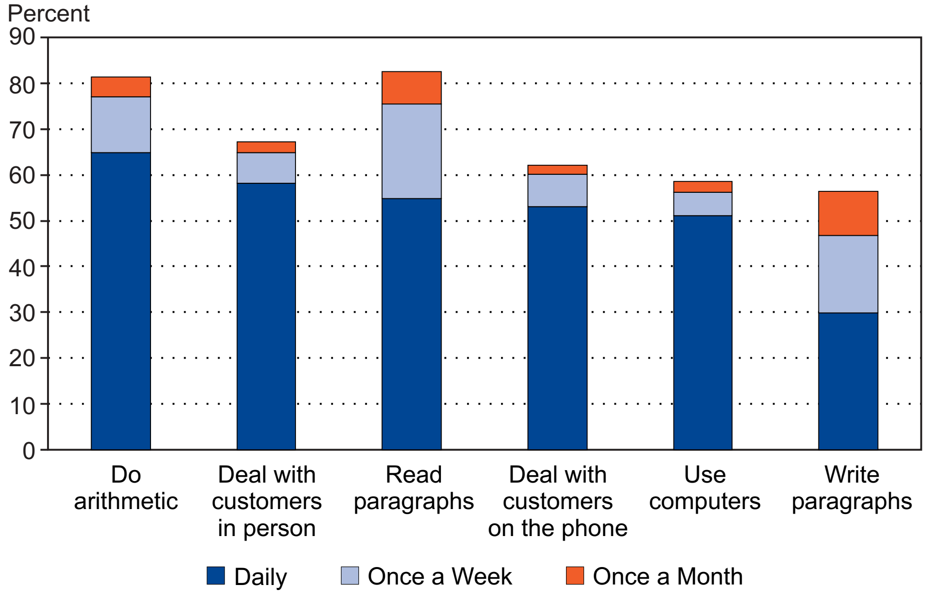
In a recent study one team of economists surveyed 800 employers in 4 large cities about the characteristics of recently filled jobs (Holzer 1996). In their survey they asked employers how frequently workers had to deal with customers in person or on the phone, read or write paragraphs, do arithmetic, or use a computer. Even in jobs filled by non-college graduates they found that more than 90 percent of the positions required daily performance of at least one of these tasks. And, as Figure 9 shows, with the exception of writing, each of these tasks was required on a daily basis in more than 50 percent of the jobs represented in the survey.

These findings about the importance of cognitive skills are echoed in the results of a recent survey of Kansas employers (Stella, Krider, and Ash 1997). The vast majority of the employers surveyed in the state reported an increase in skill requirements between 1992 and 1997, with 22 percent describing the increase as "significant," and 49 percent characterizing it as "slight." Employers were also asked to identify the areas where the most improvement in skills was needed. Their responses are summarized in Table 2. While technical and manual skills clustered near the bottom of the list in terms of frequency, cognitive and interpersonal skills were clustered near the top.

Employment forecasts for the near term suggest that employment trends through 2010 will closely resemble those of the recent past. As a result, employers are likely to continue to need workers with strong cognitive skills. For educators this suggests a need for continued effort to upgrade training in basic cognitive and problem-solving abilities, while providing training in working effectively in teams. While addressing the evident short-term skill needs of employers, better cognitive and problem solving skills should also provide workers with greater flexibility in responding to shifting patterns of demand over their entire working lives.

Based on rising pay for college graduates one route toward this end is

Figure 9. Task Performance Frequency of Non-College Jobs, 1996



Source: Holzer (1996, p. 81).

to encourage ever more students to pursue additional education. College is a costly solution to these training needs, however, and it may not be the best solution for all students. One recent study by Richard J. Murnane, John B. Willett, and Frank Levy (1995) that examined the relationship between cognitive ability of high school graduates in the classes of 1972 and 1980 (measured by scores on a standardized math test), and earnings six years after graduation (i.e., in 1978 and 1986, respectively) found that there was a positive relationship, and that this relationship had grown stronger over time.[8] Between 1978 and 1986 the differential between the earnings of 24-year old women with a B.A. and those with only a high school diploma increased by 20 percent. All of this growth can be explained, however, by the increase in pay related to cognitive ability: controlling for differences in test scores at the time of high school graduation, the researchers found there was no change in the college wage premium for women between 1978 and 1986. Among young men, this effect was less dramatic, but controlling for differences in cognitive abilities at high school graduation reduced the growth in college wage premiums by more than one-third. These results suggest that while there is a need for an increased number of college graduates, some of the economy's growing demand for cognitive skills might be met in a more cost effective way by enhancing training in these skills at the high school and/or community college level.

*Acknowledgements

This paper is a revised version of a presentation made at the Connecting Education & Employment Conference in Wichita in February 2002. I am grateful to the organizers of that conference for inviting me to speak on this topic. Pat Oslund helped to compile some of the data for this paper, and she and David Burress made a number of valuable suggestions on earlier versions of this paper. I thank them for their contributions, without in any way implicating them in any of the shortcomings that may remain.

Table 2. Frequency with Which Kansas Employers Cited a Need for Improvement of Specified Job Skills Among Newly Hired Workers, 1996

Skill	Percentage of Employers
Listening/oral communication	76
Problem solving	75
Goal setting/personal motivation	73
Work attitudes/habits	72
Decision making	70
Organizational effectiveness /leadership	70
Teamwork	69
Comprehension/ understanding	68
Creative thinking	66
Interpersonal relations	66
Adaptability/flexibility	62
Writing	59
Computer	58
Computation	57
Willingness to learn	53
Business/management	50
Reading	39
General labor	32
Skilled trades/crafts	32
Machine operation	34
Mechanical	36
Electrical	24

Source: Stella, Krider, Ash (1997, Table 7).

Notes

1. There are, of course, differences in pay among college graduates, and these are related in part to specific fields of study. In 1996, the highest paid college graduates were those with degrees in engineering, who earned an average of $4,680 a month or 67% more than the lowest paid college graduates, those in education, whose average monthly earnings were $2,802. But even the lowest paid category of college graduates earned considerably more than the median high school graduate ($1,894 per month). See Bauman and Ryan (2001).

2. Shackleton (1995, chs. 2-3) provides a good introduction to human capital theory as well as criticisms of this approach.

3. Nonetheless, it is hard to imagine how economy-wide productivity could have increased enough to support all the additional goods and services that are produced unless rising levels of education had contributed to rising productivity.

4. Real Gross Domestic Product per worker (values at 2000 prices) has increased from $13,700 in 1890 to $65,500 in 2000. See DeLong (2000).

5. Dictionary of Occupational Titles examiners evaluate each of over 12,000 jobs along 44 objective and subjective dimensions including training time, physical demands and required workers aptitudes, temperaments and interest. From these Autor, Murnane and Levy selected five of these measures to capture different dimensions of job content. The job characteristics they used were: DCP (direction, control and planning of activities) used as a measure of non-routine managerial skills; GED Math score used as a measure of non-routine cognitive tasks; STS (set limits, tolerances or standards) used to indicate routine cognitive tasks; FINGDEX (finger dexterity) used as a measure of routine manual activity; and EYEHAND (eye, hand, foot coordination) used as a measure of non-routine motor tasks.

6. For these forecasts and links to documentation explaining them in detail, see the BLS occupational employment web site http://www.bls.gov/emp/home/htm.

7. Occupational forecasts by state are also available on the Internet at http://almis.dwis.state.us.us/occ/projhome.asp.

8. The math test focused on students' ability to read well enough to follow directions, manipulate and use fractions and decimals, and interpret graphs. It did not assess mastery of more advanced mathematics, such as algebra or geometry (Murnane, Willett, and Levy 1995, p.253).

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County Trade Pull Factors FY 2001

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Introduction

This annual report provides new retail market data on all 105 Kansas counties for fiscal year 2001: July 1, 2000 to June 30, 2001. Retail market data are presented in three ways. The first is a location quotient of retail trade, a *County Trade Pull Factor* (CTPF), which is a measure of the relative retail trade strength of the business community. The reader should interpret a CTPF of 1.00 as a perfect balance of trade. The purchases of county residents who shop in a county other than the one they live in are offset by the purchases of out-of-county customers. CTPF values greater than 1.00 indicate that the local businesses are capturing or pulling in trade from beyond their county borders; therefore, the balance of trade is favorable. CTPF values of less than 1.00 indicate that the balance of trade is unfavorable, because more trade is being lost than captured.

Two other measures are included in Table 1: the *Trade Area Capture* and the *Percent Market Share* that the communities of businesses control from the total state customer base. The *Trade Area Capture* (TAC) of a county is the measure of the customer base served by a business community. It is calculated by multiplying the CTPF times the population base of the same county. The *Percent Market Share* (MS) of a county is calculated by dividing the county's TAC by the sum of all 105 county TAC numbers.

In this report, the authors begin with the year 2000 population provided by the U.S. Census Bureau. These numbers have been adjusted downward to remove the institutionalized populations in every county as reported by the Census Bureau.

These adjusted populations are held constant; therefore, any change in the numbers for a county is due to a change in state sales tax collections, at the 4.9 percent rate, as reported by the Kansas State Department of Revenue in its annual report (Map 1).

Discussion

In FY 2001 the CTPF values range from a low of 0.25 in Wabaunsee County to a high of 1.56 in Johnson County (Table 1, Map 2). All counties, except Ness County, with a population less than 6,000 have a CTPF value below 1.00. Ness County, with a population of just 3,378 has a CTPF of 1.01 and is the smallest county to have a high CTPF, 1.00 or above. The Ness CTPF is up from 0.84.

The 105 counties in Kansas have been divided into six regions: northwest, southwest, south central, north central, northeast, and southeast. The 18-county northwest region has three high CTPF values in FY 2001: in Ellis, Sherman, and Thomas counties.

The 22-county southwest region has four high CTPF values: in Finney, Ford, Seward, and Ness counties. Next, the 22-county south central region has four high CTPF counties: Barton, Pratt, Reno and Sedgwick. The 16-county north central region, however, has just two counties with high CTPF values: Pottawatomie (the Manhattan effect) and Saline. The 15-county northeast region also has just two: Johnson and Shawnee counties. Finally, the 12-county southeast region has no CTPF values above 1.00, the highest being Neosho County, with a 0.87 CTPF, followed closely by Montgomery County, with 0.86. Crawford County's CTPF is down from the previous year and stands at 0.79.

Kansans living in the southeast region shop in the malls and specialty shops in Johnson and Sedgwick counties. They also shop in other states, specifically in Joplin, in Missouri, and Bartlesville and Tulsa, in Oklahoma.

The data in Table 1 also show the FY 2001 Trade Area Capture (TAC) of businesses in all 105 counties. The TAC is calculated by multiplying the most recently-adjusted population figure by the corresponding CTPF. The TAC value of each county is an absolute value and can be used to estimate the size of the local market. The CTPF should be used to estimate the relative strength of the business community, not the absolute strength; therefore, Allen County has a TAC of 9,054 customers, which is calculated by multiplying the county population of 14,196 by the CTPF for Allen County, 0.64 (Table 1). Johnson County's TAC is 669,426, which ranks it first in the state, followed by Sedgwick County with an estimated customer base of 538,156 (Table 1).

This year's report again includes the Percent Market Share (MS), which measures the percent of the total customer base in Kansas captured by the community of businesses in every county. The total customer base is calculated by summing all of the TAC values. The MS is a county's TAC divided by the sum of 105 TAC values. These values are then presented as percentages. Johnson County has a FY 2001 MS value of 26.46; therefore it captures more than one quarter of the Kansas retail market, the largest market share. The next largest is Sedgwick County's MS of 20.36 percent.

Over time, trade tends to concentrate in the largest trade centers, which means that small businesses located in rural places such as Russell, in

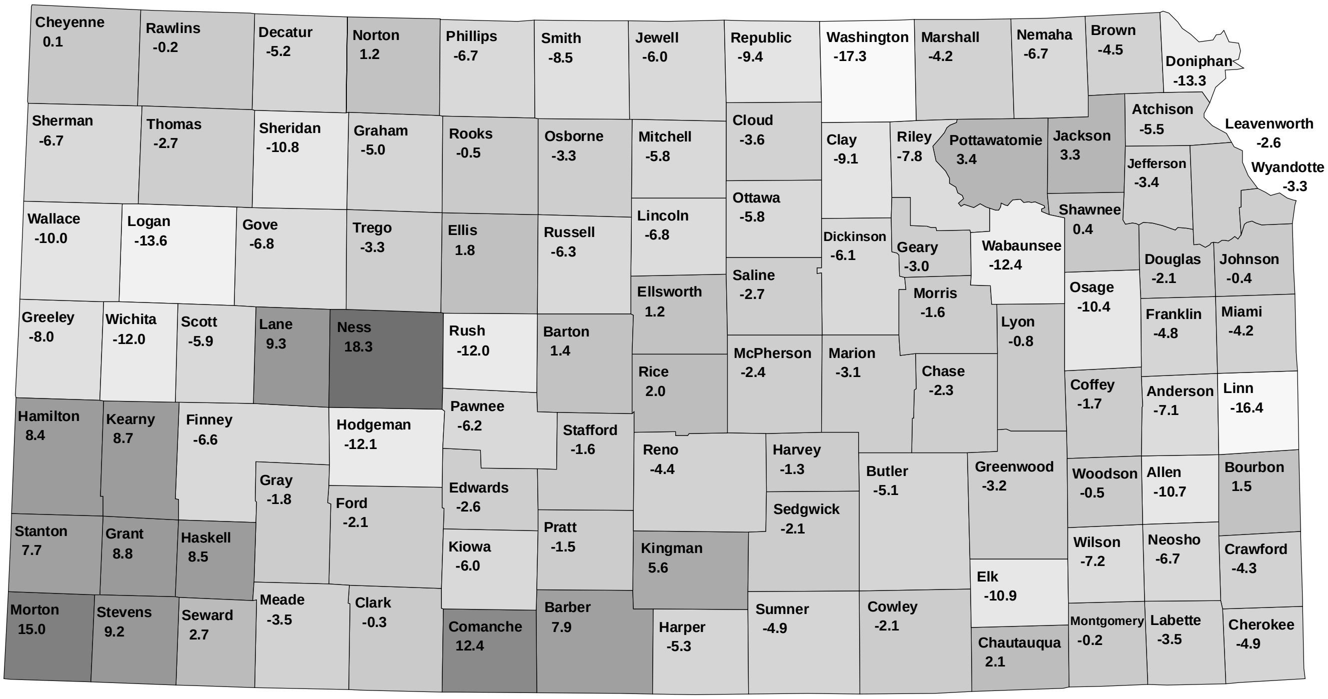
Table 1. County Trade Pull Factors, FY2001

Kansas County	Rural/Urban Code	Sales Tax $ July 00 - June 01	Adjusted County Pop. 2001	FY 2001 Per Capita Sales Tax	County Pull Factor for FY 2001	Trade Area Capture for 2001	%MKT Share 2001
Allen	7	$4,994,351.21	14,196	$351.81	0.64	9,054	0.34
Anderson	7	$2,340,698.50	7,992	$292.88	0.53	4,244	0.16
Atchison	6	$5,160,003.61	16,461	$313.47	0.57	9,355	0.35
Barber	10	$2,223,790.68	5,242	$424.23	0.77	4,032	0.15
Barton	7	$17,319,838.44	27,766	$623.78	1.13	31,400	1.19
Bourbon	7	$5,671,382.54	15,174	$373.76	0.68	10,282	0.39
Brown	7	$3,207,610.17	10,522	$304.85	0.55	5,815	0.22
Butler	2	$21,561,826.02	57,728	$373.51	0.68	39,090	1.48
Chase	8	$620,252.99	2,917	$212.63	0.39	1,124	0.04
Chautauqua	9	$676,009.19	4,205	$160.76	0.29	1,226	0.05
Cherokee	6	$4,860,969.12	22,341	$217.58	0.39	8,813	0.33
Cheyenne	10	$919,289.35	3,111	$295.50	0.54	1,667	0.06
Clark	9	$469,224.05	2,344	$200.18	0.36	851	0.03
Clay	7	$2,910,141.85	8,657	$336.16	0.61	5,276	0.20
Cloud	7	$4,392,549.59	9,922	$442.71	0.80	7,963	0.30
Coffey	7	$2,935,509.35	8,739	$335.91	0.61	5,322	0.20
Comanche	10	$605,266.99	1,897	$319.07	0.58	1,097	0.04
Cowley	4	$13,309,925.87	35,345	$376.57	0.68	24,130	0.91
Crawford	4	$16,338,407.62	37,544	$435.18	0.79	29,621	1.12
Decatur	10	$781,322.73	3,352	$233.09	0.42	1,416	0.05
Dickinson	7	$6,916,160.20	19,014	$363.74	0.66	12,539	0.47
Doniphan	8	$1,638,113.55	8,155	$200.87	0.36	2,970	0.11
Douglas	3	$51,082,920.41	99,379	$514.02	0.93	92,610	3.50
Edwards	9	$672,536.83	3,390	$198.39	0.36	1,219	0.05
Elk	8	$752,226.99	3,175	$236.92	0.43	1,364	0.05
Ellis	7	$19,679,696.64	27,184	$723.94	1.31	35,678	1.35
Ellsworth	9	$1,808,726.18	5,715	$316.49	0.57	3,279	0.12
Finney	5	$23,441,247.90	40,286	$581.87	1.05	42,498	1.61
Ford	5	$18,164,070.93	31,956	$568.41	1.03	32,930	1.25
Franklin	6	$10,090,169.30	24,469	$412.37	0.75	18,293	0.69
Geary	5	$10,875,903.84	27,719	$392.36	0.71	19,717	0.75
Gove	10	$1,165,697.21	3,015	$386.63	0.70	2,113	0.08
Graham	10	$1,166,037.28	2,901	$401.94	0.73	2,114	0.08
Grant	7	$4,275,090.32	7,838	$545.43	0.99	7,750	0.29
Gray	9	$1,783,918.51	5,768	$309.28	0.56	3,234	0.12
Greeley	10	$445,420.77	1,507	$295.57	0.54	808	0.03
Greenwood	6	$1,825,541.83	7,510	$243.08	0.44	3,310	0.13
Hamilton	10	$814,697.37	2,627	$310.12	0.56	1,477	0.06
Harper	9	$2,219,592.87	6,368	$348.55	0.63	4,024	0.15
Harvey	2	$14,413,758.52	32,078	$449.33	0.81	26,131	0.99
Haskell	9	$1,061,256.80	4,272	$248.42	0.45	1,924	0.07
Hodgeman	9	$439,998.51	2,050	$214.63	0.39	798	0.03
Jackson	6	$4,159,651.72	12,443	$334.30	0.61	7,541	0.29
Jefferson	8	$3,038,436.99	18,178	$167.15	0.30	5,509	0.21
Jewell	10	$618,635.59	3,750	$164.97	0.30	1,122	0.04
Johnson	0	$385,796,446.60	447,311	$862.48	1.56	699,426	26.46
Kearny	9	$860,107.01	4,486	$191.73	0.35	1,559	0.06
Kingman	6	$2,321,600.05	8,475	$273.94	0.50	4,209	0.16
Kiowa	9	$990,193.54	3,218	$307.70	0.56	1,795	0.07
Labette	7	$8,402,729.78	22,244	$377.75	0.68	15,234	0.58
Lane	9	$544,715.51	2,132	$255.50	0.46	988	0.04
Leavenworth	1	$19,162,455.97	62,702	$305.61	0.55	34,740	1.31

Table 1. (Con'd.)

Kansas County	Rural/Urban Code	Sales Tax $ July 00 - June 01	Adjusted County Pop. 2001	FY 2001 Per Capita Sales Tax	County Pull Factor for FY 2001	Trade Area Capture for 2001	%MKT Share 2001
Lincoln	9	$773,851.03	3,502	$220.97	0.40	1,403	0.05
Linn	8	$2,050,449.30	9,461	$216.73	0.39	3,717	0.14
Logan	10	$1,182,547.97	2,989	$395.63	0.72	2,144	0.08
Lyon	5	$17,767,703.30	35,509	$500.37	0.91	32,212	1.22
McPherson	6	$14,027,967.66	28,896	$485.46	0.88	25,432	0.96
Marion	6	$3,461,522.37	13,030	$265.66	0.48	6,276	0.24
Marshall	7	$3,873,170.81	10,732	$360.90	0.65	7,022	0.27
Meade	9	$1,075,673.18	4,517	$238.14	0.43	1,950	0.07
Miami	1	$9,481,481.08	27,745	$341.74	0.62	17,189	0.65
Mitchell	7	$3,063,335.01	6,692	$457.76	0.83	5,554	0.21
Montgomery	5	$16,895,677.62	35,695	$473.33	0.86	30,631	1.16
Morris	9	$1,839,854.40	6,029	$305.17	0.55	3,336	0.13
Morton	10	$1,363,776.33	3,439	$396.56	0.72	2,472	0.09
Nemaha	7	$3,433,946.36	10,263	$334.59	0.61	6,226	0.24
Neosho	7	$7,998,101.80	16,700	$478.93	0.87	14,500	0.55
Ness	10	$1,888,669.07	3,378	$559.11	1.01	3,424	0.13
Norton	7	$2,075,126.69	5,179	$400.68	0.73	3,762	0.14
Osage	6	$3,637,361.24	16,493	$220.54	0.40	6,594	0.25
Osborne	10	$1,366,280.24	4,339	$314.88	0.57	2,477	0.09
Ottawa	9	$1,164,840.70	5,991	$194.43	0.35	2,112	0.08
Pawnee	7	$2,185,317.80	6,585	$331.86	0.60	3,962	0.15
Phillips	7	$2,035,780.22	5,858	$347.52	0.63	3,691	0.14
Pottawatomie	6	$13,875,891.20	18,067	$768.02	1.39	25,156	0.95
Pratt	7	$5,404,229.96	9,503	$568.69	1.03	9,798	0.37
Rawlins	10	$673,763.86	2,916	$231.06	0.42	1,221	0.05
Reno	4	$35,497,030.74	61,837	$574.04	1.04	64,354	2.43
Republic	10	$1,653,886.71	5,695	$290.41	0.53	2,998	0.11
Rice	7	$2,882,008.31	10,608	$271.68	0.49	5,225	0.20
Riley	5	$21,289,097.60	62,416	$341.08	0.62	38,596	1.46
Rooks	9	$1,986,024.13	5,488	$361.88	0.66	3,601	0.14
Rush	9	$677,629.19	3,463	$195.68	0.35	1,229	0.05
Russell	7	$2,671,038.95	7,198	$371.08	0.67	4,842	0.18
Saline	5	$39,633,064.99	52,887	$749.39	1.36	71,852	2.72
Scott	7	$2,170,043.77	5,034	$431.08	0.78	3,934	0.15
Sedgwick	2	$296,841,445.80	448,932	$661.22	1.20	538,156	20.36
Seward	7	$15,238,588.26	22,284	$683.84	1.24	27,627	1.05
Shawnee	3	$111,136,995.55	165,794	$670.33	1.22	201,485	7.62
Sheridan	10	$794,547.68	2,769	$286.94	0.52	1,440	0.05
Sherman	7	$4,182,255.54	6,688	$625.34	1.13	7,582	0.29
Smith	10	$1,196,905.89	4,432	$270.06	0.49	2,170	0.08
Stafford	9	$992,672.99	4,719	$210.36	0.38	1,800	0.07
Stanton	10	$683,417.69	2,351	$290.69	0.53	1,239	0.05
Stevens	7	$1,873,224.55	5,403	$346.70	0.63	3,396	0.13
Sumner	6	$6,496,544.09	25,564	$254.13	0.46	11,778	0.45
Thomas	7	$5,038,805.07	8,062	$625.01	1.13	9,135	0.35
Trego	9	$1,036,405.63	3,210	$322.87	0.59	1,879	0.07
Wabaunsee	8	$944,405.47	6,773	$139.44	0.25	1,712	0.06
Wallace	10	$483,394.77	1,724	$280.39	0.51	876	0.03
Washington	9	$1,381,313.23	6,302	$219.19	0.40	2,504	0.09
Wichita	10	$637,541.37	2,506	$254.41	0.46	1,156	0.04
Wilson	7	$2,411,745.30	10,165	$237.26	0.43	4,372	0.17
Woodson	10	$752,047.43	3,674	$204.69	0.37	1,363	0.05
Wyandotte	0	$62,752,922.25	156,766	$400.30	0.73	113,767	4.30

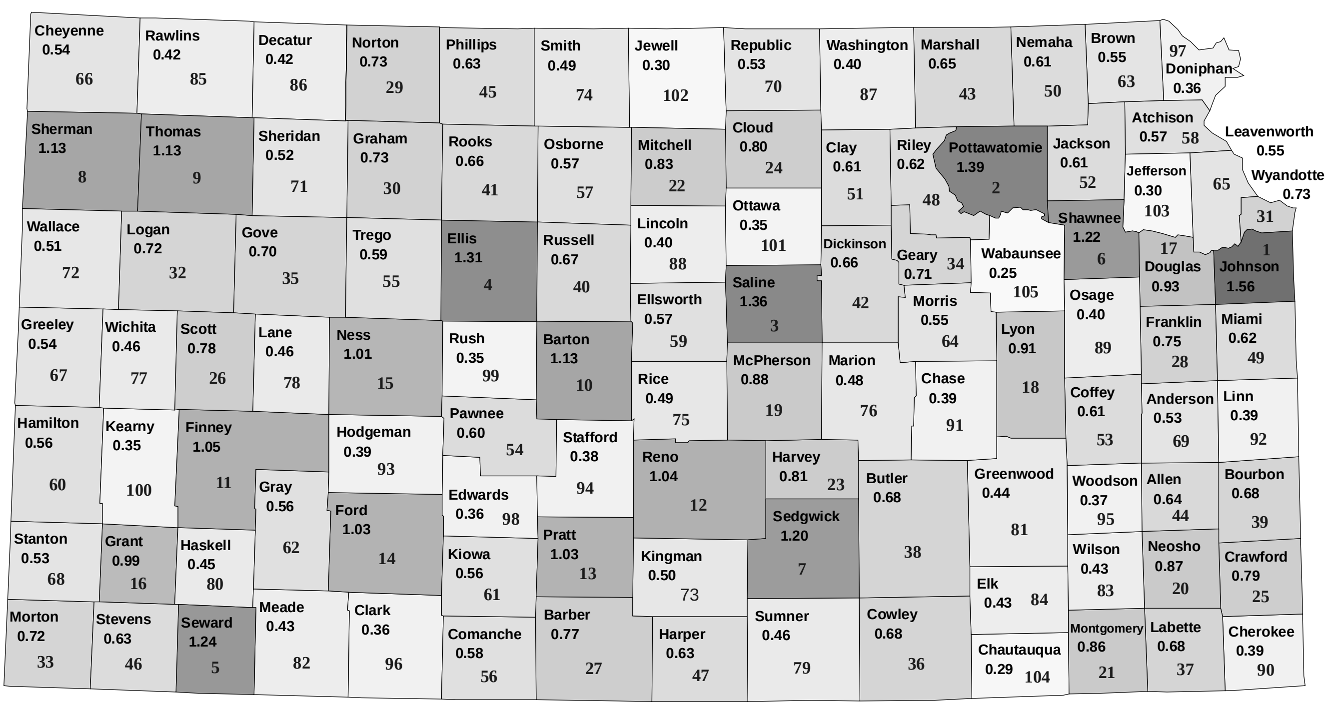
Map 1. Percent Change in Sales Tax Collections, FY 2000 Compared to FY 2001



Source: David L. Darling and Jia Liu, Kansas State University Research and Extension, Department of Agricultural Economics, October 2001.

105 County Average = –1.8
Maximum Value = 18.3
Minimum value = –17.3

Map 2. County Trade Pull Factors and Rank Order, FY 2001



Source: David L. Darling and Jia Liu, Kansas State University Research and Extension, Department of Agricultural Economics, October 2001.

Russell County, lose trade to larger businesses in trade centers such as Hays and Salina. Retail sales tax collections went down by 6.3 percent in Russell County and up by 1.8 percent in Ellis County.

To help the reader to understand and use the market statistics in this report, the authors provide a county Rural-Urban Continuum Code (Table 1). This county classification system allows the reader to compare like counties with each other and nearby counties which have a different classification. For example, Cloud and Mitchell counties are both classified as a 7 based on the Rural-Urban Continuum Code. Counties with a code of 7 are non-metropolitan counties that have an urban population between 2,500 and 19,999 (Table 2). They also are non-adjacent to any metropolitan county, such as Sedgwick County. Their CTPF numbers are 0.80 and 0.83, respectively, in FY 2001.

The CTPF number is one of three values that can be used to compare counties. Cloud County's TAC, 7,963, is significantly larger than Mitchell County's: 5,555. Their respective Market Share values also reflect the difference in TAC size: 0.30 percent versus 0.21 percent. A new Wal-Mart Super Store has been built in Cloud County, which will affect all these numbers in next year's report. Based on past observations, area households will spend more of their income in Concordia and less in the surrounding smaller towns, such as Belleville.

Research at Kansas State University has uncovered three factors that cause retail trade to change. These are population, income, and the investment environment.

Table 2. Rural-Urban Continuum Codes

Metro Counties:

0 Central counties of metro areas of 1 million population or more.
1 Fringe counties of metro areas of 1 million population or more.
2 Counties in metro areas of 250,000 to 1 million population.
3 Counties in metro areas of fewer than 250,000 population.

Non-metro Counties:

4 Counties with urban populations of 20,000 or more, adjacent to a metropolitan county.
5 Counties with urban populations of 20,000 or more, not adjacent to a metropolitan county.
6 Counties with urban populations of 2,5000 to 19,999, adjacent to a metropolitan county.
7 Counties with urban populations of 2,5000 to 1999, not adjacent to a metropolitan county.
8 Completely rural counties (no cities with populations greater than 2,5000), adjacent to one or more metropolitan counties.
9 Completely rural counties (no cities with populations greater than 2,5000), not adjacent to a metropolitan county.
10 Most rural counties (no cities with populations greater than 2,5000), not within easy commuting distance to a county offering 10,000 or more jobs.

This report highlights several interesting findings. Many counties changed rank between FY 2000 and FY 2001. For example, Ness County rose dramatically in FY 2001 compared to FY 2000, and its sales tax collections increased by 18.3 percent.

Although state government experienced declining sales tax revenues amounting to 1.8 percent, some counties, Ness, Morton, Stevens, Haskell, Grant, Stanton, Kearny, Hamilton, Lane, Comanche, Barber, Kingman, Rice, Barton, Ellis, Ellsworth, Pottawatomie, Jackson, Shawnee, Seward, Norton, and Cheyenne, had the opposite experience. In summary, 22 out of 105 counties show gains in all three measures of retail activity.

FY 2001 Data and Analysis

The Kansas Department of Revenue has improved the data series used for this report. In the past, more than $200 million was unallocated, meaning that the data user did not have any idea where these sales tax revenues originated. Therefore, the prior reports were less accurate. In the FY 2001 data, all but $8.4 million in sales tax revenue were allocated to counties, and in the FY 2000 data, all but $7.4 million dollars were allocated. It is possible that the CTPFs in 2000 and 2001 are noticeably different than past ones. The full data set is in an Excel spread sheet on Dr. Darling's web site: www.agecon.ksu.edu/ddarling.