STATE POLICY
& ECONOMIC
DEVELOPMENT
IN OKLAHOMA: 2005

A Report to

OKLAHOMA
21st Century
INC.
Research Foundation Affiliate of The State Chamber

OKLAHOMA 21st CENTURY, INC.
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OKLAHOMA 21st CENTURY, INC.

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STATE POLICY AND ECONOMIC DEVELOPMENT IN OKLAHOMA: 2005

A Report to
OKLAHOMA 21st CENTURY, INC.
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CHAPTER 1

As the Nation Grows, So Does Oklahoma: Evidence From the 1939-2004 Employment Data

Are changes in the Oklahoma economy driven by changes in the U.S. economy, or does Oklahoma's economy chart its own course? This chapter answers this question by comparing non-agricultural employment in Oklahoma and the United States from 1939 to the present. It analyzes:

1. Oklahoma's share of national employment,
2. the detailed pattern of employment growth in Oklahoma and the nation,
3. sustained growth rates in employment in Oklahoma and the nation,
4. cyclical volatility in Oklahoma and U.S. employment growth,
5. differentials in employment growth by industrial sector, and
6. recent changes in employment growth by industrial sector.

The key findings are:

- Sixty-five years ago Oklahoma employment was 1.06 percent of national employment. Today, it stands at 1.11 percent of national employment. Thus, it has gained only five basis points (0.05 percent) over the entire period. Yet, one basis point today represents about 13,000 jobs. Thus, the Oklahoma economy is about 65,000 jobs ahead of where it would be if the original 1.06 percent ratio obtained.
- The Oklahoma-U.S. employment ratio peaked at 1.36 percent in 1982, reflecting a net gain of about 223,000 jobs from the energy bubble.

- In the four years prior to the energy boom, Oklahoma's employment share expanded by almost five basis points, largely as a result of differential gains in the manufacturing, wholesale trade, transportation and utilities, and services sectors.
- Graphics of monthly employment growth rates show that Oklahoma's pattern of growth has closely mimicked the nation's monthly growth rates, with the exception of the WWII years and the energy boom and bust years. The average differential in growth rates is so small that there is little doubt that Oklahoma receives its growth impulses from the national economy.
- With the exceptions, again, of the WWII years and the energy boom and bust years, Oklahoma closely follows the nation in terms of sustained growth, although with somewhat higher volatility. Oklahoma's post-recession turning points also closely correspond to those of the nation.
- A graphical analysis of monthly employment growth rates reveals several times when Oklahoma experienced differential growth relative to the nation. These differences can be accounted for by differential growth rates in the durable and nondurable manufacturing, wholesale trade, transportation, communications, and utilities, and services sectors (especially business and professional services, and to a lesser extent, information services).
- An analysis of employment growth rates from 1990 to 2004 appears to raise some concern about future growth prospects. The most recent sustained employment growth rates are lower (about 1.6 percent per year) than at any time since 1958 and many of the industrial sectors responsible for differential growth in Oklahoma have experienced relatively slow employment growth in the last four years. Fortunately, however, the historical evidence suggests that this is a temporary phenomenon.

CHAPTER 2

Seamless Education: Chipping Away at "The Oklahoma Problem"

"The Oklahoma Problem" is a relatively low per capita personal income which seems to be stuck at around four-fifths of its national counterpart. This chapter analyzes what is arguably the most important dimension of this problem; i.e., the relatively low levels of educational attainment of the state's adult population. The key issue is the extent to which the state-supported educational system succeeds in providing students with seamless processes that help students move efficiently through the system from the 9th grade on so that they reach high levels of attainment in a timely manner.

Drawing upon recent (1990-2003) U.S. Census Bureau data, the evidence indicates that the state's relatively low level of educational attainment, especially at higher educational levels, is a major dimension of "The Oklahoma Problem."

A good indicator of the effectiveness of the state's public education system is the'"9th grade success rate" or the percentage of 9th graders likely to go on to college and receive an associate degree within three years or a bachelor's degree within six. This rate is calculated as the product of the high school graduation rate, the Oklahoma college-going rate, and the Oklahoma college-completion rate. Although Oklahoma has experienced increases in its 9th grade success rate in recent years, there is still much room for improvement in comparison with national averages, especially in terms of the college-going and college-completion rates.

This analysis emphasizes the need for a *seamless* system of public education linking higher education with elementary and secondary education and with *Career*Tech. However, the constitutional and statutory structure of Oklahoma public education is anything but seamless. In spite of this rather disjointed structure there is plenty of evidence of integrated policies focusing on in-creasing high school graduation rates, college going rates, and college completion rates. It is clear that Oklahoma officials have recognized the problem and are attempting to do something about it.

Yet, a review of selected policies leaves the impression that there is an over-abundance of programs being implemented within a somewhat ungainly structure of organizations, and begs the question: *If Oklahoma were starting from scratch, given the current knowledge of best practices, would the state build a seam-ridden public education system that looks anything like today's?* Probably not.

Three options for moving toward formal oversight and coordination are suggested: (1) a cabinet-type entity consisting of the heads of the three main educational systems, (2) a coordinating board of control for all of education, and (3) a strong Secretary of Education.

It might be desirable to create a cabinet-type entity consisting of the State Superintendent of Public Instruction, the Executive Director of *Career*Tech, and the Chancellor of Higher Education. They could be required to meet regularly and report directly to the Governor on matters concerning issues that cut across all three parts of the state's public education system.

The provision of the Oklahoma Constitution creating the Oklahoma State Regents for Higher Education specifies that body as a "coordinating board of control." Perhaps there should be something like a "coordinating board of control" for the entire public education system. Such a powerful board could make the system truly seamless.

If a system-wide coordinating board of control is too revolutionary a concept, an effective and well-staffed office of Secretary of Education, as proposed in 1995 by a Governor's Commission on Government Performance, could prove helpful. This office would study the effectiveness of the system and present comprehensive informational reports and policy proposals for the entire system, including truly integrated and comprehensive approaches to increasing the 9th grade success rate.

CHAPTER 3

Educational Finance: The Politics and Law of Adequacy and Equity

There is a long history in the United States of legal and legislative efforts to ensure that elementary and secondary students are not denied educational opportunity because they live in poor school districts. These efforts to level the playing field are intended to improve *equity* in school finance. In recent years, however, the proponents of a better system of educational finance have turned to state courts and legislatures to achieve more *adequate* funding of state educational systems.

Oklahoma has done an exemplary job in reducing disparities in educational finance based on disparities in school district wealth. Recent actions of the Oklahoma Educational Association, however, indicate a desire on their part to focus on what it costs to adequately fund a child's education. As proclaimed on their website, they will seek a legal ruling that ensures that every child in Oklahoma is provided an equal opportunity for a constitutionally'*adequate* education. The stakes in this effort are quite high; should they be successful, the other functions of government would be allocated funds only after the "adequacy needs" of elementary and secondary education are satisfied.

In order to reach a decision that a school finance system fails to provide "adequate" funding the courts must first determine if there is either a constitutionally- or statutorily- mandated education standard that must be achieved. The U.S. Supreme Court has made it clear that such matters are the province of state courts and legislatures. State courts and legislatures, for their part, have had a difficult time establishing a constitutional or statutory basis for funding aimed at achieving adequacy, but they have tackled these problems and several states now embrace adequacy in educational finance as a goal.

Central to their deliberations is the issue of measuring adequacy by the level of educational inputs – the amount of money spent per student – or by educational performance or outcomes. The use of input measures appears to be the favored approach, in spite of a lot of economic evidence of a weak or non-existent relationship between educational outcomes and money spent per student.

No lawsuit has been filed yet in Oklahoma, and thus the legal foundation to be put forward can only be a matter of conjecture. However, it can be assumed that this suit, if filed, will follow the lines of cases in other states. From press releases and the OEA website, it appears that a litany of "deficiencies" will be compiled and presented as evidence of inadequacy and that the redress sought will simply be more money per student.

Assuming that such a scenario unfolds, the legal foundation must be found in the Oklahoma Constitution. The basis for such a finding is tenuous, and the debate will probably ultimately focus on what it *means* to be "educated" (Article XIII § 1).

The recent imposition of educational standards by the federal government will probably add fuel to what appears to an inevitable debate. The proponents of greater adequacy may win this debate. They may also succeed in promoting the view that more money is the key to greater adequacy. State taxpayers should insist, however, on a clear demonstration that the expected returns from investing in additional elementary and secondary education exceed those from the programs that would be displaced.

CHAPTER 4

Investing in the Bachelor's Degree: Economic Payoffs to Students and the State

This chapter provides estimates of the real rate of return to representative students and to the state of Oklahoma from investing in a bachelor's degree, and considers some of the policy implications of these estimates. It considers the fact that the typical student who does graduate will spend more than 4 years in school and that, even then, less than half of the typical entering class of freshmen in the state's comprehensive and regional universities will graduate within 5 years. It also recognizes that only two-thirds of the students who attend these institutions in Oklahoma will remain in the state after college.

The typical graduate will invest over $71,000 in the course of earning a degree; over $17,000 in net tuition, fees, books, and supplies, and over $54,000 in foregone after-tax earnings. The typical non-graduate will invest nearly $31,000 in the two years he or she will spend in college.

Are the expected increases in lifetime earnings large enough to justify the investments these students will make? Yes; our estimates for representative students indicate that graduates can expect to earn an average real rate of return of 15.7 percent on their investment and that non-graduates can expect to earn an average real rate of return of 10.5 percent. Based on these results, high school graduates appear to be getting sound advice when they are urged to go to college, even if the outcome is not a bachelor's degree.

The costs and benefits from the students' perspective are not the same, however, as the costs and benefits from the state's perspective. Benefits to the state include the additional income earned *and taxes paid* by graduates and non-graduates who *remain* in Oklahoma, but they do not include the additional earnings and taxes that are *lost* when college graduates or non-graduates *migrate* to other states. State taxpayers also pay a significant share of college costs through annual appropriations to colleges and universities. It is reasonable to ask, then, whether the expected benefits that will remain in the state are large enough to justify the total investment (that of students' and taxpayers') in college education. Our estimates indicate real rates of return to the state of 7.1 percent and 5.1 percent for representative graduates and non-graduates, respectively.

These are attractive rates of return for both the students and the state. Students can probably expect no more than a real rate of return of 6 percent on their best investment alternative. An acceptable rate to the state is less than 5 percent. These findings also indicate that investment in a college education makes a significant contribution to state economic growth, even in the face of the substantial out-migration of college graduates and non-graduates that occurs.

As attractive as these returns may be, however, there are large potential benefits from increasing the graduation rate and from lowering the rate of out-migration. The typical student who persists to graduation, instead of dropping out, can expect to reap additional net earnings (additional earnings minus additional costs) of $537,000 over his or her working lifetime. The state can expect to realize additional net income of $230,000 from each student who graduates instead of dropping out. The state would also realize additional net incomes of $600,000 and $147,000 from graduates and non-graduates, respectively, who stay in Oklahoma, rather than migrate to other states.

These prospective benefits should stimulate efforts by both students and the state to increase the probability of college graduation, and efforts by the state to reduce the rate of out-migration of college graduates and non-graduates. As indicated in Chapter 2, there are several programs in progress in Oklahoma aimed at these outcomes. Currently, we know little about their effectiveness and cost, but it is easy to imagine that expected effectiveness times the benefits to be realized will exceed the costs of the state's efforts.

One approach that may prove to be effective is to simply inform college students that the extra benefits from finishing, rather than dropping out, greatly exceed the extra costs of finishing. In fact, the real rate of return from finishing, rather than dropping out after the typical 2-year attempt, is over 20.5 percent.

Merit-based scholarships, such as the Oklahoma Higher Learning Access Program (OHLAP), are also promising. There is evidence that they increase entry and graduation, and also reduce the probability of out-migration for those who graduate because of the merit aid. Although the number of additional entrants and graduates attributable to such programs is likely to be small, the extra rewards from degree completion and reduced out-migration may justify a relatively large level of aid for a large percentage of new freshmen.

CHAPTER 5

Changes in Liability Systems and Economic Development: The Oklahoma Context

Tort or liability reform is high on government agendas, both in Washington and many state capitols. What is it about the American civil justice system that has caused this issue to become so

visible? Or what is it about states' liability systems that generate so much political dispute? And why is it important for economic development?

This chapter answers these questions, first, by examining the role of a tort system in a modern economy and assessing the cost and effectiveness of the American tort system. This assessment indicates that the U.S. tort system is unusually expensive and somewhat ineffective. Next, it considers whether and how the existing tort system might impede or promote economic growth, for both the United States and Oklahoma. It then examines recent changes in liability systems in Oklahoma, Mississippi, Ohio, and Texas, and shows that the changes in the last three states probably will have a greater effect in reducing liability costs than will the changes that have been made in Oklahoma.

Growth in a modern economy is dependent on the continuous introduction of new products and technologies. They are necessarily brought to the market before all risks are known. Without perfect foresight and information it is simply impossible to perceive all of the risks associated with all new products and processes. These risks generate costs that we must live with, short of stifling new products, new processes, and economic growth.

Determining the best way to reduce the risks of new products and technologies without reducing innovation or economic growth too much is a significant social issue. The goal is to move toward the optimal level of safety and growth. This can be done either through regulation or a system of tort law, or some combination of both.

The U.S. tort system plays a vital role in balancing safety and growth. If it is functioning well, it provides incentives for all parties to economic transactions to reveal and process accurate information about the effects of introducing and using new products and technologies. The parties involved can then make decisions that maximize their economic welfare, and the economic welfare of society, as well. A tort system that is functioning properly will not eliminate risk or the costs associated with risk, but it will tend toward minimizing those costs, to both producers and consumers.

Unfortunately, the American tort system appears to be performing poorly. Studies examined in this chapter indicate that the costs of operating the system are higher than necessary, that it fails to move the economy toward an appropriate level of safety, and that it both over-compensates and fails to compensate people who are damaged by new products or technologies. The data also indicate that the costs attributable to the tort system are rising as a share of national output.

A study reviewed last year in this publication indicated that states that had liability systems that ranked higher in a survey of senior corporate attorneys had better growth performance. Another study reviewed last year found that changes in state laws that reduced potential liability costs were associated with increases in productivity in a state's industries. The Congressional Budget Office (CBO) has produced a survey of many other studies of the effects of tort reform. Most of the studies surveyed by the CBO found that tort reform reduced tort costs by reducing damage awards, the number of court cases filed, and so on. Caps on damage awards appear to be especially effective in reducing the number of lawsuits filed, the value of awards, and insurance costs. One group of studies found that medical malpractice reforms were associated with reductions in defensive medicine without harming outcomes.

Several states are considering the revision of elements of their liability systems. Some states have revised them significantly in recent years. The most recent comprehensive revisions in state liability systems have occurred in Texas (2003), Mississippi (2004) and Ohio (2004). Prior to these revisions, economic development and business experts had generally ranked Oklahoma's liability system as less costly than those of Mississippi and Texas. Although Oklahoma also has had changes in its liability system in the last two years, its changes have been limited compared (especially) to those of Mississippi and Texas. As a result, part of Oklahoma's competitive advantage based on liability costs may have eroded.

As the Nation Grows, So Does Oklahoma: Evidence From the1939-2004 Employment Data

A re changes in the Oklahoma economy driven by changes in the U.S. economy, or does it chart its own course? Policy makers would like to know, but the evidence has never been reviewed carefully – until now. This chapter examines covered-sector employment in Oklahoma in comparison to the nation from 1939, the initial year of availability of these important statistics, to present day. Covered-sector employment pertains to jobs qualifying for the state run unemployment insurance program. These employment statistics are a by-product of the 1938 Fair Labor Standards Act. This act established the minimum wage, overtime pay requirements, child labor standards, and most importantly for our purposes, recordkeeping on employees in certain enterprises, including government. Domestic, agricultural, and self-employed workers were excluded from the act. These data are collected at the establishment level of companies, and non-profit and governmental institutions. The resulting employment, hours, and wage rate data are sometimes referred to as the *Establishment Survey*. More often, these data are known as *Nonagricultural Employment* data, even though, as noted, workers other than agricultural workers are excluded from this database. Employment in this chapter will always refer to covered-sector employment.

Answers to several questions are produced by this analysis:

1. What is Oklahoma's share of national employment and how has this share changed over time?

2. What has been the detailed pattern of employment growth in Oklahoma in comparison to the nation? Does Oklahoma consistently follow national trends, or tend to "go it alone?"

3. What has been the sustained growth rate in employment in Oklahoma at various times and in comparison to the nation?

4. How cyclically volatile is Oklahoma's employment growth in comparison to the nation?

5. During those periods in which Oklahoma has experienced differential growth or decline relative to the nation, what industrial sectors (mining, construction, manufacturing, etc.) were responsible for these differentials?

6. How has the industrial distribution of employment in Oklahoma changed in recent years and do these changes engender any concerns?

Highlights of Findings

Key findings of this study are as follows:

• Sixty-five years ago, the beginning year of the establishment-base survey, Oklahoma employment was 1.06 percent of national employment. Today, it stands at 1.11 percent of national employment. Thus, it has gained only five basis points over the entire period. Yet, one basis point today, or 0.01 percent, represents about 13,000 jobs. Therefore, the Oklahoma economy is about 65,000 jobs ahead of where it would be if the original 1.06 percent ratio obtained.

• At the peak of the energy boom in 1982, the Oklahoma ratio was 1.36 percent, which at that time represented about 223,000 jobs in excess of what the 1.11 percent ratio achieved in the pre-boom years would have yielded. This is a measure of the employment extent of the energy bubble.

- Netting out the energy boom/bust years, Oklahoma remains slightly to the plus side in market share owing to gains in manufacturing, wholesale trade, transportation and utilities, and services occurring in 1970 to 1973. In these four years prior to energy boom, Oklahoma's market share expanded by almost five percentage basis points.

- Graphics of detailed monthly growth rates, calibrated as year-over-year percentage changes, show that Oklahoma's patterns of growth have closely mimicked the nation's monthly growth rates. Aside from the WWII years, where, clearly, the Oklahoma economy began to grow somewhat belatedly, and the energy boom/bust years, this pattern of close correspondence in swings in growth activity prevails. The average differential in growth rates is so small that there is little doubt that Oklahoma receives its growth impulses from the national economy.

- A methodology is developed for computing sustained growth rates between recessionary employment troughs. With the notable exceptions of the WWII years and the energy boom/bust, Oklahoma closely follows the nation in the level of sustained growth, but with somewhat higher volatility. This somewhat higher volatility is to be expected in that the nation's total employment, as an aggregate of all 50 states, smoothes out much of the variation across states. The timing of Oklahoma's post-recession turning points also closely correspond with those of the nation. Abstracting from the energy boom/bust period, the correspondence in growth rates is even more clearly revealed. The most recent sustained growth rates are lower, at about 1.6 percent, than at any time since 1958.

- The graphical analysis of detailed monthly growth rates reveals several times when Oklahoma experienced differential growth relative to the nation. A methodology is developed to identify the industry sectors associated with this differential growth. Several important industry drivers of differential growth are identified, including durable and nondurable manufacturing; wholesale trade; transportation, communication, and utilities; and services. Use of the new NAICS industry classification system allows the pinpointing of business and professional services, and to some extent, information, as the service sectors of importance.

- Review of growth rates in the 1990 to 2004 period utilizing the NAICS system yields some cause for concern about future growth prospects. Many of the industry sectors that have been identified as drivers of differential growth in Oklahoma appear to be experiencing growth difficulties in the last four years. All of the aforementioned industries in the previous highlight have declined at rates exceeding the overall decline in employment in the 2000 to 2004 time period. While this represents a cause for concern, the historic evidence suggests that the Oklahoma economy will soon regain its balance in relation to national trends.

Methodologies

To examine Question 1, *"What is Oklahoma's share of national employment and how has this share changed over time?",* the ratio of Oklahoma's total covered-sector employment to the nation's total covered-sector employment will be computed. Because the numerical values are very small we will speak in terms of basis points, where one basis point represents one one-hundredth of a percentage point. To speak in basis-point terms may seem inconsequential, but today a basis point change in employment in Oklahoma relative to the nation represents a not insignificant 13,000+ jobs.

Question 2, *"What has been the detailed pattern of employment growth in Oklahoma in comparison to the nation?"*, will be answered by computing year-over-year growth rates in employment, using monthly data. Computation of such growth rates is quite easily achieved by forming the statistic $(E_t/E_{t-12} - 1)$, where E_t is employment

in the tth month and E_{t-12} is employment 12 months earlier. Graphical comparisons of these year-over-year growth rates will be the primary method of discerning differentials in Oklahoma's and the nation's experiences. The full 65 years of monthly growth rates will be presented. Our objective will be to see just how well Oklahoma's experience correlates with the nation's experience and also to see where this experience differs substantially from that of the nation.

Question 3 pertains to sustainable employment growth rates in Oklahoma and the United States and how these compare. Just what is meant by *sustainable* may differ from investigator to investigator. There are a variety of ways in which such a concept could be measured. All such measures need a definable base, however, and in this paper that base will be the trough in employment following a recessionary period.

The National Bureau of Economic Research identifies 11 recessionary periods since 1939. For this study, growth will be measured from the low point in employment following a recession to the trough in employment following the end of the next recession. The resulting growth rate will be the sustained growth rate between recessions. Actually, as will be shown below through example, this rate is the average monthly rate of change in employment from trough to trough. As will be seen, use of this convention for defining sustained rates of growth provides a rather interesting graphic in which the sustained rate of growth "envelopes" the employment series, thus forming what is known as an *envelope* curve. There may exist periods of time between recessionary years where there is a distinct change in growth rates, and these will be noted.

Use of this sustained rate of growth also provides a base for comparing employment growth rates for Oklahoma and the U.S. The time periods between troughs will not necessarily be the same for Oklahoma and the U.S. Thus, this methodology provides us with a means of comparing the timing of employment change from negative to positive growth. It will be interesting to see whether these turning points for Oklahoma coincide with national recoveries from recession.

The answer to question 4, *"How cyclically volatile is Oklahoma's employment growth in*

comparison to the nation?", follows naturally from the answer to question 3. Once we know the average monthly rate of growth in employment between recessions, the question of volatility can be explored by simply computing a measure of variation in that growth rate between troughs. This in accomplished by computation of the *standard deviation* in the growth rate between employment troughs.[1] The standard deviation is then divided by the mean rate of growth to form a statistic called the *coefficient of variation*, or C.V. This measure of relative variation can then be used to compare Oklahoma and U.S. experiences in the cyclical volatility of employment.

Industry sources of differential growth for those time periods when the Oklahoma economy demonstrated consistent over or under performance relative to the nation motivates question 5. During those periods in which Oklahoma has experienced differential growth or decline relative to the nation, what industrial sectors (mining, construction, manufacturing, etc.) were responsible for these differentials?. Where the Oklahoma experience in year-over-year growth rates differs substantially from that of the nation, we will analyze industrial sector employment changes for clues as to why. Unfortunately, data on the industrial distribution of employment is available only since 1969 for Oklahoma. In addition, there are breaks in the data associated with changing from the Standard Industrial Classification (SIC) system to the North American Industrial Classification System (NAICS). These two systems are highly incompatible, even at the fairly high level of aggregation that will be used in this study.

SIC data are available from 1969-2001. Eleven sectors will be examined to determine the sources of differential growth: 1. Mining; 2. Construction; 3. Durables Goods Manufacturing; 4. Nondurables Goods Manufacturing; 5. Transportation, Communication, and Public Utilities; 6. Wholesale Trade; 7. Retail Trade; 8. Finance, Insurance and Real Estate; 9. Services; 10. Federal Government; and, 11. State & Local Government. Fortunately, NAICS data have been recompiled back to 1990 and extended to the present. The NAICS sectors that will be analyzed are 16 in number: 1. Natural Resources and Mining; 2. Construction; 3. Durable Goods Manufacturing;

4. Non-Durable Goods; Manufacturing, 5. Wholesale Trade; 6. Retail Trade; 7. Transportation and Utilities; 8. Information; 9. Financial Activities; 10. Professional and Business Services; 11. Educational and Health Services; 12. Leisure and Hospitality; 13. Other Services; 14. Federal Government; 15. State Government; and, 16. Local Government. The overlap in availability of the two data series is of some value and it is interesting to see just how the Oklahoma economy has changed as captured by this new industrial classification system.

Question 6, *How has the industrial distribution of employment in Oklahoma changed in recent years and do these changes engender any concerns?"*, is somewhat peripheral to the main thrust of this paper. But the availability of the new NAICS series since 1990 provides a useful and relatively unexplored portrait of how the Oklahoma economy changed in the Information Age. Thus, the paper will close with a brief analysis of the recent contributions of the various sectors to the nonagricultural employment base in Oklahoma.

Aggregate Growth and Energy Boom/Bust

Since 1939, covered employment in Oklahoma and the nation has expanded more than four-fold. In 2003, employment in Oklahoma in nonagricultural establishments is estimated to be 1,450,600 on average, or 4.46 times the 1939 average employment level. National employment in nonagricultural establishments averaged 129.9 million in 2003, or 4.24 times the 1939 average. It is apparent that Oklahoma's 64 year growth rate is higher than the nation's, but not by much. Indeed, the Oklahoma rate of growth averaged 2.33 percent per year from 1939 to 2003 while the US averaged 2.26 percent. Only seven one-hundredths of a percentage point separate these long-term growth rates. Figure 1.1 shows just how comparable Oklahoma and US employment growth have been over this broad span of time. The energy boom and bust period, from roughly 1977 to 1987, is the main differential between these two series.

Figure 1.2 shows the ratio of Oklahoma to US employment using a scale of basis points. In 1939, using average employment for the year, Oklahoma stood at 106.5 basis points, or at 1.065 percent of national establishment-based employment. In 2003, Oklahoma's ratio was 111.6. Thus, over that 64 year period, Oklahoma netted only a 5.1 basis point increase in employment. One basis point in 2003 represented about 13,000 jobs, however. Thus, employment in 2003 was about 65,000 higher than it would have been if Oklahoma had only retained the 1939 ratio.

In the war years, the ratio fluctuated between 98 and 105 basis points, but it is interesting to note that in the period 1949 through 1969, the ratio averaged 106.6 basis points, a value about equal to the 1939 ratio. Beginning in 1970, Oklahoma employment surged relative to the nation with the ratio rising by 4.2 basis points to 110.8 in 1973. Thus, Oklahoma began a period of significant growth relative to the nation prior to the advent of the Yom Kipper war and the energy embargo in October 1973. Continued differential growth and the beginnings of the energy boom took the ratio to 117.6 in 1977. That year was the "jumping off" point for the energy boom, with the ratio rising dramatically to 135.7 in just five years. Starting in 1982, however, the ratio fell dramatically, to 107.4 in 1988, below the level just prior to the energy boom.

An interesting question is "how much employment gain and subsequent loss can be associated with the energy boom period?" These simple statistics allow us to compute a "back-of-the-envelope" answer. Accepting the argument that the Oklahoma economy had already begun to grow relative to the nation in the 1970-1973 period, achieving a ratio of 110.8 in 1973, this ratio can be applied to the national employment level to provide a benchmark for what Oklahoma employment would have been if it had stayed at this ratio. That benchmark employment level can then be compared to actual employment as an indicator of the employment bubble associated with the energy boom. Using this 110.8 ratio, Oklahoma employment would have only been 993,000 in 1982. Instead, Oklahoma employment averaged 1,216,000 in 1982. Thus, Oklahoma employment was about 223,000 jobs higher than it otherwise would have been in the absence of the energy boom. This estimate is substantiated by

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Figure 1.1

Oklahoma and US Average Annual Employment

OK in Thousands

US in Millions
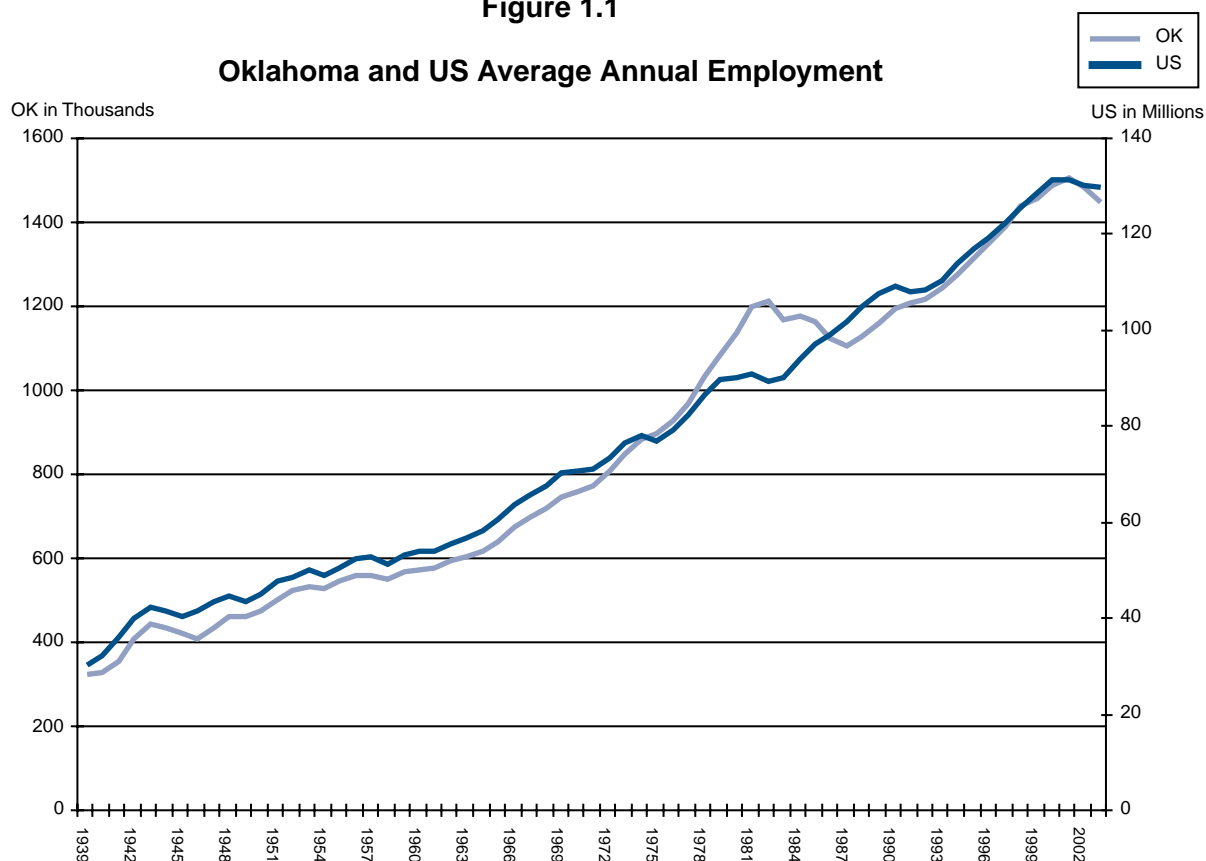
the growth in the mining sector in Oklahoma. In 1973, mining sector employment averaged about 36,500. In 1982, it averaged 105,600. This is a 69,000 difference in employment. Dividing the 223,000 by 69,000 gives a total multiplier of about 3.2, consistent with multipliers in economic impact models for the mining sector. Thus, the estimate of nearly a 223,000 employment gain, or more than one-fourth of the 1973 employment base, appears to be a reasonable estimate of the employment boost attributable to the energy boom.

As noted, by 1988, the energy-bust had taken the state to a 107.4 basis-point ratio, better than three points lower than the 1973 ratio. How could this have happened? Shouldn't the state's ratio simply have returned to the pre-energy boom ratio? There is probably no way to know for sure why the ratio declined disproportionately relative to the 1973 ratio. A hypothesis is that the Oklahoma industrial employment base had become

intensively oriented to the energy sector during the boom period: steel plants converting to manufacture of pipe casings, electrical equipment and pump manufacturers concentrating on energy field equipment, financial institutions devoting significant proportions of their loanable funds to the energy industry. The decline of the ratio to the 1988 low may well have been a result of the strong energy orientation of the Oklahoma industrial base during the energy boom.

1987 was a "pivot" year for the Oklahoma economy, a year in which the last vestiges of the energy bust were put behind us and the state's employment growth once again ventured into positive territory. The U.S. economy was enjoying phenomenal growth in the post 1981-82 recessionary period for the same reasons that the Oklahoma economy was plunging; namely, falling energy prices. However, by September 1987, the state's employment base began to expand once again.

Figure 1.2

**Oklahoma to US Employment Ratio
in Percentage Basis Points**
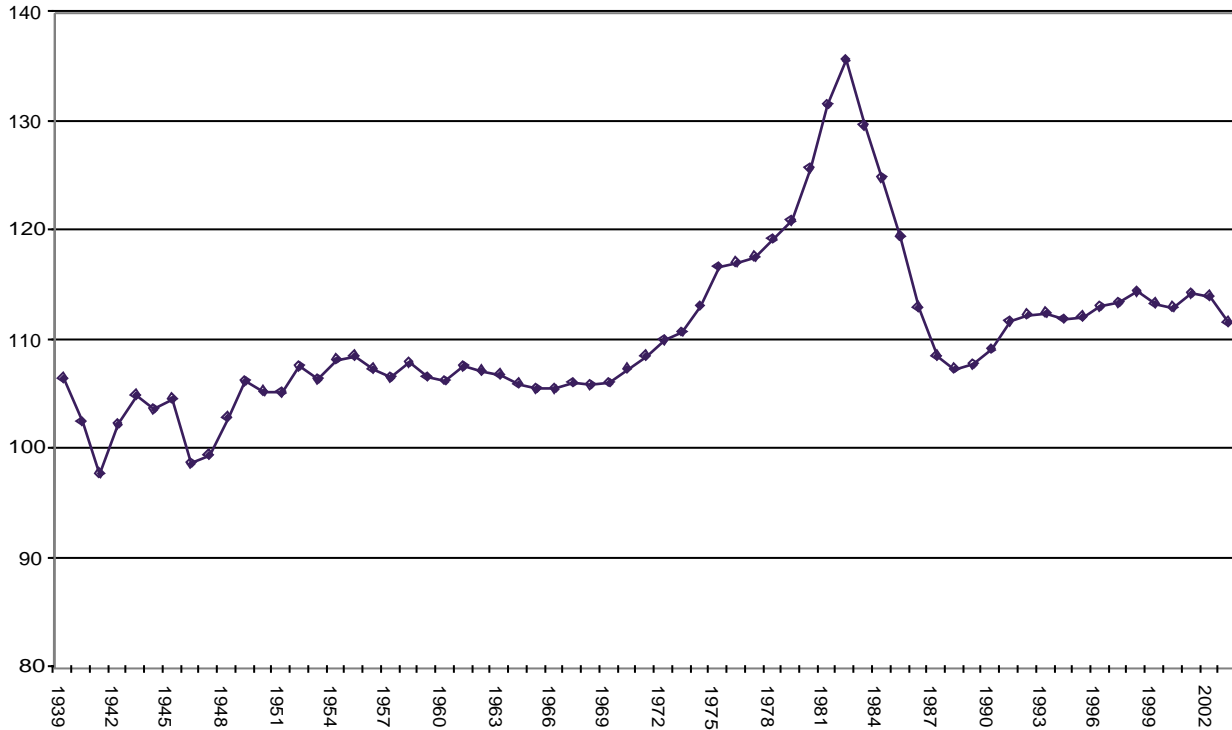
Relative to the nation, growth was still slow, so the basis-point ratio continued to slide into 1988. From that juncture, however, the state recovered fairly quickly to the 111 level and the 1990-2002 period was very kind to Oklahoma, taking the state to the 114 level prior to the recent slide in the ratio. The decline in the ratio from 114.0 in 2002 to 111.6 in 2003 is troubling and potentially indicative of recent structural change in the Oklahoma economy, an issue that will be explored in greater detail below.

Year-to-Year Employment Growth

Question 2 relates to the detailed pattern of growth in the Oklahoma economy relative to the nation. Simple graphics of the monthly percentage change in year-over-year employment provide a rather clear view of the extent of correspondence between the Oklahoma and US experiences. A close correspondence would

indicate that the Oklahoma economy receives its primary growth impulses from the national economy. We already know from the above analysis that the energy-boom created dramatic divergence in growth patterns. Certainly that period, stretching essentially from 1977 to 1987, but having roots as early as 1974 when employment in the mining sector in Oklahoma began to accelerate, was exceptional. Indeed, the Oklahoma economy continued to rise for some of the very same reasons that caused the national economy to falter. In the energy-bust period, the national economy began to experience growth for some of the same reasons that caused the Oklahoma economy to falter. That 10-year period was, however a small fraction of the 65 years of data that are analyzed in this chapter. Figures 1.3 through 1.6 graphically portray the year-over-year percentage employment changes for Oklahoma and the U.S. in 17 year overlapping time spans.

Figure 1.3

Oklahoma and US Employment Growth Rates
1940-1956
(Year-over-Year in Percent)
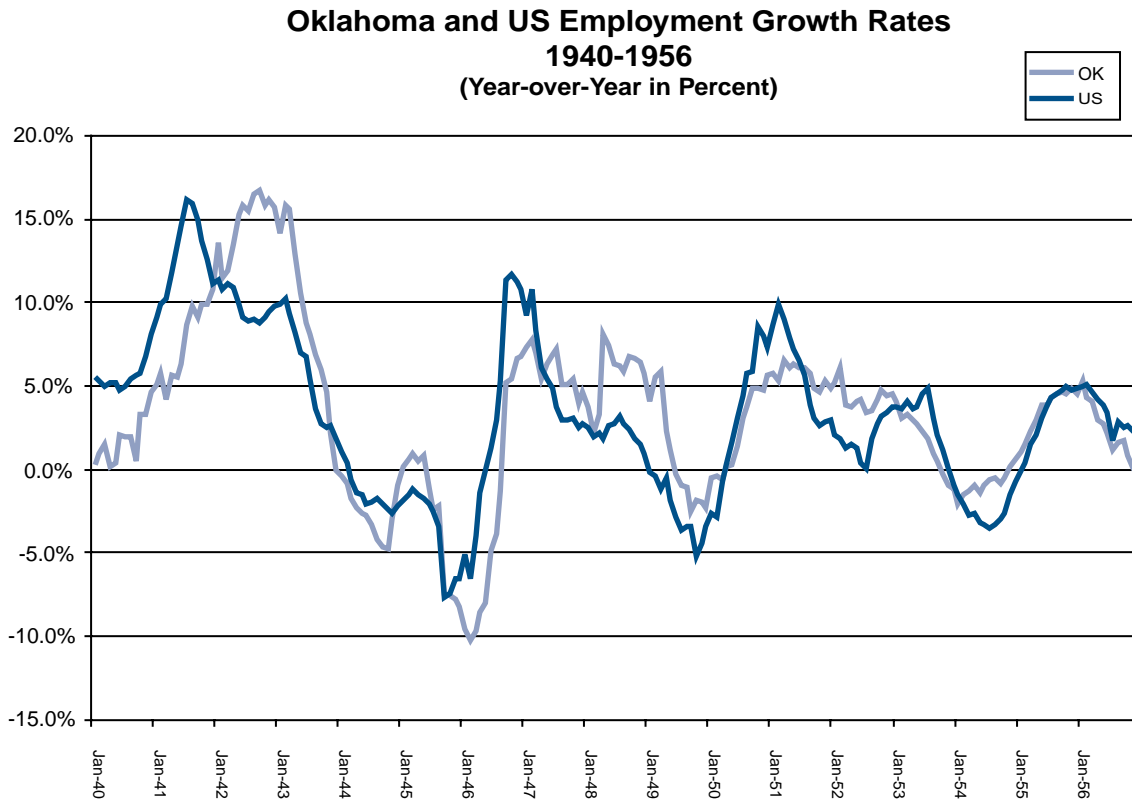
Figure 1.3 examines the 1940-1956 period, which was marked by three recessions. The first recession lasted from February, 1945 to October, 1945; the second, from November, 1948 to October, 1949; and the third, from July, 1953 to May, 1954. Corresponding peaks and troughs in rates of employment growth can be seen in Figure 1.3, but these peaks and troughs generally occur several months after the beginning and ending dates of the recessions. The dominant feature of Figure 1.3 is the generally close parallel in growth in Oklahoma to growth nationally. Oklahoma was a little slow off the mark. The WWII employment expansions came late to Oklahom. Peak growth in the nation occurred during 1941 at better than 15 percent. These phenomenal rates of growth in Oklahoma did not occur until the second-quarter of 1942. Yet, there appears to be remarkable correspondence in the cyclical pattern of these growth rates. Indeed, the correlation of the Oklahoma and US growth rates is a sizable 78.2 percent. Another indicator of the correspondence in growth rates is the average differential, that is,

the average difference in the monthly growth rates. The average difference in growth rates over the 1940 through 1956 time period is only six percentage basis points or 0.06 percent. There was, however, considerable variability in this average differential, 3.34 percent. Thus, on average, the differential in growth in Oklahoma vs. the U.S. over this period was small, but highly variable. The central message is that employment in Oklahoma eventually achieves par with the nation, but with high variability.

Figure 1.4 graphically portrays the 1956 to 1972 comparative growth experiences. This period was marked by three recessions. The first extended from September, 1957 to April, 1958; the second, from April, 1960 through February, 1961; and, the third, from December, 1969 to November, 1970. Swings in employment growth are seen in relation to these recessionary periods, again somewhat belatedly. This period appears to be marked by extremely close correspondence between the Oklahoma and national growth rates.

Figure 1.4

**Oklahoma and US Employment Growth Rates
1956-1972
(Year-over-Year in Percent)**
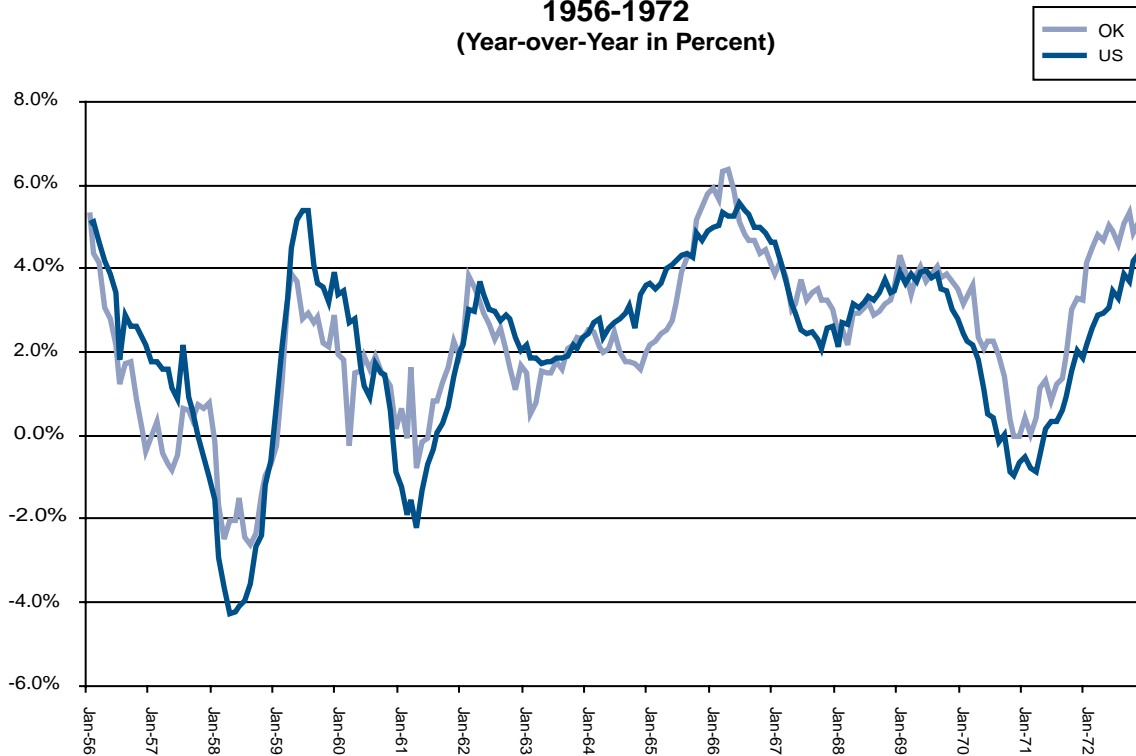
In fact, the correlation in growth rates is quite strong at 84.8 percent and a favorable-to-Oklahoma growth differential of seven basis points, or 0.07 percent, accrues to the state. Variability about this seven basis point differential is a comparatively low 1.12 percent. An interesting differential in growth begins to occur in March 1970 and extends through 1972. Oklahoma averaged a +124 basis point (1.24 percent) differential with a comparatively low variability of 0.48 percent as measured by the standard deviation. It will be interesting to explore what was happening in the industrial sectors of Oklahoma during this period that produced this differential growth.

Figure 1.5, encompassing the volatile energy boom/bust period, shows substantial divergence in comparative growth experiences. With the exception of only a few months, and then only by minor amounts, Oklahoma's year-to-year employment growth rates exceeded the nation's from January 1972 to November 1982. There were three official recessions in this period: November, 1973 to

March, 1975; January, 1980 to July, 1980; and, July, 1981 to November, 1982. The recession in 1980 was so brief that employment growth nationally stalled only briefly. The recession of 1981-82 was a quite different story with employment nationally falling at rates near two percent as late as February, 1983. The Oklahoma economy fell apart mid-year 1982 with dramatic declines in employment at rates in the negative 4 – 6 percent range for many months in 1983. The correlation in rates of growth was only 33.0 percent and the variability in growth differentials was a sizable 3.34 percent for the entire period. However, for the entire 1972-1988 period, the average growth differential was only a negative 3.0 basis points (-0.03 percent). Again, we have a dramatic example that over the long-term, the growth differential for Oklahoma closely matches the nation's, again with substantial variability. Even in the face of widespread structural change that led to a dramatic realignment of production in Oklahoma toward energy production, coupled with a

Figure 1.5

**Oklahoma and US Employment Growth Rates
1972-1988
(Year-over-Year in Percent)**
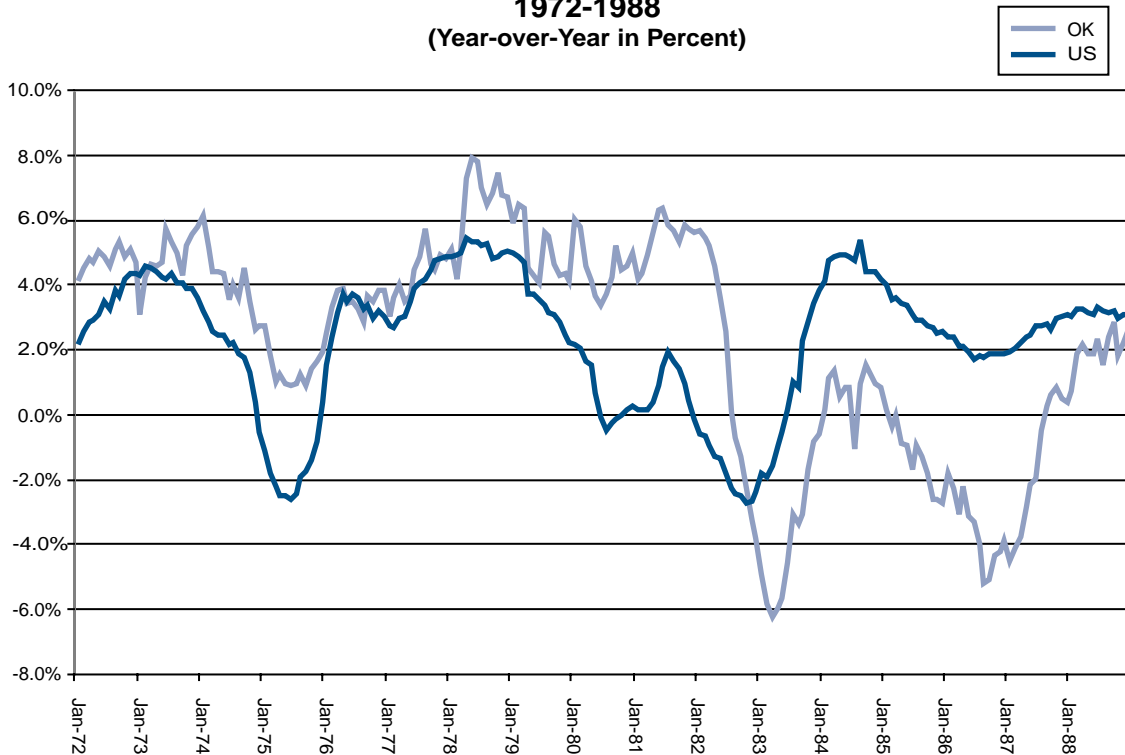
complete reversal of that structural change, the Oklahoma economy continues to demonstrate in the long-run a close alignment with the national economy.

Figure 1.6 graphically portrays the 1988 through November, 2004 comparative growth experiences. Two recessions occurred during this period: July, 1990 to March, 1991, and March, 2001 to November, 2002. In general, we see fairly close correspondence between the growth experiences. For the entire period, the correlation in growth rates was 73.0 percent, with Oklahoma enjoying a 14 percentage basis point growth differential. Also, variability in the growth differential was quite low at 1.14 percent, closely matching the 1.12 percent variability that occurred in the 1956 to 1972 period. This period also contains several periods in which the Oklahoma economy experienced patterns of consistent differential growth: mid-1989 through mid-1992, mid-1995 through 1998, 1999 through mid-2000, mid-2000 through mid-2002, and mid-2002 through mid-2004. Only in two of these periods

was the growth experience negative in Oklahoma. Somewhat disconcertingly, the most recent consistent growth differential was quite negative. For all of these periods, it will be interesting to observe whether any consistent patterns of industry or sector changes are in evidence.

Before turning to the industry-sector analysis, a recap of the historic evidence should prove useful. Table 1.1 provides summary data on comparative growth rates gleaned from the four overlapping time periods. Over each of these time periods, encompassing 17 years of monthly data, it is clear that the average year-over-year monthly growth rate in Oklahoma closely parallels the nation's with an ever so slight advantage to Oklahoma, with the exception of the period containing the energy boom/bust. Again with the exception of the 1972-1988 period, the correlation between Oklahoma's growth rates and the nation's is quite high. Variability, as measured by the standard deviation in differential growth rates, is also quite high. The message is quite clear:

9

Figure 1.6

**Oklahoma and US Employment Growth Rates
1988-2004**
(Year-over-Year in Percent)
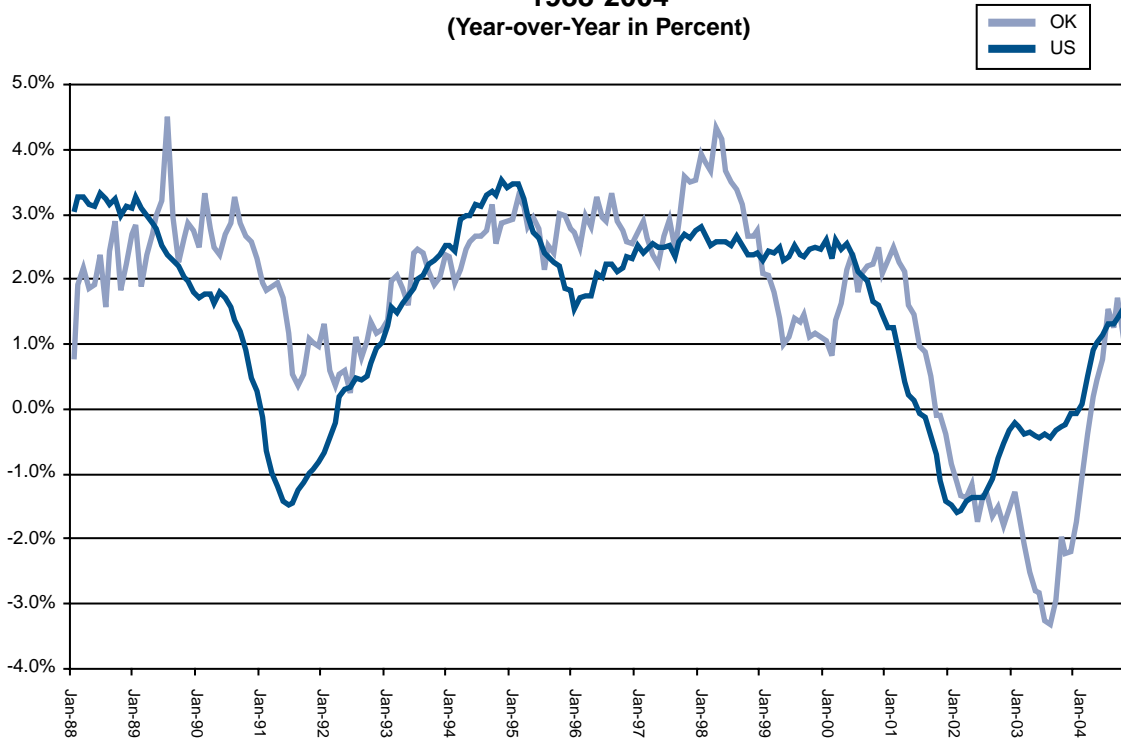
Oklahoma eventually operates on par with the nation in growth rates, but with substantial variability. It is also clear that employment growth rates have slowed rather considerably. Oklahoma has, from time to time, experienced growth differentials consistently above and below national patterns. Especially disturbing is the markedly lower rates of growth since the end of the 2001 recession. A more detailed analysis of what was happening in Oklahoma during these periods will be presented in the Industrial Sector section.

Sustained Growth Rate and Volatility

The sustained growth rate is defined in this chapter, primarily, as the trough-to-trough rate of growth in employment. Alternatively, the sustained growth rate can be any time period that exhibits a consistently higher or lower rate of employment growth than the preceding or following months. Generally, the sustained growth rate can be found by connecting the low employment

levels following a recessionary period. Between recessions it is possible that divergent growth rates are observed, but such instances are rare. Assume two low employment values following a recession, E_t and E_{t+k}, where E_t is the earlier trough-level of employment in the tth month and E_{t+k} is the next trough-level of employment, k months ahead. Then, the sustained growth rate, $r = \ln(E_{t+k}/ E_t)/k$.[2]

An example might help to clarify this concept. In Table 1.2, assume that the employment level in month 1 is a post-recessionary low as is the employment level in month 14. The log ratio in column 3 is the month-to-month growth rate, the natural log of the employment ratios. Notice that the average of these monthly growth rates is equal to $\ln(E_{t+k}/ E_t)/k$, the value of r, the average rate of trough-to-trough employment growth. This is a very useful property of natural logarithms in computing growth rates. The square-root of the average squared deviation from the mean is the standard deviation. The *standard deviation* of these month-to-month growth rates

Table 1.1

Oklahoma and US Comparative Employment Growth Rates and Related Statistics

Time Period		Average Growth				
Begin	End	OK	US	Correlation	Differential	Variability
1940	1956	3.39%	3.33%	78.2%	0.06%	3.35%
1956	1972	2.31%	2.24%	84.8%	0.07%	1.12%
1972	1988	2.31%	2.34%	33.0%	-0.03%	3.34%
1988	2004	1.64%	1.50%	73.0%	0.14%	1.14%

Table 1.2

Hypothetical Example of Computation of Sustained Growth Rates

Month	Hypothetical E	Log Ratio
1	1200	
2	1220	1.65%
3	1230	0.82%
4	1245	1.21%
5	1260	1.20%
6	1300	3.13%
7	1315	1.15%
8	1345	2.26%
9	1370	1.84%
10	1380	0.73%
11	1390	0.72%
12	1385	-0.36%
13	1380	-0.36%
14	1370	-0.73%
15	1380	0.73%
16	1390	0.72%

Months 2-14Average Log Ratio
Average Log Ratio 1.019%
$\ln(E_{t+k}/ E_t)/k$ 1.019% 1.019%
Standard Deviation 1.088%
Coefficient of Variation 107%

provides a measure of the within-period variation in the growth rate. Furthermore, the *coefficient of variation* (C.V.), a measure of relative variation, is computed as the ratio of the standard deviation to the mean. From this hypothetical example we see that not only is the average rate of growth a meaningful statistic, but that the standard deviation and coefficient of variation are useful measures of typical dispersions from the average rate. This simple methodology provides measures of both the trend rate of growth and its cyclical volatility, enabling exploration of both questions 3 and 4.

Figure 1.7, for the Oklahoma economy, is a graphical illustration of the *envelope* curve that is generated by connecting employment troughs. This curve shows that the Oklahoma economy experienced a period of almost straight-line growth from 1939 into the mid 1950s, hit somewhat of a flat-spot from the mid 1950s into the early 1960s, then went into an accelerated growth phase that lasted through the energy boom. There was a slight recovery in employment following the rather deep 1981-82 recession, but then the energy-bust became more pronounced. Recovery did not occur until late in 1987. From that juncture, employment growth has been on rather a straight line trend.

Figure 1.7

Oklahoma Employment Envelope Curve

Thousands
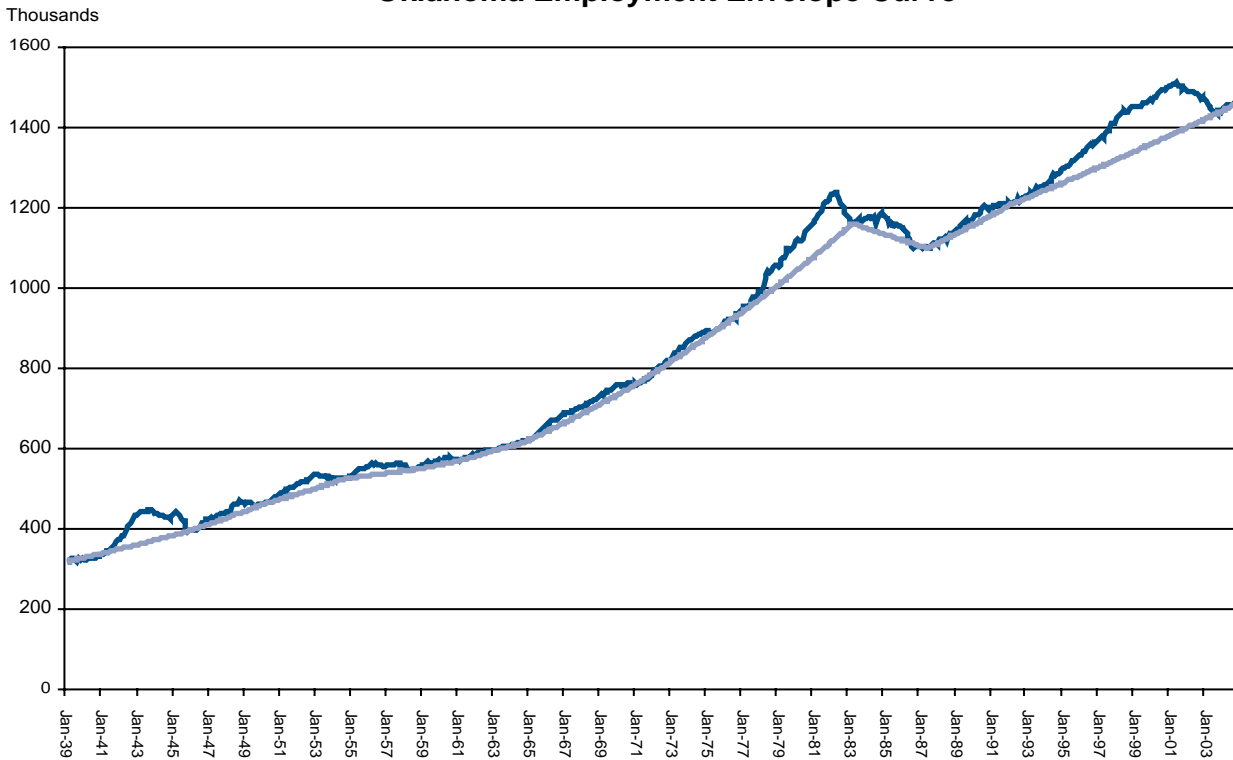
Figure 1.8 is the corresponding graphic for national employment. It shows, initially, similar patterns: strong growth until the mid 1950s, a brief flat spot, then accelerating growth into the early 1970s, followed by rather straight line performance to the present.

Table 1.3 depicts relevant statistics for the Oklahoma experience, identifying beginning and ending dates, associated employment levels, average monthly growth rates, the annualized rate (the base of the natural log system, 2.71828, to the power 12 times the monthly employment growth rate), the standard deviation, and the coefficient of variation (C.V.). Table 1.4 reports the results for national employment. Comparison of these two tables produces some very interesting findings. The first thing to observe is the very close correspondence between the months associated with the employment troughs, with, of course, the exception of the energy boom/bust. For example, there was an employment trough in Oklahoma in December, 1949 and another in September, 1954, which coincide rather closely with the national

employment troughs of October, 1949 and August, 1954. For the last two recessions, the employment troughs for Oklahoma were in March, 1992 and September, 2003. For the nation, the troughs were February, 1992 and August, 2003. There are several other examples of the closeness of employment troughs in these tables. The trough in Oklahoma in November, 1970 is coincident with the U.S. trough and the March, 1975 trough is actually a month earlier than the U.S. trough.

Perusal of Tables 1.3 and 1.4 reveals a very close correspondence between Oklahoma and U.S. implied annual growth rate attainments, again with the exception of the energy boom/bust years. In the 1939 to 1945 period, the annual rate of growth was 3.1 percent for Oklahoma; 3.8 percent for the nation. But in the 1945 to 1949 period, Oklahoma's growth rate was 3.7 recent compared with 2.8 percent nationally. This pattern of closely aligned growth rates remains in effect until 1970, with Oklahoma sometimes enjoying a slight advantage, sometimes not.

Figure 1.8

US Employment Envelope Curve

Millions
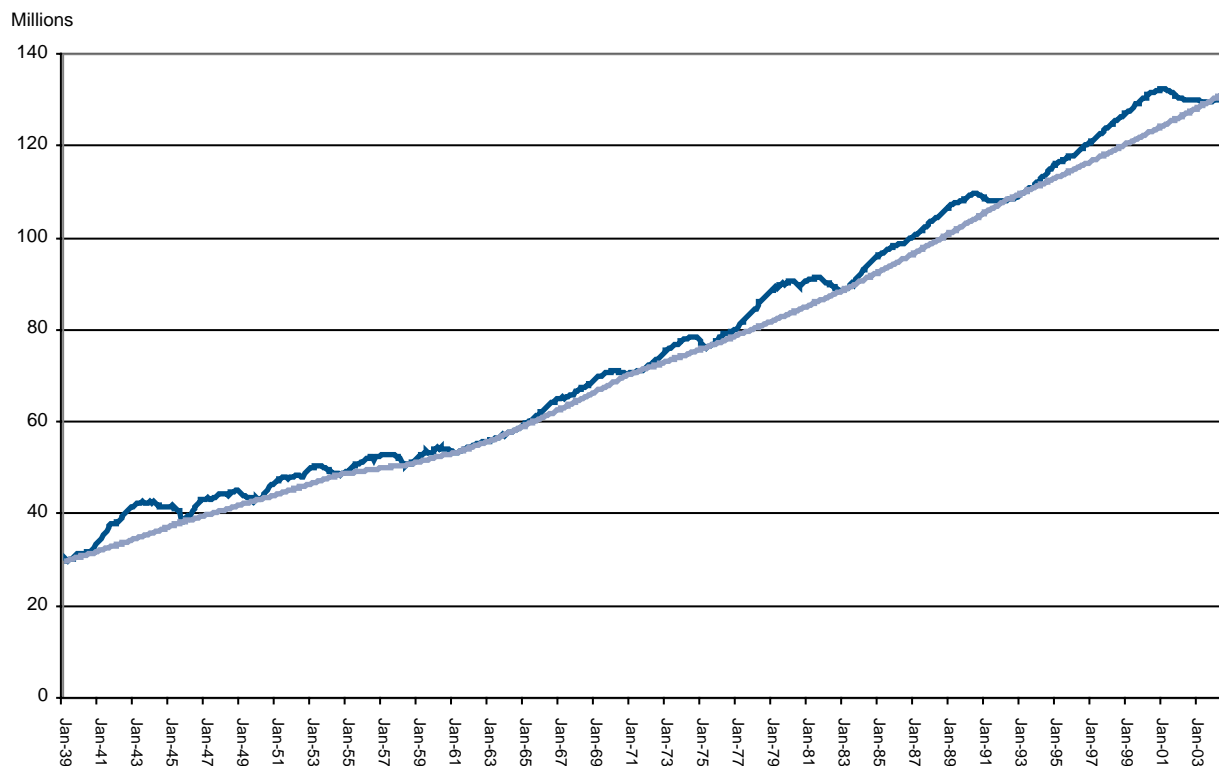
Table 1.3

Oklahoma Sustained Employment Growth and Related Statistics

Begin	End	E_t	E_{t+k}	Mean	Annualized Growth	Std. Dev.	C.V.
Jan-39	Dec-45	323.1	400.2	0.26%	3.1%	1.19%	462%
Dec-45	Dec-49	400.2	463.7	0.31%	3.7%	0.86%	280%
Dec-49	Sep-54	463.7	529.7	0.23%	2.8%	0.43%	183%
Sep-54	May-58	529.7	550.3	0.09%	1.0%	0.46%	530%
May-58	Feb-61	550.3	573.8	0.13%	1.5%	0.60%	470%
Feb-61	Nov-64	573.8	622.7	0.18%	2.2%	0.26%	141%
Nov-64	Nov-70	622.7	759.6	0.28%	3.4%	0.30%	110%
Nov-70	Mar-75	759.6	888.1	0.30%	3.7%	0.40%	132%
Mar-75	Mar-83	888.1	1164.1	0.28%	3.4%	0.52%	184%
Mar-83	Jun-87	1164.1	1102.8	-0.11%	-1.3%	0.56%	-526%
Jun-87	Mar-92	1102.8	1213.7	0.17%	2.0%	0.34%	204%
Mar-92	Sep-03	1213.7	1438.6	0.12%	1.5%	0.30%	246%

Table 1.4

US Sustained Employment Growth and Related Statistics

Begin	End	E_t	E_{t+k}	Mean	Annualized Growth	Std. Dev.	C.V.
Jan-39	Sep-45	29.8	38.5	0.32%	3.9%	0.89%	281%
Sep-45	Oct-49	38.5	43.0	0.23%	2.8%	0.72%	316%
Oct-49	Aug-54	43.0	48.8	0.22%	2.6%	0.52%	237%
Aug-54	May-58	48.8	50.9	0.09%	1.1%	0.45%	492%
May-58	Feb-61	50.9	53.5	0.15%	1.8%	0.43%	283%
Feb-61	Mar-63	53.5	56.2	0.20%	2.4%	0.19%	95%
Mar-63	Nov-70	56.2	70.5	0.25%	3.0%	0.23%	92%
Nov-70	Apr-75	70.5	76.4	0.15%	1.8%	0.31%	204%
Apr-75	Dec-82	76.4	88.7	0.16%	2.0%	0.27%	167%
Dec-82	Feb-92	88.7	108.2	0.18%	2.2%	0.20%	111%
Feb-92	Aug-03	108.2	129.7	0.13%	1.6%	0.15%	112%

Beginning in 1970, Oklahoma enters an accelerated growth phase with a 3.7 percent growth rate to 1975 and a 3.4 percent growth rate to 1982. Growth rates for corresponding periods nationally were 1.8 and 2.0 percent. The 1983 to 1987 period is unique to the Oklahoma economy, associated as it is with the energy bust. Employment declined at an average annual rate of 1.3 percent. The Oklahoma economy was saved, to a certain extent, by growth nationally. From 1982 to 1992, the nation's employment advanced at a fairly healthy 2.2 percent rate.

Figure 1.9 is offered as an alternative view of the Oklahoma employment envelope curve that considers the 1975 through 1987 period as a whole. This graphic essentially ignores the turning points connected with the energy boom/bust. Using this alternative we see rather straight line growth for Oklahoma beginning in 1975. Also, the maximum difference between peak employment and the envelope curve is about 236,000 jobs, occurring in March, 1982. This value is close to the 223,000 measure of the extent of the energy-boom employment bubble mentioned above. Table 1.5 presents the associated statistics. Over the 1975 to 1987 period, the annualized growth was 1.8 percent and from 1987 to 1992 it was 2.0 percent. These rates are slightly below the growth rates of 2.0 and 2.2 percent for the 1975 to 1982 and 1982 to 1992 periods nationally. In the 1992 to 2003 period, the growth rate for Oklahoma is only 0.1 percent below the nation's growth rate. Oklahoma remains slightly ahead of the nation for this full 65 years of data because of the growth spurt that occurred in 1970 to 1975.

The question of cyclical volatility is tackled in this chapter through use of the standard deviation and coefficient of variation. Examination of these statistics for corresponding time periods amply demonstrates that employment growth is more volatile in Oklahoma than in the nation. The standard deviations and coefficients of variation for the US and Oklahoma tend to vary positively, that is, high values for the US are associated with high values for Oklahoma. Nevertheless, the results for Oklahoma are almost always somewhat higher. These results can be summarized by saying that Oklahoma tends to be somewhat more cyclically volatile than the nation, even excluding the energy boom/bust years. Given that the national numbers comprise all states, this result is not surprising. Now at better than 130 million workers, the national series would seem to smooth out a lot of random variation as the sum of employment in the 50 states. Given that, it is surprising that the cyclical volatility of the Oklahoma economy, in normal times, so closely resembles the nation's cyclical volatility. The long-term message is that the Oklahoma economy generally gets to where the national economy is going, but with greater volatility.

Figure 1.9

Alternative Oklahoma Employment Envelope Curve

Thousands
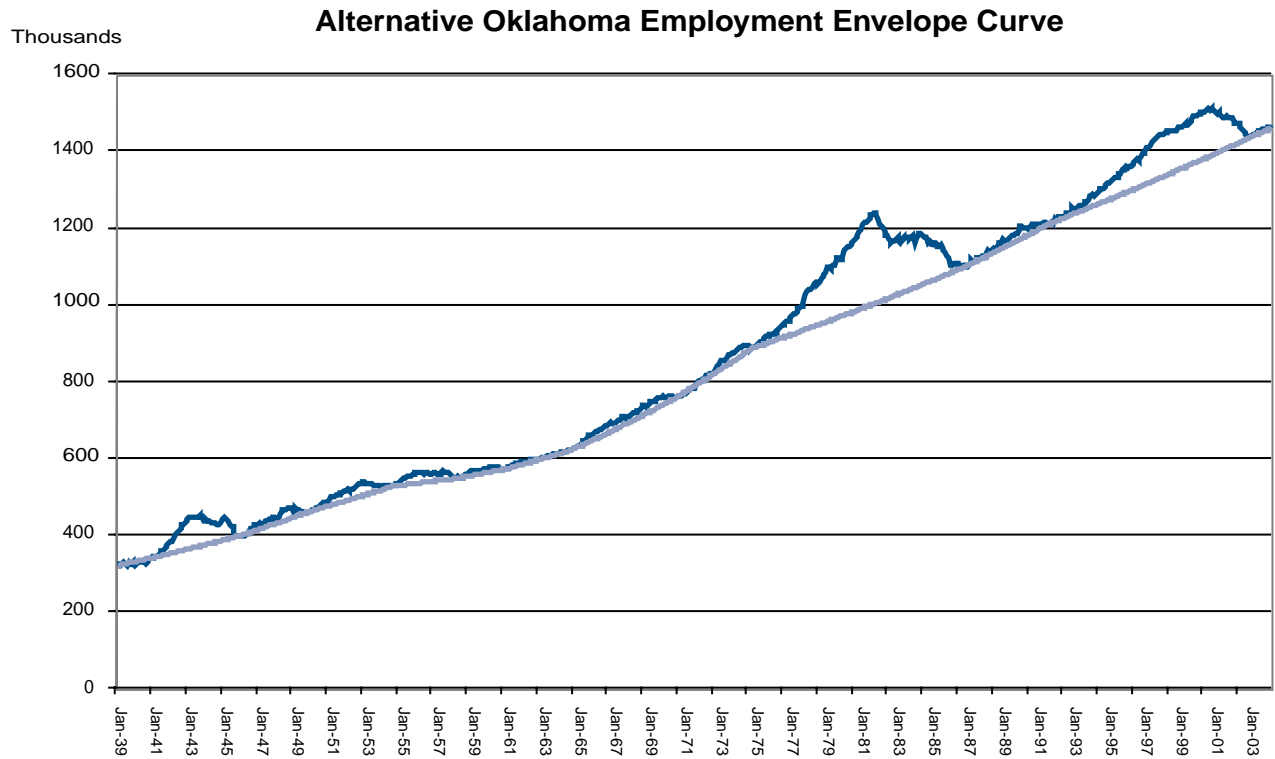
Table 1.5

Alternative Oklahoma Sustained Employment Growth

Begin	End	E_t	E_{t+k}	Mean	Annualized Growth	Std. Dev.	C.V.
Jan-39	Dec-45	323.1	400.2	0.26%	3.1%	1.19%	462%
Dec-45	Dec-49	400.2	463.7	0.31%	3.7%	0.86%	280%
Dec-49	Sep-54	463.7	529.7	0.23%	2.8%	0.43%	183%
Sep-54	May-58	529.7	550.3	0.09%	1.0%	0.46%	530%
May-58	Feb-61	550.3	573.8	0.13%	1.5%	0.60%	470%
Feb-61	Nov-64	573.8	622.7	0.18%	2.2%	0.26%	141%
Nov-64	Nov-70	622.7	759.6	0.28%	3.4%	0.30%	110%
Nov-70	Mar-75	759.6	888.1	0.30%	3.7%	0.40%	132%
Mar-75	Jun-87	888.1	1102.8	0.15%	1.8%	0.56%	382%
Jun-87	Mar-92	1102.8	1213.7	0.17%	2.0%	0.34%	204%
Mar-92	Sep-03	1213.7	1438.6	0.12%	1.5%	0.30%	246%

Industrial Sector Analysis

As noted above, Oklahoma has experienced a number of periods of consistent differential growth. Question 5 asks whether the sources of this differential growth can be identified through analysis of changes in employment in the various industrial sectors. Eleven industrial sectors are used for the 1969 through 2001 data. These sectors utilize the SIC coding format. Table 1.6 shows the employment levels associated with key dates that marked transitions, generally from high to low growth relative to the nation. July 1969 is the starting point for the analysis. The first period, a period of generally positive growth differentials, ends in November 1973, a date chosen in that it corresponds with the beginning of the Arab oil embargo. The second period, the energy-boom period, closes at the peak of employment for the Oklahoma economy during the boom. This was, of course, a period of exceptional growth in the Oklahoma economy. Other benchmark dates are shown in the table. These periods were identified by examination of tabled and graphical evidence.

Table 1.7 displays the percentage growth rates between the key benchmark dates. This table shows, for example, that between July, 1969 and November, 1973, Oklahoma employment grew by 16.4 percent. Interestingly, employment in the mining sector actually fell by 7.0 percent in this

period. In the energy boom, Oklahoma's employment expanded by nearly 40 percent. Mining sector employment nearly tripled. At the high-water mark of mining sector employment, occurring in March, 1982 at 117,500, employment in mining was 3.2 times the average level of employment in mining in 1973. In the energy bust, coinciding with the July, 1982 to April, 1989 period, employment fell by only 4.8 percent, overall, while declining by 60 percent in the mining sector. Clearly, the Oklahoma economy was getting significant growth impulses from the national economy that kept the employment base from contracting substantially.

There are many other interesting features of Table 1.7 that could be discussed at length. The issue at hand is one of differential growth and the industry-sector drivers of the Oklahoma economy during these periods of consistent differential growth. Thus, comparisons with growth rates nationally are called for. Table 1.8 shows employment growth rates nationally for key benchmark periods.

The method for computing Oklahoma industry-sector differential growth consists of three stages. First, the US growth rates are applied, by sector, to the employment levels in base years to obtain a hypothetical level of employment in Oklahoma. Second, the sectors are summed, yielding the hypothetical total employment.

Table 1.6

Oklahoma Establishment-based Employment at Key Benchmark Dates

	Jul-69	Nov-73	Jul-82	Apr-89	Jun-93	May-95	Dec-98	Dec-00
Total	748.7	871.5	1,216.7	1,158.1	1,245.1	1,309.0	1,458.2	1,488.1
Mining	40.5	37.7	105.5	42.2	35.5	31.7	30.5	29.3
Construction	38.2	49.7	56.5	35.9	42.6	47.7	56.9	61.6
Durables Goods Mfg.	80.1	92.8	115.5	105.0	104.8	108.5	118.4	116.1
Nondurables Goods Mfg.	50.6	62.8	62.7	59.2	62.6	61.9	67.1	65.0
Trans., Comm., and Pub. Util.	53.3	56.4	71.5	65.1	72.0	73.0	81.4	85.4
Wholesale Trade	44.6	50.5	75.8	61.7	59.6	64.7	69.3	68.5
Retail Trade	119.6	150.9	215.6	215.4	229.2	246.5	266.6	271.7
Fin., Ins., and Real Estate	35.7	42.8	61.5	58.2	62.1	64.7	72.9	73.8
Services	110.3	131.5	219.1	261.4	305.5	341.4	413.5	428.6
Federal Government	59.9	53.6	48.8	52.0	47.7	43.4	46.2	46.5
State & Local Government	115.8	142.8	184.2	201.9	223.6	225.5	235.3	241.7

Third, differential growth by sector is computed as the ratio of actual employment to the hypothetical level minus one. Proceeding in this manner produces a sum of employment changes by sector that matched the aggregate rate of employment change times the beginning period level of employment.[3]

Table 1.9 shows the differences between the actual and hypothetical employment levels; the latter, as mentioned, computed by applying the U.S. growth rates to the initial employment level. Note that the sum of the sector differential em-

ployment levels equals the total differential. Table 1.10 reports the resulting percentage differentials relative to the beginning period employment level. Consider this example. To three decimal places, the growth differential for the July 1969 to November 1973 period is 5.843 percent. The rounded, tabled value is 5.8 percent. Notice that 5.843 percent times the initial July 1969 employment level of 748.7 equals 43.7, which, in turn, equals the sum of the component level changes across all 11 industrial sectors.

Table 1.7

**Percentage Change in Employment in Oklahoma
for Key Benchmark Periods**

	Jul-69 Nov-73	Nov-73 Jul-82	Jul-82 Apr-89	Apr-89 Jun-93	Jun-93 May-95	May-95 Dec-98	Dec-98 Dec-00
Total	16.4%	39.6%	-4.8%	7.5%	5.1%	11.4%	2.1%
Mining	-7.0%	180.2%	-60.0%	-16.0%	-10.7%	-3.8%	-3.9%
Construction	30.3%	13.7%	-36.5%	18.8%	11.9%	19.3%	8.2%
Durables Goods Mfg.	15.8%	24.5%	-9.1%	-0.2%	3.5%	9.1%	-2.0%
Nondurables Goods Mfg.	24.0%	-0.2%	-5.5%	5.6%	-1.1%	8.5%	-3.2%
Trans., Comm., and Pub. Util.	5.9%	26.6%	-8.9%	10.6%	1.4%	11.5%	4.9%
Wholesale Trade	13.2%	50.1%	-18.6%	-3.5%	8.6%	7.1%	-1.1%
Retail Trade	26.2%	42.9%	-0.1%	6.4%	7.6%	8.2%	1.9%
Fin., Ins., and Real Estate	19.8%	43.6%	-5.3%	6.6%	4.2%	12.6%	1.3%
Services	19.2%	66.7%	19.3%	16.9%	11.7%	21.1%	3.6%
Federal Government	-10.5%	-9.1%	6.6%	-8.3%	-9.0%	6.4%	0.7%
State & Local Government	23.2%	29.1%	9.6%	10.7%	0.9%	4.3%	2.7%

Table 1.8

**Percentage Change in Employment in the US
for Key Benchmark Periods**

	Jul-69 Nov-73	Nov-73 Jul-82	Jul-82 Apr-89	Apr-89 Jun-93	Jun-93 May-95	May-95 Dec-98	Dec-98 Dec-00
Total	10.1%	14.9%	20.4%	2.7%	5.7%	9.0%	3.8%
Mining	6.3%	69.8%	-38.3%	-12.2%	-4.1%	-2.2%	-3.6%
Construction	15.4%	-6.1%	32.4%	-9.8%	9.9%	22.5%	6.4%
Durables Goods Mfg.	1.4%	-9.1%	4.5%	-11.2%	4.9%	4.4%	-0.5%
Nondurables Goods Mfg.	-0.5%	-7.4%	3.9%	-1.7%	0.0%	-4.2%	-3.8%
Trans., Comm., and Pub. Util.	5.5%	8.2%	10.0%	3.8%	5.1%	9.9%	6.2%
Wholesale Trade	10.6%	21.7%	17.2%	-3.7%	6.7%	7.6%	0.4%
Retail Trade	15.2%	21.8%	28.1%	1.4%	7.0%	6.5%	4.3%
Fin., Ins., and Real Estate	16.0%	30.7%	24.7%	1.2%	0.8%	10.4%	1.8%
Services	16.8%	45.3%	40.4%	12.9%	9.2%	16.1%	6.9%
Federal Government	-3.7%	2.9%	8.4%	-2.7%	-2.5%	-3.0%	-2.9%
State & Local Government	19.0%	16.1%	12.7%	8.2%	3.3%	5.1%	4.3%

Table 1.9

**Differential Oklahoma Employment Relative to the Nation
for Key Benchmark Periods**

	Jul-69 Nov-73	Nov-73 Jul-82	Jul-82 Apr-89	Apr-89 Jun-93	Jun-93 May-95	May-95 Dec-98	Dec-98 Dec-00
Total	43.7	189.2	-255.9	55.6	-2.7	36.6	-25.0
Mining	-5.4	41.6	-22.9	-1.6	-2.3	-0.5	-0.1
Construction	5.7	9.8	-38.9	10.3	0.8	-1.5	1.1
Durables Goods Mfg.	11.5	31.2	-15.7	11.6	-1.4	5.1	-1.8
Nondurables Goods Mfg.	12.4	4.6	-5.9	4.3	-0.7	7.8	0.4
Trans., Comm., and Pub. Util.	0.2	10.4	-13.5	4.4	-2.7	1.1	-1.0
Wholesale Trade	1.2	14.4	-27.1	0.1	1.1	-0.3	-1.1
Retail Trade	13.1	31.8	-60.7	10.7	1.2	4.0	-6.4
Fin., Ins., and Real Estate	1.4	5.5	-18.4	3.2	2.1	1.4	-0.4
Services	2.7	28.0	-46.2	10.4	7.7	17.2	-13.5
Federal Government	-4.0	-6.4	-0.9	-2.9	-3.1	4.1	1.7
State & Local Government	4.9	18.4	-5.7	5.0	-5.5	-1.8	-3.8

Visual inspection, tedious though it may be, is the means for identifying where Oklahoma was receiving differential growth impulses, thereby accounting for the overall differential growth rates in total employment. Essentially, we look for sectors whose differential growth exceeded the aggregate differential growth. Table 1.10 results are the basis for the following discussion.

In the prior to energy-boom July 1969 through November 1973 period, Oklahoma grew by 5.8 percent more than the nation. Employment gains in construction, durable goods, nondurable goods, and retail trade far exceed the average employment differential gain. Durables and nondurables, combined, accounted for more than one-half of the differential employment gain. Mining sector and federal government employ-ments declined relative to the nation, meaning that these sectors could not have been drivers for differential positive growth. Other sectors, while showing positive growth, were not strong relative to the total employment differential. In the energy boom, employment in Oklahoma expanded by nearly a 22 percent differential in comparison with the nation. Mining sector employment grew by a 110 percent differential. Another dominant growth differential occurred in durable goods

manufacturing at 33.6 percent. Obviously, durable goods manufacturing was favorably impacted in the energy boom. Wholesale trade also appears to have been a driver with a growth differential exceeding the total differential. Retail trade and services also grew at strong rates, near the economy-wide differential. The predominant drivers in the boom period appear to be mining and durable goods manufacturing.

During the energy bust, all differential employment growth rates are negative, but by differing amounts in comparison to the nation. Total employment fell by a 21 percent differential. Mining-sector employment declined by a 21.7 percent differential, close to the overall differen-tial decline. All sectors experienced differential declines, but five sectors yielded differential changes that were less in absolute values than the overall decline, and thus, were comparatively favorable results for that dismal period. Examples include durable goods; nondurable goods; trans-portation, communications, and public utilities; services, and governmental employment. The big loser during this July, 1982 to April, 1989 period was construction, declining by a whopping 69 percent differential. Memories of the Savings and Loan fiasco come to mind.

Table 1.10

**Differential Oklahoma Growth Relative to the Nation
for Key Benchmark Periods**

	Jul-69 Nov-73	Nov-73 Jul-82	Jul-82 Apr-89	Apr-89 Jun-93	Jun-93 May-95	May-95 Dec-98	Dec-98 Dec-00
Total	5.8%	21.7%	-21.0%	4.8%	-0.2%	2.8%	-1.7%
Mining	-13.3%	110.3%	-21.7%	-3.8%	-6.6%	-1.6%	-0.3%
Construction	14.9%	19.7%	-68.9%	28.7%	1.9%	-3.1%	1.9%
Durables Goods Mfg.	14.4%	33.6%	-13.6%	11.1%	-1.4%	4.7%	-1.5%
Nondurables Goods Mfg.	24.6%	7.3%	-9.4%	7.3%	-1.1%	12.7%	0.6%
Trans., Comm., and Pub. Util.	0.4%	18.4%	-18.9%	6.8%	-3.7%	1.5%	-1.3%
Wholesale Trade	2.6%	28.4%	-35.7%	0.2%	1.9%	-0.5%	-1.6%
Retail Trade	11.0%	21.1%	-28.2%	5.0%	0.5%	1.6%	-2.4%
Fin., Ins., and Real Estate	3.8%	12.9%	-29.9%	5.4%	3.4%	2.2%	-0.5%
Services	2.5%	21.3%	-21.1%	4.0%	2.5%	5.0%	-3.3%
Federal Government	-6.8%	-12.0%	-1.7%	-5.6%	-6.6%	9.4%	3.6%
State & Local Government	4.3%	12.9%	-3.1%	2.5%	-2.5%	-0.8%	-1.6%

It is interesting to note that services employment expanded by 40.4 percent nationally during July, 1982 to April, 1989 on top of 45.3 percent growth in the November, 1973 to July, 1982 period. The services sector, even during the energy bust, and undoubtedly suffering secondary impacts from the declines in principal export sectors of the Oklahoma economy, experienced 19.3 percent growth. As shown in Table 1.6, from July, 1982 to April, 1989, the services sector added 42,300 jobs. Obviously, independent growth impulses were coming from the services sector. Federal and state and local government employment were the only other sectors to grow during this period.

April, 1989 to June, 1993 was a period of significant differential employment growth in Oklahoma relative to the nation. Employment grew by a 4.8 percent differential on top of a recession-diminished growth of 2.7 percent nationally. Mining sector and federal government employment were negatives in this period. Construction and durable goods comparative gains were principal drivers. Nondurables also recorded a significant differential advance as did transportation and public utilities. Construction, durable and nondurable goods manufacturing, transportation and public utilities, and services, appear to be

principal drivers of the positive total differential achieved in this period. Indeed, as Table 1.9 reveals, in terms of levels, rather than rates of change, the service sector differential employment gain, at 10,400, was close to the durables gain of 11,600 jobs.

June, 1993 to May, 1995 yielded a small negative differential in growth in Oklahoma. The mining sector continued its decline at a negative 6.6 percent differential rate. Construction; wholesale trade; finance, insurance and real estate; and, services recorded positive differentials. Durable and nondurable goods, transportation and public utilities; and governmental employment grew less rapidly than the nation. The services sector positive 2.5 percent differential likely kept the overall relative change near the zero mark with a 7,700 differential employment gain.

The May, 1995 to December, 1998 period was one of significant advance in employment in Oklahoma relative to the nation. National employment expanded by 9.0 percent during this period. Oklahoma grew by 11.4 percent. Again, the mining sector declined relative to the nation. Construction, wholesale trade, and state and local government were the only other negatives. Nondurable goods; federal government; services;

durable goods; finance, insurance and real estate; retail trade; and transportation, communications and public utilities recorded the largest relative percentage gains, in that order. In terms of differential levels, the services component accounted for 17,200 of the 36,600 job gain. Durables and nondurables combined accounted for nearly a 13,000 differential job gain.

The December, 1998 to December, 2000 period was a time of suppressed growth in Oklahoma. National employment expanded by 3.8 percent during this period; Oklahoma's grew by only 2.1 percent. Differential growth fell in durable goods; transportation, communications, and public utilities; wholesale trade; retail trade; services; and, state and local government by amounts near to or exceeding the negative 1.7 percent decline overall. Particularly disturbing was the 3.3 percent relative decline in the services sector, disturbing because of the size of this sector. In December, 2000, this sector accounted for about 29 percent of total employment. In terms of differential levels, this sector represented more than one-half of the total differential job decline of 25,000.

Table 1.10 can be examined for consistency in the sign of differential growth for the various sectors. That is, when the overall growth differential is positive, is sector growth also positive? Also, when the growth differential is negative, is sector growth also negative? Three sectors (durable goods; nondurable goods; and transportation, communications, and public utilities) are precisely consistent in the sign of differential change. This is important because these sectors, along with the mining sector and certain services are export drivers for the Oklahoma economy. That is, these sectors represent jobs in the state that produce products for export to other states and nations. They are not the proverbial "taking in each other's laundry" types of jobs. Federal employment is a pure export sector, as well, but comparatively small in employment and not very volatile. Still, it is an important export sector in that the jobs here are financed largely by other states. Oklahoma is a net beneficiary of federal largesse.

Wholesale trade likely has important export elements, too, and the signs of its changes correspond fairly closely to the overall differential change, matching in five of the seven cases. The signs for services match in six of the seven cases and the shear size of this sector renders it important whatever the magnitude of differential change may be. Theoretically, retail trade; finance, insurance, and real estate; and, state and local government are close to pure support sectors. Certainly there are examples of firms in these sectors that are export-oriented. Sonic corporate headquarters in Oklahoma City is an example of an export-oriented firm in the retail sector. But, the great bulk of the jobs in these sectors are supported by local consumption, and, therefore, are not export-oriented.

As noted in the methodology section, employment data by sector are available from 1990 using the new NAICS classification system. This system disaggregates the services sector. Thus, it my enable us to see in greater detail what the comparative differential drivers have been for the Oklahoma economy since 1990. Employment levels for key benchmark dates are shown in Table 1.11.

Table 1.12 reports percentage growth rates for key benchmark periods for national employment. These rates, by industry sector, were applied to base period Oklahoma employment levels to obtain hypothetical employment levels that would have been achieved had Oklahoma grown, or declined, at national rates. Table 1.13 shows the resulting differential levels once the hypothetical levels are subtracted from actual employment. Examining the total differentials, we see an alternating pattern of positive and negative values. Sectoral contributions to this total differential reveal the importance of professional and business services as a consistent indicator of the direction of change in the total differential. Professional and business services grew from 110,200 in January, 1990 to 177,500 in November, 2004. This sector appears to have been an important driver for the Oklahoma economy during the 1990s to the present.

Table 1.11

**Oklahoma Employment Using the NAICS System
for Key Benchmark Dates**

	Jan-90	Jun-93	May-95	Dec-98	Dec-00	Mar-02	Nov-04
Total	37.6	32.2	30.6	28.1	28.6	27.8	31.6
Natural Resources and Mining	40.6	44.7	50.0	57.6	63.3	65.0	63.5
Construction	98.6	99.5	105.4	116.2	118.2	101.4	93.3
Durable Goods	54.4	56.3	56.9	60.8	58.9	54.1	48.3
Non-Durable Goods	49.6	49.6	51.9	57.3	57.3	56.8	53.9
Wholesale Trade	146.1	149.5	158.2	174.3	181.1	174.7	168.6
Retail Trade	51.5	52.6	53.8	58.6	58.1	56.0	53.0
Transportation & Utilities	22.8	23.4	25.2	32.6	36.6	36.4	31.3
Information	67.8	67.9	72.5	81.8	82.1	83.2	84.2
Financial Activities	95.6	108.1	120.7	158.3	167.8	162.8	159.2
Professional and Business Services	110.2	130.0	142.4	164.9	164.8	170.9	177.5
Educational and Health Services	92.9	103.8	113.7	116.7	126.1	127.4	127.7
Leisure and Hospitality	51.6	55.8	59.1	68.0	71.0	75.8	73.9
Other Services	51.6	47.7	43.4	46.1	46.3	45.9	44.8
Federal Government	73.9	75.9	76.0	78.2	78.8	81.6	80.0
State Government	135.4	148.7	149.5	156.8	164.8	172.1	170.5
Local Government	37.6	32.2	30.6	28.1	28.6	27.8	31.6

Table 1.12

US Percentage Growth Rates

	Jan-90 Jun-93	Jun-93 May-95	May-95 Dec-98	Dec-98 Dec-00	Dec-00 Mar-02	Mar-02 Nov-04
Total	1.3%	5.7%	8.9%	4.0%	-1.5%	1.2%
Natural Resources and Mining	-13.1%	-3.4%	-2.0%	-4.1%	-2.2%	0.8%
Construction	-12.5%	9.5%	22.4%	6.5%	-0.3%	3.6%
Durable Goods	-8.5%	5.1%	4.8%	-0.1%	-11.6%	-6.4%
Non-Durable Goods	-1.9%	0.1%	-4.4%	-4.0%	-7.8%	-7.1%
Wholesale Trade	-3.8%	6.7%	7.7%	0.8%1	-3.8%	0.3%
Retail Trade	-2.2%	6.7%	6.2%	4.3%	-1.9%	-0.4%
Transportation & Utilities	1.9%	5.2%	8.1%	4.4%	-4.9%	0.6%
Information	-0.3%	6.4%	15.9%	12.7%	-6.7%	-8.7%
Financial Activities	1.6%	1.7%	11.3%	2.2%	1.1%	3.6%
Professional and Business Services	6.2%	11.2%	21.7%	8.5%	-4.8%	4.1%
Educational and Health Services	14.5%	7.8%	10.4%	4.7%	4.8%	6.3%
Leisure and Hospitality	4.5%	7.8%	8.8%	5.2%	-0.1%	3.6%
Other Services	3.4%	4.5%	10.4%	3.3%	3.2%	0.8%
Federal Government	-1.5%	-3.2%	-5.1%	-1.8%	-0.4%	-1.2%
State Government	5.7%	3.4%	0.3%	3.5%	4.1%	1.2%
Local Government	5.7%	3.3%	7.0%	4.8%	3.2%	2.1%

Table 1.13

Hypothetical Differentials in Oklahoma Employment Levels

	Jan-90 Jun-93	Jun-93 May-95	May-95 Dec-98	Dec-98 Dec-00	Dec-00 Mar-02	Mar-02 Nov-04
Total	49.1	-2.1	37.7	-8.0	7.0	-48.8
Natural Resources and Mining	-0.4	-0.5	-1.9	1.6	-0.1	3.6
Construction	9.2	1.1	-3.7	2.0	1.9	-3.8
Durable Goods	9.3	0.8	5.8	2.0	-3.0	-1.6
Non-Durable Goods	2.9	0.6	6.3	0.5	-0.1	-2.0
Wholesale Trade	1.9	-0.9	1.3	-0.5	1.7	-3.0
Retail Trade	6.6	-1.4	6.3	-0.6	-3.0	-5.3
Transportation & Utilities	0.1	-1.5	0.4	-3.0	0.7	-3.3
Information	0.7	0.2	3.5	-0.2	2.3	-2.0
Financial Activities	-0.9	3.4	1.1	-1.5	0.2	-2.0
Professional and Business Services	6.5	0.5	11.4	-4.0	3.0	-10.3
Educational and Health Services	3.7	2.4	7.6	-7.9	-1.8	-4.2
Leisure and Hospitality	6.7	1.8	-7.0	3.3	1.5	-4.3
Other Services	2.5	0.8	2.8	0.8	2.5	-2.5
Federal Government	-3.1	-2.8	4.9	1.0	-0.2	-0.6
State Government	-2.1	-2.5	2.0	-2.2	-0.4	-2.6
Local Government	5.5	-4.1	-3.1	0.5	2.0	-5.1

Table 1.14

Oklahoma Percentage Differential Growth Rates

	Jan-90 Jun-93	Jun-93 May-95	May-95 Dec-98	Dec-98 Dec-00	Dec-00 Mar-02	Mar-02 Nov-04
Total	4.2%	-0.2%	2.9%	-0.6%	0.5%	-3.3%
Natural Resources and Mining	-1.2%	-1.6%	-6.2%	5.8%	-0.5%	13.0%
Construction	22.8%	2.4%	-7.3%	3.5%	2.9%	-5.9%
Durable Goods	9.4%	0.8%	5.5%	1.7%	-2.6%	-1.6%
Non-Durable Goods	5.3%	1.0%	11.1%	0.9%	-0.2%	-3.7%
Wholesale Trade	3.8%	-1.9%	2.6%	-0.8%	2.9%	-5.2%
Retail Trade	4.5%	-0.9%	4.0%	-0.4%	-1.7%	-3.0%
Transportation & Utilities	0.2%	-2.8%	0.7%	-5.2%	1.2%	-5.8%
Information	3.2%	1.0%	13.8%	-0.5%	6.2%	-5.4%
Financial Activities	-1.4%	5.0%	1.5%	-1.8%	0.2%	-2.3%
Professional and Business Services	6.8%	0.4%	9.4%	-2.5%	1.8%	-6.3%
Educational and Health Services	3.4%	1.8%	5.4%	-4.8%	-1.1%	-2.5%
Leisure and Hospitality	7.2%	1.7%	-6.1%	2.8%	1.2%	-3.3%
Other Services	4.8%	1.4%	4.7%	1.1%	3.6%	-3.3%
Federal Government	-6.0%	-5.8%	11.3%	2.1%	-0.4%	-1.3%
State Government	-2.9%	-3.3%	2.6%	-2.8%	-0.4%	-3.2%
Local Government	4.1%	-2.8%	-2.1%	0.3%	1.2%	-3.0%

Table 1.15

NAICS System Based Oklahoma Employment

	1990	1995	2000	2004	1990-2000 Growth	2000-2004 Growth
Total	1195.8	1315.6	1489.4	1458.6	2.4%	-0.5%
Natural Resources and Mining	38.4	30.4	27.0	30.8	-3.9%	3.3%
Construction	41.2	50.3	61.8	63.1	4.5%	0.5%
Durable Goods	101.5	104.6	117.6	92.6	1.6%	-6.0%
Non-Durable Goods	55.1	56.8	59.8	49.1	0.9%	-4.9%
Wholesale Trade	50.4	52.0	57.1	54.3	1.4%	-1.3%
Retail Trade	145.0	159.3	179.3	169.4	2.4%	-1.4%
Transportation & Utilities	52.7	54.3	57.7	53.2	1.0%	-2.0%
Information	22.9	25.3	35.6	31.6	4.9%	-3.0%
Financial Activities	67.9	73.6	81.7	84.5	2.1%	0.9%
Professional and Business Services	97.6	121.9	164.8	158.1	5.8%	-1.0%
Educational and Health Services	113.3	143.8	163.0	177.2	4.0%	2.1%
Leisure and Hospitality	95.5	113.6	126.1	126.6	3.1%	0.1%
Other Services	52.0	59.5	70.1	74.3	3.3%	1.5%
Federal Government	50.8	43.5	47.9	44.4	-0.7%	-1.9%
State Government	75.5	76.0	78.6	80.6	0.4%	0.6%
Local Government	135.5	150.0	161.2	169.1	1.9%	1.2%

Table 1.14 displays the percentage differentials. Durables and nondurables appear to be fairly consistent performers, especially through the year 2000. Employment in manufacturing began a precipitous decline in 2000 both nationally and in Oklahoma. Wholesale trade, retail trade, transportation and utilities, information, and professional and business services match in sign with the direction of the total differential in five or six out of the six periods shown in Table 1.14. The retail trade matches likely have more to do with the supportive services role of this industry.

The NAICS data classification system provides supporting evidence of the important drivers of differential growth in Oklahoma. From this and the SIC data analysis, these drivers appear to be mining, durable and nondurable goods manufacturing, wholesale trade, transportation and utilities, information, and professional and business services.

NAICS System Growth Rates

The NAICS system is very new and it should prove interesting to see just how the Oklahoma economy has changed since 1990, the earliest date for which this system is available. Table 1.15 shows the average annual employment levels in five-year increments, except for 2004. The 2004 data are averaged through the first 11 months. Average annual growth rates are shown for 1990 to 2000 and 2000 to 2004. From 1990 to 2000, the state grew at a quite respectable 2.4 percent. Those sectors that grew at rates greater than 2.4 percent expanded their share of total employment. Included in this group are the construction, information, professional and business services, education and health services, leisure and hospitality, and other services.

Notice that few of Oklahoma's historic drivers advanced their shares, and this is disturbing. Equally disturbing are the declines in rates of growth among the historic drivers of the Oklahoma economy in the 2000 to 2004 period. Durable goods, nondurable goods, wholesale trade, transportation and utilities, professional and business services, and federal government employment, all of which have an export orientation, fell at rates exceeding the aggregate rate of decline. Interestingly, the mining sector experienced positive growth in the 2000 to 2004 years. Perhaps we are coming full circle.

Conclusion

This study explores historic growth of establishment-based employment in Oklahoma relative to the nation. By examining the behavior of Oklahoma's share of national employment, monthly detailed statistics on year-over-year growth rates, the secular trend in sustained rates of growth, cyclical deviations about the trend, and industry-sector sources of differential growth, we arrive at several conclusions. First and foremost among these conclusions is that Oklahoma total employment base has expanded much like the nation's. With the passage of 65 years since the beginning of the establishment-based employment survey, Oklahoma finds itself only slightly ahead of where it began, at 1.11 percent of national employment.

Post-recessionary turning points from employment troughs coincide closely with the national experience. Rates of growth between recessionary lows are also in close correspondence, with the notable exception of the energy boom/bust years. Variation in employment growth rates between recessionary lows is slightly more volatile in Oklahoma, but that is somewhat to be expected given that the national totals smooth-out a lot of interstate variation. The energy boom/bust years were clearly an outlier in the Oklahoma experience. Estimates of the size of the energy employment bubble from 223,000 to 236,000 jobs at the peak of the boom. Abstracting from that experience, Oklahoma's growth still closely parallels the nation's.

Periods of differential growth in Oklahoma relative to the nation are dissected in this study to uncover the industry sources of differential growth. In this process, certain industries stand out in the evidence as drivers of that differential growth. Many of the sectors identified as drivers of differential growth seem to be waning in importance in recent years. As we look to the future, these developments are certainly a concern.

To be sure, the US economy has undergone considerable transformation in the past 65 years, and the evidence is strong that the Oklahoma economy has found a consistent role for itself in all phases. This much is certain: The Oklahoma economy is dependent upon the national economy for its growth impulses. Doubts will form from time to time, like those occasioned by the 2000 to 2004 experience. Given sufficient time, however, the historic evidence indicates that there should be little doubt that the Oklahoma economy will once again regain its balance relative to the rest of the country.[4]

Endnotes

[1]This note provides a brief tutorial on the mean and standard deviation for those readers who may not be familiar with elementary statistics or, for whom, it has been some time since they studied such material. The arithmetic mean and the standard deviation are two frequently used measures of central tendency and variation. As any elementary statistics book will note, the arithmetic mean is simply the sum of the observations divided by the total number of observations. If the ith observation of variable X is represented by X_i, then the arithmetic mean is

$$\overline{X} = \sum_{i=1}^{n} X_i / n.$$

The standard deviation closely resembles another mean, and much confusion about the standard deviation becomes clear when seeing it as such. Let $Y_i = (X_i - \overline{X})^2$, that is, subtract from a value of X the mean of X and square the resulting number. Now, $\sum_{i=1}^{n} Y_i / n$ is certainly a mean of transformed X values and the square-root of this mean will be very close to

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the value of the standard deviation. Thus, the standard deviation is closely approximated by the square-root of a mean, the root of the mean squared deviation. The formula for the standard deviation is

$$\sigma_x = \sqrt{\frac{\sum_{i=1}^{n}(X_i - \overline{X})^2}{n-1}}.$$ The reason for this

elementary discussion is simply to note that the standard deviation has distinct usefulness as a measure of volatility. Close examination of the formula shows, working from the inside-out, that first the difference is computed for each X value from the mean. These deviations from the mean are squared, yielding all positive values, and the sum is taken for all of these squared differences. That result is divided by the number of observations minus 1. The value *n-1* is used instead of *n* to reflect the loss of one degree of freedom when the sample mean is used instead of the true mean in the computation of the standard deviation. The square-root is then taken to return to the original units of measure. With the *n-1* instead of *n* adjustment, the expected value of the standard deviation is equal to the true standard deviation.

Now let's say that the X values represent monthly growth rates of employment over some span of time. Employment growth rate might be 0.50 percent month 1, -0.25 percent in month 2, and 0.12 percent the next, and so on. Over a broad span of time, the monthly growth rate might have averaged, say, 0.20, yielding an average annual growth rate of about 12 times the monthly growth rate, or 2.4 percent. (Actually, the 12 month growth rate would be slightly higher than 2.4 percent owing to monthly compounding.) The value of the standard deviation is in providing a measure of volatility in that average growth rate. If the standard deviation is only 0.05 percent, it would appear that growth has been very steady or non-volatile in that the standard deviation would be only one-fourth or 25 percent of the mean rate of growth. If the standard deviation is 0.40 percent, however, one would have to say that growth has been highly volatile. In this case the standard deviation would be 200 percent of the mean. The ratio of the standard deviation to the mean is often used as a measure of relative volatility. This ratio is called the *coefficient of variation*, or C.V.

[2]Table 1.2 shows the computation of monthly growth rates using the natural log of a ratio to compute the growth rates. This note explains why natural logs are utilized. The natural log of a number is the power by which the base of the natural logarithmic system, or

e, which is approximately equal to 2.71828, must be raised to equal that number. Thus, in the expression $y = e^x$ or $y = 2.71818^x$, the value of x is the natural log of y. For example, 7.389 approximately equals e^2. Thus 2.0 is the natural log of 7.389.

When two numbers are fairly close to one another, the natural log of the ratio of these two numbers approximates the percentage change. Referring to the table 1.2 example, because employment in month 1 is 1200 and employment in month 2 is 1220, the percentage change in employment is 20/1200, or 1/60, or 1.67 percent, rounded. The natural log of the ratio (1220/1200) equals 1.65 percent, again rounded. We see that the natural log of the ratio approximates the conventional percentage change. The advantage in using natural logs for computing growth rates is seen in the behavior of the arithmetic mean for month-to-month growth rates. As is shown in Table 1.2, the average of all of the monthly growth rates for a set period of time equals the natural log of beginning and ending employment levels divided by the number of interceding months. In a formula this last sentence is equivalent to:

$$\sum_{t=2}^{T} \ln(X_t / X_{t-1}) / (T-1) = \ln(X_T / X_1) / (T-1),$$

Where the left-hand side of this expression is the average monthly growth rate.

This works because:

$$\ln(X_T / X_1) / (T-1) =$$

$$\ln\left(\frac{X_2}{X_1}\frac{X_3}{X_2}\frac{X_4}{X_3}...\frac{X_{T-1}}{X_{T-2}}\frac{X_T}{X_{T-1}}\right) / (T-1)$$

$$= \left[\begin{array}{c} \ln\left(\frac{X_2}{X_1}\right) + \ln\left(\frac{X_3}{X_2}\right) + \ln\left(\frac{X_4}{X_3}\right) + ... + \\ \ln\left(\frac{X_{T-1}}{X_{T-2}}\right) + \ln\left(\frac{X_T}{X_{T-1}}\right) \end{array}\right] / (T-1)$$

$$= \sum_{t=2}^{T} \ln(X_t / X_{t-1}) / (T-1)$$

Thus, the average monthly growth rate can be computed by simply using the natural log of the ratio of the ending to beginning employment levels, dividing that result by number of intervening months. The implied compounded annual growth rate is found

simply by taking *e* or 2.71812 to the power of 12 times the average monthly growth rate and subtracting 1.0 from the resulting quantity. For example, if the monthly growth rate is 0.2 percent, then the implied annual growth rate is $e^{12*.002}$ -1.0 = $e^{0.024}$ – 1.0 = 1.02429-1.0 = 2.429 percent.

[3] The methodology used to identify those industry sectors accounting for differential growth requires some further elaboration. As noted on page 17, the first step is to compute how much each sector grew at the national level. This national growth rate is then used to compute a hypothetical employment level for Oklahoma. For example, if the mining sector grew by 2.0 percent nationally, this 2.0 percent growth rate would be applied to Oklahoma's base employment to yield a hypothetical Oklahoma mining sector employment level had Oklahoma grown at the national rate. Computing such quantities for all sectors and summing the results, the second step, yields a hypothetical total employment level that would have resulted had each of Oklahoma's sectors grown at national rates. Subtracting this hypothetical total employment value from the actual employment level shows the net differential. This net total differential divided by the base employment level yields the excess or deficit growth rate, an important benchmark rate. For example, examination of Table 1.9 reveals that over the July, 1969 to November, 1973 period, Oklahoma grew by 43,700 more jobs than would have been the case if each sector grew at national rates. The sum of the sectoral employment differentials is that same 43,700 jobs. That 43,700 jobs divided by the

initial employment level of 748,700 yields a growth of 5.843 percent. Differential growth rates are then computed for each industry sector. This average total differential growth rate then becomes a benchmark for comparing differential sectoral growth rates. Sectors that grew at rates higher than that 5.8 percent average growth are seen as the principal contributors to differential growth. Durable and nondurable goods, manufacturing, construction, and retail trade are seen as the principal contributors to differential growth during that July, 1969 to November, 1973 period. All other sectors grew at lower differential rates, or actually contracted in net differential terms.

[4] Two other studies by the author deserve mention because they provide evidence showing that Oklahoma's industrial employment patterns and occupational structure fairly closely resemble the nation's. Similarities in structure imply nothing about similarities in growth rates and the timing of growth episodes, however. Combined with this present study, the three together accentuate the binding-ties that the Oklahoma economy has with national growth patterns. These other two studies are as follows:

"Growth of the Oklahoma Economy: The Roles of Wages and Jobs," *State Policy and Economic Development in Oklahoma: 2002*, Oklahoma 21st Century, State Chamber of Commerce, 1-24.

"Oklahoma's Occupational Structure and Implications for Income Growth," *State Policy and Economic Development in Oklahoma: 2003*, Oklahoma 21st Century, State Chamber of Commerce, 59-79.

Seamless Education:
Chipping Away at "The Oklahoma Problem"

Conversations about economic development in Oklahoma often begin with a discussion of what might be called "The Oklahoma Problem," that is, the state's low income level relative to the nation. Most frequently cited as specific evidence of the problem is the state's per capita personal income which seems to be stuck year after year at around four-fifths of its national counterpart.

Many causes have been suggested for "The Oklahoma Problem"—most of which have been reviewed in previous issues of *State Policy and Economic Development in Oklahoma*. "The Oklahoma Problem" is so persistent and has so many dimensions that state policymakers have no choice but to chip away at one issue after another, whether it be tax rates and tax structure, tort reform, the promotion of healthy lifestyles, access to financial capital, the regulatory framework, rural economic development, highways and transportation, and specific sectors such as bio-technology—to name a few.

The remarks that follow focus on what is arguably the most important dimension of "The Oklahoma Problem," i.e., the relatively low levels of educational attainment of the state's adult population. Within this dimension of insufficient educational attainment, the focus is narrowed further to looking at the extent to which the state-supported educational system is succeeding in providing students with seamless processes in which students are moving efficiently through the system from the 9th grade on so that they reach high levels of attainment in a timely manner.[1]

Emphasis is on the *economic* implications of having a well-educated Oklahoma population. There are, of course, many other *noneconomic* benefits of high educational attainment—ranging from less crime to better health to political and cultural dimensions.[2]

The analysis is presented in four major sections. First, recent (1990-2003) U.S. Census Bureau data are used to sharpen the conclusion that educational attainment is a major dimension of "The Oklahoma Problem." Second, the state's Oklahoma Office of Accountability data provide the basis for creating a measure of the degree of seamless success in the state-supported educational system. That measure, referred to as the "9th grade success rate," is an indication of the ultimate higher education success of 9th graders. The variables used to calculate the 9th grade success rate are compared with neighboring states and national averages in the third section. The fourth section emphasizes that something is being done about this dimension of "The Oklahoma Problem." Programs and policies are being implemented by the state's education agencies in order to facilitate student progress toward high levels of educational attainment. Concluding remarks point to continued challenges.

Educational Attainment and "The Oklahoma Problem"

There is a strong positive relationship between earnings and educational attainment. It is, therefore, not surprising that geographic areas such as Oklahoma—with populations having relatively low levels of educational attainment—lag the nation in terms of income.

The Education-Earnings Linkage Once More

Education is "investment in human capital" with greater investment yielding greater receipts. This positive relationship between extent of education and earnings receives much emphasis.

For example, the Oklahoma State Department of Education distributes in the schools thousands of copies of a four-color magazine entitled *Oklahoma Choices . . . a guide to life after high school.*[3] The 2004-05 edition of that publication includes a page with the heading "Learn it to Earn it!" presenting Census Bureau data for 2000 showing median earnings and levels of educational attainment, along with estimates of lifetime earnings. Attention-getting data include the estimate that in 2000 the lifetime earnings of someone with a bachelor's degree are $2.1 million, compared with $1.2 million for someone with only a high school diploma.

In Table 2.1, a related and more current set of Census Bureau data on education and money earnings is presented for the total U.S. population and for males and females working full-time, year-round in 2003. (It is important to use full-time, year-round workers to examine the true effects of education on earnings because of the tendency for persons with relatively low levels of education to be employed less than full time.) The final column in Table 2.1 allows a quick comparison of earnings by presenting index numbers that relate earnings for different levels of achievement with the earnings of someone with only a high school diploma set at 100. For every dollar that a high school graduate earned in 2003, someone with less than a 9th grade education earned 66 cents, a high school dropout earned 75 cents, and a college graduate with no further education earned $1.62. Those with advanced degrees earned two to three times as much as a high school graduate.

Oklahoma's Educational Attainment Deficit

Oklahoma is a good example of a state with relatively low income and relatively low levels of educational attainment—particularly at the high end of the attainment spectrum. Data presented in Tables 2.2 and 2.3 permit comparison of the educational attainment of Oklahoma's population 25 and over with that of the nation as a whole for 1990, 2000, and 2003.

Table 2.1

Total Money Earnings by Educational Attainment, Persons 25 and Over, Worked Full-time, Year-round, Oklahoma and U.S., 2003

Education attainment	Median earnings, male (dollars)	Median earnings, female (dollars)	Median earnings, all persons (dollars)	Index numbers, H.S. graduate = 100[a]
Total, all levels of attainment	41,939	31,565	37,189	121
Less than 9th grade	21,217	16,907	20,180	66
9th to 12th grade, nongraduate	26,468	18,938	22,939	75
High school graduate including GED	35,412	26,074	30,766	100
Some college, no degree	41,348	30,142	35,714	116
Associate degree	42,871	32,253	37,605	122
Bachelor's degree	56,502	41,327	49,889	162
Masters degree	70,640	50,163	59,508	193
Doctorate	87,131	67,214	79,403	258
Professional degree	100,000	66,491	95,699	311

[a]For all persons.

Source: U.S. Census Bureau, Current Population Survey, Annual Demographic Survey, March Supplement, 2004.

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Table 2.2

Educational Attainment, Persons 25 and Over, Oklahoma and U.S, 1990, 2000, and 2003
(percent of population 25 and older)

	Oklahoma 1990	U.S. 1990	Oklahoma 2000	U.S. 2000	Oklahoma 2003	U.S. 2003
Less than 9th grade	9.8	10.4	5.6	7.0	5.1	6.5
9th to 12th grade, no diploma	15.6	14.4	14.3	11.5	11.6	9.9
High school graduate (including equivalency)	30.5	30.0	31.2	29.6	32.4	29.8
Some college, no degree	21.3	18.7	23.0	20.5	22.6	20.3
Associate degree	5.0	6.2	5.7	6.4	6.4	7.0
Bachelor's degree	11.8	13.1	13.8	16.0	14.7	16.9
Graduate or professional degree	6.0	7.2	6.4	9.0	7.2	9.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
High school graduate or higher	74.6	75.2	80.1	81.5	83.3	83.6
Associate degree or higher	22.8	25.2	25.9	31.4	28.3	33.5
Bachelor's degree or higher	17.8	20.3	20.2	25.0	21.9	26.5

Source: U.S. Census Bureau, SF3 File, 1990 Census of Population, American Community Survey, 2000, 2003.

Table 2.3

High School Graduate and Above Shares of the Population,
Oklahoma Compared with the U.S., 1990, 2000, and 2003

	Oklahoma Number	Oklahoma Percent	U.S. Percent	Oklahoma Number with U.S. Percent	Oklahoma Excess or Deficit
1990					
Number, 25 and over	1,995,424	100.0	100.0	1,995,424	
High school graduate or higher	1,488,463	74.6	75.2	1,500,559	-12,096
Some college, no degree or higher	880,560	44.1	45.2	901,932	-21,372
Associate degree or higher	455,335	22.8	26.5	528,787	-73,452
Bachelor's degree or higher	354,969	17.8	20.3	405,071	-50,102
Graduate or professional degree	118,857	6.0	7.2	143,671	-24,814
2000					
Number, 25 and over	2,137,971	100.0	100.0	2,137,971	
High school graduate or higher	1,712,515	80.1	81.5	1,742,446	-29,932
Some college, no degree or higher	1,045,468	48.9	51.9	1,109,607	-64,139
Associate degree or higher	553,734	25.9	31.4	671,323	-117,588
Bachelor's degree or higher	431,870	20.2	25.0	534,493	-102,623
Graduate or professional degree	136,830	6.4	9.0	192,417	-55,587
2003					
Number, 25 and over	2,185,412	100.0	100.0	2,185,412	
High school graduate or higher	1,820,448	83.3	83.6	1,827,004	-6,556
Some college, no degree or higher	1,112,375	50.9	53.8	1,175,752	-63,377
Associate degree or higher	618,472	28.3	33.5	732,113	-113,641
Bachelor's degree or higher	478,605	21.9	26.5	579,134	-100,529
Graduate or professional degree	157,350	7.2	9.6	209,800	-52,450

Source: U.S. Census Bureau, 1990 Census of Population, SF3 File; American Community Survey, 2000, 2003.

Table 2.2 contains data on the percentage allocation of the population according to seven levels of attainment ranging from less than a 9th grade education to a graduate or professional degree. From the point of view of the percent of Oklahoma adults with *at least* a high school education, the state compares favorably with the national average and has improved at about the same pace as the nation during 1990-2003. In the latter year, 83.3 percent of Oklahomans had at least graduated from high school, while the share for the U.S. was a virtually identical 83.6 percent.

When we turn to an examination of the attainment of higher levels of education—percent with associate degree or higher, with bachelor's degree or higher, and with graduate or professional degrees—Oklahoma is significantly behind the national norms. In the examination of the extent of a "seamless" public education system in Oklahoma we will emphasize a measure of the indicated success of 9th graders in attaining an associate degree or bachelor's degree in a reasonable amount of time. In Table 2.2, Oklahoma's share of adults with an associate degree or higher was 22.8 percent in 1990, 25.9 percent in 2000, and 28.3 percent in 2003. This indicates a substantial upgrading in the state's high-end educational attainment. However, when the shares in this category are compared with shares for the nation, we observe that in 1990 the state's share was 90.5 percent of the national average, but that this share did not rise as rapidly as the nation's share during the 1990s, and in 2000 the state's share had dropped to 82.5 percent of the nation. By 2003, the state had picked up a bit with a share rising to 84.5 percent of the national average share. However, the share of Oklahomans 25 and over in 2003, *in comparison with the U.S.*, had failed to return to its 1990 level.

Table 2.3 presents an alternative approach to comparing Oklahoma's high-end educational attainment with that of the nation. We start with the actual numbers of state residents 25 and over falling into five classes of attainment ranging from high school graduate or higher to graduate or professional degree. Then we apply the national percentage shares in the various levels of attainment to the total number of Oklahomans 25 and over in order to simulate what the state's numbers

would look like if it had the same relative attainment as that of the nation. When the actual number of persons in each category is subtracted from the simulated number, an estimate is obtained indicating how many more Oklahomans in each category would be needed in order to match the national share. For example, in 1990 it would have taken 73,452 more Oklahomans with an associate degree or above for the state to achieve the national share of 26.5 percent. That deficit in attainment rose to 117,588 in 2000 and dropped to 113,641 in 2003.

The data in the Tables 2.2 and 2.3 also indicate that the state is further behind the nation in terms of persons with bachelor's degrees and graduate or professional degrees than it is with respect to the share with the associate degree. In 1990 it would have taken 50,102 more Oklahomans 25 and over with bachelor's degrees or above for the state to match the national norm share with this level of educational attainment; that gap more than doubled in 2000 and 2003.

Especially important in terms of the emphasis on high-technology development is the deficit in number of persons with graduate or professional degrees. In 2003, it would have taken 52,450 more Oklahomans with such attainment for the state to match the national share.

A correlate of relatively low educational attainment can be observed in U.S. Census Bureau data on the number of persons in various earnings classes. Table 2.4 presents data on those working full-time, year round in 1999 with shares by earnings class for both Oklahoma and the nation. The table then indicates what the mix of employment by earnings class would have looked like in Oklahoma if the state had had *the same* earnings distribution as the nation. If those simulated figures are subtracted from the actual employment, an estimate is obtained of the excess or deficit of jobs by earnings class in Oklahoma as compared to the U.S. In this context, the state had an excessive number of employed persons in the table's three lowest earnings classes ranging from $1 to $29,999 and a big deficit for those with earnings in excess of $30,000. Note, for example, that it would have taken 44,750 more full-time year round workers earning $75,000 or more for the state just to have matched the national norm.

Table 2.4

Full-time, Year-round Employment by Earnings Class
Oklahoma and the U.S., 1999

Earnings class	Number, Oklahoma	Percent by earnings class, Oklahoma	Percent by earnings class, U.S.	Oklahoma number with U.S. percent	Oklahoma excess or deficit
$1 to $9,999	49,538	4.70	3.12	32,892	16,646
$10,000 to $19,999	262,740	24.92	17.44	183,858	78,882
$20,000 to $29,999	277,767	26.35	23.47	247,428	30,339
$30,000 to $49,999	289,095	27.42	30.82	324,914	-35,819
$50,000 to $74,999	113,681	10.78	15.08	158,978	-45,297
$75,000 or more	61,411	5.83	10.07	106,161	-44,750
Total	1,054,232	100.00	100.00	1,054,232	0

Source: U.S. Census Bureau, 2000 Census of Population, STF3 File.

Oklahoma's Educational Attainment Deficit: A "Chicken and Egg" Issue

There are two dimensions to the state's educational attainment deficit—both of which are relevant to "The Oklahoma Problem" of low income. (1) Low levels of educational attainment result from Oklahoma's relatively large number of jobs not requiring high levels of educational attainment. (2) However, the state's mix of employment opportunities may also be heavily weighted with such jobs because of the relatively low levels of educational attainment of the available local labor supply. As the state's economy has developed, jobs with low educational requirements have attracted less well educated workers, while the stock of Oklahoma labor has tended to attract economic activities requiring work forces with relatively lower educational attainment.

We are not going to grapple with this "chicken and egg" problem in this report. We are, however, going to emphasize that the state's public education system plays an important role in chipping away at "The Oklahoma Problem" when it adds highly educated young persons to the state's potential employment base.

The Academic Success of 9th Graders

An indicator of the academic success of students beginning high school can be obtained by multiplying the high school graduation rate (percent of 9th graders graduating) by the Oklahoma college going rate (percent going on to college) and by the college completion rate (percent getting an associate degree in three years or a bachelor's degree in six). This is referred to as "the 9th grade success rate." The term "success" in this context is simply a handy way of referring to a student's seamless flow through to the completion of high school and either an associate degree or bachelor's degree. There is no intention to minimize the importance of effective preparation of students who enter the workforce right after high school, or the importance of efforts to assist students who would otherwise drop out of high school. The point, however, is that whatever the causes of "The Oklahoma Problem," it is unlikely that those causes include a relative shortage of high school graduates or high school dropouts in the state's labor force.

We will introduce the results of this calculation for the state as a whole. Then we will note some of the methodological limitations of this as a measure of seamless success. Finally, we will review 9th grade success rates for selected school districts and be reminded of the potential for the intergenerational transmission of low educational attainment in Oklahoma.

Statewide 9th Grade Success Rates

Ninth grade success rates and their three components for the 1995-96 through the 2002-03 school years are presented in Table 2.5. During this period there has been significant improvement in the likelihood of academic success of 9th graders, with the rate rising from 12.5 percent to 14.9 percent. However, this increase in success was due entirely to an increase in the college completion rate from 33.0 percent to 39.8 percent. This overall increase in the completion rate was spread unevenly across the three major types of higher education institutions. For comprehensive universities (University of Oklahoma and Oklahoma State University) the rate increased from 44.0 to 55.8 percent; for the regional state universities such as Central State University the increase was from 27.6 to 31.8 percent, and for the two-year colleges such as Rose State College the increase was from 14.3 to 19.4 percent.[4]

Over the eight years 1995-96 to 2002-03, there was very little change in high school graduation rates or in Oklahoma college going rates. The high school graduation rate was stuck at about 75 percent and the college going rate was stuck at 50 percent.

Measurement Problems

The most basic point about the 9th grade success rate is that it is only an *indicator.* It is not a longitudinal measure of the record of a single cohort of 9th graders. Multi-year averages are used. For a given year, the college completion data apply to a different set of students than those included in the high school graduation rate.

The 9th grade success rate does not accurately measure the ultimate academic success of students. Many students who complete a college degree do not proceed directly through high school, go directly on to college, and complete degrees within the prescribed limit of six years for the bachelor's degree or three years for the associate degree. In 2003, 28.3 percent of Oklahomans 25 and older had achieved an associate degree or higher, while the 2002-03 9th grade success rate was 14.9 percent. That means that many apparently take an indirect route to higher levels of educational attainment. It is, of course, desirable that individuals who have stopped formal education choose to return and achieve higher levels of attainment. Investment in human capital has economic benefits at almost any age.

Table 2.5

Indicators of the Academic Success of 9th Graders, Oklahoma, 1995-96 through 2002-03

	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003
High school graduation rate, percent[a]	75.0	72.9	73.4	74.4	74.3	75.2	74.3	74.5
Oklahoma college going rate, percent[b]	50.6	49.3	50.0	50.7	51.8	50.1	50.9	50.1
Oklahoma college completion rate, percent[c]	33.0	32.8	33.2	33.2	34.3	35.4	38.0	39.8
Ninth grade success rate, percent[d]	12.5	11.7	12.2	12.5	13.2	13.3	14.4	14.9

[a]Calculated by dividing the number of high school graduates for the year at issue by the 9th grade average daily membership four years earlier and multiplying by 100.

[b]Calculated using the average number of graduates of a district during the last three years attending an Oklahoma public college or university.

[c]Calculated using a three-year average of students completing an associate degree in three years or a bachelor's degree in six years.

[d]Calculated by multiplying the high school graduation rate, the Oklahoma college going rate, and the Oklahoma college completion rate and dividing by 10,000.

Source: Oklahoma Office of Accountability, Profiles 2003 State Report, and earlier issues.

However, given the education attainment/income relationship described in Table 2.1, the payoff to this investment is always greater, the sooner the investment can be completed. Both the individual and society benefit from a greater number of years during a lifetime in which an individual can take advantage of a stream of higher annual income.

The data on Oklahoma college going rates and Oklahoma college completion rates are reliable because the Oklahoma State Regents for Higher Education has a unitized data system that permits tracking individual students. Even here, there are caveats. Some Oklahoma high school graduates attend college out-of-state, and some Oklahoma college students transfer out-of-state and receive degrees.

The National Center for Education Statistics collects information about high school graduates and first-time freshmen that can be used to track students out-of-state. Also, seniors planning on attending college out-of-state are identified through a survey of high school principals whose information may be incomplete. During 2002-03, the principals' survey indicated an out-of-state college going rate of 6.2 percent. If those attending out-of-state completed at the same rate as those attending public institutions in-state, the indicated success rate of Table 5 would have been raised 1.4 percentage points to 16.3 percent. It is reasonable to assume a lower likelihood of returning to Oklahoma for those attending college out-of-state, although there are no data to justify such a conclusion. Based on the OSRHE *Employment Outcomes Report*, of the students who were non-residents when they enrolled in an Oklahoma college, 19 percent were still in Oklahoma five years after earning a bachelor's degree. Data are not available on the number of Oklahoma college students transferring out-of-state.

The data on high school graduation rates—particularly as they apply to individual school districts—may over- or under-state true graduation performance. As noted in Table 2.5, the high school graduation rate is calculated by dividing the number of high school graduates by the number of 9th grade enrollees four years earlier. Although a K-12 Statewide Student Information System is currently in the development stages, the state does not at this time have in place a means for tracking students through assigning state pupil numbers.[5] To the extent that a school district experiences students transferring to other public districts, private schools, or home schooling where they graduate four years after beginning the 9th grade, that district's graduation rate will be understated. To the extent that a district experiences in-migration of 10th, 11th and 12th graders, its graduation rate will be overstated. Especially in large urban school districts, it is likely that a significant number of students really do drop out and cease attending school before they receive a high school diploma.

District Level 9th Grade Success Rates and Family Income

Oklahoma had 541 separate school districts in 2003—far more than will be examined herein. Table 2.6 ranks the state's 52 largest districts (those with 2,000 or more students) from high to low with respect to 9th grade success rates. These districts accounted for 59 percent of the state's total enrollment measured by average daily membership (ADM), i.e., the average number of students on school rosters during the 2002-03 school year.

Within this group of larger districts, the range in 9th grade success rates is remarkable—from 32.1 percent in Jenks to 5.3 percent for Oklahoma City. With a statewide success rate of 14.9 percent (Table 2.5), this range is from over twice the state average down to nearly one-third that rate.

The impact of family socioeconomic status on student performance is a pervasive concern of education policymakers. Research consistently shows that children from low-income families tend not to do as well as other children. Table 2.6 reports percent of students eligible for free and reduced cost meals under the federal government's Child Nutrition Program. Children were eligible for free meals if their family's income was 130 percent or less than the official federal poverty guideline, and they could receive reduced-cost meals if family income was less than 185 percent of the guideline. In 2002-03, 52.4 percent of all Oklahoma public school students were eligible for free and reduced cost lunches. "The Oklahoma

Problem" is strongly reflected in the state's public school population.

In Table 2.6, the range in percent of district students eligible for free and reduced cost meals is also remarkable—from lows of 14.6 percent in Owasso and 14.9 percent in Edmond to highs of 78.5 percent in Tulsa and 84.5 percent in Oklahoma City. The state's two largest big-city urban school districts are faced with very high concentrations of students from low-income families.

In Table 2.6, it is obvious that school districts exhibiting relatively high 9th grade success rates also have relatively few students eligible for free and reduced cost meals and vice versa. If we divide the districts in Table 6 into quintiles from

high to low based on 9th grade success rates, we see the following enrollment-weighted percent of students eligible for free and reduced cost meals.

	percent eligible
Highest quintile (Jenks-Bartlesville)	21.9
Second quintile (Ada-Broken Arrow)	35.6
Third quintile (Ponca City-Choctaw/NP)	40.2
Fourth quintile (Guymon-Guthrie)	49.2
Fifth quintile (Harrah-Oklahoma City)	73.6

This is a strong indication of the intergenerational transmission of low levels of educational attainment and low incomes. This also illustrates how

Table 2.6

Ninth Grade Success Rates, School Districts with Enrollments of 2,000 and Above, Oklahoma, 2002-03

District	Enroll-ment (ADM)	Percent free and reduced cost meals	Okla. ninth grade success percent	District	Enroll-ment (ADM)	Percent free and reduced cost meals	Okla. ninth grade success percent
Jenks	9,251	16.3	32.1	Miami	2,453	63.4	15.8
Yukon	5,901	20.2	26.9	Catoosa	2,312	41.8	15.4
Edmond	17,851	14.9	25.7	Collinsville	2,012	29.5	14.9
Stillwater	5,424	28.9	23.7	Choctaw/Nicoma Park	4,386	28.8	14.6
Owasso	7,246	14.6	23.7	Guymon	2,232	60.8	14.6
Bixby	3,785	21.7	23.3	Woodward	2,515	38.9	14.6
Elk City	2,089	47.5	22.3	Coweta	2,626	36.2	14.3
Union	13,389	20.1	21.9	El Reno	2,549	67.3	14.2
Duncan	3,699	49.6	21.5	Shawnee	3,757	58.4	14.2
Bartlesville	6,021	33.4	21.2	Sapulpa	4,157	51.9	13.9
Ada	2,537	56.6	20.5	Sand Springs	5,255	44.0	13.2
Norman	12,678	29.3	19.8	Midwest City/Dell City	13,914	45.4	13.0
Mustang	6,793	18.9	19.6	Chickasha	2,785	48.0	12.9
Pryor	2,347	45.9	19.5	Guthrie	3,126	57.6	12.4
Claremore	3,986	38.7	19.2	Harrah	2,194	39.8	12.3
Putnam City	19,208	38.7	19.1	Muskogee	6,290	68.1	12.0
Durant	3,068	62.3	18.7	Lawton	16,701	51.9	11.5
McAlester	2,802	57.6	18.7	Grove	2,335	53.0	10.3
Altus	4,260	50.0	17.9	Anadarko	2,128	79.2	10.1
Broken Arrow	14,632	24.8	17.8	Noble	2,742	50.3	9.8
Ponca City	5,541	56.8	17.7	Tecumseh	2,167	57.1	9.3
Skiatook	2,301	37.1	17.7	Tulsa	42,461	78.5	9.0
Ardmore	3,136	67.4	17.0	Western Heights	3,066	71.0	8.7
Moore	18,430	28.6	17.0	Talequah	3,661	64.6	8.6
Enid	6,333	49.4	16.8	Wagoner	2,438	77.8	7.2
Glenpool	2,092	38.2	16.3	Oklahoma City	39,740	84.5	5.3

Source: Oklahoma Office of Accountability, *Profiles 2003 District Report.*

intractable is "The Oklahoma Problem" and how its solution requires, among other things, long-term policies which keep chipping away at the low performance of students in school districts dominated by children from low income families.

How Does Oklahoma Compare?

In Tables 2.2 and 2.3 it was established that Oklahoma had relatively fewer persons with high-end levels of educational attainment than is the case nationwide. How does the state stack up with respect to the three variables used in calculating the 9th grade success rate? Other states do not publish reports with data identical to those of the Oklahoma Office of Accountability. Nevertheless, data available from the National Information Center for Higher Education Policymaking and Analysis lead to the conclusion that state high school graduation rates compare favorably with those found elsewhere, while college going rates and completion rates are below par.

Selected data for 9th grade success rate components are presented in Table 2.7 for recent years for Oklahoma, six surrounding states, and the United States. The numbers in Table 2.7 do not match those in Table 2.5 because of different sources, different time periods, and possible differences in definitions. Nevertheless, the data

in the two tables are close, and Table 2.7 permits interstate comparisons.

- Oklahoma's high school graduation rate of 72.5 percent in 2002 was above the national average of 68.2 percent, and was higher than in surrounding states Colorado, New Mexico, and Texas.
- The state's college going rate of 49.7 percent was lowest in the seven state area and was 7.0 percentage points below the national average.
- While the state's students were completing associate degrees within three years at a rate above three of the surrounding states (Colorado, New Mexico, Texas), at 25.4 percent, Oklahoma was well below the national norm of 30.6 percent.
- Oklahoma's six-year bachelor's degree graduation rate of 41.8 percent was far below the national average of 54.3 percent, but did exceed the rates observed for Colorado and New Mexico.
- A measure quite similar to the Oklahoma 9th grade success rate is developed by the National Information Center source. At 13 percent, Oklahoma was tied with Texas, exceeded Arkansas and New Mexico, and was far below the national average of 18 percent.

Table 2.7

Ninth Grade Success Variables
Oklahoma, Surrounding States, and the U.S., 2000-2003

	High school graduation rate 2002	College going rate 2000	3-year graduation rate, associate degree 2003	6-year graduation rate, bachelor's degree 2003	Student completion rate, 9th grade through college 2002[a]
Arkansas	73.9	52.9	22.3	39.0	15
Colorado	70.6	52.8	32.4	51.8	20
Kansas	75.9	67.5	36.3	50.3	19
Missouri	73.1	53.4	37.7	55.3	20
New Mexico	59.8	58.9	19.3	39.0	10
Oklahoma	72.5	49.7	25.4	41.8	13
Texas	62.5	52.5	20.3	49.0	13
United States	68.2	56.7	30.6	54.3	18

[a]Percentage of 9th graders who graduate from HS on time, go directly to college, return for their second year, and graduate within 150 percent of program time.

Source: National Information Center for Higher Education Policymaking and Analysis, www.higheredinfo.org.

Thus while improvement in Oklahoma's 9th grade success rate during the eight year period 1996-97 through 2002-03 was entirely due to higher college graduation rates (Table 2.5), the state's overall poor performance for this variable was apparently due to its low college graduation rates as well as a low college going rate, while high school graduation rates were relatively high.

Policies for Enhancing
9th Grade Success Rates

Implicit in the above excursion through data on the performance of Oklahoma's public education system is the proposition that students need a seamless system that enables them to move efficiently through high school and on to and through college. The proposition recognizes the challenge of "The Oklahoma Problem" and the state's deficit in the share of the adult population with high-end educational attainment

The structure of Oklahoma's public education system is anything but seamless. The state's constitution specifies three major delivery systems involving elementary-secondary education, vocational education, and higher education. The three systems' structures are very complex.

- A public school system administered by an appointed state Board of Education, an elected Superintendent of Public Instruction, and a State Department of Education (SDE), with 541 separate school districts administered by elected boards of education and appointed superintendents.
- A Career and Technology Education (CareerTech or CTE) system with an appointed State Board, a State Department of Career and Technology Education with an Executive Director, and with 29 separate technology center districts—each with their own elected board and appointed superintendent.
- A state system of higher education led by the appointed Oklahoma State Regents for Higher Education (OSRHE), who hire the Chancellor of Higher Education, with 25 institutions with their own presidents reporting to one of 14 governing boards,

and nine "constituent" agencies such as law, health sciences, and veterinary medicine.

Policies to improve the 9th grade success rate are implemented throughout the three systems and their disparate components. In a sense, any policy of reform or improvement could be argued to have a positive effect on the rate. (A good example of such policies is found in the business community's recommendations for elementary and secondary education through its Oklahoma Business and Education Coalition.[6]) However, the focus here is on policies whose *direct* impact is on high school graduation rates, college going rates, and college completion rates. Among the more important policy initiatives are new federal mandates for public schools, new policies within the CareerTech system, and a variety of efforts by higher education to attract more high school students into college and to assure their success once they are there. Three of the most important policies are programs of the federal government: the No Child Left Behind Act for the public schools, Tech Prep for CareerTech, and GEAR UP for higher education.[7]

State Department of Education
and the Public Schools

Some time after 2000, we began to speak of *transparency* in a wide number of contexts. Organizations perform better when the public is well informed about what they are doing and how well they are doing it. Transparency has been a major theme of public school policy since the passage of a major Oklahoma reform measure, H.B. 1017 in 1990. In addition to a wide range of improvements and additional funding, that legislation established a state Office of Accountability under the direction of an Education Oversight Board within the SDE. Today, the agency is housed in the offices of the Oklahoma State Regents for Higher Education. The agency publishes annually a set of reports with a massive amount of detail on the performance of Oklahoma public schools. These reports are available on the agency's web site (www.schoolreportcard.org) and are the basis for much of the data used herein.

In 1999, the Oklahoma Legislature mandated that the SDE prepare an Academic Performance Index (API) measuring and publicizing school effectiveness. This index has the effect of putting pressure on local school administrators and teachers for improved performance. In constructing the API, the SDE has included several indicators directly relevant to the 9th grade success rate for high schools and for school districts with high schools. Measures of performance on end-of-instruction (EOI) tests in English II and Algebra I account for 80 percent of the API. Ten percent of the API depends on measures of school completion, i.e. attendance, dropout rates, and graduation rates. Another 10 percent depends on student ACT scores, participation in Advanced Placement (AP) courses, and the incidence of the need for remediation once in college. API scores of schools and districts are available from the SDE web site [www.sde.state.ok.us].

Arguably more important than the API is the federal government's No Child Left Behind (NCLB) Act of 2002 requiring schools and subgroups of students to make Adequate Yearly Progress (AYP) as measured by federally approved indicators of performance.[8] Various levels of sanctions are applied to school districts and school sites that fail to achieve AYP over time. The sanctions become quite severe for schools and districts failing to perform year after year. And the Bush administration is proposing to raise the bar higher. In early 2005, the President proposed requiring states to develop and apply expanded testing requirements in reading and math in order to improve the performance of high school students in grades nine through eleven.[9]

Having already developed the Academic Performance Index, the SDE was in a position to propose using that as the basis for measuring Adequate Yearly Progress. The SDE gained approval from the federal authorities to include major components of the API in the determination of AYP. The high school graduation rate is an important indicator from the API that is included in the AYP calculation and is also directly relevant to the 9th grade success rate. Thus, since the NCLB Act was passed, the strong hand of the federal government imposes penalties causing

administrators to focus directly on raising high school graduation rates.

Also included in the AYP are data on performance on end of instruction (EOI) tests. Improved performance on such tests enhances the probability of success in college and should have the effect of raising the college going rate and the college completion rate. At the same time, however, critics point out that the importance of test scores in the API/AYP framework may inadvertently provide an incentive for school administrators to encourage their weaker students (low test scorers) to drop out.[10]

In recent years, the state's public schools have been graduating students somewhat better prepared for college. Most impressive is the increase in the share of high school graduates completing a college-bound curriculum of 15 units from 63.7 percent in 1996-97 to 77.0 percent in 2002-03 (Table 8). The proportion of schools in Oklahoma offering Advanced Placement courses has risen from 16 percent in1996 to 68 percent in 2003.[11]

In spite of such improvements, challenges remain. Composite scores on the ACT college entrance test have been relatively stable, as has been the share of Oklahoma students taking that exam. Recently available data indicate a state average score for 2003-04 of 20.6—identical to the score in 1996-97 with no change in the share of students taking the test. The nationwide composite score has been above that of Oklahoma, but has also remained relatively stable at 21.0 in 1996-97 and 20.9 in 2003-04. In 2004, the fact that Oklahoma's composite ACT score lagged the nation 20.6 to 20.9 was due mainly to relatively poor performance of the state's students in the science and math components of the test; Oklahoma was right at the national norms in English and reading.[12]

There has been a slight downward trend in the share of college freshmen taking at least one remedial course in math, English, science, or reading, though the share needing such service remained at a relatively high 35.5 percent of the students direct from Oklahoma high schools in 2002-03 (Table 8).

Table 2.8

**Indicators of High School Preparation for College,
Oklahoma, 1996-97 through 2002-03**

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03
High school graduates completing college-bound curriculum (percent)[a]	63.7	64.5	66.2	67.0	70.0	71.0	77.0
ACT test score for high school graduates	20.6	20.5	20.6	20.8	20.5	20.5	20.6
Percent taking the ACT test	71.7	70.8	72.4	73.3	74.1	72.8	73.7
Oklahoma college freshmen taking at least one remedial course (percent)[b]	37.7	37.2	38.0	37.5	36.6	35.6	35.5

[a]Fifteen units required for admission to Oklahoma colleges and universities.

[b]Annual data for 1996-97 and 1997-98; two-year average for 1998-99 through 2000-01; three-year average for 2001-02 and 2002-03.

Source, Oklahoma Office of Accountability, Profiles 2003 State Report, and earlier issues; Oklahoma State Department of Education, News Release, Aug. 18, 2004.

One of the most important policies of the state's public schools involves a willingness to work with the career-tech and higher education systems to expose students to a wide set of opportunities for postsecondary education and to better prepare students for such opportunities. Important initiatives by those two systems will be examined in the next section.

The Oklahoma Department of Career and Technology Education and Technology Center Districts

There was a time when many people believed that students on the vocational-technical education track were less capable and/or less motivated. Students who were college bound were viewed much more favorably. This image is now much less appropriate in Oklahoma or for the nation as a whole. The name of the field has been changed to career and technology education and there is now strong emphasis on *Career*Tech students' transition to postsecondary education. At the heart of this initiative is a program called Tech Prep.

Tech Prep is a program in which students starting in the junior year receive counseling concerning access to "career clusters" which attract the attention of secondary education

students. Counseling at high schools concerning the following 16 broadly defined career clusters is available with the aid of Tech Prep coordinators at one or more of the *Career*Tech Technology Center Districts and two-year colleges throughout the state.

Agriculture
Architecture and construction
Arts, audiovisual, telecommunications
Business management and administration
Education and training
Finance
Government and public administration
Health science
Hospitality and tourism
Human services
Information technology
Law and public safety
Manufacturing
Marketing, sales, and services
Science, technology, engineering, and math
Transportation, distribution, and logistics

Students develop a plan of study appropriate to the career cluster—either a six year plan in the 9th grade or a four year plan when the student begins the 11th grade. The plan will include "all required academic coursework, additional academic courses, and electives that will enhance or complement a student's career interest area

(cluster). It will also include appropriate *Career*Tech coursework, work-based learning options and transition plans for post-high school (2 years *minimum*)."[13]

In mid-2004, Oklahoma's Tech Prep program was serving 375 high schools and 4,236 students. Another important element in the program involved working with business and industry to provide student internships or apprenticeships, and job shadowing, mentoring, and workplace touring opportunities.

There are Tech Prep programs throughout the nation, and states receive financial support for the programs through the federal government's Carl D. Perkins Vocational and Technical Education Act. Congress is currently reconsidering the reauthorization of that act, and the Bush administration has proposed changes consistent with the philosophy of its No Child Left Behind Act. This is made clear in the administration's proposed recommendations for changes in the Perkins Act. Three quotations are illustrative.[14]

> "Unlike jobs a half-century ago, most of today's job positions that pay family-supporting wages and offer opportunities for advancement demand strong academic and technical skills, technological proficiency, and some education and training beyond high school."

> "Successful preparation for both postsecondary education and employ-ment requires learning in the same rigorous English and mathematics content and skills. No longer do students planning to go to work after high school need a different and less rigorous curriculum than those planning to go to college."

> The new legislation should "Ensure that every CTE pathway in secondary schools offers a smooth transition into a postsecondary program leading to a technical certificate, associate or baccalaureate degree, apprenticeship, or a job."

As important as such lofty goals may be, there are also many "at risk" students needing assistance. CTE is playing an increasing role with its dropout recovery programs at seven of the technology center districts. From July 1, 2003 to June 30, 2004, dropout recovery programs re-ported 64 students returning to their home high school or other alternative program, 895 enrolled in a CTE program, 225 working on a GED, and 809 enrolled in the technology center pursuing a high school diploma.[15] A new campus being planned in Oklahoma City by the Francis Tuttle Technology Center District includes an alternative education facility for students having difficulty operating in regular classroom settings.

Direct interaction between *Career*Tech and higher education is being enhanced by an evolving set of arrangements by which high school students take courses at technology centers for which college credit may be granted. These Cooperative Agreements and the new Alliance Model will be discussed in the following section treating higher education.

The Oklahoma State Regents for Higher Education and the Public Colleges and Universities

The OSRHE and state institutions of higher education play an especially important and comprehensive role in Oklahoma's policies having the effect of raising the 9th grade success rate. Policies include:

- assisting high schools in testing and counseling to prepare students for higher education and assuring students from low-to-moderate income families of financial aid (EPAS, GEAR UP, OHLAP);

- collaborating with high schools and CTE to enable high school students to take college-level courses and to take Advanced Placement (AP) courses and exams;

- and counseling, remediation, and financial aid for students once they have arrived at college—having the effect of raising college completion rates.

EPAS, GEAR UP, and OHLAP—These three programs are coordinated by OSRHE and implemented within the public schools. Taken together, they form an integrated system which provides high school students with both the academic and financial means to proceed to college and other postsecondary education.

EPAS refers to the Educational Planning and Assessment System. The EPAS system was developed by ACT, Inc., the national organization that developed the ACT college entrance exam typically used by Oklahoma public colleges for admission and course placement. The program was started in Oklahoma in 1993. All schools may participate free of charge in testing and progress evaluation at three points in the students' secondary school careers. (1) In a component of the program called EXPLORE, students in grades 8 or 9 take a test covering the same general areas they will face when they take the ACT exam, i.e. English, math, reading, and science reasoning. They also take an interest inventory which will help them consider career options. (2) In the second component called PLAN, 10th graders take a "pre-ACT" test that helps them see how they might perform on the ACT exam. Plans of study are reviewed and adjustments may be made to assure that students will be prepared for the ACT test and for postsecondary education. (3)The ACT admissions test is administered in the 11th or 12th grades.

During the 2003-04 school year, 44,072 students in 489 school districts and private schools participated in the EXPLORE component of EPAS, while 40,135 students in 440 districts and private schools participated in PLAN. Sixty-nine percent (24,969) of the 2003 graduating class took the college entrance ACT exam.

GEAR UP (Gaining Early Awareness and Readiness for Undergraduate Programs) is a program which the federal government provides to state and local educational agencies. The overall goal of the program is to expand the number of middle and high school students from low-income families who proceed to postsecondary education. The discussion above relating 9th grade success rates to percent of students eligible for free and reduced cost meals emphasizes the importance of

special efforts in districts with large number of students from relatively low-income families.

In 1999, Oklahoma received a five-year federal grant of $20.5 million to initiate its GEAR UP program. This grant has been matched by more than $25 million from state and local sources. During the 2004-05 school year, 144 of the state's districts were focus districts for the program; all had relatively high shares of students eligible for free and reduced cost meals. Special activities include videos and parent guides emphasizing the benefits of college and what is needed to prepare students for college. Teachers from selected districts participate in professional development programs which help them help students be better prepared for college.[16]

GEAR UP builds upon and supplements EPAS activities. Effective counselors find it easy to combine both GEAR UP and EPAS with Tech Prep initiatives. However, efforts to convince high school students to pursue postsecondary education sound relatively hollow to students from low-income families if there is no opportunity for financial support. Here is where the Sate Regents' OHPLAP program enters the picture.

The OHLAP (Oklahoma Higher Learning Access Program) pays resident tuition costs at state institutions of higher education for students from families with annual incomes of $50,000 or less. Those attending private institutions of higher education within the state may receive OHLAP funds equal to about one-quarter of tuition costs. The cash scholarships are made even when a student receives a tuition-only scholarship or waiver. Students begin to participate in the program in the 8th, 9th, or 10th grades. Among other things, high school students participating in the program must maintain a 2.5 grade point average, take 17 units of required courses, attend class, and stay out of trouble. Those eligible must go on to college within three years. They must maintain satisfactory grades in college, and they may receive the tuition aid for up to five years.

OHLAP has proved to be a very popular program. In its initial year of operation, 2001-02, it cost $2.9 million and provided scholarships to 1,997 students. By 2004-05, OHLAP was estimated to cost $17.9 million and aid 9,035 students. The OSRHE projected a cost of $43.5

million for 18,044 students by 2007-08.[17] The state is in a position of needing to honor a commitment that it is now making to 8th graders who will not be entering college until 2009-10. In order to ease the burden on legislative appropriations for OHLAP, Oklahoma voters approved State Question 712 on Nov. 2, 2004. This measure, the State-Tribal Gaming Act, allocates 12 percent of the state's revenues from the new gambling arrangements to an OHLAP Trust Fund. A projected total state revenue of $71.8 million for the first year of the Act's operation will generate $8.6 million for OHLAP.[18] This is clearly not nearly enough to fund OHLAP, and OSRHE, in its 2005 request to the Oklahoma Legislature, is seeking an additional dedicated funding source.

College-level Work at High Schools and Technology Centers—One of the best ways to get a high school student "hooked" on the idea of postsecondary education is to directly expose the student to college-level coursework. Additional confidence-building occurs when students take Advanced Placement (AP) courses and succeed in taking AP exams which also provide a head start in college. Students in many high schools—especially those near an institution of higher education—are able, if they are deemed qualified, to take college courses in which they receive concurrent credit. Students with a sufficient ACT score may enroll in general education courses at any public college or university. Tuition waivers may be available.

There is a natural community of educational interests between *Career*Tech technology centers and Oklahoma's higher education institutions offering associate degrees—especially the Associate of Applied Science (AAS) degree. For many years there have been "Cooperative Agreements" between technology centers and two-year colleges in which students take technical courses at the technology center that are part of the course requirements for a specific AAS program at one of the colleges. When students have completed at least 12 hours at the specific college involved in the Cooperative Agreement, then they are awarded college credit.

This approach is being strengthened through what are called "Cooperative Alliances." A Cooperative Alliance is arranged between a technology

center and a college. At the heart of this will be the immediate awarding of college credit for courses taken at the technology center. The high school student actually begins to develop a college transcript in which the course credit can be applied to a degree at any higher education institution accepting the transfer work. Another improvement resulting from the alliance method is that student progress can be tracked more closely and remediation needs can be identified while the student is still in high school.

An innovative approach to integrating high school and college is found in the Oklahoma City's Pathways Middle College High School. This is a school covering grades 8 through 12 located on the campus of Oklahoma City Community College (OCCC) and officially a unit of the Oklahoma City Public Schools district. The unit serves 70-80 students, primarily from the southern half of the school district. Students take the courses required for the OHLAP program as well as additional work in Spanish and Hispanic culture, computer technology, journalism, health and safety, and fine arts exploration. In the 11th and 12th grades, the students may begin taking courses for college credit through concurrent enrollment at OCCC. Students get used to life on campus as they access the college's library, recreational, and student center facilities.

Nationwide, there is a movement to push the middle college concept further with the creation of "early college high schools." These small schools recognize that wasted time during the high school senior year as well as high school and college dropout rates may be reduced by having schools that are thoroughly integrated with the first two years of college. The Bill and Melinda Gates Foundation, the Carnegie Corporation of New York, and the W.K. Kellog Foundation are supporting the establishment of 150 early college high schools.[19]

OCCC is an example of an institution with a wide range of activities to make college more accessible to high school students and adults. In addition to Pathways, its "OKC-GO" program provides tuition for freshmen who are recent graduates of Oklahoma City Public Schools. Assistance is for 24 hours of courses, with the possibility of receiving support for another 24

hours during a second year. OCCC has several cooperative agreements with the Technology Centers within the metropolitan area. The college actively promotes concurrent enrollment of high school juniors and seniors throughout central Oklahoma.

Upward Bound is a federal program aimed at improving the academic preparation, self confidence, and post-secondary enrollment of students from low-income families and from families of potential first-generation college students. With the aid of a federal grant of nearly $300,000, OCCC administers an Upward Bound program in high schools primarily in south Oklahoma City and the southern suburb of Moore. Services for students include monthly counseling, tutoring, meetings twice a month involving study skills, cultural trips, and visits to other campuses; and a six-week summer "mini-college" with college courses and information about getting into college and seeking financial aid. Fourteen other higher education institution and tribal organizations in Oklahoma had Upward Bound grants in November 2004.[20]

Another of OCCC's programs does not have the direct effect of raising the 9th grade success rate, but rather helps improve the educational prospects of a significant group of parents who often do not emphasize academic work. The college operates the OKCCC Capitol Hill Center located at Oklahoma City's Capitol Hill High School. This school is right in the center of the city's rapidly-growing Latino neighborhood. Low-income residents receive a six-week program on computers called "From Information Technology to Work." This program emphasizes increasing job readiness and educational aspirations of the participants and has helped provide employment for 100 to 120 families. In addition to the six-week program, OKCCC Capitol Hill Center offers short-term, non-credit, basic computer application courses in both Spanish and English.

Raising College Completion Rates— In early 1999, the OSRHE adopted an initiative referred to as "Brain Gain 2010." The basic reason for this initiative was an awareness of the relatively low levels of educational attainment of Oklahoma's adult population—as in the data

reported in Tables 2.2 and 2.3. The single goal of Brain Gain 2020 was for Oklahoma to achieve substantial increases in the share of its adult population with bachelor's and associate degrees by 2010. At the time of its adoption, the program aimed at achieving 28 percent of the adult population with bachelor's degrees and 10 percent with an associate degree. (Table 2.2 reports 2003 estimates of 21.9 percent and 6.4 percent, respectively.) Basic strategies to achieve the goal fall under three categories: (1) increasing the number of Oklahomans earning a college degree; (2) keeping more Oklahoma college graduates in the state, and (3) attracting college degree holders from outside the state.

Of the three types of Brain Gain 2010 strategies, the first one is most directly subject to policies developed for the higher education system. The State Regents receive a lump sum appropriation for higher education which they then allocate to the various institutions. In 2001, they implemented a program of performance funding to the institutions for specific Brain Gain 2010 related outcomes such as number of degrees, first year retention rates and graduation rates. Since that time, they have been allocating from $2-2.4 million per year for this program at the institutions. Substantial effort has also been devoted to studying the dimensions of student retention and graduation.[21] Perhaps the single most important result of analyses of retention and graduation is the fact that high school students that take the OSRHE-recommended set of courses succeed in college at a substantially higher rate than those who do not. As pointed out above, there has been a big increase in the share of high school students taking the college-bound curriculum in recent years.

The second category of Brain Gain 2010 strategies, the retention of graduates in-state, is essentially beyond the control of the higher education system. However, OSRHE has developed a system for tracking the employment record of all Oklahoma graduates. Findings are instructive concerning Oklahoma's employment opportunities. For example, 59 percent of the 1997-98 bachelor's degree graduates were employed within the state after five years. However, there was

substantially greater out-migration of graduates in technical fields such as engineering and computer science.[22]

Program Effectiveness—In Table 2.5 above, it was noted that the Oklahoma college going rate was stuck at about 50 percent during the entire period 1995-96 through 2002-03. It must be emphasized that this does not mean that the programs just described such as EPAS, GEAR UP, OHLAP, and Cooperative Agreements have been ineffective. There have been two strong forces at work which would otherwise have tended to reduce college going rates and perhaps even discourage high school students from bothering with a diploma. First, beginning in 1990, there have been several increases in admission requirements at the state's comprehensive and regional universities.[23] Second, there have been significant increases in tuition since the mid-1990s. Also, during some of this time unemployment rates were low which meant that some potential students, especially at the community college level, chose work instead of college. Without the efforts to increase high school graduation rates and college going rates, it is possible that those rates would have actually fallen rather than remaining stable.

Table 2.5 above also reports a significant increase in college completion rates from 33.0 percent in 1995-96 to 39.8 percent in 2002-03. Without increases in the share of high school students taking the college-bound curriculum, the college completion rate might not have risen as much. The same can be said of OHLAP and other programs of financial aid for college tuition and expenses. And Brain Gain 2010 has also caused colleges and universities to focus on student retention and graduation.

Summary and Conclusions

"The Oklahoma Problem" of relatively low income is so complex and has so many dimensions that there is no choice but to keep chipping away at it. Perhaps the most important of these dimensions involves the population's low level of high-end educational attainment. As the State Regents concluded in their "Brain Gain 2010" initiative, attacking this aspect of "The Oklahoma

Problem" requires the in-state production of more college graduates, keeping those graduates employed in Oklahoma, and attracting highly educated persons from out-of-state.

A good indicator of the effectiveness of the state's public education system is the "9th grade success rate" or the percentage of 9th graders likely to go on to college and receive an associate degree within three years or a bachelor's degree within six. The rate is calculated as the product of the high school graduation rate, the Oklahoma college going rate, and the Oklahoma college completion rate. Although Oklahoma has experienced increases in its 9th grade success rate in recent years, there is still much room for improvement in comparison with national averages.

Contemplating the state's high-end educational gap in this context immediately emphasizes the need for a *seamless* system of public education linking higher education with elementary and secondary education and with *Career*Tech. However, the constitutional and statutory structure of Oklahoma public education is anything but seamless. In spite of this rather disjointed structure, there is plenty evidence of integrated policies focusing on increasing high school graduation rates, college going rates, and college completion rates.

Yet even the brief overview of selected policies presented here leaves the lay person with the impression that there is an over-abundance of programs being implemented within a somewhat ungainly structure of organizations. Think of all the terms, acronyms, and abbreviations! For example, we looked at the NCLB Act with its API and AYP for the state's elementary and secondary system. *Career*Tech is involved in Tech Prep, Cooperative Agreements, and the impending implementation of Cooperative Alliances. OSRHE has, among other programs, EPAS, GEAR UP, OHLAP, Upward Bound, and middle college high schools.

Given such a multitude of initiatives and structures, it is worth asking an overarching question: *If Oklahoma were starting from scratch, given the current knowledge of best practices, would the state build a seam-ridden public education system that looks anything like today's?*

In the 2001-02 fiscal year, the latest for which comprehensive data are available, Oklahoma's state and local jurisdictions spent $6.9 billion on education—one-third of all state and local government direct expenditures.[24] That is a very large expenditure flow applied to a single broad function of government without the formal oversight and coordination that could truly focus on having a seamless system assuring that 9th graders achieve their maximum educational potential in a reasonable amount of time. Three options are suggested: (1) a cabinet-type entity consisting of the heads of the three main educational sectors, (2) a coordinating board of control for all of education, and (3) a strong Secretary of Education.

It might be desirable to create a cabinet-type entity consisting of the State Superintendent of Public Instruction, the Executive Director of *Career*Tech, and the Chancellor of Higher Education. Such an entity could be required to meet regularly and report directly to the Governor on matters concerning issues that cut across all three sectors of the state's public education system.

The provision of the Oklahoma Constitution creating the Oklahoma State Regents for Higher Education specifies that body as a "coordinating board of control." Perhaps there should be something like a "coordinating board of control" for the entire public education system. Such a powerful board could make the system truly seamless.

If a system wide coordinating board of control is too revolutionary a concept, an effective and well-staffed Secretary of Education could prove helpful. Oklahoma state government currently has a weak cabinet system with a slot for a Secretary of Education. That slot has not been filled since early 2003. In 1995, for example, a Governor's Commission on Government Performance proposed that the state achieve improved executive authority through a strong Secretary of Education.[25] Such an office, among other things, would study the effectiveness of the system and present comprehensive informational reports covering policies for the entire system. Topics to be examined might include truly integrated and comprehensive approaches to seeing to it that the

state's 9th graders have the greatest possible opportunity to reach their educational potential in as timely a manner as possible.

Endnotes

[1]The concept of a seamless system could apply to policies extending from early childhood education through graduate school. See for example, Education Commission of the States, "What is P-16 Education? A Primer for Legislators," no date, www.ecs.org.

[2]See, for example, Sandy Baum and Kathleen Payea, *Education Pays 2004, The Benefits of Higher Education to Individuals and Society*, College Entrance Examination Board, 2004, www.collegeboard.com.

[3]*Oklahoma Choices . . . a guide to life after high school*, 2004-2005 ed., Oklahoma City, OK: The Journal Record Publishing Co., 2004, p. 43, www.oklahomachoices.com.

[4]"Observations on the State of Enrollment Management and Financial Aid in Oklahoma," presentation to the Oklahoma State Regents for Higher Education by Kevin Crockett and Mark Heffron, December 8, 2004.

[5]A student information system, to be called "The Wave," is being developed by the State Department of Education as a result of a measure passed in the 2003 session of the Oklahoma Legislature. This was a major initiative of the Oklahoma Business and Education Coalition (OBEC).

[6]Achieve, Inc., *Aiming Higher, Leveraging the Opportunities for Education Reform in Oklahoma*, Washington, DC, 2002.

[7]Space does not permit discussion of the extensive types of financial support available to college students. For an overview of these programs, see, Oklahoma State Regents for Higher Education, *Grant and Scholarship Programs*, August 2004, www.okhighered.org.

[8]The eleven separate subgroups for which progress must be made include all students, regular education students, English language learners, students with Individualized Education Programs (special education), economically disadvantaged students, American Indian students, Asian/Pacific Islander students, Black students, Hispanic students, White students, and other students not identified as being in one of the five major racial/ethnic groups.

[9]"President Discusses No Child Left Behind and High School Initiatives," The White House, Office of the Press Secretary, Press Release Jan. 12, 2005, www.whitehouse.gov/news/releases/2005/01.

[10]Robert J. Sternberg, "Good Intentions, Bad Results: A Dozen Reasons Why the No Child Left Behind Act is Failing our Schools, *Education Week*, Oct. 27, 2004.

[11]Southern Governors' Association, *New Traditions: Options for Rural High School Excellence*, 2004, p. 5.

[12]ACT, Inc., "Measuring College Readiness: The Oklahoma Graduating Class of 2004," PowerPoint presentation available from the Oklahoma State Regents for Higher Education.

[13]Oklahoma State Department of Career and Technical Education, "Definitions & Information for PDOS," August 2004.

[14]"The Carl D. Perkins Secondary and Technical Education Excellence Act, Summary of Major Provisions," U.S. Department of Education, Office of Vocational and Adult Education, May 11, 2004, pp. 1, 9, and 4.

[15]Oklahoma State Department of Career and Technology Education, "Dropout Recovery Report, 4th Quarter," June 30, 2004.

[16]See, for example, Mick Hilton, "State teachers chosen for professional training," *The Oklahoman*, Dec. 26, 2004.

[17]Oklahoma State Regents for Higher Education, "Oklahoma Higher Learning Access Program (OHLAP) 2002-03 Year-End Report," March, 2004.

[18] Community Action Project (Tulsa), "State Ballot Question Issue Brief #3, SQ 712: State-Tribal Gaming Act," no date, www.okpolicy.org.

[19]See, for example, "Early College High School Initiative, Core Principles," www.earlycolleges.org.

[20]U.S. Department of Education, Office of Postsecondary Education, www.ed.gov/programs/trioupbound.

[21]See for example, Oklahoma State Regents for Higher Education, *Report of the Oklahoma Higher Education Task Force on Student Retention*, February 2002.

[22]Oklahoma State Regents for Higher Education, *Employment Outcomes Report*, February 2004.

[23]Oklahoma State Regents for Higher Education, *Admission Policy Impact Study*, Sept. 13, 2002.

[24]U.S. Census Bureau, Census of Governments 2001-02, Table 1, *State and Local Government Finances by Level of Government: 2001-02*, www.census.gov/govs/estimate/0237oksl_1.html.

[25]Governor's Commission on Government Performance, *A Government As Good As Our People*, State of Oklahoma, December 1995, p. 52.

Educational Finance: The Politics and Law of Adequacy and Equity

On April 24, 2004 the delegate assembly of the Oklahoma Educational Association voted to support their "Adequacy and Equity Project" including potential legal action against the State Legislature. Roy Bishop, President of the Oklahoma Education Association, stated that "We must shift the debate from partisan politics to what it actually costs to a*dequately* fund a child's education".[1] (Emphasis added) While lawsuits are nothing new in educational finance either in Oklahoma or elsewhere, the stated goal of the OEA's suit, and others that have recently preceded it in other states, is new. In the past, the emphasis has been on the distribution of funds *among school districts*, or equity, while the current spate of suits goes to the distribution of funds *among all functions of government,* or adequacy. In short, the OEA suit, as the other adequacy suits in other states before it, will be asking the court to mandate levels of appropriations for elementary and secondary education, arguing that the current level of funding is inadequate, in order to provide some minimum or guaranteed level of education. In theory, all other functions of government would be allocated funds only after the "adequacy needs" of elementary and secondary education are satisfied.

This chapter will first review the history of educational finance lawsuits to place this new legal theory in perspective. Next, the recent legal challenges in other states based on adequacy will be reviewed. Finally, the implications for government budget allocation and the role the legislature plays in that process will be discussed.

Educational Finance and Equity Lawsuits

Educational finance lawsuits perhaps can be dated best from the publication of the *Coleman Report* in 1966.[2] Indeed, this carefully researched and politically high-profile study of the quality and causes of educational success and failure laid the foundation for numerous lawsuits targeting the allocation of funds among school districts within states. At the heart of the issue was the conclusion by Coleman and others that money does matter in terms of educational achievement. School districts were then, even more than now, primarily funded with local property taxes, and thus the wealth of a district significantly affected the funds available for a school district. Per pupil expenditures in school districts within a state varied dramatically. As an example, in Oklahoma at that time the now-consolidated school district of Red Rock spent more than $25,000 per student while the state average was less than $3,000. If indeed money mattered, as was the premise of the equity suits, and the state had a responsibility to provide equal educational opportunity, then such variations called for redress. School districts with great property wealth, whether from local homeowners or the random beneficence of an industrial plant location, could generate more funds as a percentage of local incomes than property-poor districts.

This was not a new revelation. As early as 1922, states had developed a variety of state aid formulas providing revenues to local districts from general government funds.[3] Oklahoma's first state aid distribution occurred in 1937. Known by such names as "power equalization", "percentage equalization" and "guaranteed yield" these state allocations were designed to make up for some of these disparities. In Oklahoma incentives were built into the constitutional millage provisions known as "incentive aid" and the state allocation formula recognized the differences in wealth among districts with adjustments accordingly. Nevertheless, even with such distribution formulas, all students were not supported with equal dollars, in Oklahoma or elsewhere. Today in

Oklahoma no school district can expend more than 150% of the state average weighted pupil expenditure without suffering a reduction in state aid, effectively creating a maximum variation among school district expenditures and resulting in very little variation in per *weighted* student funding.

In recent years it has been argued that all students should NOT be supported equally if the goal is equal *outcomes* of the educational process, given that some students exhibit disadvantages that require compensatory education and, thus, compensatory funding. Most state aid formulas today follow this philosophy. Students are weighted differently for funding purposes depending upon a variety of conditions. One obvious cost-based difference is between elementary and secondary students, but more often the weights are tied to such conditions as economically disadvantaged (usually meaning the percentage of students eligible for free lunches), speech impaired, bilingual, gifted, etc.

While such state aid formulas had been in place for many years, vast differences persisted in per pupil funding, on both weighted or unweighted bases, and were the foundation for the equity suits of the late 1960's and early 1970's. Of the many suits filed during this period, the most important are *Serrano v. Priest* in California and *San Antonio Independent School District v. Rodriguez* in Texas.

Serrano v. Priest

In 1971 a federal court in California found that the school finance system was not "fiscally neutral" and thus violated the equal protection clause of the U.S. Constitution, implicitly stating that education was a fundamental right on the same basis as the right to vote.[4] At one extreme is the position that education can not be a right, because educations are provided by others and nobody has a right to compel another to provide a person with a car or television set or any other transfer of wealth. At the other end is the position that education is so fundamental to the proper functioning of our democracy that a social interest exists in the benefits for the greater good produced by the individual student who receives the

education. Somewhere in between, perhaps, lies the truth; in the terminology of economic theory, education is a mixed public-private good. In any case, states may create legal rights to education and this principal was the foundation of the equity law suits.

The facts presented in *Serrano* demonstrated significantly different levels of funding among the school districts of California. As much as 300% variations were not uncommon. At the heart of these differences in available funds were the differences in property wealth among districts, coupled with the high degree of reliance on local funds for elementary and secondary education. If education was to maintain its historic local funding base then such differences were to be expected, just as one would expect differences in the quality of local fire departments or city streets funded primarily from local income or wealth. This same relationship is at the core of differences found in the election process, one that is still funded significantly at the local level in many states. There is a new interest on the national level in the reliance on local funding as presidential elections have been decided by closer and closer margins. Here, of course, the appeal to the fundamental rights of voters is never in question. Whether the right to an education ranks with the right to have one's vote counted is the question at issue.

In *Serrano* the courts found that the differences that existed were indeed in violation of the equal protection clause of the U.S. Constitution. Importantly, the federal court left to the state courts and the legislature the task of finding a remedy. After more than a decade and numerous state court cases, with at least one extending even to the appeals level to this day, changes were made in the way California funded elementary and secondary education, reducing disparities to almost trivial levels. This required dramatic transfers of funds from wealthy districts to property-poor districts. Base revenue limits were created and all students were to be funded within the severely narrow range of $100 per pupil variation from the base level limits.[5] In the context of the current debate over adequacy in levels of funding, the "Serrano band" is irrelevant; it is the absolute amount of the base level that is at issue.

San Antonio Independent School District v. Rodriguez

In 1968, a complaint was filed on behalf of the students in the Edgewood Independent School District in San Antonio, Texas. In December of 1971 a three judge panel held that the school finance system in Texas was unconstitutional under the equal protection Clause of the Fourteenth Amendment of the U.S. Constitution. The case was appealed to the U. S. Supreme Court and they rendered their decision in March 1973. In part, they concluded "The Texas system does not disadvantage any suspect class", even though the court acknowledged that "...the financing system disadvantages those who... reside in comparatively poor districts [but] the resulting class cannot be said to be suspect." Further the court decided "...the Texas school-financing system [does not] impermissibly interfere with the exercise of a 'fundamental' right or liberty".[6]

The court in its decision demonstrated that it was keenly aware of the stark differences between the property wealth in the plaintiff's district and in a neighboring district, Alamo Heights, citing the $5,960 in per pupil assessed valuation in Edgewood and $49,000 in per pupil assessed valuation in Alamo Heights. The lower court had ruled that wealth was a suspect class, similar to earlier findings dealing with the rights of an indigent defendant in a criminal trial. But the U.S. Supreme Court disagreed ..."find[ing] neither the suspect-classification nor the fundamental-interest analysis persuasive."

While the *Serrano* case is a landmark in the history of educational equity finance litigation, it is in many ways an anomaly in that it sets no precedents for other states. The federal system that allows each state to "...serve as a laboratory; and try novel and economic experiments without risk to the rest of the country"[7] meant that what was decided in California did not necessarily apply elsewhere. Nevertheless, between 1971 and 1983, 17 other states were subjected to similar suits based upon the unique language of each of their statues and constitutions that resulted in rulings from their respective State Supreme courts. Other suits often were "settled" through a preemptive

legislative response that was the result of local politics similarly setting no national precedent and providing no national consensus in the debate over equal educational opportunity. To confound maters, in 10 other states the State Supreme Courts upheld the school financing systems.

The *Rodriguez* case provided a clear signal that at the federal level there was no legal right to an education. Simply because a school district is poor, or poorer than another in the same state, the Court would not conclude that this impaired the right of an individual or was a concern to the "broader society" due to the critical need for an educated populous. Given this precedent, the cases that followed sought relief in state courts where perhaps language in their individual constitutions or statues may leverage a different decision, as it many times did.

Even in cases that failed in the courts, legislative responses often provided partial victory for plaintiffs. In fact, court decisions have never mandated increased taxes or appropriations to educational funding, although in states where the courts have overturned the school finance systems this has been the result.[8]

A second result of some significance is the diminished role local funds currently play in elementary and secondary education. Even in Oklahoma, with an historically low property tax and constitutional caps on millage levels, there has been a continuing trend toward greater reliance on central government funds. Of course, with greater reliance on state funds comes less local control of school districts and more mandates for everything from curriculum to teacher qualifications. After all, one can not simultaneously ask for financial relief because of differences in wealth and hold that with such a redistribution the funds come unencumbered.

In spite of the failure of *Rodriguez*, school equity finance lawsuits continued to work their way through the courts in a number of states. Even as late as 1989 and 1990 five cases concerning the state constitutionality of the school finance system were decided. One case upheld the state system, but in four other states the finance system was overturned. The dominant theme of these suits was the issue of equitable distribution of revenues among the various school districts within the state

involved, but other issues emerged under the broad umbrella of "equity." Facilities inequities, in particular, raised the issue of "adequacy." This line of legal theory has dominated school finance suits ever since merging equity and adequacy in the debate.

Educational Finance and Adequacy Lawsuits

In order to reach a decision that a school finance system fails to provide "adequate" funding the court must first determine if there is either a constitutionally or statutorily mandated minimum or optimal education standard. In a Wyoming case the court determined that the "basic" education constitutionally guaranteed required a legislative determination as to what constituted "basic".[9] Wyoming is not so different from many other states in that there is some language in the state constitution referring to the duty of the state to provide for some level of education. Such flowery, but vague, language as "free education for all" pervades state constitutions, as if it was never contemplated to be read through strict judicial eyes some 100 or 200 years later. But to make these education clauses operational in a judicial framework has proven troublesome in many states. As long ago as *Rodriguez* the courts struggled with this concept.[10] The majority opinion in *Rodriguez* quotes at length from Justice White writing in *Lindsey v. Normet (1972)* "...the Constitution does not provide judicial remedies for every social and economic ill". Writing further in this case concerning guaranteed housing quality, "We are unable to perceive in that document [the U.S. Constitution] any constitutional guarantee of access to dwellings of a particular quality...". It is perhaps these statements that have left those wishing to increase the level of funding to elementary and secondary education through "adequacy" lawsuits to seek redress within state court systems. And here they have found some degree of success.

In 1989, in *Rose v. Council for Better Education, Inc.* the Kentucky State Supreme Court found the state system of education, not just its funding system, constitutionally inadequate, and

ordered the legislature to ensure that all students had the opportunity to achieve seven specific goals[11]. These goals are:

"(1) Sufficient oral and written communication skills to enable students to function in a complex and rapidly changing civilization (2) Sufficient knowledge of economic, social, and political systems to enable the student to make informed choices (3) Sufficient understanding of governmental processes to enable the student to understand the issues that affect his or her community, state, and nation. (4) Sufficient self-knowledge of his or her mental and physical wellness. (5) Sufficient grounding in the arts to enable each student to appreciate his or her cultural and historical heritage.(6) Sufficient training or preparation for advanced training in either academic or vocational fields so as to enable each child to choose and pursue life work intelligently.(7) Sufficient levels of academic orvocational skills to enable public school students to compete favorably with their counterparts in surrounding states, in academics or in the job market."

Other courts have faced the same difficulty in determining just what constitutes "adequate" and have been less sure of this than Kentucky's Supreme Court. In New Hampshire, Ohio, and Wyoming the court either reminded the legislature of its duty to define what constitutes an adequate education or directly ordered the legislature to define it. These decisions have resulted in little in the way of the hoped for reform prayed for by the plaintiffs. Further cases have often resulted when legislative action itself was deemed inadequate.

Nevertheless, other cases have created significant changes in the role the legislature plays in the process of funding elementary and secondary education, for good or for ill. Of particular interest is *Campaign for Fiscal Equity, Inc. v. State* in New York.[12] After a significant number of appeals and reversals, the court decided to define adequacy as "consist[ing] of basic literacy, calculating, and verbal skills necessary to

enable children to eventually function productively as civic participants capable of voting and serving in a jury", admittedly not very high standards, particularly in light of other court decisions on the standards of exclusion for jury duty. The appellate court, in directing the trial court, specifically dismissed outcome measures as merely ""helpful" and instructed the lower court to review input measures almost exclusively. In 2003, one decade after the case was filed; a final decision was handed down that defined adequacy to be those "skills fashioned to meet a practical goal: meaningful civic participation in contemporary society" which included a "meaningful high school education." Perhaps most importantly, the court determined that the state could only rebut a presumption of inadequacy on the basis of inputs provided to the educational system when outcomes were found to be inadequate. If outcomes were adequate, as measured by test scores, etc., then the system was adequate even if inputs were not. Quite clearly, the court embraced the concept that money matters, and if it did not matter for the good, then so much the better. Embedded in this determination of adequacy is the notion that compensatory funding may be required.

Of some interest is the scope of the adequacy cases. They are seldom brought by individual students and thus all measures of *state* adequacy funding is determined on a *district* level rather than an individual level, although it is the individual scores on various exams that can salvage a state system from a finding of inadequacy.

Various solutions to the quandary of just what constitutes adequacy have been crafted by those states' courts that have thus far addressed the issue. The New York case in *Rose* is the exception where judicial activism seems to have played a significant role. There the court seemed willing to act as educator, legislator, and court, defining the constitutionally appropriate measures of the outcomes and the constitutionally appropriate measures of the inputs. Other courts have been more circumspect, even after a finding of inadequacy.

In 1997, the Ohio Supreme Court found that Ohio's funding system led to an inadequate education in poor school districts. It ordered the legislature to create a new funding system and most importantly to define adequacy. After four years, a follow up suit asked the court to again revisit the legislature's work. And again the court deferred to the legislature upholding in most part their definition. Here the lesson seems to be that, if the court defers to a legislature, then it will almost certainly have to accept its work.

In Alabama in 1997 the court concluded that it "...is the legislature that bears the primary responsibility for devising a constitutionally valid public school system".[13] In 2002 the court was asked to address the progress of the legislature and, perhaps in exasperation, ruled that "compelled by the [separation of powers] and a concern for judicial restraint, we hold ...that this Court's review of the merits of [this case] has reached its end and [that] ...it is the Legislature, not the courts, from which any further redress should be sought"[14] Perhaps the lesson here is that without a working definition of adequate, provided by *someone,* there can be neither guidance nor orders to act. This presumes that either such a definition can be found in the state's constitution or crafted by a court willing to convert the often high flown and flowery language common in state constitutions into something measurable.

In Wyoming, the mandate to the legislature by the Supreme Court in 1995 to define adequacy came with guidelines similar to those found in New York in *Rose.* That is to say, adequacy presupposed that inputs created outputs and the standard laundry list of class size, *et cetera,* was included.[15] The Wyoming court was forced to revisit the case and in 2001 became more specific in it own definition of adequate. The court determined that the legislature's actions still fell short and held that the schools could only be found to be adequate if specific levels of appropriations were made. The Court specified dollar figures for many programs including even the level of kindergarten supplemental appropriations. Here again, the court relied on input measures of adequacy.

In New Hampshire's *Claremont* litigation, concerning three cases spanning more than a decade, the court determined that adequacy could be determined on the basis of outputs with such goals as the student's ability to make informed choices, function in a complex world, and become a civic participant. [16] However, no specific test was mandated and no norms against which such a test could be validated were provided. Indeed, such goals, it has often been argued, are not within the province of standardized tests, setting aside for the moment the charges of racial, ethnic and economic bias often leveled at such tests.

Inputs V. Outputs and Constitutional Rights

Long before there was any debate over legal definitions of adequacy, or the legal or constitutional foundation for mandating changes due to failure to reach such a definition, the issue of the role of inputs to create outputs in elementary education was critically examined. Abstracts of articles in the economics literature, alone, would comprise volumes. The results of this research have produced consistent results: variations in school expenditures are not consistently related to student performance.[17] But it is upon the assumption that inputs, read dollars, create outputs that courts have based their decisions concerning adequacy of school systems, and it is to dollars that reformers look for a solution.

Within the economics paradigm, education is like any other production process; inputs are combined using some technology (pedagogical technique, "hard" technology, *et cetera*) to produce an output. Between the two, inputs and output, inputs seem the most accessible to measurement, although this is easily disputed when one considers that the student is the most critical input in the process. Family background in terms of parent's education levels, economic circumstances, and "culture" have all been found to play critical roles in the effectiveness that the other inputs have in producing the final "product". This was one of the paradoxical findings of the *Coleman Report* as long ago as 1966. Something called home environment matters, too. All

measures of school effectiveness recognize this critical aspect of the issue, with terms such as "improvement" and "value-added" used to rationalize the poorer outcomes for school districts with particularly high populations of non-English speakers, poor economic conditions, and other parameters of hardship for students.

Measuring inputs in dollar terms, alone, raises a list of concerns. Even after adjusting for cost of living differentials across a state, differences in dollars can not offset true differences in the quality of inputs. Teachers' salaries are the most expensive part of the cost of education. To the extent that salaries bear only little relationship to the quality of the input they can not be a true measure of the input's productivity. Legislatively-mandated salary packages, minimum salaries by education level, mandated starting salaries state-wide, and other step-raise programs created either through collective bargaining or statute, mute this relationship. Research on the relationship between inputs and outputs has attempted to account for this disparity by recognizing the disconnect between quality and expenditures. Rather than use dollars, such proxies for quality as teacher's education level and years of experience have been used. If there are changes in teaching theories and pedagogy then older teachers may not have the same productivity as new teachers, a phenomenon analogous to newer versus older capital in a manufacturing setting.

With respect to the "hard" technology available to a student and teacher, there is endless debate over its effectiveness. The simple fact that large expenditures are made to make the internet available to all students says nothing about its effectiveness, for example. Access to current texts and laboratory equipment is less debatable as a minimum for teaching effectiveness, but the fact that some specialized and expensive piece of equipment is available does not guarantee that it yields benefits greater than costs. Class size has similarly been researched with mixed results. Certainly smaller classes are better, but the lower limits are not certain from a cost-effectiveness perspective. Even with relatively generous resources some interactive activities create more "learning" than a pure tutorial.

And it is the very definition of "learning" that presents the greatest challenges to courts and others looking for the illusive definition of adequacy. Standardized test scores have been administered routinely since the beginning of the century. These have purported to measure "innate" potential, "progress", and "skill achievement" among other things. These tests have been criticized for alleged bias against a number of factors including race, ethnicity, rural environment, and economic circumstances. (The correct answer to what is a "plant" was once a "factory," which obviously created significant consternation among students from rural backgrounds).

The courts in *Rose, Campbell,* and *Claremont* all focused significantly on goals that met some greater social good, such as citizenship and thoughtful participation in juries and the democratic process. These it seems were the foundation for the finding of a constitutional failure of the system although this very "fundamental-interest analysis" was rejected by the U.S. Supreme Court in *Rodriguez.* Standardized tests have only a passing acquaintance with these goals of the education system, even if a tie could be established between some skill set and the tests administered. Perhaps more disturbing is the finding that a school system can be deemed "constitutionally adequate" by some examination created by a for-profit company. This is a most ephemeral foundation upon which to base a constitutional "right."

Oklahoma and Adequacy Litigation

With the threat of a lawsuit by the Oklahoma Educational Association based upon the alleged inadequacy of current funding of elementary and secondary education, the issues raised in other states will be raised, but in the context of the Oklahoma State Constitution. In each state, the legal foundation for a finding of inadequacy, no matter how defined, had to be determined from its own unique constitutional framework. The U. S. Supreme Court has effectively closed the door to any federal litigation along these lines with it finding in *Rodriguez.* As of this writing, no lawsuit has been filed, and thus the legal founda-

tion to be put forward can only be a matter of conjecture. However, it can be assumed that this suit, if ever filed, will follow the lines of cases in other states. From press releases, it seems that a litany of "deficiencies" will be compiled and presented as evidence of inadequacy. As true as these anecdotal cases may be, and as saddened as one may be by their revelation, they do not constitute a legal foundation for a finding of inadequacy. It is illustrative, however, of where such a suit may be headed. It would seem that such a suit will not be based upon differences *among* school districts, but simply a demand for greater funding for the total system.

Assuming that such a lawsuit follows the lines of other state's adequacy litigation, the legal foundation must be found in the Oklahoma Constitution. At Article XIII § 1, the Oklahoma Constitution creates the mandate to the legislature to "...establish and maintain a system of free public schools where all the children of the state may be educated". In Article XIII § 1a, the legislature is charged to ..."raise and appropriate funds for the annual support of the common schools." This is the sum total of the constitutional mandate to provide and fund elementary and secondary education in the state of Oklahoma. Even in the provision for the creation of an agency to administer the funds, no reference is made to the depth or breadth of the education to be provided, with the exception that instruction shall be in English (Article XIII § 1a), and at Article XIII § 7, providing for "...the teaching of the elements of agriculture, horticulture, stock feeding and domestic science in the common schools of the State." As close as one can get to adequacy is a debate concerning just what is meant by the "elements" of agriculture, *et cetera.*

Searching further in the Oklahoma Constitution one does find reference to a State "guaranteed program." This is contained in Article X § 9(e) concerning the maximum levy of 15 mills for local support for common schools. The reference is to the guaranteed program of *funds,* not to a program of outputs of the educational process. The reference is archaic because the guaranteed program has been superceded through changes in the state aid funding formula and this reference to the guaranteed program acts only as a

part of the millage cap that can be placed on any piece of property for school finance purposes.

The debate then must consider what it is to be "educated" (Article XIII § 1). Educated certainly means something different today than at the time of the writing of the Oklahoma Constitution. In 1910, only three percent of school enrollment was at the high school level. It was not until 1938 that the state mandated that the school year increase from three months to nine months. Today, as the state and the federal government have taken on a significant role in the curriculum of local school districts, the financial need to meet these goals has changed. Under the No Child Left Behind Act (NCLB), the federal government places rigid requirements on states to develop specific objectives for elementary and secondary education. States must develop, in the words of the NCLB, "annual adequate yearly progress (AYP) objectives"[18]. The National Assessment of Educational Progress will provide benchmarks for ensuring the rigor of state standards. Coupled with federal requirements for students with disabilities contained in the Americans with Disabilities Act, local school districts find themselves with a number of mandated requirements, all with important implications for school finance. In some cases, the objectives can be met with a showing of appropriate inputs, but for others there must be measurable progress through some set of output measures. In short, there seems to be no limit on the number of participants in determining just what it means to be educated, and the definition varies with respect to the characteristics of each particular student; success is measured differently for a student with severe learning disabilities than for a student without such challenges.

Conclusions

Litigations of adequacy cases have reached different conclusions in the various states where decisions have been rendered during the recent past. Each has been based on the unique differences that exist in the states' constitutions and the degree of judicial activism found there. In common has been the difficulty of determining just what is meant by an adequate education, and

just how one goes about the process of measuring adequacy. Confounding this difficulty is the extensive research that calls into question the very foundation of the debate; that state controlled inputs are the significant determinant of the output.

The search for quality education has been both a real and politically fruitful policy objective. The very foundation of the American experience can be traced to the unique policy at that time of a free universal education system. It is not debated that without this historic policy objective and the success it has seen, that democracy could not flourish as it did and that economic growth could not have been what it has been. The importance of education to both the individual and the state can not be more eloquently stated than it was by Chief Justice Earl Warren writing for the majority in *Brown v. Topeka Board of Education.*[19] He writes:

"...education is perhaps the most important function of state and local governments. Compulsory school attendance laws and the great expectations for education both demonstrate our recognition of the importance of education to our democratic society. It is required in the performance of our most basic public responsibilities, even service in the armed forces. It is the very foundation of good citizenship. Today it is a principal instrument in awakening the child to cultural values, in preparing him for later professional training, and in helping him to adjust normally to his environment. In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms"

We suspect that there will be a finding by the Oklahoma Education Association that available resources are inadequate to reach the goals one hopes for in the education of the children of the state. This would be neither a new finding for education nor for a number of other state and local functions of government in the state. Mandates,

both state and federal for water quality, air quality, jail space and county road construction standards, among others, often impose costs unaccompanied by funds to cover the costs. The simple imposition of standards, however, does not provide a legal, not to mention a constitutional, right to the hoped-for services contained in the quality standards. Nor does it provide a superior claim for the limited funds available each year from the state treasury. It may provide an arguing point in this process, however.

Endnotes

[1]OEA Website,

[2]James S. Coleman, et. al., *Equality of Educational Opportunity*, Washington, D.C.:U.S. Government Printing Office (1966),

[3]" John G. Augenblick, John L. Myers, and Amy Berk Anderson, "Equity and Adequacy in School Funding, *Financing Schools*, Vol. 7, No. 3, Winter 1997.

[4]*Serrano v. Priest* was decided in 1971, but was followed by a series of other cases to clarify the decision and make operational the dictate that funding should be equalized among the various school districts in the state. Later versions of the case take on a variety of names including *Serrano II*. Common among all these cases are the fact that they were filed in the state courts, maintaining the legal foundation laid in *Serrano v. Priest* in the federal court.

[5]An inflation factor allowed the variation to reach $300 by 2000 and at that time 99 percent of all students attended a district within the so-called "Serrano band".

[6]U.S. Supreme Court, San Antonio Independent School District v. Rodriguez, et. al**.,** 411 U.S. 1 (1973).

[7]Justice Brandeis'dissent in *New State Ice v. Liebmann* (1932),

[8]Murray, S. E., Evans, W.N. and Schwab, R.M., "Schoolhouses, Courthouses, and Statehouses after *Serrano*", *Journal of Policy Analysis and Management* (1997) 16,1:10-31,

[9]*Campbell County School District v. State*, *(Campbell I)* 1995

[10]Justice Marshall,dissenting, wrote that "adequacy standards are unintelligible and without directing principle."

[11]Quoted in Kagan, Josh, "A Civics Action: Interpreting 'Adequacy' in State Constitutions' Education Clauses", *New York University Law Review,* Vol. 78:2241, (Dec. 2003), p. 2241-2277.

[12] Cited as *CFI I*, 655 N.E. 2d 661 (N.Y. 1995).

[13] *James I,* 713 So. 2d 869,882 (Ala. 1997).

[14] *James II*, 836 So. 2d 813,815 (Ala.2002).

[15] *Campbell I,* 907 P. 2d 1238, 1279 (Wyo. 1995).

[16] *Claremont School District v. Governor*, 794 A.2d 744 (N.H. 2002).

[17]Eric A. Hanushek, "The Impact of Differential Expenditures on School Performance", *Educational Researcher,* May 1989, p. 45-51.

[18]No Child Left Behind Act of 2001, Title 1, Part A.

[19]U.S. Supreme Court, *Brown v. Topeka Board of Education,* (1954).

Investing in the Bachelor's Degree:
Economic Payoffs to Students and the State

In Fall Semester, 2004, over 15,000 individuals enrolled as first-time freshmen in Oklahoma's public comprehensive and regional universities. Based on U.S. Census Bureau data, we estimate that those who graduate from these institutions with a bachelor's degree (only 48.7 percent of the class) can expect to earn $832,000 more after taxes than a worker with only a high school diploma.[1] The 51.3 percent who don't earn a bachelor's degree can expect to earn $253,000 more after taxes than high school graduates.

These prizes cannot be claimed, however, without substantial financial sacrifice. The typical graduate will invest over $71,000 in the course of the 4.6 years spent earning a degree; over $17,000 in net tuition, fees, books, and supplies, and over $54,000 in foregone after-tax earnings. The typical non-graduates will invest nearly $31,000 in the two years they will spend in college.

Are the expected increases in lifetime earnings large enough to justify the investments these students will make? Yes; our estimates for representative students indicate that graduates can expect to earn an average real rate of return of 15.7 percent on their investment and that non-graduates can expect to earn an average real rate of return of 10.5 percent. Based on these results, high school graduates appear to be getting sound advice when they are urged to go to college, even if the outcome is not a bachelor's degree.

The costs and benefits from the students' perspective are not the same, however, as the costs and benefits from the state's perspective. Benefits to the state include the additional income earned *and taxes paid* by graduates and non-graduates who *remain* in Oklahoma, but they do not include the additional earnings and taxes that are *lost* when college graduates or non-graduates *migrate to other states*. State taxpayers also pay a significant share of college costs through annual appropriations to colleges and universities. It is reason-able to ask, then, whether the expected benefits that will remain in the state are large enough to justify the total investment (that of students' and taxpayers') in college education. Our estimates indicate real rates of return to the state of 7.1 percent and 5.1 percent for representative graduates and non-graduates, respectively.

These are attractive rates of return from a state perspective, even when the risks associated with this investment are acknowledged. These findings indicate, moreover, that investment in a college education makes a significant contribution to state economic growth, even in the face of the substantial out-migration of college graduates and non-graduates that occurs.

As attractive as these returns may be, however, there are large potential benefits from increasing the graduation rate and from lowering the rate of out-migration. The typical student who persists to graduation, instead of dropping out, can expect to reap additional net earnings (additional earnings minus additional costs) of $537,000 over his/her working lifetime. The state can expect to realize additional net income of $230,000 from each student who graduates instead of dropping out. The state will also realize additional net incomes of $600,000 and $147,000 from graduates and non-graduates, respectively, who stay in Oklahoma, rather than migrate to other states.

These prospective benefits should stimulate efforts by both students and the state to increase the probability of college graduation, and efforts by the state to reduce the rate of out-migration of college graduates and non-graduates. As Warner indicates in Chapter 2, there are several programs in progress in Oklahoma aimed at these outcomes. Currently, we know little about their effectiveness and cost, but it is easy to imagine that expected effectiveness times the benefits just cited will exceed the costs of the state's efforts. Merit-based scholarships, such as the Oklahoma Higher

Learning Access Program (OHLAP), are promising; the evidence is that they increase entry and also reduce outmigration persistence. Another approach that may prove to be effective is to inform college students that the extra benefits from finishing, rather than dropping out, greatly exceed the extra costs of finishing.

Benefits and Costs: Student Perspective

Student Perspective

As noted, a college education offers the prospect of a substantial increase in lifetime earnings, both for students who graduate and for those who do not. These increases in lifetime earnings are the principal monetary benefits from a college education. As also noted, students must invest money and sacrifice earnings while in school. These contingencies constitute the principal costs of a college education. In this section, we compare these benefits and costs to determine whether investing in a college education is "worth it" from a student perspective.

We are concerned with the increased earnings or benefits likely to be *actually realized* by graduates and non-graduates and the costs they are *actually likely to pay*. There may be other benefits attributable to college education, but we do not include them in this study.[2] Increased earnings actually realized are earnings *after earnings-related taxes* are paid to federal, state, and local governments. For Oklahoma students these taxes consist of state and federal individual income taxes and the employee portion of the federal social security payroll tax. The costs they are likely to pay consist of earnings foregone *after* taxes while in school, and tuition, fees, books and supplies. Our estimates are for the typical, or representative, student. Available data were not sufficient to develop estimates for the broad range of students enrolling in the entering class of 2004.

Students Who Graduate:
Benefits From a Student's Perspective

Table 4.1 illustrates the estimation of the benefits attributable to a bachelor's degree for a representative freshman enrolling in one of the state's comprehensive or regional universities in Fall, 2004. This is a student who will be enrolled full-time (30 hours or more per year) and graduate in 4.6 years (the average number of years currently taken to earn a bachelor's degree in the U.S.).

Columns 2 and 3 are estimates of real earnings for high school and college graduates that are likely to be realized over a 40-year working lifetime, with the value for year 5 reflecting the 4/10ths of the 5th year that is not spent in school. These are estimates prepared by the U.S. Census Bureau from census data. Column 4 reflects the college earnings premium- the increase in earnings attributable to a bachelor's degree.

The census data are average *national* earnings *before* taxes in constant *1999* dollars. Some of these should be converted to average *Oklahoma* earnings *after* taxes in constant *2004* dollars. In addition, they should include an adjustment for future productivity gains in the economy.

24.1 percent of high school graduates migrate from the state in which they graduate; 35.1 percent of college graduates are out-migrants.[3] National earnings are appropriate for these individuals. National earnings are not appropriate for the 75.9 percent of Oklahoma high school graduates who remain in Oklahoma, however, or for the 64.9 percent of college graduates who also remain in the state. For those remaining in the state, national earnings were converted to Oklahoma earnings by multiplying national earnings by 0.85, the average ratio of Oklahoma to national earnings.

Oklahoma earnings before taxes were converted to Oklahoma earnings after earnings-related taxes (federal and state individual income taxes and the employee portion of the federal social security payroll tax) by applying the weighted tax rates from Table 4.2, to earnings before taxes, either in Oklahoma or outside Oklahoma, as appropriate.

Table 4.1

Benefits Per Graduate, 2004 Freshman Seeking a Bachelor's Degree, Student Perspective
$2004

1 Year	2 Real Earnings HS Graduate Before Taxes 1999[a]	3 Real Earnings Coll Graduate Before Taxes 1999[a]	4 Real Earnings Coll Grad - HS Grad Before Taxes 1999[a]	5 Real Earnings HS Graduate Adjusted for Taxes, Productivity,	6 Real Earnings Coll Graduate Adjusted for Taxes, Productivity,	7 Real Earnings Coll Grad - HS Grad Adjusted for Taxes, Productivity,
5	8,390	13,212	4,822	8,138	13,054	4,916
6	20,975	33,031	12,056	19,204	29,890	10,686
7	20,975	33,031	12,056	19,415	30,219	10,804
8	20,975	33,031	12,056	19,629	30,552	10,923
9	20,975	33,031	12,056	19,845	30,888	11,043
10	24,282	41,417	17,135	22,729	38,370	15,641
11	24,282	41,417	17,135	22,979	38,792	15,813
12	24,282	41,417	17,135	23,232	39,219	15,987
13	24,282	41,417	17,135	23,487	38,580	15,093
14	24,282	41,417	17,135	23,745	39,004	15,259
15	25,633	46,532	20,899	25,342	44,303	18,961
16	25,633	46,532	20,899	25,621	44,790	19,169
17	25,633	46,532	20,899	25,903	45,283	19,380
18	25,633	46,532	20,899	26,188	45,781	19,593
19	25,633	46,532	20,899	26,252	46,147	19,895
20	27,696	49,724	22,028	28,101	49,855	21,753
21	27,696	49,724	22,028	28,411	50,403	21,993
22	27,696	49,724	22,028	28,723	50,958	22,234
23	27,696	49,724	22,028	29,039	51,518	22,479
24	27,696	49,724	22,028	29,358	52,085	22,726
25	27,936	50,322	22,386	29,939	53,207	23,268
26	27,936	50,322	22,386	30,268	53,792	23,524
27	27,936	50,322	22,386	30,601	54,384	23,783
28	27,936	50,322	22,386	30,937	54,982	24,044
29	27,936	50,322	22,386	31,278	55,587	24,309
30	27,942	54,419	26,477	31,629	60,773	29,145
31	27,942	54,419	26,477	31,977	61,442	29,465
32	27,942	54,419	26,477	32,328	62,118	29,790
33	27,942	54,419	26,477	32,684	62,801	30,117
34	27,942	54,419	26,477	33,043	63,492	30,449
35	27,643	50,981	23,338	33,049	60,135	27,086
36	27,643	50,981	23,338	33,413	60,797	27,384
37	27,643	50,981	23,338	33,781	61,465	27,685
38	27,643	50,981	23,338	34,152	62,141	27,989
39	27,643	50,981	23,338	34,528	62,825	28,297
40	25,446	41,259	15,813	32,133	51,485	19,352
41	25,446	41,259	15,813	32,487	52,051	19,565
42	25,446	41,259	15,813	32,844	52,624	19,780
43	25,446	41,259	15,813	33,205	53,203	19,998
44	25,446	41,259	15,813	21,580	33,890	12,310
Total			793,426			831,687

[a]From: U.S. Census Bureau, *The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings*, July, 2002, p 10.

[b]1999 estimates updated to 2004 using Bureau of Labor Statistics' Wage Index. Earnings assumed to grow at 1.1 percent per year as a consequence of increases in productivity. Earnings are adjusted for differences in earnings between Oklahoma and the rest of the states. Earnings are also reduced to reflect the average federal, state, and local taxes paid.

Table 4.2

**Taxes on Earnings as a Share of Earnings
By Size of Earnings, 2002**

Income ($)	Oklahoma Income Tax Rate[a]	US Average State Income Tax Rate[a]	Federal Income Tax Rate[b]	Fed Soc Sec Payroll Tax Rate	Oklahoma: Fed&State Tax Rate	US Average: Fed&State Tax Rate	Weighted Tax Rate[c]
0-11,000	0.004	0.005	0.036	0.077	0.116	0.117	0.116
11,001-15,000	0.017	0.016	0.036	0.077	0.129	0.128	0.128
15,001-30,000	0.029	0.023	0.071	0.077	0.176	0.170	0.175
30,001-40,000	0.029	0.023	0.089	0.077	0.194	0.188	0.193
40,001-50,000	0.038	0.027	0.104	0.077	0.218	0.207	0.216
50,001-60,000	0.038	0.027	0.124	0.077	0.239	0.228	0.237
60,001-70,000	0.041	0.027	0.124	0.077	0.242	0.228	0.239
70,001-90,000	0.041	0.032	0.124	0.077	0.242	0.233	0.240

[a]Institute on Tax and Economic Policy, *Who Pays?* January 2003.

[b]Calculated as the ratio of tax liability to salaries and wages, from: U.S. Internal Revenue Service, *Individual Income Tax, All Returns: Sources of Income and Adjustments, by Size of Adjusted Gross Income, Tax Year 2002*

[c]The sum of Oklahoma federal & state tax rate and U.S. average federal & state tax rate, weighted by shares of earnings in Oklahoma and in the rest of the U.S.

Oklahoma earnings after taxes in constant 1999 dollars were adjusted upward by 16 percent – the increase in earnings per worker between 1999 and 2004 - to get Oklahoma earnings after taxes in constant 2004 dollars. Finally, Oklahoma earnings after taxes in 2004 dollars were increased by 1.1 percent per year as an adjustment for future productivity gains.

The net result of these conversions is the set of adjusted earnings in columns 5, 6, and 7. Column 7 is the "bottom line"; it indicates the increase in earnings per year attributable to a bachelor's degree. The sum of that column indicates that a bachelor's degree is expected to produce an additional $831,687 in lifetime earnings, or benefits.

Students Who Graduate: Costs From a Student's Perspective

Table 4.3 contains our estimates of the cost assumed by a representative student who earns a bachelor's degree. These costs consist of real earnings foregone after taxes while the student is enrolled, and net tuition and fees, and books and supplies. Real earnings foregone is the difference between what students could have earned in a full-time job if not enrolled and what a student earns from a part-time job while enrolled. Real earnings foregone are Oklahoma-specific, adjusted for productivity, and expressed in constant 2004 dollars. Net tuition is the sum of tuition and fees after a deduction for scholarships and fellowships ($862 per full-time equivalent student in 2004), also expressed in constant 2004 dollars.

Total student costs average over $15,000 for each of the first four years and over $9,400 for the portion of the 5th year spent in school. Total costs for the degree are nearly $72,000, with 75 percent of the total accounted for by earnings foregone.

Students Who Graduate: Real Rate of Return From a Student's Perspective

The estimates in Tables 4.1 and 4.3 provide all of the data required to determine the real student rate of return from investing in a bachelor's degree. This is determined by solving the following equation for the value of "i", the internal rate of return:

(1) $((-15,436/(1+i)^1) + ... + ((-9,405)/(1+i)^5) = ((4,916/(1+i)^5) + ... + ((12,310)/(1+i)^{44}),$

Table 4.3

Cost Per Graduate
2004 Freshman Seeking a Bachelor's Degree
Student Perspective
$2004

Year	Real Earnings Foregone Before Taxes: Adjusted for Productivity, $2004	Real Earnings Foregone After Taxes: Adjusted for Productivity, $2004	Net Tuition, Fees & Books $2004	Total Student Cost $2004
1	-$13,312	-$11,606	-$3,830	-$15,436
2	-$13,459	-$11,733	-$3,830	-$15,563
3	-$13,607	-$11,863	-$3,830	-$15,693
4	-$13,756	-$11,993	-$3,830	-$15,823
5	-$7,923	-$7,107	-$2,298	-$9,405
	-$62,057	-$54,301	-$17,618	-$71,919

where the values in the numerators of the terms on the left side of the equation are the costs in years 1 through 5 in Table 4.3, column 5, and the values in the numerators of the terms on the right side are the benefits in years 5 through 44 in Table 4.1, column 7.

The value of "i" for equation (1) is 0.157 or 15.7 percent. That is, an investment in a 4.6 year bachelor's degree in Oklahoma in 2004 is expected to yield an average annual real rate of return of 15.7 percent from the perspective of the typical freshman entering one of the state's comprehensive or regional universities.

It is worth emphasizing that this is the expected rate of return after taxes, net of inflation, and corrected for the somewhat lower earnings that Oklahoma graduates can expect to receive when they work in Oklahoma. As noted, recent college completion rates indicate, however, that there is only a 48.7 percent probability of realizing returns this high.

Students Who Do Not Graduate: Benefits from a Student's Perspective

What about the 51.3 percent of students who will not graduate? The data in Table 4.4 indicate that the completion of "some" college does generate a significant increase in benefits per non-graduate: over $253,000 in additional lifetime

earnings after taxes, net of inflation, and corrected for the somewhat lower earnings that Oklahoma graduates can expect to receive when they work in Oklahoma.

Our focus is on students who seek a bachelor's degree, both those who graduate and those who do not. Data on earnings attributable to a bachelor's degree (used above) are readily available and reliable as measures of benefits to individuals seeking and earning a bachelor's degree. Data on earnings attributable to individuals who do not earn a bachelor's degree are also readily available, but they are less reliable as measures of benefits to individuals seeking a bachelor's degree who do not earn one. The data available for non-graduates are estimates of earnings for individuals with "some" college. This category of individuals includes individuals who: (1) enroll in a 4-year college not seeking a bachelor's degree, (2) enroll in a 4-year college seeking a bachelor's degree but fail to earn one, (3) enroll in a 2-year college seeking a bachelor's degree (transferring eventually to a 4-year institution) but fail to earn one, and (4) enroll in a 2-year college with no intention of earning a bachelor's degree. Unfortunately, it is not possible to separate the "some college" earners into these four categories. We *assume* that reported earnings attributable to "some college" accurately represent earnings of individuals who enroll in a 4-year college seeking

a bachelor's degree, but do not earn one (category (2)). They may, however, also be representative of earnings for students who enroll in either 2-year or 4-year institutions seeking something other than a bachelor's degree.

Table 4.4

Benefits Per Non-Graduate
2004 Freshman Seeking a Bachelor's Degree
Student Perspective
$2004

Years	Real Earnings HS Graduate After Taxes Adjusted for Productivity, State	Real Earnings Some College After Taxes Adjusted for Productivity, State	Real Earnings Differential After Taxes Adjusted for Productivity, State
3-7	88,570	95,745	7,175
8-12	108,381	125,256	16,874
13-17	124,045	149,657	25,612
18-22	140,325	168,863	28,538
23-27	153,492	186,281	32,789
28-32	159,880	201,991	42,111
33-37	165,872	214,347	48,475
38-44	220,811	272,699	51,888
Total			253,463

Students Who Do Not Graduate: Costs From a Student's Perspective

Students with "some" college attend school for approximately 2 years. The costs of doing so are outlined in Table 4.5.

Students Who Do Not Graduate: Real Rate of Return From a Student's Perspective

The estimates in Tables 4.4 and 4.5 provide all of the data required to determine the real student rate of return from investing in some college. This is determined by solving the following equation for the value of "i", the internal rate of return:

$$(2) \ ((-15{,}436/(1+i)^1) + ((-15{,}563)/(1+i)^2) = ((397/(1+i)^3) + ... + ((4{,}696)/(1+i)^{44}),$$

where the values in the numerators of the terms on the left side of the equation are the costs in years 1 and 2 in Table 4.5, column 4, and the values in the numerators of the terms on the right side are the benefits in years 5 through 44 (from an EXCEL spreadsheet used to construct Table 4.4).

The value of "i" for equation (2) is 0.105 or 10.5 percent. That is, an investment in two years of some college in Oklahoma in 2004 is expected to yield an average annual real rate of return of 10.5 percent from the perspective of the typical freshman entering one of the state's comprehensive or regional universities.

Benefits and Costs: State Perspective

The costs and benefits from the students' perspective are not the same as the costs and benefits from the state's perspective. Benefits to the state include the additional income earned *and taxes* paid by graduates and non-graduates who *remain* in Oklahoma, but they do not include the additional earnings and taxes that are *lost* when college graduates or non-graduates *migrate to other states*.[4] State taxpayers also pay a significant share of college costs through annual appropriations to colleges and universities. It is reasonable to ask, then, whether the expected benefits that will remain in the state are large enough to justify the total investment (that of students' and taxpayers') in college education.

Table 4.5

Cost Per Non-Graduate 2004 Freshman
Seeking a Bachelor's Degree
Student Perspective
$2004

Year	Real Earnings Foregone After Taxes Adjusted for Productivity	Net Tuition Fees & Books	Total Cost
1	-11606	-3830	-15436
2	-11733	-3830	-15563
			-30999

Table 4.6

Benefits Per Graduate
2004 Freshman Seeking a Bachelor's Degree State Perspective
$2004

Years	Real Earnings HS Graduate Before Taxes, Adj For Productivity, State, Outmigration	Real Earnings Coll Graduate Before Taxes, Adj For Productivity, State, Outmigration	Real Earnings Differential Before Taxes, Adj For Productivity, State, Outmigration
5-9	80,898	101,823	20,925
10-14	112,074	152,787	40,713
15-19	124,961	181,308	56,346
20-24	142,610	204,638	62,028
25-29	151,933	218,743	66,810
30-34	160,509	249,852	89,342
35-39	167,720	247,227	79,507
40-44	150,111	194,537	44,425
Total			460,098

Students Who Graduate: Benefits From The State's Perspective

Table 4.6 summarizes the benefits realized by the state from investing in a bachelor's degree. Benefits to the state reflect differences in earnings *before* taxes, rather than *after* taxes, on the grounds that before-tax earnings measure the contribution of the worker to state income, whereas after-tax earnings measure the contribution of the worker to his/her own income. Benefits to the state also reflect a deduction for the earnings realized by a graduate outside Oklahoma. The benefits lost through out-migration of graduates are much larger than the taxes collected on earnings realized in the state. Thus, the net effect is a reduction in benefits to the state relative to the benefits realized by students – from $832,000 down to $460,000.

Students Who Graduate: Costs From The State's Perspective

Costs, on the other hand, are larger from the state's perspective than from the student's perspective. There are two reasons for this: (1) earnings foregone before taxes are larger than

earnings foregone after taxes, and (2) costs to the state include all instructional costs per student; i.e., those covered by tuition and fees *plus* those covered by *state appropriations*. Comparing Tables 4.3 and 4.7, costs from a state perspective exceed costs from a student's perspective by $35,020 per student.

Table 4.7

Cost Per Graduate
2004 Freshman Seeking a Bachelor's Degree State Perspective
$2004

Year	Real Earnings Foregone Before Taxes: Adjusted for Productivity, State	Instructional & Support Cost, Books&Supplies	Total Social Cost (-)
1	-$13,312	-$9,757	-$23,069
2	-$13,459	-$9,757	-$23,216
3	-$13,607	-$9,757	-$23,364
4	-$13,756	-$9,757	-$23,513
5	-$7,923	-$5,854	-$13,777
	-$62,057	-$44,882	-$106,939

Students Who Graduate: Real Rate of Return From The State's Perspective

Given smaller benefits and larger costs from a state perspective than from a student's perspective, the real rate of return from the state perspective should be smaller than the real rate of return from a student's perspective. And it is. Using the same algorithm represented by equations (1) and (2), the real rate of return from investing in a bachelor's degree from a state perspective is calculated as 7.1 percent.

Students Who Do Not Graduate: Benefits From The State's Perspective

Table 4.8 summarizes the benefits realized by the state from investing in some college; i.e., in students who complete an average of two years of college. Total benefits are considerably less than for students who graduate – about $170,000 versus $460,000, or only 37 percent as much.

Students Who Do Not Graduate: Costs From The State's Perspective

Cost per *non-graduate* from the state's perspective is the same *per year* as cost per *graduate* from the state's perspective. Non-graduates spend only two years in college, however, so their total cost ($45,403) is less than the total cost ($106,939) for graduates.

Students Who Do Not Graduate: Real Rate of Return From The State's Perspective

Given that benefits per student are lower for those who do not graduate than for those who do graduate, but that costs per student are also lower for those who do not graduate than for those who do, it is not clear, *a priori*, that the real rate of return from the state's perspective for non-graduates will be lower than the real rate of return for graduates. It is, however. Application of the algorithm used in equations (1) and (2) indicates a real rate of return from the state's perspective for non-graduates of 5.1 percent, or 2 percentage points less than for graduates.

Table 4.8

Benefits Per Non-Graduate
2004 Freshman Seeking a Bachelor's Degree
State Perspective
$2004

Years	Real Earnings HS Graduate Before Taxes, Adj For Productivity, State, Outmigration	Real Earnings Some College Before Taxes, Adj For Productivity, State, Outmigration	Real Earnings Differential Before Taxes, Adj For Productivity, State, Outmigration
3-7	87,174	86,475	-699
8-12	108,186	114,769	6,582
13-17	124,813	138,182	13,369
18-22	141,194	159,623	18,429
23-27	154,443	177,044	22,601
28-32	163,700	196,243	32,542
33-37	171,797	209,326	37,529
38-44	169,627	193,761	24,134
Total			169,549

Table 4.9

Cost Per Non-Graduate
2004 Freshman Seeking a Bachelor's Degree
State Perspective
$2004

Year	Real Earnings Foregone Before Taxes Adjusted for Productivity, State	Instructional & Support Cost, Books&Supplies Per Student	Total Costs (-)
1	-12874	-9757	-22631
2	-13015	-9757	-22772
			-45403

Contribution To Economic Growth

The above estimates of the benefits and costs from a state perspective for representative students can be used to develop an estimate of the aggregate impact of the entering class of 2004 on state income. If recent trends prevail, the class is expected to produce 5,858 full-time-equivalent graduates and 6,166 full-time-equivalent non-graduates. As indicated in Table 4.10, the state (students and taxpayers together) will invest over $926 million in the entering class of 2004. These students will generate an increase in state income of $3.7 billion after they leave college, or an annual average increase in state income of $93.5 million for the next 40-42 years. As a group, they will generate a 6.41 percent real rate of return on investment.

Table 4.10

Impact on the Oklahoma Economy
2004 Freshmen Seeking a Bachelor's Degree
$2004 and Real Rate of Return

Total Real Investment	Total Increase in Real State Earnings	Ave Annual Increase in Real State Earnings	Real State Rate of Return
-926,088,391	3,738,638,556	93,465,964	6.41%

The additional income of $93.5 million per year is the amount that the entering class of 2004 will add to state economic growth. That is, the state's economy will grow by $93.5 million more than it would have in the absence of the investment in the entering class of 2004.

Are Expected Returns High Enough?

Given the large investments required, it is reasonable to ask if the expected rates of return are high enough to justify the investments.

Student Returns

The first thing that needs emphasizing is that the typical student should not enter college expecting to earn the rate of return associated with graduating. There is only a probability of 0.487 that this will be the outcome and a probability of 0.513 that it will not be the outcome. The relevant expected return can be determined by using:

(3) Expected Real Student Rate of Return =
P_g(RRORG$_s$) + P_n(RRORNG$_s$),

where P_g and P_n are the probabilities of graduating and not graduating, respectively, and RRORG$_s$ and RRORNG$_s$ are the real rates of return (RROR) for graduates (G) and non-graduates (NG) from the student's perspective (hence, the 's' subscript), respectively .

Given the values estimated or mentioned above, the solution for equation (3) is:

Expected Real Student Rate of Return =
0.487(0.157) + 0.513(0.105) = 0.13, or 13 percent.

The typical student should make this investment only if this rate of return is greater than the rate of return on the best alternative investment *with similar risk characteristics*. There is some risk that the earnings of college graduates and non-graduates will fall temporarily as a result of national and regional recessions, labor market dynamics, and local business failures.

The most widely available alternatives are investments in stocks and bonds. Investments in stocks and bonds are also subject to risks created by recessions and business failures. For the period, 1926-2002, annual losses in bond investments averaged 5 percent per year during the years when bond prices fell, but annual losses in stock investments averaged 29 percent during the years when stock prices fell.[5] Thus, the risks associated with bonds are probably closer in magnitude to the risks associated with earnings of college graduates and non-graduates than the risks associated with stocks. This being the case, the average annual rates of return on bonds is a better proxy for the best financial alternative to investing in college education than the average annual rate of return on stocks. Given that bonds yielded an average annual rate of return of only 6 percent from 1926 to 2002, investing in a college education clearly makes good sense from the typical student's perspective.

Social Returns

Like the typical student, the state should not assume that the typical student entering college will graduate. As noted, there is only a probability of 0.487 that this will be the outcome and a probability of 0.513 that it will not be the outcome. The relevant expected return for the state, then, can be determined by using:

(4) Expected Real State Rate of Return =
     $P_g(RRORG_p) + P_n(RRORNG_p)$,

where P_g and P_n are still the probabilities of graduating and not graduating, respectively, but $RRORG_p$ and $RRORNG_p$ are the real rates of return (RROR) for graduates (G) and non-graduates (NG) from the state's or the public's perspective (hence, the 'p' subscript), respectively.

Given the values estimated or mentioned above, the solution for equation (4) is:

Expected Real State Rate of Return = 0.487(0.071) + 0.513(0.051) = 0.062, or 6.2 percent.

The state should make this investment only if this rate of return is greater than the rate of return on the best alternative investment. The "state" consists of both students and the state government. The appropriate alternative rate of return for the student portion has already been determined.

When the government invests in college education it does so by investing money withdrawn from the private sector in the form of taxes. Given the high proportion of state taxes accounted for by sales and excise taxes and the high proportion of household income spent on consumption, it is reasonable to assume that the government's alternative is the real rate of return that people can earn in exchange for postponing consumption. In practice, this is the real after-tax rate of return on savings. In an authoritative review of the elements used to determine this rate, Boardman, et al, estimate an average annual value of 1.71 percent for the period, April, 1953 to April, 1999.[6]

The appropriate alternative rate from a social perspective is determined by calculating a weighted real rate of return using:

(5) Alternative Social RROR = ARSROR (Student Cost / (Student Cost + Appropriations)) + ARPROR (Appropriations / (Student Cost + Appropriations)),

where ARSROR and ARPROR are the alternative real *student (S)* rate of return and the alternative real *public* or government *(P)* real rate of return, respectively. The solution for equation (5) is:

(5) Alternative Social RROR = 0.06 (0.79) + 0.017 (.21) = 0.0478, or 4.78 percent.

Since the expected real rate of return to the state is 6.2 percent, investing in a college education makes good sense from the state's perspective, although the call is a lot closer than it is from a student's perspective.

Increasing Expected Social Returns

The closeness of the call underscores the desirability of adopting policies or practices

designed to increase the real social rate of return. Ideally, such policies or practices, themselves, should also be required to yield benefits in excess of costs sufficient to produce a suitable social rate of return.

Table 4.11 displays the incremental payoffs from completing a bachelor's degree or keeping a student in Oklahoma after the completion of their Oklahoma college schooling.

A student who completes a bachelor's degree instead of dropping out would realize an increase in net benefits (additional after-tax earnings minus the additional costs of investing in an extra 2.6 years of college) of $537,304 and a whopping real rate of return on the incremental investment of 20.54 percent. That same student would increase state income by $229,895 and the state would realize a real rate of return of 9.21 percent on the incremental investment associated with the extra schooling required. A graduate who stays in Oklahoma instead of migrating to another state would increase state income by $600,218 over his/ her working lifetime, and a non-graduate who stays, rather than goes, would increase state income by $146,973.

The estimated increase in net benefits for completing a bachelor's degree is so large that publicizing this finding may be a cost-effective strategy to follow. That is, the costs of publicizing the net benefits from staying in college and finishing a degree may be quite small relative to the benefits of such a campaign. The benefits are equal to the net benefit per student times the number of students who graduate because of the publicity campaign. The benefits per student are so large that even a small number of students (the probable outcome?) who graduate because of the publicity campaign may be sufficient to warrant investing in the campaign.

Another strategy where a small degree of effectiveness may pay off handsomely is the expansion of the state's merit aid program, the Oklahoma Higher Learning Access program (OHLAP). Oklahoma is one of 14 states with a merit aid program for college students. As ex-plained more fully in Chapter 2 of this volume, OHLAP pays resident tuition costs at state institu-tions of higher education for students from families with annual incomes of $50,000 or less, conditional on maintaining a 2.5 grade point average in high school, taking 17 units of required courses, attending class, and staying out of trouble. Those eligible must go on to college within three years. They must maintain satisfac-tory grades in college, and they may receive the tuition aid for up to five years.

Table 4.11

Incremental Payoffs
2004 Freshman Seeking a Bachelor's Degree

Outcome	Alternative Outcome	Perspective	Incremental Net Benefits $2004	Incremental Rate of Return Percent
Bachelor's Degree	Some College	Student	537,304	20.54%
Bachelor's Degree	Some College	State	229,895	9.21%
Graduate Stays in Oklahoma	Graduate Migrates	State	600,218	NA
Non-Graduate Stays in Oklahoma	Non-Graduate Migrates	State	146,973	NA

NA: Not applicable; no additional investment required

A recent study by Harvard's Susan Dynarski of merit aid in Arkansas, Georgia, and Mississippi, the three pioneering states in this approach to educational finance, provides information that can be applied to Oklahoma to determine if the expansion of merit aid is likely to be worth it.[7] Table 4.12 displays our findings based on this information.

Dynarski's study of these three systems indicates that their programs of merit aid increased the number of new entrants in public colleges and universities in these states by 2 percent, increased the number of graduates by 2 percentage points, and reduced the rate of out-migration of the additional graduates induced by the merit program by 19 percentage points. The estimates in Table 4.12 are based on these findings applied to Oklahoma's entering class of 2004. These are small degrees of effectiveness, but as Table 4.12 illustrates, they have significant financial impacts when applied to the representative students we have been examining.

A 2 percent increase in new entrants translates into 240 new entrants in Oklahoma; a 2 percent increase in new graduates means 360 new graduates. Table 14.2 contains two scenarios applied to these students. In the first case (the 100% case), we assume that the state provides merit aid of $3,000 per year (a level close to that provided in Georgia during Dynarski's study period) to all members (none become ineligible because of poor academic performance) of the

entering class of 2004 for the first five years they are seeking a degree. The only proviso is that they stay in school. Using national attrition rates for each year, the total cost of the merit aid program is $133,449,807 or $370,694 per additional graduate. The 360 additional graduates produce additional lifetime earnings of $329,174,174, or $914,373 per additional graduate. Given these earnings and costs, the real rate of return on the investment in the merit aid program is 4.18 percent.

If the state requires a somewhat higher rate of return, say the 4.78 percent calculated in equation (5), this could be achieved with a little room to spare by providing merit aid to only 85 percent (the 85% scenario in Table 14.2) of the entering class. Such a high percentage may well be required, however, given the low GPA required to sustain OHLAP merit aid.

As noted, Dynarski's findings are weighted heavily by the impacts of the Georgia HOPE program. Compared to this program, OHLAP has lower academic standards for the initial receipt of merit aid. It's conceivable, then, that merit aid may have a larger impact on new entrants in Oklahoma than Dynarski's estimate. If so, our estimates of the payoff are biased downward. Standards for the continuation of merit aid while in college in Georgia are also higher than the performance required for the continuation of OHLAP aid (Georgia students lose their aid if they fail to attain a 3.0 college grade point average; Oklahoma students lose their aid only if their GPA

Table 4.12

Effects of A $3,000 Increase in Merit Aid on New Entrants Seeking A Bachelor's Degree

	Before Merit Aid	After Merit Aid	Effect of Merit Aid 100 % Entrants	Effect of Merit Aid 85% Entrants
Number of Entrants	12,024	12,264	240	240
Number of Graduates	5,858	6,218	360	360
Total Cost of Merit Aid			-$133,449,807	-$113,432,336
Total Earnings Attributable to Merit Aid			$329,174,174	$329,174,174
Cost Per Post-Merit Aid Graduate			-$370,694	-$315,090
Earnings Per Post-Merit Aid Graduate			$914,373	$914,373
Real Rate of Return to State			4.18%	5.06%

falls below 1.7 in the freshman year and 2.0 thereafter). Thus, the impact on the graduation rate in Oklahoma may be higher than Dynarski's estimate. If so, there is a further source of downward-bias in our estimates. In any event, these are important enough determinants of the payoff to merit aid that they certainly deserve additional research.

Endnotes

[1]U. S. Census Bureau, *The Big Payoff: Educational Attainment and Synthetic Estimates of Worklife Earnings*, July, 2002.

[2]See, for example, Sandy Baum and Kathleen Payea, *The Benefits of Higher Education for Individuals and Society*, 2004, The College Board. We do not include such benefits because the monetary estimates of their magnitude are not firmly confirmed. We also do not include estimates of fringe benefits, partly due to inadequate data, and partly as an offset to our failure to include a downward adjustment in earnings for the portion attributable to ability, rather than to college education. We believe that these latter two adjustments would largely offset each other.

[3]Kodrzycki, Yolanda, "Migration of Recent College Graduates: Evidence from the National Longitudinal Survey of Youth," January/February, 2001, *New England Economic Review*, p.15.

[4]Malkiel, Burton G., *The Random Walk Guide to Investing*, 2003, W.W. Norton Co., pp. 28-29.

[5]Earnings lost due to out-migration are likely to be an overestimate of actual losses because many Oklahoma taxpayers are probably willing to pay something to ensure that Oklahoma youth can compete outside the state for good paying jobs, but we do not have the information required to make this adjustment.

[6]Boardman, A.E., D.H. Greenberg, A.R. Vining, and D.L. Weimer, *Cost-Benefit Analysis,* 2001, Prentice-Hall, p. 239.

[7]Dynarski, Susan, "States, Migration, and Human Capital Policy," Oct, 2004, Harvard University, Kennedy School of Government, Unpublished Manuscript.

Changes in Liability Systems and Economic Development: The Oklahoma Context

The *Economist* magazine recently referred to tort reform as one of President Bush's first-term objectives that deserves and is receiving serious attention in the second term. It states, "Trial lawyers apart, few deny that America's tort system needs reform," and generally endorses the proposals to move multistate class-action lawsuits to federal courts, to limit non-economic damage awards in medical malpractice and other liability cases, and to change the rules for asbestos payouts.[1] Expressing substantial agreement, in a recent editorial, *The Washington Post* asserts, "that the staggering costs and irrationality of America's civil justice system are unacceptable. The tort system is something of a casino, offering windfall judgments to a small number of claimants and nothing to others — with the merits of cases seeming almost irrelevant to their valuation. But it won't be easy to do reform properly." The Post generally supports the proposed asbestos legislation, suggests that class-action legislation does not go far enough, and thinks it is not sufficient to impose caps on noneconomic damage awards unaccompanied by attempts to develop other ways of reducing negligence in the delivery of medical services.[2]

The same climate with regard to the tort system exists in many states. Several of them are considering the revision of elements of their liability systems or have revised them signifi-cantly in recent years. The most recent compre-hensive revisions in state liability systems have occurred in Texas (2003), Mississippi (2004) and Ohio (2004). Prior to these revisions, economic development and business experts had generally ranked Oklahoma's liability system as less costly than those of Mississippi and Texas.[3] Although Oklahoma also has had changes in its liability system in the last two years, as we shall see, its changes have been limited compared to those of

Mississippi and Texas. As a result, part of Oklahoma's competitive advantage based on liability costs vis a vis these states may have eroded.

What is it about the American civil justice system (liability system or tort system) that evokes such strong statements from sources that are generally not thought of as unabashed support-ers of business? Or what is it about states' liability systems that generate so much political dispute? And why is it important for economic development?

To approach these questions, we first exam-ine the role of a tort system in a modern economy. We then assess the costs and effectiveness of the American tort system. This assessment suggests that it is unusually expensive and somewhat ineffective. Next, we consider whether and how the existing tort system might impede or promote economic growth, both for the United States as a whole and in Oklahoma. Finally, we examine recent changes in liability systems in Oklahoma, Mississippi, Ohio, and Texas and show that the changes in the last three states probably will have a greater effect in reducing liability costs than will the changes in Oklahoma.

The Tort System in a Modern Economy

Innovation, Economic Growth and Development

The hallmark of the American economy is change. People develop new products and new ways of doing business and they try new products, new jobs, and so on. This unrelenting search for improvement results in continuing economic development and growth at both the national and state levels. Business owners know that new products and processes are necessary to maintain

and expand competitive advantage. As consumers, we choose new, unproven, and potentially much better products and services over established, proven, but perhaps less-effective ones. The choice of entertainment technologies, cell phone providers, or cars is multidimensional and difficult. These choices are sometimes daunting, but having them improves our quality of life. Their availability is a consequence and cause of economic growth. The new choices that we have regarding health care, medical services, or equipment have the same characteristic: a choice of the new and perhaps unproven or of the tried and true. Their availability is also linked to economic growth in the same way.

Choosing a cell phone provider or television technology is straightforward, unless contracts are misrepresented or unexpected hazards emerge. Deciding on a new cardiac treatment, a new production process, or a new product, on the other hand, inherently involves risks for the user. The recent withdrawal of Vioxx from the market and the concerns about Celebrex, certain statins, or diets illustrate those risks. As the asbestos litigation and various product liability cases illustrate, these risks are not restricted to medical products; many new products, almost by virtue of their newness, present risks to users. They are necessarily brought to the market before all risks are known, and therefore the unknown harm that the products may cause can be large. Without perfect foresight and information, however, it is simply impossible to know all of the risks associated with all new products and processes. These risks are costs that we must live with, short of stifling new products and processes and consequently stifling economic growth.

Regulation or Torts: Effects on Economic Growth

As a society, we face the issue of how to reduce the risks of new products without reducing innovation too much. For example, for every new pharmaceutical, we balance the costs of impeding its development and preventing people from receiving its sometimes life-saving benefits with the costs of rapid introduction and the potential

unexpected life-threatening side effects. One polar approach is to rely even more heavily on government regulation of the development and introduction of new products to optimize the net benefits of new product development, using a benefit-risk framework. The other pole keeps regulation to a minimum and uses a well-designed tort system to optimize these net benefits. The goal in both cases is to move toward the optimal level of safety.

In the United States, we use a combination of regulation and tort law to move toward the optimal combination of safety and growth. Regulation relies, as with the Food and Drug Administration, on businesses supplying the regulators with information about their proposed products. The regulators, after collecting and evaluating the information, come to a decision about the introduction of the product. It is a centralized system that can be adversarial or can result in conflict-of-interest problems. This approach may minimize the number of adverse events, but it moves decision making away from the people who have the best information about the costs, benefits, and profit potential of the product. As a result, regulation may also reduce the product's net benefits by delaying or preventing its introduction. An example would be the delayed introduction of a beneficial drug because of its side effects.

Moreover, as a centralized system in the political arena, political considerations probably influence the regulators' decisions. "Drug approval agencies", as a result, "are frequently criticized for either being too slow or too fast." [4] For instance, the AIDs crisis and the desperation of terminal cancer patients has created political pressure for a more rapid introduction of new drugs. On the other hand, political pressures may have affected the FDA's unwillingness to approve over-the-counter sale of a "morning-after" pill to prevent pregnancy. Approval of the abortion pill RU-485 also was surrounded by controversy. If all new products were subject to this type of centralized regulation, it is almost inevitable that economic growth would suffer.

The tort system, on the other hand, provides a more decentralized way of handling the unexpected damages incurred by the purchaser and user of a product or damages that result from an

accident. Consider automobile accidents. One risk factor is the car's mechanical condition. An automobile's condition in some states is subject to regulation and inspection in the interests of safety; in other states it is not. The latter states rely on the automobile owner's knowledge of her car and her concern about her own safety and that of others—passengers and strangers—to optimize safety. The existence of the tort system provides the automobile owner with additional incentive to keep her car in a safe condition by adding to her personal cost of driving an unsafe car.

Now consider purchases that, unlike accidents, imply voluntary transactions. For instance, the FDA is considering over-the-counter sales of some statins; i.e., cholesterol-reducing drugs. The wider availability of such drugs presumably would result in more people taking them and thus less heart disease. On the other hand, statins have serious side effects that affect a small percentage of users. More people will be harmed. A tort system allows people to decide whether to use the products and leaves the question of damages to the legal system.

The FDA has approved new and more powerful statins, even though they may have stronger side effects. The patient, in consultation with his doctor, can decide on the benefit-risk tradeoff. With the regulatory approval, the tort system then becomes the mechanism influencing the producer's decision about marketing and distribution of the product. Combining the tort system with regulation has the advantage of reducing the inhibiting effect of a pure regulatory system. If the tort system imposes heavy liability costs, regulators know that producers have stronger incentives to emphasize safety. Therefore, they can be more confident about the research that the producers use to support their new product. They also know that the producers will have an incentive to avoid unnecessary mass use of their product. In short, producers incorporate expected liability cost into their production and marketing decisions.

On the other hand, if potential liability costs are substantially reduced by regulatory approval, regulators know that the producers have less incentive to be concerned about safety and widespread use of their products. Consequently, the regulators are apt to be more skeptical about the research used by producers to get their products approved. Furthermore, if the potential liability cost is minimal, producers have no incentive to restrict users. Finally, the regulators know that victims are less apt to be compensated under this tort regime.

This combination of factors suggests that relying more heavily on regulation and less heavily on tort law may inhibit the approval of new products. Thus, if the tort system is working well, it would seem that choice is enhanced and growth stimulated while the individual decision makers evaluate risks.

To recap, an important function of a tort system, or a tort and regulatory system, is to induce economic agents to move toward the optimal level of safety. In this context, that optimal level is determined by the benefits of producing and selling certain products or taking certain actions and the safety cost of using those products or taking those actions. A tort system has the advantage of decentralization. Economic agents with the best information about the products and their uses make the relevant decisions. If incentives are appropriate, appropriate choices regarding safety are incorporated into the decision-making. Moreover, because less information is passed to the regulatory agency, decisions can be made more quickly. In addition, the agents have no incentive to distort the information and there is one less channel through which the information flows. Consequently, inaccurate information is less of a problem. In summary, the decentralized approach would appear to be a more growth-oriented approach. Another important function of a tort system is to compensate victims who have been harmed in the transaction. The expected compensation to plaintiffs affects both the behavior of potential defendants and plaintiffs and thus provides incentives for safe practices. Strict liability rules put the burden of safety squarely on the person whose product or action inflicts harm, leaving users with less incentive for safe behavior. Negligence rules, on the other hand, provide incentives for both parties to pursue safety. Finally, *caveat emptor* (buyer beware) places the burden for safety on the user, assuming the producer provides all available information.[5]

Problems with the American Liability System

According to the writers for the *Economist* and the *Washington Post* quoted above, the American tort system is no longer performing well. These authors indicate that too often the system as it now operates is too costly, fails to move the economy toward an appropriate level of safety, and fails to compensate appropriately people who are damaged. Their analyses suggest that an ineffective tort system imposes costs in at least three ways. First, the legal or administrative costs incurred by plaintiffs and defendants are real costs to the economy in that they draw talented lawyers and business people away from economic activities that are wealth creating to those that redistribute wealth. If these costs were reduced, resources could transfer to wealth creating activities, stimulating economic activity.

A second type of cost of an ineffective system is its effect on economic growth and on economic decisions that are taken to avoid tort costs or to collect damages. As we discussed, if the liability system leads to too much safety, it inhibits growth by stifling innovation. Similarly, if it creates too much uncertainty or risk for innovative firms, it can increase their costs sufficiently to cause otherwise successful innovators to fail, reducing economic growth. Conversely, if it leads to too little safety, economic well-being again is damaged.

Third, in the interests of fairness, people in our society appear to believe that victims deserve compensation. Failure to provide that compensation is a cost to the victims and to the rest of us.

The Costs of the Tort System

Costs in 2003

Both the costs and the benefits of the tort system are difficult to measure. In principle, based on our discussion above, we know what these benefits and costs are. The best evidence we have about costs relate to the administrative costs of operating the system. The effects of the system on economic performance and the extent to which

victims are appropriately compensated are much harder to measure. With regard to administrative costs and victim compensation, Tillinghast-Towers Perrin, a consulting firm whose clients are insurance companies, has tabulated the amount of the damages incurred by plaintiffs in terms of insured damages, medical liability payments, and uninsured damages. In addition, it calculates the administrative cost of the firms and insurance companies in dealing with tort claims.[6]

These costs are large. In 2003, according to Tillinghast-Towers Perrin, they amounted to almost $850 per person in the United States, for a total of almost $250 billion. Since 1975, they have almost doubled as a share of GDP, growing from 1.2 to 2.2 percent of GDP. In addition, these costs as a share of GDP are much larger than in other developed countries: twice their average or more.

About 22 percent of these costs goes to compensate victims for economic damages, 24 percent to compensate for noneconomic damages—pain and suffering, 19 percent to plaintiffs' lawyers, 14 percent to defense costs, and 21 percent to insurance administration.[7] Sebastian Mallaby, columnist and editorial writer for the *Washington Post* states that the administrative costs (the sum of the costs of plaintiffs' and defendants' lawyers and insurance administration) are too high, comparing them to the administrative costs of health insurance of about 14 percent or of Social Security disability of about 3 percent.[8] Mallaby may underestimate the administrative cost of an efficient tort system; the U.S. Council of Economic Advisers under President Bush has suggested that the 23 percent administrative costs attributed to workers' compensation systems may provide a useful benchmark.[9] According to this more generous benchmark, excess administrative costs still amounted to over $75 billion dollars in 2003.

Mallaby also suggests that the damages paid to compensate for pain and suffering are excessive. He agrees that compensation for well-defined economic damages can be appropriate, but he questions compensation for pain and suffering. Mallaby argues that one best thinks of the tort system as an insurance system. The cost of the insurance and the other costs discussed above are

built into the prices of goods and services. Each consumer purchasing a risky product pays an "insurance premium" as part of the price. If businesses were not liable for the risk of their products, the price would be lower.

Examples of this price effect abound. For instance, the per dose wholesale price of DPT vaccine in 1986 was $7.84, according to a study by Richard Manning, with about 95 percent of this price—$7.46—related to liability risk due to the use of a strict liability rule. If the vaccine producers were held liable for damages only if they were negligent—a negligence rule rather than a strict liability rule—the vaccine price would have been about 40 cents a dose. Less dramatically, Manning found that the movement to strict liability had increased the price of the oral polio vaccine by 300 percent and the mumps, measles, rubella vaccine by 50 percent.[10]

In another study Manning found that about one-half of the average difference between Canadian and American drug prices could be explained by the greater liability costs in the United States market. For the most risky drugs, all of the difference could be explained by the liability risks.[11] For American consumers, the expected liability cost associated with any product will be included in the product price, just as it is with pharmaceuticals.

Presumably we would want the tort system to provide the same kind of insurance that we provide for ourselves. As individuals, what types of things do we insure against? Typically, we insure against loss of earnings due to disability and premature death and extraordinary health costs. But we generally do not insure against the pain and suffering or loss of prospective earnings related to a child's death or that of a retired member of our household. Because we do not insure against these things, Mallaby argues, it may be inappropriate to implicitly force people to insure against them through the liability system. Therefore, he suggests that large noneconomic damages—larger, in fact, than the economic damages that we do insure against—are unwarranted.[12]

Finally, Mallaby points out that the economic damages part of tort costs also is problematic. Obvious errors and negligent doctors and by other providers of goods and services, if they cause serious damage, are likely to result in damage awards. But many cases of medical malpractice and product liability slip through the system. Whether damages will be recovered and the amount that will be recovered are not very predictable. Because they are not predictable, the incentives that the tort system could generate for safety are reduced. Moreover, the unpredictability makes insuring against the risk abnormally expensive.

Trends in Costs

As Figure 5.1 shows, torts costs as a share of GDP grew rapidly from 1975 through the late 1980s, peaking in 1989. The share then fell until 1997. Beginning in 1998 through 2004, the trend again is upward. From 2002 to 2003 the trend line looks similar to that from 1982 to 1983 and 1986 to 1987. This is intriguing because after 1983 the share grew from 1.8 to 2.3, but after 1987 it fell back to 1.8 before the latest expansion. Will tort cost as a share of GDP start falling as in 1987, or is it going to continue to increase as in 1983?

Figure 5.2 shows the average annual growth rate in tort costs adjusted for inflation over 3 periods. They grew close to 12 percent annually from 1976 through 1989. At that rate, tort costs were doubling every six years. For the next several years they grew at about two percent per year and, finally, since 1997, at about six percent per year. If they continue to grow at or close to this rate, tort costs as share of GDP will continue to grow.

Total tort costs are broken into Medical Malpractice and other Tort Costs in Figure 5.3. The other Tort Costs are then broken into Insured Costs and Uninsured Costs. An examination of Figure 5.3 reveals several trends. First, medical malpractice costs—the first three columns—have grown faster than insured-plus-uninsured costs in every period. The growth rate of medical malpractice costs was above 5 percent per year in each of the three periods. As a result, they continue to grow as a proportion of GDP. Second, the run up of other Tort Costs from 1976 to 1989 was associated with a rapid growth of uninsured costs.

Figure 5.1

Tort Costs as a Percent of GDP
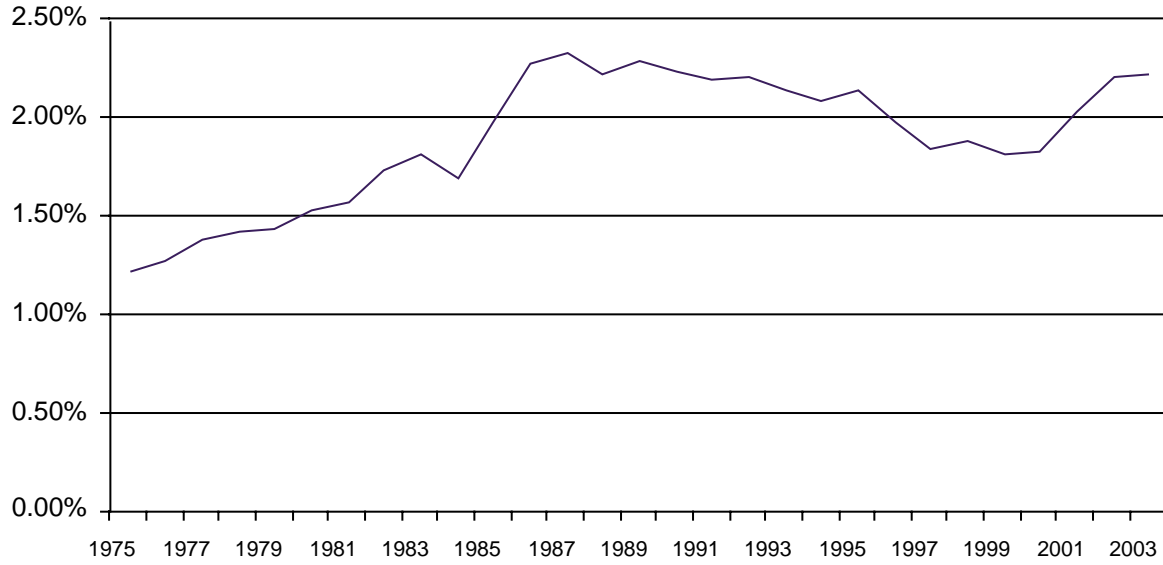
Figure 5.2

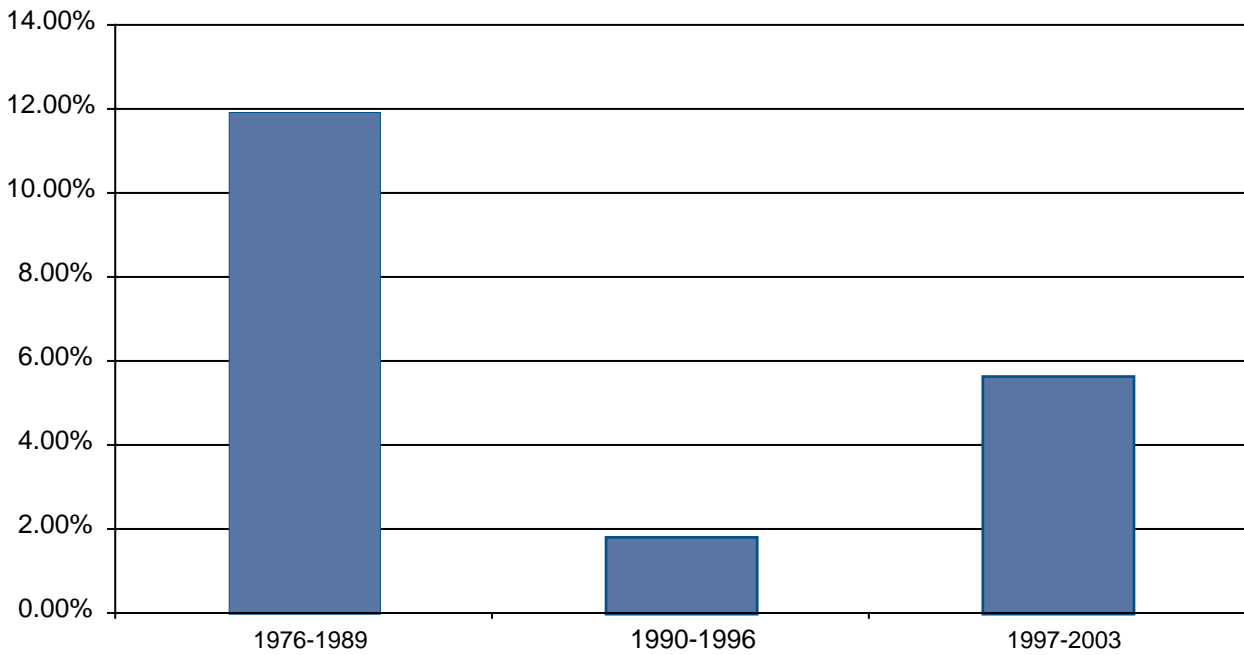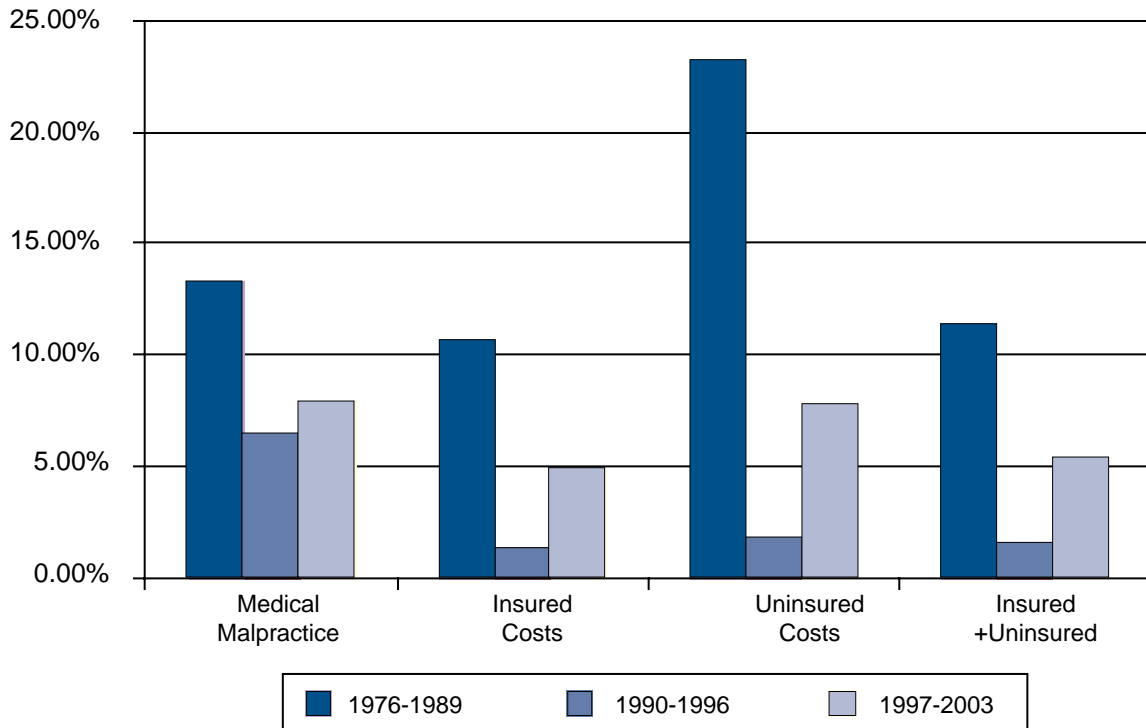**Average Annual Growth Rate of Tort Costs (adjusted for inflation)**

Figure 5.3

Average Annual Growth Rate of Components of Tort Costs

Parts of the uninsured costs are deductibles and copayments, but another part reflects self-insurance. Perhaps the uncertainty about what was going to happen with product liability was part of the reason that insurance companies could not write policies that customers were willing to buy. Although the growth rate has moderated, the growth of the uninsured costs was greater than that of insured costs in every period.

The Effects of Tort Costs on Economic Growth and Development

An earlier paper for Oklahoma 21st Century analyzed two studies of the direct effects of states' liability systems on their economic performance.[13] Both studies found significant effects on performance. States that had liability systems that ranked higher in a survey of senior corporate attorneys had better growth performance. Another study found that changes in state laws that reduced

potential liability costs were associated with increases in productivity in a state's industries.

The Congressional Budget Office (CBO) has recently surveyed several economic studies of the effects of tort reform. The purpose was to see if changes in state's tort law have the expected effects on litigation costs and results. Another purpose was to determine if any consensus existed about how different changes in tort law would affect behavior, so that policy analysis of proposed federal legislation could be undertaken.

Most of the studies surveyed by the CBO found that tort reform reduced tort costs by reducing damage awards, the number of court cases filed, and so on. Other effects indicating reduced tort costs included reduced insurance premiums and pressures to reduce these premiums because of reduced insurance-company losses. In addition, one group of studies found that medical malpractice reforms were associated with reductions in defensive medicine without harming outcomes.[14]

"The most consistent finding in the studies that CBO reviewed was that caps on damage awards reduced the number of lawsuits filed, the value of awards, and insurance costs."[15] The evidence was mixed on other changes. Moreover, the tort system or a change in the system is not something that is easily measured for quantitative analysis. Although the evidence is strong that tort systems and changes in tort systems affect economic behavior in expected ways, the CBO paper concludes that the nature and timing of the observed specific changes make it difficult to use these studies to analyze specific federal or state policies or laws. One example of the problem is that different states have enacted different sets of changes at the same time. Consequently, it is difficult to isolate which, if any, single change is responsible for the change in behavior.

Changes in Liability Systems and State Economic Development

Medical and general liability systems affect the desirability of a state for economic development in much the same way that a desirable climate or location does. States with locations favorable for certain kinds of business firms, say ski resorts, will attract those firms. As the firms are attracted to these locations, markets will achieve a balance, so that a firm in a state with the desirable location will be equally prosperous as one in a state with the undesirable location (assuming that the less desirable state has any firms in this industry). The firm might exist in the undesirable location, say a ski resort in a warm state forcing the use of artificial snow, because of a niche market or because it pays less for land or labor.

Similarly, a state with an attractive climate may find that workers are willing to live and work there for a lower wage. Again markets will achieve balance in that the workers who live in the states with a less attractive climate will be compensated by either a higher wage or lower housing prices.

States cannot alter their climate or their location for economic development purposes. They can, however, change their litigation climate.

For instance, California has had limits on noneconomic damages in medical malpractice cases since 1975. A recent Rand report demonstrates that the cap on noneconomic damages has had substantial effects on the total damages awarded in court cases. The damage cap is accompanied by limitations on attorneys' fees, which the study also finds to have been effective.[16]

Although the Rand study does not examine the question, some people claim that the limit on non-economic damages has had the effect of reducing malpractice premiums and thus medical costs in California. Suppose it has. Would this be a plus for California economic development? It depends on whether California residents think that California's medical liability system combined with its medical system is preferred to that in other states. If it is preferred, then they will be willing to accept lower wages than in the other states and consequently California will be more attractive to business firms. Alternatively, if other states are perceived as having better systems, then Californians will require higher wages with all that implies for economic development. Similar considerations would apply with respect to automobile liability and insurance systems.

The analysis also applies to legislation, pertaining to caps on punitive and noneconomic damages from changes in product liability laws that affect general liability costs of business. By reducing liability costs, business firms will find the state a more attractive location. If residents perceive these changes as having little effect on their well being, wages initially would be little affected. In this case the changes will have made the state more attractive for business. On the other hand, if residents perceive the changes as very costly, they will require higher wages to remain in the state.

Small Business, Tort Costs, and Economic Growth

Mounting evidence suggests that small business firms play a crucial role in national and state economic growth. Accord to David B. Audretsch of the University of Indiana, small and medium enterprises (SMEs),

are important sources of employment growth and innovation. For example, the net employment gain during 1990-1995 is shown to be greater among smaller firms than among larger firms. Furthermore, while large firms often produce a larger number of patents per firm, the patenting rate for small firms is typically higher than that for large firms when measured on a per employee basis.[17]

Audretsch argues that small firms are important sources of growth in the U.S. economy and implicitly in the Oklahoma economy.

The reason is that small firms are very fluid. They are created, they survive or fail, and some of them grow. In addition to accounting for much new economic activity, some of the small firms grow and become large firms having a significant effect on the economy in which they operate. Why are there so many small-firm startups, given that they must compete with large firms that have established markets and economies of scale and that they have extremely large failure rates? Audretsch answers that an important reason for a startup is that the founder, the owner or entrepreneur, has developed an idea or a concept that he expects to be extremely profitable. The entrepreneur could attempt to sell the concept to the owners of a larger firm, who might in fact be his employer. It is often difficult, however, to convince the owners or managers of large firms that a new idea has significant profit potential, particularly if adopting it involves significant changes in established procedures or products. Even if the potential entrepreneur can convince his employers of the significance of the idea, it may be difficult for him, as an employee, to capture the expected profits from the idea. The idea's originator can overcome both obstacles with a new business.

Audretsch argues that, for at least two reasons, small business is an important engine of the innovation, growth, and development process discussed above. The most obvious reason is that some of the startups become very successful as growth poles for the region in which they are located. A more subtle reason is related to the process of startup success and failure.   As it turns

out, most of the ideas incorporated in startups turn out to be not very successful. Hence, there is a high failure rate. But the process of developing and testing these ideas generates new knowledge and new ideas in a continuing process. This is important for state and local economic development because the type of knowledge generated sticks in the area and is available to other small firms and to other new startups. Many entrepreneurs have a couple of failures before they have a big success. Eventually, some of these startups become the growth firms of the future. This analysis suggests that providing an environment conducive to small business is an important element of a state or national economic development program. If Audretsch is right, and there is much evidence in support of his position in the economic development literature, then the process of economic growth is somewhat fragile. It requires that a state have talented and well-educated people who are willing to take risks. It requires financing sources. And it requires the minimization of the competitive disadvantages of SMEs.

Another study by George L. Priest of Yale University emphasizes the role of small business in economic growth. Priest first discusses economic growth and shows how small business is an important driver of growth. As he puts it: "The freedom of America's small businesses to experiment, create, and expand makes them powerhouses in our economic system." [18] The main point of his paper is to consider the so-called Huffman conjecture that regulation and liability risk differentially affect small business in a negative way. He concludes that if this conjecture is correct, than a state or national economy is harmed by the differential effect.

A recent study sponsored by the Institute for Legal Reform, a separately incorporated affiliate of the U.S. Chamber of Commerce, has studied the incidence of liability cost on small business. The study finds that small business pays a disproportionate share of business liability costs. As Figure 5.4 shows, small businesses account for about 25 percent of business revenues and almost 70 percent of business liability costs. The disparity is even greater for very small businesses.

Figure 5.4

Small Business Revenues and Liability Costs
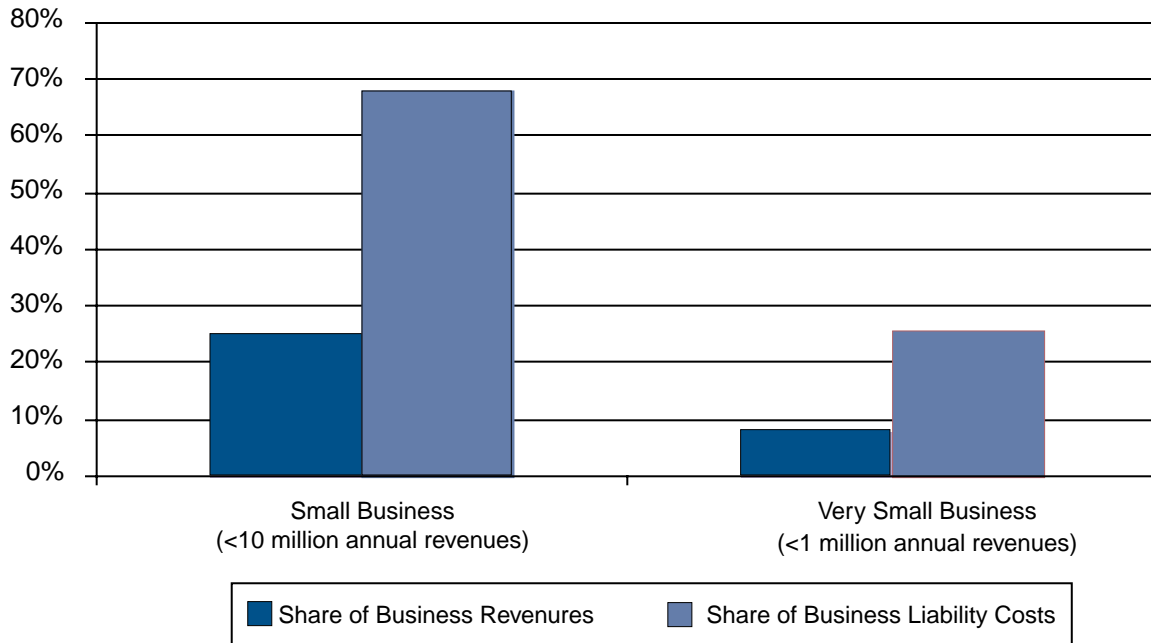
Their share of liability costs is over three times their share of business revenues. The study shows that the Huffman conjecture discussed by Priest applies to business liability costs. The tort system places a disproportionate burden on the small business sector, a sector that many economists and development experts think is a driving force in economic growth.[19]

Recent Changes in State Liability Systems

State and federal liability systems are in ferment. Three states have enacted extensive changes in the last two years. The ferment is stirred by what the American Medical Association terms the medical malpractice crisis. In fact, the three states—Ohio, Mississippi, and Texas—that enacted extensive changes over the last two years are classified as "crisis" states by the AMA. Mississippi and Texas are frequently rated as high-liability cost states by state ranking studies.   The rapid increase in tort costs, as discussed above, adds to the brew. This increase may be associated with an increased variability of these costs over

states or over cases. The variability over states can be damaging to the economic development of high-cost states. The variability over cases reduces the effectiveness of the tort system in providing incentives for safety to producers. Moreover, this variability raises the risks, and therefore costs, for insurance companies and business firms.

Greater variability for insurance companies in the past has resulted in some companies being unwilling to write certain lines of insurance. At a minimum, the increased tort costs can be expected to result in increases in insurance premiums and a greater tendency for producers to "go naked," i.e., self-insure. As we discussed, these rising costs will affect economic growth adversely and are likely to have adverse effects in states that do not keep up with legislative changes that reduce liability costs.

In this final section we examine Oklahoma's liability system with respect to surrounding states, adding Mississippi and Ohio to the comparison.[20] The 2004 liability systems survey is used.[21] Table 5.1 shows the 10 states in three discrete groups.

Table 5.1

Ratings on Elements of Liability Systems
Oklahoma and Selected States

State	Overall Ranking	Tort and Contract Litigation	Class Action	Punitive Damages	Scientific and Technical Evidence
Kansas	9	16	22	7	15
Colorado	13	15	13	13	6
Oklahoma	31	29	35	29	31
Ohio	32	30	21	23	23
New Mexico	37	33	38	28	37
Missouri	41	42	36	34	39
Arkansas	42	39	42	31	46
Texas	45	41	41	39	25
Louisana	47	47	46	NA	47
Mississippi	50	50	NA	44	50

NA: Not Allowed

Source: Harris Interactive, Inc., *2004 State Liability*, March, 2004

Kansas and Colorado appear to have the most desirable liability systems in the region from the corporate perspective. Oklahoma and New Mexico, with Ohio tagging along, form a middle group. Finally, the lowest-rated group includes Missouri, Arkansas, Texas, Louisiana, and Mississippi. This ranking is similar to the 2003 ranking except that Missouri fell from the second to the third group.

Of the various categories listed, Oklahoma has its lowest rankings in Class Action and Scientific and Technical Evidence. The latter is an indication of a concern related to product liability. Indeed, class action and product liability are two features of the liability system where Oklahoma lags its competitors in making changes. According to the American Tort Reform Association's definition of reforms, Oklahoma has made no product liability reforms or class action reforms since 1986, the year ATRA started tracking "reforms." Oklahoma is not unusual; it joins 34 other states with respect to no changes in product liability and 41 other states with no changes in class action liability. Nevertheless, Kansas, Colorado, and Ohio are preferred to Oklahoma in the rankings in these categories in Table 5.1. As

we shall see, these three states and Mississippi and Texas have made additional changes in the class action and product liability areas in the last two years.

Given the changes that other states in the region and nation have made, it is likely that Oklahoma's relative ranking by corporations in terms of the cost of its liability system to producers will deteriorate . Mississippi and Texas have enacted comprehensive ATRA "reforms" as has Ohio. In the last two years Oklahoma has enacted only minor reforms. To keep this analysis brief, we deal only with ATRA reforms, comparing Oklahoma to several of these states.

In 2004 Oklahoma became one of 40 states that have modified the joint and several liability rule. If a defendant is found to be, say, 10 percent liable, it is no longer subject to paying 100 percent of the damages. This potentially important change reduces Oklahoma's previous competitive disadvantage in this area.

Another important area of liability costs consists of noneconomic damages, pain and suffering. Oklahoma made what may turn out to be a modest "reform" with regard to medical liability, but it does not apply to general liability.

It is "modest" because the cap it imposes on noneconomic damages is complex and its effects are not readily apparent. The ATRA's description of Oklahoma's reform follows.[22]

Oklahoma:Medical Liability Reform: Noneconomic Damages Reform: H.B. 2661 (2004). Limits noneconomic damages to $300,000 in medical liability cases provided the defendant made an offer of judgment and the amount of the verdict is less than one-and-a-half times the amount of the final offer of judgment. Indexes the limit to inflation. Non-economic damages do not include, by definition, exemplary damages. Limit on noneconomic damages may be lifted if nine or more members of the jury find by clear and convincing evidence that the defendant committed negligence or if nine or more members of the jury find by a preponderance of the evidence that the conduct of the defendant was willful or wanton. Provides, however, that the judge must, before submitting such determination to the jury, make a threshold determination that there is evidence from which the jury could reasonably make the findings set forth in the case. Provides that if the jury returns a verdict that is greater than $300,000 but less than one-and-a-half times the amount of the final offer of judgment, the court shall submit additional forms of possible verdicts to the jury covering possible determinations of negligence and/or willful and wanton conduct. Provides that limits do not apply to wrongful death action. Provisions of this section sunset on November 1, 2010.

Compare this with the ATRA description of the caps imposed by Mississippi, Ohio, and Texas.

Mississippi: Medical Liability Reform: Noneconomic Damages Reform: H.B. 13 (special session) (2004). Establishes a hard cap of $500,000 on noneconomic damages in medical liability cases.

Mississippi: Noneconomic Damages Reform: H.B. 13 (special session) (2004). Limits the recovery of noneconomic damages in all civil cases, with the exception of medical liability actions, to $1 million.

Ohio: Noneconomic Damages Reform: Limits noneconomic damages in cases involving noncatastrophic injuries to the greater of $250,000 or three times economic damages up to $350,000, per plaintiff, with a maximum limit of $500,000 per occurrence. Limits apply to all cases but medical liability cases.

Texas: Medical Liability Reform: Noneconomic Damages Reform: HB 4 (2003); Limits the award of noneconomic damages in medical malpractice cases to $250,000 against all doctors and health care practitioners and a $250,000 per-facility cap against health care facilities such as hospitals and nursing homes, with an overall cap of $500,000 against health care facilities, creating in effect an overall limit of noneconomic damages in medical malpractice cases of $750,000.

These caps, along with previously enacted caps in Colorado and Kansas, are hard, clearly defined caps, in contrast to Oklahoma's complex, conditional legislation.

In terms of regional competitive advantage, the record suggests that Kansas and Colorado in particular are continuing to change their liability systems. Kansas recently has adopted an ATRA class action reform and Colorado has adopted class action and product liability reforms while continuing to adjust other elements of its system. In particular:

Kansas: 2004—HB 2764: Provides for the interlocutory appeal of class action certifications.

Colorado: 2003—HB 1186: Prohibits a plaintiff from filing a claim for punitive damages unless the claim can show evidence of willful or wanton action that would justify such a claim.

Colorado: 2004—SB 115: Limits noneconomic damages in breach of contract claims by specifying that noneconomic damages may only be recovered for breach of contract when recovery of such damages is specifically authorized in the contract that is the subject of the claim.

Colorado: 2003—SB 03-231: Provides that a product liability action could not be taken against a manufacturer or seller of a product if the product was used in a manner other than which the product was intended and which could not reasonably have been expected. Provides for an innocent seller provision which prohibits product liability action against parties who were not the manufacturer of the product.

Colorado: 2003—HB 03-1027: Provides for the interlocutory appeal of class action certification.

Oklahoma's competitive advantage with regard to liability systems is also eroding in comparison to Mississippi and Texas. In addition to most of the reforms that Oklahoma has adopted, such as collateral source and joint and several liability, these states along with Ohio have made changes that Oklahoma has not made. These changes are in addition to hard caps that they have imposed on noneconomic damages. Some of the prominent changes are with respect to class action changes, product liability changes and punitive damage changes:

Texas: Class Action Reform, HB 4 (2003): Provides for the interlocutory appeal of class action certification. Reforms attorney fees whereby fees are based on time and cost expended...

Texas: Product Liability Reform, HB 4 (2003): Provides for a 15 year statute of repose for product liability cases...Provides for an innocent seller provision which prohibits actions against non-manufacturing sellers except in specific circumstances...

Texas: Punitive Damages Reform, HB 4 (2003): Tex. Civ. Prac. & Rem. Code §§41.003. Requires unanimous jury verdict to award punitive damages. Specifies that jury must be so instructed.

Mississippi: Innocent Seller/Product Liability Reform, H.B. 13 (special session) (2004): Provides that the seller of a product, other than a manufacturer, cannot be held liable unless the seller had substantial control over the harm causing aspect of the product, the harm was caused by a seller's alteration or modification of the product, the seller had actual knowledge of the defective condition at the time the product was sold, or the seller made an express warranty about the aspect of the product which caused the plaintiff's harm.

Mississippi: Punitive Damages Reform, H.B. 13 (special session) (2004): Modifies and lowers some caps on punitive damages, based upon the net worth of a defendant.

Ohio: Product Liability Reform, Statute of Repose: Provides for a ten-year statute of repose for product liability actions, with certain exceptions.

Ohio: Punitive Damages Reform: Limits punitive damages to not more than two times compensatory damages. Limits punitive damages for small businesses to the lesser of two times compensatory damages or 10 percent of a defendants net worth, not to exceed $350,000.

Within its region and compared to some other states in the nation, Oklahoma has been less aggressive in changing its liability system to reduce liability costs. In particular, Oklahoma has not taken action regarding hard caps on noneconomic damages, class action issues, or product liability issues. As our previous discussion indicates, if other states are more aggressive in reducing liability costs, one can expect an adverse effect on Oklahoma economic development. In addition to the higher cost this imposes on business, it imposes differentially high cost on small business. To the extent that small business is an important engine of growth, the effect could be to reduce the dynamism of the state's economy. An adverse economic effect will surely occur if the state becomes so undesirable to potential plaintiffs that they require significantly higher wages to remain in the state.

Endnotes

[1]*The Economist*, "George Bush's second term: The revolution comes home," Jan 13th 2005 (Online print edition).

[2]*The Washington Post*, "Get Tort Reform Right," January 10, 2005, Editorial, p A17.

[3]Harris Interactive, Inc., *2003 State Liability Systems Ranking Study*, Conducted for the U.S. Chamber of Commerce and the U.S. Chamber Institute for Legal Reform, Final Report, Released April 9, 2003.

[4]We are not arguing that politics should play no role in the decisions about drug approval. Rather, we use this as an example of the effect of moving the decision about the sale and use of a new product to a centralized, political agency. This choice affects the rate of introduction of the new products. The question is what combination of regulation and torts leads to a more appropriate rate. The quote is from Vickie Brower, "Fast tracking drugs to patients*," EMBO Reports* (European Molecular Biology Association) Vol. 3, no. 1. pp 14-16, 2002.

[5]Space does not permit more than an overview of the economics of tort liability. For a more detailed economic analysis of the tort system see *The Economics of U.S. Tort Liability: A Primer*, October 2003 Congressional Budget Office, Washington, DC.

[6]Tillinghast-Towers Perrin, "U.S. Tort Costs: 2004 Update: Trends and Findings on the Costs of the U.S. Tort System," January 12, 2005.

[7]Tillinghast-Towers Perrin, "U.S. Tort Costs: 2003 Update: Trends and Findings on the Costs of the U.S. Tort System," December 10, 2003.

[8]Sebastian Mallaby, "The Trouble with Torts*," The Washington Post*, January 10 2005, p. A16 and "Better Than Lawsuits: We Need a Smaller, Predictable System," January 17 2005, p. A16.

[9]Council of Economic Advisers. *Who Pays for Tort Liability Claims? An Economic Analysis of the U.S. Tort Liability System*, April 2002, CEA White Paper, Executive Office of the President, Washington, D.C..

[10]Richard L Manning, "Changing Rules in Tort Law and the Market for Childhood Vaccines, " *Journal of Law and Economics*, Vol. 37, No. 1. (Apr., 1994), pp. 247-275.

[11]Richard L Manning, "Products Liability and Prescription Drug Prices in Canada and the United States," *Journal of Law and Economics*, Vol. 40, No. 1. (Apr., 1997), pp. 203-243 as discussed in Michael J Moore and W Kip Viscusi., *Product Liability Entering the Twenty-First Century* : AEI-Brookings Joint Center for Regulatory Studies, Washington, D.C 2001.

[12]Mallaby, op. cit., "The Trouble with Torts.

[13] See Ronald L. Moomaw, "The Civil Justice System and State Economic Development," *State Policy & Economic Development in Oklahoma: 2004*, Oklahoma City: Oklahoma 21st Century, Inc., 2004, pp. 65- 76.

[14] For citations to these studies and for the CBO analysis see the CBO paper "The Effects of Tort Reform: Evidence from the States," June 2004, Congressional Budget Office, Washington, DC.

[15]ibid., p viii.

[16]Nicholas M. Pace, Daniela Golinelli, and Laura Zakaras, *Capping Non-Economic Awards in Medical Malpractice Trials: California Jury Verdicts under MICRA*, Prepared for the RAND Institute for Civil Justice, Rand Corporation, Santa Monica California, 2004.

[17]David B. Audretsch, "The Dynamic Role of Small Firms: Evidence from the U.S.," *Small Business Economics,* 18: 13- 40, 2003. The quote is from the abstract.

[18]George L Priest, "Small Business, Economic Growth, and the Huffman Conjecture," *Journal of Small & Emerging Business Law,* p 1 2003.

[19]"Liability Costs for Small Business" a Report written by Judyth W. Pendell, Senior Fellow, AEI-Brookings Joint Center for Regulatory Studies with the cost analysis conducted by Paul J. Hinton, Vice President, NERA Economic Consulting, June 2004. This study was sponsored by the Institute for Legal Reform, U.S. Chamber of Commerce.

[20]Moomaw, op. cit., discusses the state liability systems of Oklahoma and surrounding states in some detail. In this paper, we concentrate on changes in liability systems in the last two years.

[21]Harris Interactive, Inc*., 2004 State Liability Systems Ranking Study*, Conducted for the U.S. Chamber of Commerce and the U.S. Chamber Institute for Legal Reform, Final Report, Released March 2004.

[22]The descriptions of the ATRA reforms are extracted from *Tort Reform Record* - December 31, 2004 and *2004 State Tort Reform Enactments* – December 2004 American Tort Reform Associa-tion,Washington, DC available at http://www.atra.org/. I thank the ATRA for granting reprint permission. In the interests of space I have shortened the ATRA descriptions. Interested readers can go to the ATRA website to see the full ATRA description. Full under-standing, of course, requires obtaining and reading the legislation.

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