2010

Kentucky Annual Economic Report 2010

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2010

Center for Business and Economic Research
Gatton College of Business and Economics
University of Kentucky

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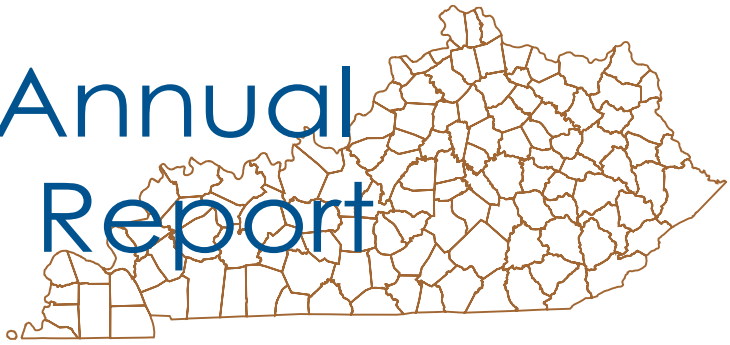

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Center for Business and Economic Research

Department of Economics

Gatton College of Business and Economics

University of Kentucky

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CBER

From the Director . . .

This year marks the 38th year the Center for Business and Economic Research (CBER) has published the Kentucky Annual Economic Report. This report is one of the important ways that the Center fulfills its mandated mission to examine various aspects of the Kentucky economy. The 2010 report contains five articles. These articles cover a wide variety of topics from the condition of Kentucky and the national economy to the comparison of Kentucky taxes with surrounding states and the effect of NAFTA on the Kentucky economy.

In putting together this issue, we have drawn on the expertise of the faculty, staff and student research assistants at the University of Kentucky. Contributors include three University of Kentucky faculty members and a Research Assistant at CBER and undergraduate at the University of Kentucky and two University of Louisville faculty members.

I contributed an article that looks back at the performance of the national and state economies over the recent period and provides forecasts for the coming year. My forecast for the U.S. is that the economy will grow by 2% percent in the coming year, that unemployment will average 10% for the year, but that inflation will remain at a historically low level. My forecast for Kentucky is that the state's economy will grow by 1%, that unemployment will remain above 10% for the year and that manufacturing employment in the state will continue to decline. In other words, while both the U.S. and Kentucky economies will improve in the coming year, growth will remain below trend, while unemployment will remain well above average.

Dr. William H. Hoyt is Director of the Martin School of Public Policy and Endowed Professor of Economics at UK. His article discusses the differences in tax instruments and tax revenues in Kentucky as compared to surrounding states. One finding is that while Kentucky is one of the lowest taxed states in the region on a per capita basis, when based on a share of income, Kentucky's taxes are higher. Additional findings are discussed along with underlying causes.

Dr. Paul A. Coomes and Barry J. Kornstein, MA, both from the University of Louisville have contributed an article examining the latest data on jobs, population, human capital, and housing to gain insights into how differently our regions have developed over the last decade. There is great variation around the state, with areas like Bowling Green, Richmond-Berea and Clarksville-Hopkinsville posting strong growth in jobs and population, and areas like Ashland, Middlesboro and Paducah continuing to lose people due to the lack of job growth. Their article discusses the variation and causes of these differences.

Dr. Christopher Jepsen is Associate Director of CBER and Associate Professor at the University of Kentucky. His article looks at the labor-market returns to Kentucky community colleges' degrees, diplomas, and certificates. His findings include that Associate's degrees and diplomas are associated with increases in quarterly earnings of approximately 20 percent for men and 40 percent for women and that certificates are associated with quarterly earnings increases of 9 percent for men and 3 percent for women. He also looks at fields of study and regional patterns.

Finally, Rachel Keller, a research assistant at the CBER and an undergraduate at UK and myself have contributed an article on NAFTA. We look at how NAFTA has affected specific areas of the United States differently, specifically in terms of international trade. We do not find definitive evidence that NAFTA has affected the volume of Kentucky exports to foreign countries. Greater GDP is associated with decreased trade with Kentucky, as is membership in the European Union. Membership in Mercosur does not have any discernable effect on trade. Finally, trade with Kentucky has increased rapidly in recent years.

In the past year, we have worked on a number of important projects at the Center for Business and Economic Research. One project we completed earlier in the year examined whether changes in the sources of revenue used to finance local K-12 schools has any impact on educational outcomes of students in the schools. In another report we examined the affordability of housing in Lexington, KY over the last decade. We also completed a report examining the return to an individual from earning a degree, diploma or certificate from the Kentucky Community and Technical College System. Finally, we completed a report examining the impact that federal job training programs have on the earnings and employment of participants in the program. In the coming year we anticipate completing several new project we believe will address some of the important problems facing Kentucky.

Center for Business and Economic Research

CBER Staff

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Associate Director: Dr. Christopher Jepsen
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The Center for Business and Economic Research (CBER) is the applied economic research branch of the Carol Martin Gatton College of Business and Economics at the University of Kentucky. Its purpose is to disseminate economic information and provide economic and policy analysis to assist decision makers in Kentucky's public and private sectors. In addition, CBER performs research projects for federal, state, and local government agencies, as well as for private-sector clients nationwide. The primary motivation behind CBER's research agenda is the belief that systematic and scientific inquiries into economic phenomena yield knowledge which is indispensable to the formulation of informed public policy.

CBER's research includes a variety of interests. Recent projects have been conducted on manpower, labor, and human resources; transportation economics; health economics; regulatory reform; public finance; and economic growth and development..

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Authors

Dr. Paul Coomes

Paul Coomes is Professor of Economics at the University of Louisville. Dr. Coomes received his Ph.D. in economics from the University of Texas in 1985. Before going to Texas to finish his graduate education, Paul was assistant director of CBER and helped build databases and models to improve economic intelligence about the Kentucky area. At the University of Louisville, Paul has specialized in regional economic development studies, with particular attention to industrial impacts, peer city analyses, workforce issues, and measurement problems. His research has been published in the Journal of Urban Economics, Journal of Regional Science, Urban Studies, Environment and Planning A, Economic Development Quarterly, the International Journal of Forecasting, the Journal of Economic and Social Measurement, and the Journal of Economic Dynamics and Control.

Dr. William H. Hoyt

Dr. William H. Hoyt is Director of the Martin School of Public Policy and Professor of Economics at the University of Kentucky. He was Professor, Director of Graduate Studies for Economics at the University of Kentucky. Dr. Hoyt received his Ph.D. in economics from the University of Wisconsin-Madison in 1986, at which time he came to Kentucky. From 1992-3, Dr. Hoyt was an assistant professor and associate professor in the Department of Economics and Graduate Public Policy Program at Georgetown University. His primary research areas include public finance and urban economics. Dr. Hoyt has received research support from the National Science Foundation, the National Real Estate Research Center, the Department of Labor, the Department of Health and Human Services, the Kentucky Cabinet for Human Resources, and the Governor's Office for Policy and Management. He has published papers in leading academic journals such as the *American Economic Review, Review of Economics and Statistics, Journal of Public Economics, Journal of Urban Economics, Southern Economic Journal, National Tax Journal and Regional Science and Urban Economics.*

Rachel Keller

Rachel Murray Keller is an undergraduate research assistant at the Center for Business and Economic Research. She is pursuing a double major in Economics and Spanish at the University of Kentucky and plans to graduate in December, 2011.

Authors

Dr. Christopher Jepsen

Dr. Christopher Jepsen is the Associate Director of the Center for Business and Economic Research and an Assistant Professor of Economics at the University of Kentucky. Dr. Jepsen received his Ph.D. in Economics from Northwestern University in 2000. Prior to his appointment at the University of Kentucky, he was a research fellow at the Public Policy Institute of California in San Francisco. His primary research interests are community colleges, English Language Learners, and the economics of education more broadly. He has published in important economic journals such as the *Journal of Human Resources, Demography, the Journal of Urban Economics, and the Economics of Education Review.*

Barry Kornstein

Barry J. Kornstein is Senior Research Analyst in the College of Business, University of Louisville. He has BS degrees in Applied Mathematics and Literature from the Massachusetts Institute of Technology, a Master in International Studies degree from the Claremont Graduate University, and was a Doctoral Candidate in Political Science at the University of Minnesota. Mr. Kornstein has worked with Dr. Coomes at the University of Louisville since 1993 on numerous local and regional economic development and demographic studies. He was a co-author on the CBER research report "The Individual, Regional and State Economic Impacts of Kentucky Community and Technical Colleges."

Dr. Kenneth R. Troske

Dr. Kenneth R. Troske is Director of the Center for Business and Economic Research and William B. Sturgill Dr. Kenneth R. Troske is Director of the Center for Business and Economic Research, Chair of the Economics Department and William B. Sturgill Professor of Economics at the University of Kentucky as well as a Research Fellow with the Institute for the Study of Labor (IZA) in Bonn, Germany. Prior to coming to Kentucky Dr. Troske was an Assistant and an Associate Professor of Economics at the University of Missouri. He received his Ph.D. in economics in 1992 from the University of Chicago and his undergraduate degree in economics from the University of Washington in 1984. His primary research areas are labor and human resource economics. Dr. Troske has authored a number of widely-known papers utilizing employer-employee matched data on topics such as productivity, technology, and discrimination. His most recent work has focused on evaluating various aspects of the Workforce Development System in the U.S., the role of human capital in promoting the economic growth of a region and the impact of tax incentives on the creation of jobs in a region. His papers have appeared in many leading journals in economics including the *Quarterly Journal of Economics, Journal of Labor Economics, Journal of Human Resources, Review of Economics and Statistics, and the American Economic Review.*

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The U.S. and Kentucky Economics in 2009: Has the Recession Ended? What will the Recovery Look Like? When will the Unemployment Rate Fall?

Kenneth R. Troske

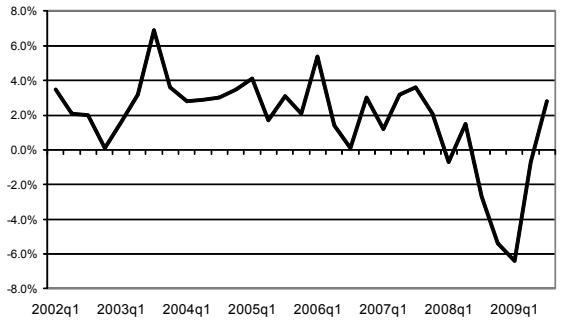
2009 turned out to be another rocky year for the U.S. and Kentucky economies. The start of the year saw both economies continuing on the downward slide that began in the middle of 2008. However, the economy appeared to reach bottom in the second quarter and actually began to grow in the third quarter. The expectations are that this growth will continue into the future, although it is still an open question how quickly the economy will expand in the coming years. In this article I will review the performance of the U.S. and Kentucky economies over the past year as well as the performance of the three major metropolitan areas in Kentucky: Cincinnati/Northern Kentucky, Lexington and Louisville. I will also examine parts of the economy that I expect to play a significant role in determining the strength of the recovery: the housing market, the financial market and the manufacturing sector. Finally, I will discuss what I think will occur in 2010. My forecast for the U.S. is that the economy will grow by 2% percent in the coming year, that unemployment will average 10% for the year, but that inflation will remain at a historically low level. My forecast for Kentucky is that the state's economy will grow by 1%, that unemployment will remain above 10% for the year and that manufacturing employment in the state will continue to decline. In other words, while both the U.S. and Kentucky economies will improve in the coming year, growth will remain below trend, while unemployment will remain well above average.

Introduction

The U.S. economy has been on quite a roller coaster ride over the past year-and-a-half. At the start of the 2009 the economy was continuing on the downward spiral that started in September 2008, with many wondering how far the economy would fall and whether we were poised for another Great Depression. But, as many of us predicted, the economy bottomed out in the second quarter and by the third quarter began showing nascent signs of growth. However, the gyrations of the past year have lead some to question whether the recovery has really begun (it has), whether we will experience a "double-dip" recession (not likely) and wondering how soon unemployment rates will begin to fall (not for a while).

In this article, I will review the performance of the U.S. and Kentucky economies over the past year. I will also review the economic performance of the three major metropolitan areas in the state: Cincinnati/Northern Kentucky, Lexington and Louisville. In this review I will also examine parts of the economy that I expect to play a significant role in determining the strength of the recovery: the housing market, the financial market and the manufacturing sector. Finally, I will discuss what I think will occur in 2010. Hopefully, this discussion will provide readers with a better understanding of where the economy has been and some clues about what to look for when trying to figure out where the economy is heading.

Figure 1: Percent Change in U.S. Gross Domestic Product (GDP)



Source: U.S. Department of Commerce, Bureau of Economic Analysis

Gross Domestic Product (GDP)

Starting in the third quarter 2008 the economy contracted for four straight quarters (Figure 1) and between the third quarter of 2007 and the second quarter of 2009 the economy contracted in five out of eight quarters. Since 2007, the economy has shrunk

by an amount that matches the recessions of the mid 1970s and the early 1980s. And while the economy did grow by 2.8% in the third quarter of 2009, this growth appears at least partially due to a temporary increase in spending by the federal government on programs such as "Cash-for-Clunkers." Since these programs largely shifted spending that would have occurred in future quarters, there is continued concern about the future growth of the economy.

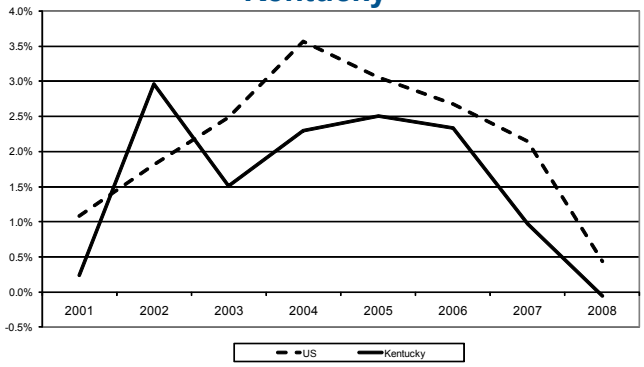
Looking at Figure 2 we see that the Kentucky economy has grown much slower than the U.S. economy for several years and that trend intensified in 2007. As I will discuss in more details below, the reason for the more severe downturn in Kentucky is due to the fact that Kentucky has a relatively larger manufacturing sector combined with the fact that this recession has had a larger negative impact on manufacturing firms.

Figure 3 shows that, while the recession has impacted growth in all three metropolitan areas in Kentucky, there are some important differences. Given the large number of manufacturing firms in the Louisville area, it is not surprising that the recession appears to have had the largest impact in Louisville. And while the recession has had a somewhat smaller impact on the Cincinnati/ Northern Kentucky region, as the figure makes clear, this region has experienced fairly low growth for a number of periods. Finally, while the growth in the Lexington area has slowed recently, the Lexington economy continued to grow throughout 2008 and appears to be the most dynamic of the three regions.

Unemployment

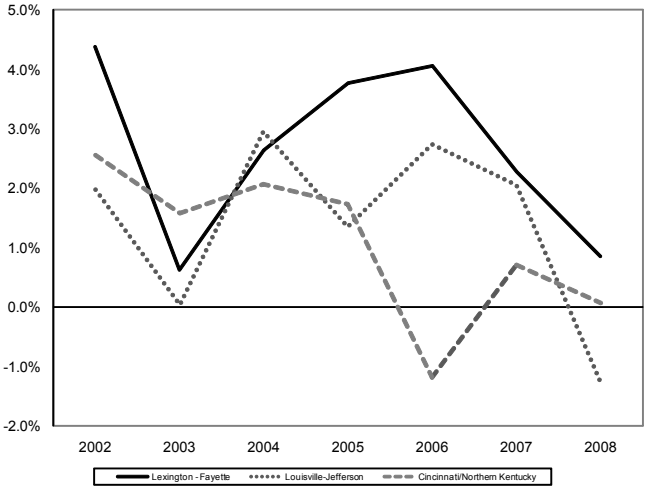
Despite the increase in output that occurred in the third quarter of 2009, the unemployment rate for both the U.S. and Kentucky remains at the highest levels seen in the last thirty years (Figure 4). In November 2009 the U.S. unemployment rate stood at 10.0% which, while down slightly from the previous month, is well above the 4.7% rate in November 2007 and the 6.8% rate in November 2008. The 11.2% unemployment rate in Kentucky is also substantially higher than the rates from just one year earlier. Figure 5 shows that the unemployment rate has also risen substantially in all three metropolitan areas in the state, with the highest rates found in Louisville and the lowest rates in Lexington.

Figure 2: Percent Change in GDP, US and Kentucky



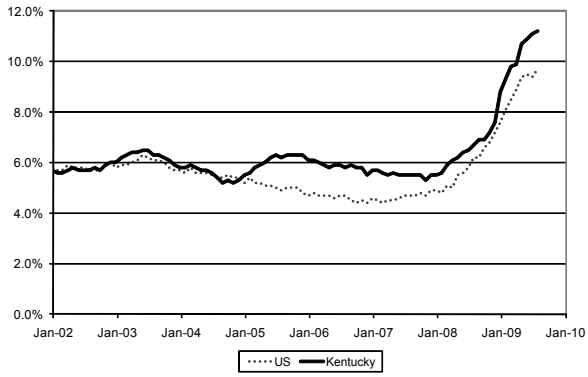
Source: U.S. Department of Commerce, Bureau of Economic Analysis

Figure 3: Percent Change in GDP, Kentucky's Major Metropolitan Statistical Areas (MSAs)



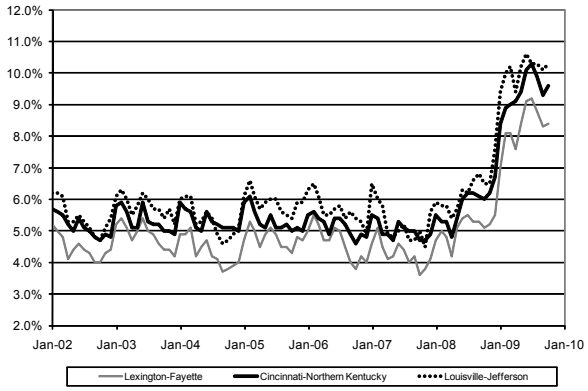
Source: U.S. Department of Commerce, Bureau of Economic Analysis

Figure 4: Unemployment Rate for the U.S. and Kentucky



Source: U.S. Department of Labor, Bureau of Labor Statistics

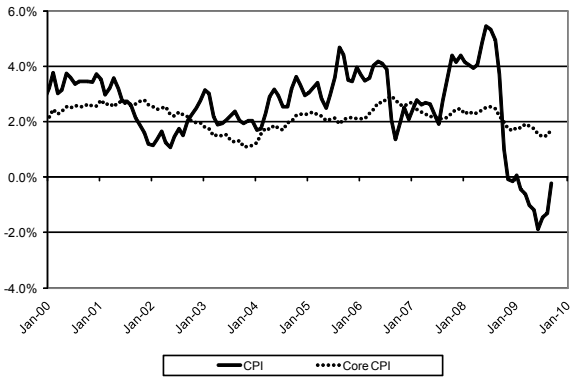
Figure 5: Unemployment Rate For Kentucky's Major MSAs



Source: U.S. Department of Labor, Bureau of Labor Statistics

For many people the unemployment rate is a much more important measure of the state of the economy than GDP growth or inflation. This is because they think the unemployment rate is a better indicator of the number of individuals in the country who are struggling. Unfortunately, there are three reasons why it is unlikely that the unemployment rate will soon return to the levels seen even one or two years ago. First, unemployment rates typically remain high for several periods after a recession ends because during a recession businesses not only cut back on the number of people they hire they also cut back on the number of hours their employees work. Therefore, during the early part of a recovery businesses can expand output by having current workers work more hours before they need to hire additional workers. Second, as the recovery builds, workers who had left the labor market (and therefore were not counted among the unemployed) begin to return to the labor market, which pushes up the unemployment rate. Finally, unlike in previous recessions of this magnitude, during this recession we have seen a growth in labor productivity. This means that workers are producing more output for every hour worked. Because of this increase in productivity firms are able to increase output without hiring more workers, lessening the pressure on firms to expand employment as the demand for their product increases. All of these factors together means that, even if output continues to grow, firms are unlikely to hire many more workers so unemployment with remain high for some time to come.

Figure 6: Annual Change in CPI and Core CPI



Source: U.S. Department of Labor, Bureau of Labor Statistics

Inflation

Over the past year inflation has remained at very low levels (Figure 6). In fact, over the past year the Consumer Price Index (CPI) has declined in ten of the last twelve months. The hope is that slowly rising or even falling prices will eventually lead to an increase in consumer demand which will lead to growing output and eventually falling unemployment.

While inflation is currently quite low, there are several reasons to be concerned about higher levels of inflation in the future. In an effort to prevent the current recession and a possibility of a collapse of the financial system, the Federal Government has spent enormous sums of money which has led to an increase in the federal deficit. Currently Federal Government spending equals 25% of total GDP—which is the highest level seen since World War II. In addition, the U.S. Federal Reserve (Fed) has increased the value of and types of assets that it holds; a trend that it will have to reverse in the years to come. Both of these changes—increased government spending and the increase in the value of assets held by the Fed—raise concerns that we will see an increase in the rate of inflation in the next three to five years as the Fed sells the assets that it now holds and as the government tries to reduce the size of the debt. What efforts the government takes to reduce the deficit and how the Fed goes about reducing the size of its balance sheet is clearly worth watching closely.

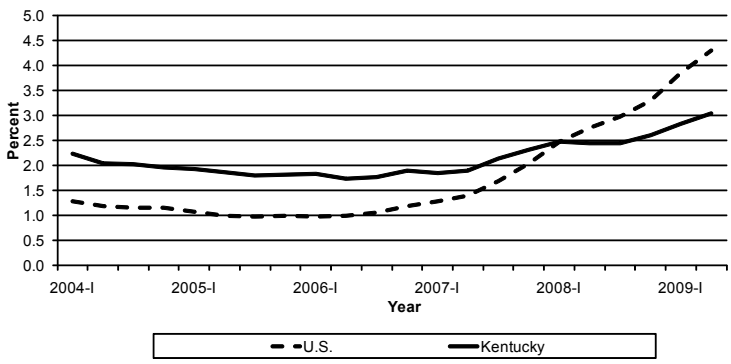
The Housing Market

Each recession seems to vary in how it starts: problems in the energy and oil markets were at the heart of the recession in the mid

1970s, continuing problems in oil markets combined with problems in manufacturing lead to the early 1980s recession, while problems in the hi-tech sector contributed to the recession earlier this decade. In this current recession it appears that problems in the housing market, which then spread to the financial sector, lead to the downturn. Since the recession started with problems in the housing market, it seems unlikely that the economy will fully recover until the housing market returns to "normal." Therefore, it is worth spending a little time examining the housing market.

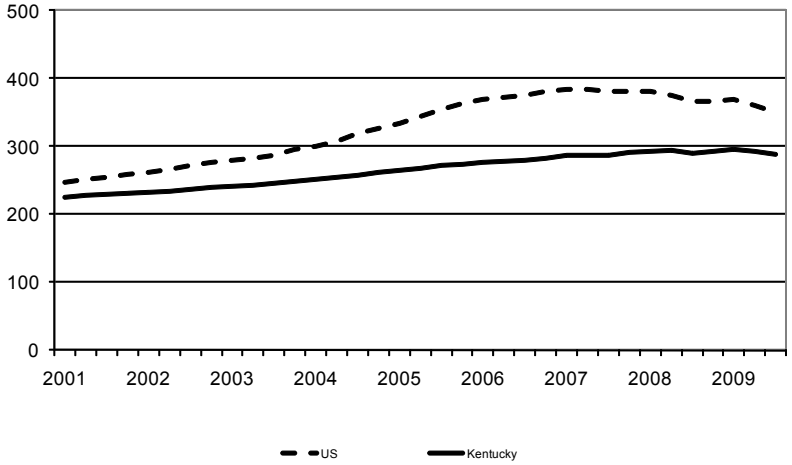
As has been extensively discussed in a variety of places, both the Federal Government and the private sector undertook an extensive effort to increase the number of people who owned a home using methods such as keeping mortgage rates artificially low or by creating new financing options that allowed people to purchase homes with very small, or nonexistent, down payments. And while these efforts did succeed in pushing the homeownership rates up to 69%—the highest rate in history—it is now clear that many of these new homeowners could not afford their home, which has lead to a significant increase in foreclosures. Figure 7 shows that between the first quarter 2006 and the second quarter 2009 there has been over a four-fold increase in the percent of mortgages that are in foreclosure in the nation, and there is no sign that this increase is slowing down.

Figure 7: Foreclosures as a Percentage of All Mortgages



Source: Mortgage Bankers Association

Figure 8: Housing Price Index, U.S. and Kentucky



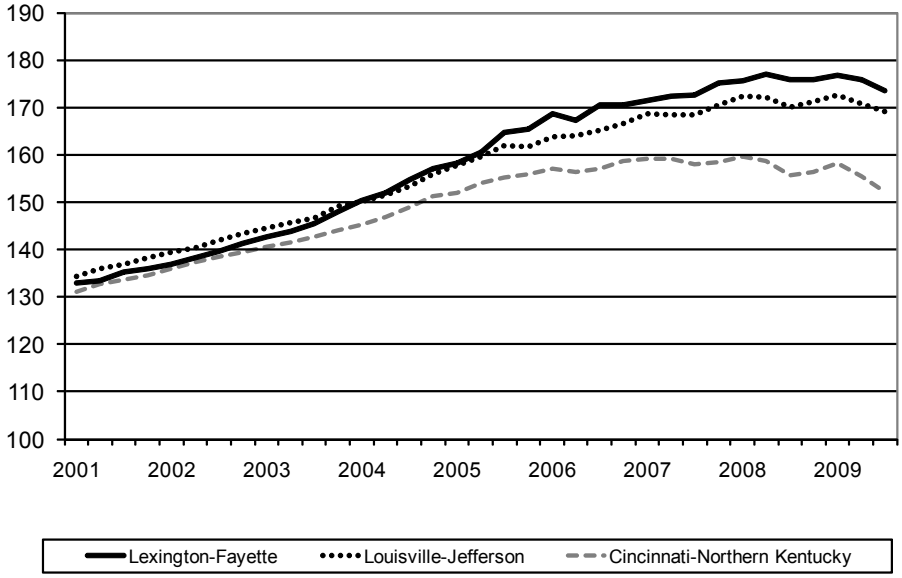
Source: Federal Housing Finance Agency

While the foreclosure rate is also up in Kentucky, it has risen much slower than the foreclosure rate for the entire country. In fact, while the foreclosure rate historically has been higher in Kentucky than in the average state, in 2009 the foreclosure rate in Kentucky is 25% lower than the rate for the nation as a whole. This lower foreclosure rate in Kentucky is one indication that the housing problems that are plaguing many places in the country are less severe in Kentucky.

The rising foreclosure rates and the earlier efforts to increase homeownership rates have lead to an increase in the supply of housing in the county. Since this increase in the supply of houses has not been met by an increase in demand for houses, we have seen a significant fall in housing prices in recent periods. Figure 8 plots the Federal Housing Finance Agency's housing price index for the U.S. and Kentucky. As this figure shows, housing prices in the country have been falling almost unabated since second quarter 2007. Overall, housing prices in the country have fallen approximately 9% since their peak and there is no indication that prices have reached the bottom.

In contrast, Kentucky housing prices have remained fairly steady over this period, although they are down slightly in the third quarter of 2009. Figure 9, which plots the housing price index for Lexington, Louisville, and Cincinnati/Northern Kentucky,

Figure 9: Housing Price Index for Kentucky's Major MSAs



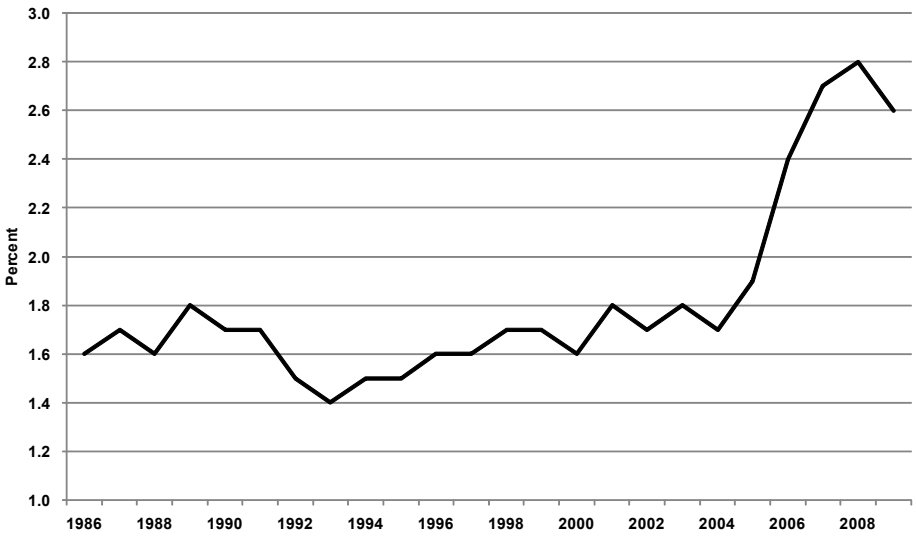
Source: Federal Housing Finance Agency

shows that housing prices have remained steady in both the Lexington and Louisville markets. In contrast the Cincinnati/Northern Kentucky market has seen a fairly steady fall in housing prices over the last two years.

Housing prices will only begin to stabilize once the excess supply of housing is eliminated through an increase in housing demand. One measure of the excess number of houses is provided by homeownership vacancy rate. This is the percentage of single family homes that are currently empty. Figure 10 shows that between the mid 1980s and the early 2000s, the homeownership vacancy rate remained at around 1.6%. Starting in 2005 the vacancy rate skyrocketed and now stands at around 2.6%. There are approximately 130 million homes in the U.S., so this increase in the vacancy rate of one percentage point means that there are an extra 1.3 million vacant homes on the market. And with foreclosure rates still growing, it is unlikely that the excess supply of homes will begin to decline in the near future. Additionally, until the homeownership vacancy rate returns to around 1.6%, housing prices will continue to fall and homeowners will remain reluctant to spend money, which will limit the growth of the economy.

Unfortunately, efforts on the part of the federal government to induce people to buy homes by pushing down the mortgage rates or by offering tax incentives are unlikely to reduce the excess supply of housing, because these solutions are identical to the programs that produced the excess supply of housing in the first place. Programs that continue to push unqualified individuals into buying homes will lead to a continual increase in the number of homes in foreclosure, which will in turn further increase the excess supply of housing. The supply of housing will only begin to fall once the population grows. This process simply takes time, and government efforts to speed the process along are likely to prolong the current crisis in the housing market.

Figure 10: Homeownership Vacancy Rate for the U.S.

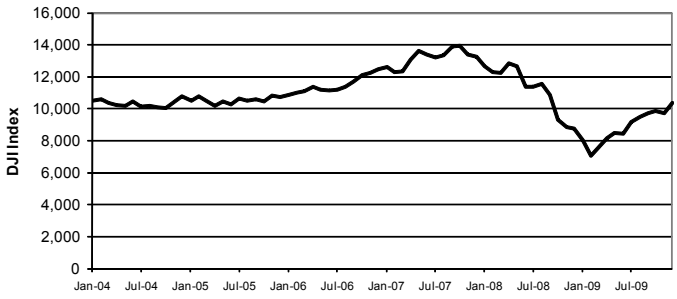


Source: U.S. Census Bureau

Financial Markets

A turn around in the financial markets is often a harbinger of a recovery in the rest of the economy.

Figure 11: Dow Jones Industrial Average, Monthly Close



Source: Yahoo Finance

As Figure 11 shows, after a precipitous drop that started in late 2007, the Dow Jones Industrial Average (DJIA) bottomed out in March of this year and since then has been rising steadily. Between March and November the DJIA has risen by over 40%. This rise is a strong signal that the recovery has begun, although it is clear that the economy remains weak and has a long way to go before we fully recover from the stock market losses of the previous two years.

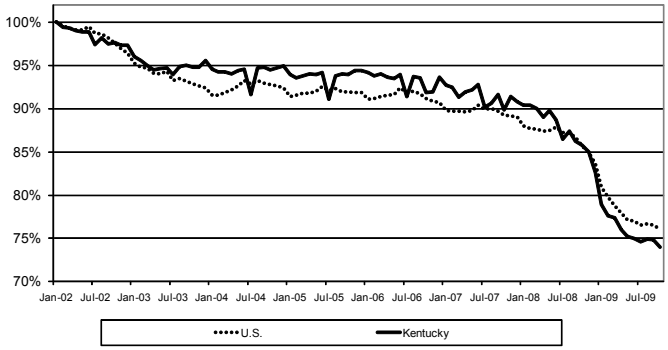
Many people wonder how the stock market can continue to rise while unemployment is also rising. The answer is that while the unemployment rate is one measure of future growth of the economy, it is not the only measure or even the most important measure of future growth. Prices in the stock market reflect expectations of the future profits of companies. As I have mentioned earlier, there has been a significant increase in worker productivity over the past year. This means that workers now produce more output per hour than they did a year ago, which also means that it costs less for firms to produce output than it did previously. These lower costs translate into higher profits for firms. And while the high unemployment rate does affect consumer demand, the effect is not that large since even with a 10% unemployment rate, 90% of people who want a job have one. Therefore, even though the unemployment rate is likely to remain high for several years, the increase in worker productivity is likely to produce higher profits for firms, which is what fuels the increase in the value of the stock market.

The Manufacturing Sector

The manufacturing sector has traditionally employed a large percentage of workers, particularly in Kentucky. So the fact that the current recession has had a larger impact on the manufacturing sector is one of the reasons why the recession has had a disproportionately large impact on the Kentucky economy. Figure 12 shows that, while manufacturing employment has fallen since January 2002, the fall in employment has been much larger since the middle of 2008. In Kentucky manufacturing employment has fallen by 50,000 jobs since January 2008, which represents a 20% decline in manufacturing employment in the state.

Figure 13 shows that the dramatic fall in manufacturing employment has occurred in all three metropolitan areas in the state. Louisville has experienced the largest decline in employment, followed closely by Cincinnati/Northern Kentucky, with Lexington suffering the smallest decline. Lexington is somewhat unusual because manufacturing employment in the region had remained fairly steady until the start of 2009. Since then Lexington has lost 10% of its manufacturing employment.

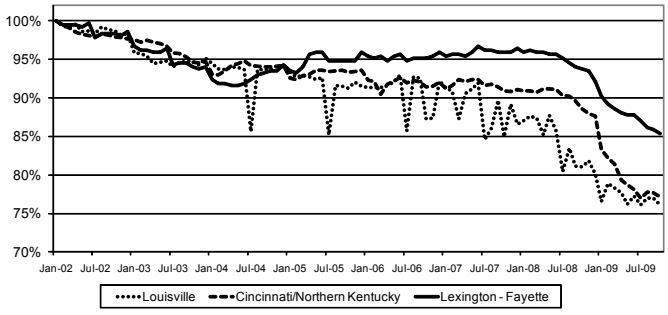
Figure 12: Change in Manufacturing Employment



Source: U.S. Bureau of Labor Statistics

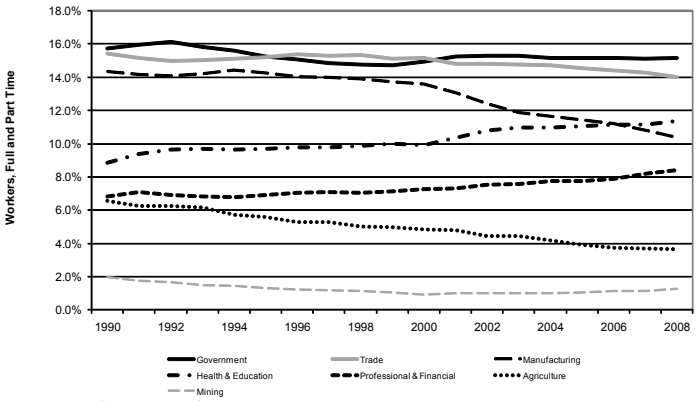
The impact of the current recession has already had a profound, and likely permanent, impact on Kentucky's economy.

Figure 13: Change in Manufacturing Employment in Kentucky's Major MSAs



Source: U.S. Bureau of Labor Statistics

Figure 14: Change in Industry's Share of Employment



Source: Regional Economic Information System, Bureau of Economic Analysis, US Department of Commerce

As seen in Figure 14, during this recession the Manufacturing sector's share of employment has fallen from 13% to 10%. In contrast, the share of the state's employment in Health & Education has risen from 10% in 2000 to over 11% in 2008 and has surpassed manufacturing in employment share. The Professional & Financial sector has also seen a growth in its share of employment and appears likely to pass Manufacturing in the next few years. As the focus of Kentucky's economy continues its long-run shift away from traditional industries such as manufacturing, agriculture and mining, the future growth of the state will be driving by growth in the Health & Education and Professional & Financial sectors. It is important that policy makers in the state recognize this on-going shift and change their focus away from the declining sectors towards the sectors holding the greatest potential for future growth.

Outlook for 2010

So what will 2010 hold? My forecast for the coming year is shown in Table 1.

In the first column I present my prior forecast for 2009, while the second column contains the current expectations for what actually happened in 2009. In the third column I present my predictions for 2010.

For the U.S. economy as a whole I believe that the problems in the housing market will continue to be a drag on the economy. While I do expect that the U.S. economy will grow throughout the year, my forecast of 2.0% growth is well below the long-run trend growth rate of the economy and also well below the growth one would expect coming out of a deep recession. Given the large increases in labor productivity that I have discussed, I expect unemployment to remain at historically high levels for much of the year. Finally, I expect inflation in the next year to remain fairly low, although I believe that in the next three to five years we have an increasing chance for much higher rates of inflation.

I believe that the Kentucky economy will continue to struggle in the coming year, with much slower growth and higher unemployment than the rest of the country. On the bright side, I think the housing market in the state will continue to be relatively stable with below average foreclosure rates and above average growth in prices. Unfortunately, continuing housing problems in other parts of the country will continue to have a negative effect on Kentucky's manufacturing sector as well as the rest of the state's economy.

In summary, I am fairly pessimistic about the performance of the economy in 2010. I do expect the economy to grow in the coming year, but I expect the growth to be slow and accompanied by high rates of unemployment. Hopefully by 2011 we will begin to see faster growth and falling unemployment.

Table 1: Forecast for 2010

	2009 Forecast	Predicted Performance 2009	2010 Forecast
Real GDP Growth--U.S.	-0.5%	-0.6%	2.0%
Unemployment Rate--U.S.	8.0%	9.3%	10.0%
Inflation--U.S.	0.6%	-0.8%	1.7%
Employment Growth--U.S.	-1.0%	-2.0%	-0.5%
Employment Growth--Kentucky	-0.5%	-3.2%	-1.0%
Growth in Manufacturing Employment--U.S.	-4.5%	-4.1%	-2.0%
Growth in Manufacturing Employment--Kentucky	-4.0%	-4.9%	-2.5%
Real GDP Growth--Kentucky	1.0%	---	1.0%
Unemployment Rate--Kentucky	8.5%	10.5%	10.5%

Kentucky and its Neighbors: How Different, How Similar Taxes?

William Hoyt

While there are significant differences in the tax instruments used by Kentucky and its neighbors, the level of total state and local taxes and, perhaps, more relevant, state and local own-source revenue are quite similar, with Kentucky being one of the lowest taxed states on a per capita basis. However, when based as a share of income, Kentucky's taxes are higher. This and the centralized nature of revenue collection in Kentucky explains the high individual income tax rates. In terms of who bears the burden of taxes Kentucky's total taxes on its lowest quintile of income are, in comparison to its neighbors, relatively low with only Virginia having lower taxes as share of income for its lowest income households. In contrast, only Ohio has higher total taxes on its highest income households. Specifically, for the individual income tax, rates in Kentucky are generally higher than those in the states its shares the largest borders with – Indiana, Ohio, and Tennessee. It is also the case that along these borders the highest income households in Kentucky have much lower incomes than those in its neighbors.

1. Introduction

The appropriate level and structure of state and local taxes has been a topic of much discussion, if little action, in Kentucky recently. While Kentucky's taxes have been much discussed, little mention has been made of taxes in its neighbors, the most obvious competitors for population, employment, and capital.

Here I provide some comparisons among Kentucky and its seven neighbors (Indiana, Illinois, Missouri, Ohio, Tennessee, Virginia, and West Virginia) with the hopes of giving a better perspective on Kentucky's tax structure.

2. An Overview of Taxes in Kentucky and its Neighbors: A Comparison of Sources and Rates

2.1 The Levels and Sources of Revenues

We begin by providing a comparison of total state and local tax and other government revenue between Kentucky and its neighbor states. This comparison makes no attempt to consider the amount or quality of services received with these expenditures. In Table 1 we report state and local own-source revenue from all sources (column (2)) and total state and local tax collections (column (3)) for 2007 on a per capita basis. As we can see, Kentucky has the lowest per-capita own-source revenue of any state.

Table 1: Sources and Level of State and Local Revenue, Kentucky and Contiguous States, 2007

	Own Source	Local Tax Collections	Own Source	Local Tax Collections	Share of Tax Revenue (%)						Share Own Source Revenue (%)	
	Per Capita		(% of Income)		Property	Sales	Selective Sales	Individual Income	Corporate Income	Other	State	Local
Illinois	5,780	4,290	15.1	11.2	37.1	16.6	17.2	17.1	5.3	6.7	50.7	49.3
Indiana	5,296	3,332	16.7	10.5	29.1	25.7	11.5	24.7	4.7	4.3	57.7	42.3
Kentucky	4,776	3,235	16.3	11	18.8	20.6	16.5	29.5	8.1	6.5	67.8	32.2
Missouri	4,917	3,265	15.2	10.1	27.4	26.2	11.4	26.9	2	6	52.2	47.8
Ohio	5,821	4,012	17.7	12.2	29	20.4	10.8	29.8	2.6	7.3	54.8	45.2
Tennessee	4,824	3,005	15.2	9.5	24.2	45.7	11	1.4	6.1	11.6	55.6	44.4
Virginia	6,166	4,205	15.5	10.5	30.9	14.5	11.9	31.6	2.7	8.3	59.7	40.3
West Virginia	5,451	3,371	19.5	12.1	18.6	18.5	19.3	22.3	8.8	12.4	74.7	25.3

Source: Census of Governments: http://www.census.gov/govs/www/financegen.html

Only Tennessee has lower tax revenue per capita. Columns (4) and (5) report the same revenues as a percentage of income. By this measure Kentucky is a relatively high-taxed state, with own-source revenues totally 16.3% of income, the fourth highest of the eight states with tax collections making up eleven percent of income, again the fourth highest. The obvious explanation is that Kentucky's per capita income is lower than most of its neighbors. This can be seen in column (e) in which median household income is reported. Only West Virginia has a lower median income with several states (Illinois, Virginia) having much higher median incomes.

The "share" Columns of Table 1 give a breakdown of the sources of tax revenue. Property taxes are, relative, to its neighbors a very small source of tax revenue for Kentucky with only West Virginia less reliant on them. Kentucky raises 18.8% of state and local revenue from property taxation while the median of its neighbors is 29.0%. Part of the explanation for the low reliance on the property tax in these two states is undoubtedly due to the fact that much more of their revenues are from state, rather than local, tax collections where property taxes are a greater source of revenue. This low reliance on the property taxation is offset by a higher reliance on the individual income and selective sales taxes with Kentucky's share for individual income taxes (29.5%) second only to Virginia's (31.6%) and almost five percent more than the median of its neighbors. Selective sales taxes raise 16.5% of Kentucky's taxes compared to a median of 11.5% for its neighbors. Kentucky's use of the general sales tax is similar to most of its neighbors with the obvious exception of Tennessee. While in 2007 Kentucky's share of tax revenue from the corporate income tax was the highest among these states, it should be noted that this is a source of revenue that varies much more than other sources.

The last two Columns of Table 1 provide share of revenue from state and local governments. As is apparent from these columns Kentucky is far more reliant on state revenue and far less reliant on local revenue than its neighbors again with the exception of West Virginia. As mentioned, the reliance on state revenue influences the mix of taxes used, particularly the limited use of the property tax and higher use of individual and corporate income taxes.

2.2 A Comparison of Rates

2.2.1 Income Tax Rates

Table 2a provides a comparison of state income tax rates between Kentucky and its neighbors. As the individual income tax consists of a number of brackets it is difficult to easily summarize it. As can be seen in the table, in terms of the low and high rates several of the states are quite similar to Kentucky (Virginia, Missouri, West Virginia). Tennessee with an income tax only on dividends and interest income and Illinois and Indiana with flat rates of 3.0% and 3.4%, respectively, are significantly different. While Ohio's top rate is higher than Kentucky's rate, this

Table 2a: A Comparsion of State Income Tax Rates: Kentucky and Contiguous States*

	Rates		Tax Brackets			Personal Exemption			Federal De-ductibilty
State	**Low**	**High**	**Number**	**Low**	**High**	**Single**	**Married**	**Child.**	
Illinois	3		1	-----Flat rate-----		2,000	4,000	2,000	
Indiana	3.4		1	-----Flat rate-----		1,000	2,000	1,000	
Kentucky	2	6	6	3,000	75,000	20 (a)	40 (a)	20 (a)	
Missouri	1.5	6	10	1,000	9,000	2,100	4,200	1,200	* (b)
Ohio (c)	0.618	6.24	9	5,000	200,000	1450 (d)	2900 (d)	1450 (d)	
Tennessee	State Income Tax is Limited to Dividends and Interest Income Only.								
Virginia	2	5.75	4	3,000	17,000	930	1,860	930	
West Virginia	3	6.5	5	10,000	60,000	2,000	4,000	2,000	
(a) Tax Credits									
(b) Limited to $10,000 for Joint returns and $5,000 for Single returns									
(c) Brackets and Personal Exemptions adjust to the rate of inflation									
(d) Plus a credit of $20									

***Source: Federation of Tax Adminstrators (FTA): http://www.taxadmin.org/fta/rate/ind_inc.html (as of January 1, 2008)**

Table 2b: A Comparsion of State Income Tax Rates: Kentucky and Contiguous States

		Exemptions			Taxed Services								
State	Rate	Food	Pre-scrip-tion	Non-Pre-scrip-tion	Util-ities	Per-sonal	Busi-ness	Com-puter	Amuse-ments	Pro-fes-sional	Instal-lation & Re-pair	Oth-er	To-tal
Illinois	6.25	1%	1%	1%	12	1	1	1	0	0	1	1	17
Indiana	6	*	*		7	4	3	2	3	0	1	4	24
Kentucky	6	*	*		11	2	4	0	6	0	4	1	28
Missouri	4.225	1.225%	*		8	1	2	2	10	0	0	3	26
Ohio	5.5	*	*		8	12	14	5	3	0	12	14	68
Tennes-see	7	5.5%	*		11	10	7	3	12	0	13	11	67
Virginia	5 (2)	2.5% (2)	*	*	1	3	4	0	1	0	4	5	18
West Virginia	6	4% (8)	*		6	17	26	4	13	1	13	25	105
*Exempt													

rate is not applied until $200,000 of adjusted gross income. As we shall see, these differences in income tax rates will result in significant differences in tax payments for high-income households.

2.2.2 General Sales Tax Rates

Table 2b summarizes the state and local (where it applies) sales tax rates. Again, rates are quite similar with three of the eight states having a rate of six percent with one at 5.5% (Ohio) and another at 6.25% (Illinois). The highest rate among the states is Tennessee at seven percent and the lowest rate is found in Missouri (4.225%)

While three of these states, including Kentucky, do not tax food, the rest do at rates lower than their general rate. Highest among the states is Tennessee which taxes food at 5.5%. West Virginia taxes food at four percent and Illinois, Virginia, and Missouri tax food at rates between one and 2.5%. Only one state, Illinois, taxes pharmaceuticals and that it is at one percent rate.

From a study by the Federation of Tax Administrators we report on the number of services, by category, each of the states taxed in 2006. This is suggestive of the "broadness" of the sales tax base, that is, how much it includes though it should be noted that a far more relevant measure would be the amount of sales in each category. This being said, the other columns suggest that Kentucky taxes utilities more than its neighbors and computers and businesses less, but seems to tax approximately the same number of services (as defined by FTA) as its neighbors.

2.2.3 Selective Excise Tax Rates

Table 2c summarizes information, again from the FTA, on excise tax rates on motor fuels, cigarettes and alcohol. Kentucky's tax on motor fuels of twenty-one cents a gallon is a couple of cents below the average among the states. While its tax rate of sixty cents a pack on cigarettes is also below that of its neighbors, there are three states with rates significantly below Kentucky's rate, and its rates is only slightly below the average of sixty-eight cents a package.

Taxes on alcohol are more complicated particularly as several of the states (Ohio, Virginia, and West Virginia) only sell distilled spirits in government operated outlets. In addition, tax rates vary by volume and taxes are also assessed by some municipal governments. All of these states also apply their general sales tax to alcohol purchases.

3. The Distribution Impacts of State and Local Taxes

As might be expected, for a number of reasons, different taxes affect households with different incomes differentially. More specifically, the share of income paid in taxes will vary with the income of the household. For the individual income tax,

Table 2c: A Comparsion of State Excse Tax Rates: Kentucky and Contiguous States*

	Motor Fuels	Ciga-rettes	Distilled Spirits		Wine		Beer	
	(Cents/ gallon)	(Cents / pack)	Rate ($/ gallon)	Other Taxes	Rate ($/ gallon)	Other Taxes	Rate ($/ gallon)	Other Taxes
Illinois	22.6	98	4.5	under 20% - $0.73/gallon	0.73	over 20% - $4.50/gallon	0.185	
Indiana	19.1	99.5	2.68	under 15% - $0.47/gallon	0.47	over 21% - $2.68/gallon	0.115	
Kentucky	21	60	1.92	under 6% - $0.25/gallon; $0.05/case and 11% wholesale tax	0.5	11% wholesale	0.08	11% whole-sale tax
Missouri	17.55	17	2		0.3		0.06	
Ohio	28	125	(a)		0.3	over 14% - $0.98/gallon, vermouth - $1.08/ gallon and sparkling wine - $1.48/gallon	0.18	
Tennes-see	21.4	62	4.4	$0.15/case and 15% on-premise; under 7% - $1.21/gallon.	0.93	14% to 20% - $1.45/gallon, over 21% and sparkling wine - $2.07/gallon; 2% wholesale tax	0.14	17% whole-sale tax
Virginia	29.2	30	(a)		0.55	over 16% - sold through state store, 10% on-premise sales tax	0.26	
West Virginia	32.4	55	(a)		0.87	over 14% - $1.72/gallon	0.18	

*Source: Federation of Tax Adminstrators (FTA): http://www.taxadmin.org/fta/rate/ind_inc.html (as of January 1, 2008)

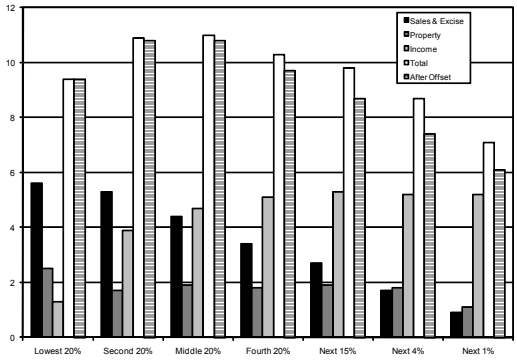
with its progressive structure in most states this is not surprising. But the incidence of other taxes, such as sales and property taxes, will depend on the consumption patterns of the households. Typically lower-income households spend a great share of their income than higher income households on goods subject to sales taxation.

In addition, when discussing incidence of taxes, economists make a distinction between *economic* and *statutory* incidence. For example, the statutory incidence of most excise taxes is the seller, from whom the taxes are collected, but most economic analysis indicates that the economic incidence is primarily borne by the purchasers. This means, for example, that an increase in the tax rate on motor fuels of $0.05 would increase the price at the pump by $0.05.

3.1 Distribution Impact of State and Local Taxes in Kentucky

In *Figure 1a* we summarize the results of a study by the Institute on Taxation and Economic Policy (ITEP)[1] on the distributional impacts of state and local taxation. They follow the standard practice of imputing the incidence of all sales taxes on the final consumer of the product. For property taxes, on rental properties they impute half the incidence to the renter and half to the property-owner; for owner-occupied housing, all the incidence is borne by the owner.

Figure 1a: Tax Shares of Income by Income Level, Kentucky 2007



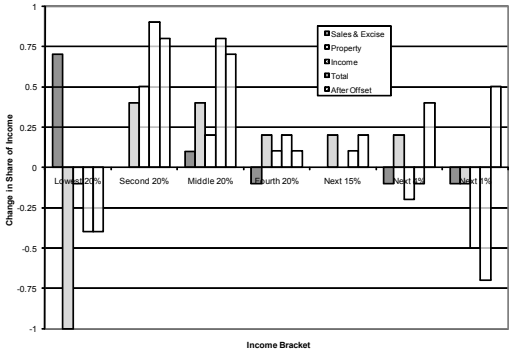
Source: ITEP

Figure 1a suggests that total taxes and total taxes after accounting for the reduced federal taxes for federal itemizers (After Offset) that taxes as share of income increase for the three quintiles of income but then decrease. Taxes for the households with the lowest twenty percent of income were approximately 9.4% of income. For household in the third quintile (40 – 60%) they were about eleven percent and for the top one percent of households they average 6.1 percent after the offset.

The income tax is progressive at low levels of income but then is essentially a flat tax – not

1 Davis, Carl et. al *Who Pays? A Distribution Analysis of the Tax Systems in All 50 States,* Institute on Taxation and Economic Policy, Washington, DC, November 2009.

Figure 1b: Change in Tax Shares of Income by Income Level, Kentucky 2007-2002

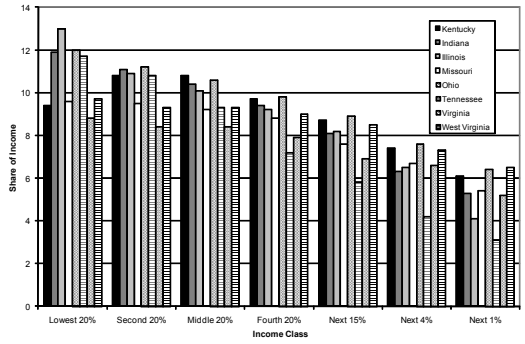


Source: ITEP

surprising as the top rate is reached at $75,000. While property taxes decrease with income, they are a relatively small share of income. Perhaps most dramatic is the difference in sales taxes paid as a share of income. For the lowest income quintile, sales taxes were 5.6% of income but for the highest one percent, they were 0.7% of income.

Figure 1b shows the changes in taxes as a share of income by quintile from 2002 to 2007. An positive number indicates a rate higher in 2007.[2] As the figure indicates, total taxes, as a share of income, decreased for both the highest and lowest income groups with increases for the middle of the income range, particularly for those households in the 20 to 60% range. However, for the highest income groups, taxes paid, after the federal offset, actually increased by 0.5%. The explanation for this is reduced federal marginal tax rates, limited deductions, and the alternative minimum tax rate for high income households mean smaller deductions for state income taxes.

Figure 2a: Total Taxes after Federal Offset as Share of Income, Kentucky and Contiguous States, 2007



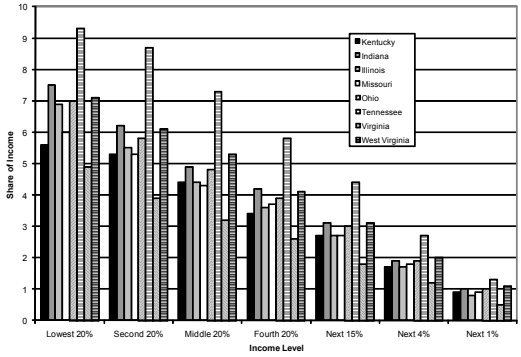
Source: ITEP

2 Comparisons of quintiles is somewhat problematic as the income ranges for the quintiles change over time so the brackets are not the same in either nominal or real dollars.

3.2 A Comparison to Kentucky's Neighbors

Figure 2a provides a summary of the total taxes as share of income by income class for Kentucky and its neighbors again using the 2007 ITEP study. Kentucky's total taxes on its lowest quintile of income are, in comparison to its neighbors, relatively low with only Virginia having lower taxes as share of income for its lowest income households. In contrast, only Ohio has higher total taxes on its highest income households. Total taxes in the middle of its income distribution are in the range of those in Indiana, Illinois, and Ohio and significantly higher than in Missouri, Virginia, and West Virginia.

Figure 2b: Sales & Excise Taxes, Share of Income, Kentucky and Contiguous States 2007



Source: ITEP

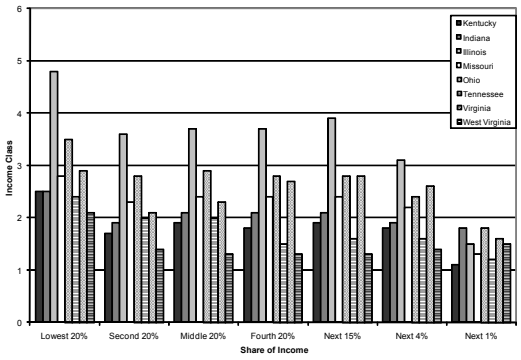
In *Figure 2b* we compare the incidence of the sales and excise taxes across income classes. The states consistently exhibit the same pattern of taxes as a share of income decreasing as income increases. In general, sales and excise taxes in Kentucky appear to be relatively low as a share of income with only Virginia having consistently lower burdens across the income distribution.

Comparisons of property taxes are found in *Figure 2c.* Again the pattern across states is similar. The highest property tax is Illinois which, not coincidentally, has highest share of its revenue locally collected. Kentucky's level and distribution of property taxes is very similar to that of Indiana, Tennessee, and West Virginia.

4. Differences in State Income Taxes

Rather than relying on the *ITEP* study for comparisons of the individual income tax among these states, we undertook our own analysis of it. Using a sample of Kentucky households from

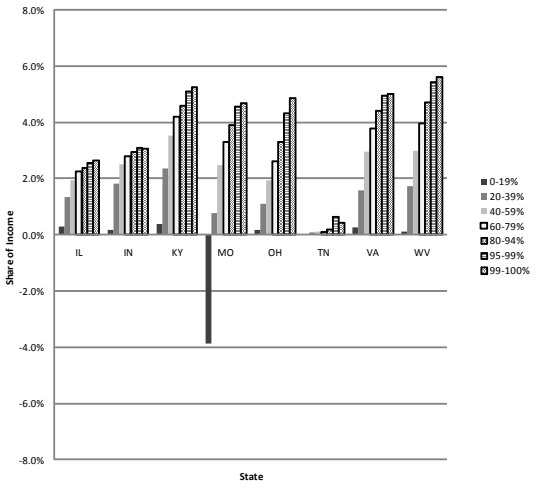
Figure 2c: Property Taxes as Share of Income, Kentucky & Surrounding States, 2007



Source: ITEP

the 2000 census[3] that contains a great deal of information on the income and structure of the household we used a program (Tax Sim) developed by the National Bureau of Economic Research (NBER)[4] that estimates state income taxes based on household characteristics. Essentially it completes the state tax form given household income and other characteristics. Then using this sample we estimate the taxes these households would pay in each of the eight states. The results of this exercise are found in *Figure 3a* with the average tax payment for the five quintiles in each state in 2008 after first adjusting income to reflect inflation.

Figure 3a: Individal Income Tax Share of Income (2008) KY Resident Hypothetical

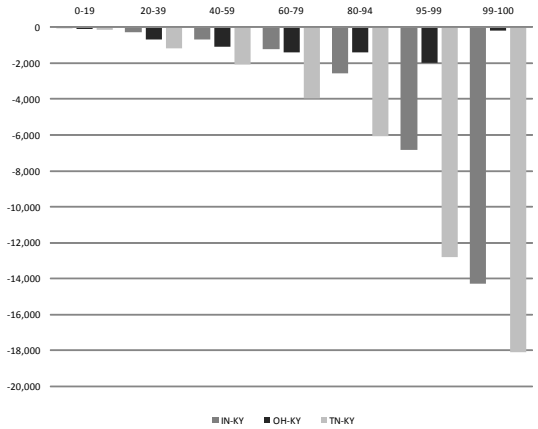


Source: IPUMS

Generally tax rates are higher in Kentucky than they are in other states for all income quintiles. This is particularly true at the top (top 1% and 5%) of income as well as the bottom quintile – generally, only West Virginia has higher rates.

Focusing only on households that live along state borders with Indiana, Tennessee and Ohio, the most populous borders for Kentucky, we conduct a similar exercise. Specifically, we consider how living in Kentucky rather than the border state affects the tax payments for those households that actually live along the board. The results of this exercise are summarized in *Figure 3b.*

Figure 3b: Difference in Cross-border Tax Burden



Source: IPUMS

Not surprisingly the largest differences in tax payments are found along the Tennessee border. For the middle of the distribution, there are pronounced differences between Kentucky and Ohio but these disappear at the top end – no doubt due to the top 6.25% bracket for Ohio. The difference between Kentucky and Indiana state income taxes are almost as pronounced as between Tennessee and Kentucky and reach almost $14,000 for the top one percent of the income distribution.

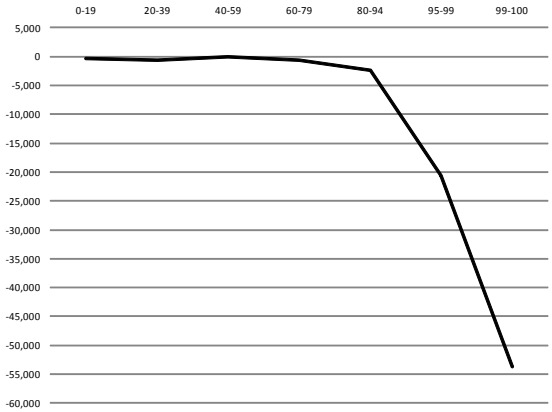
While any rigorous analysis examining the impact of differences of state taxes on the distribution of households is beyond the scope of this paper we present *Figure 3c* as some suggestive evidence. In *Figure 3a,* we report the difference in average income between Kentucky border households and its neighbors border households by income level. For the lower income quintiles the average incomes are similar.

3 The data is from the Integrated Public Use Microdata Series (IPUMS) from the University of Minnesota (http://www.ipums.umn.edu/)

4 See http://www.nber.org/~taxsim/ for a description of Tax Sim and how it estimates tax payments.

This is not surprising as the high and low income will be the same for each state limiting the difference in means. However, for the higher quintiles, the difference between the low and high incomes are quite different with no top limit for the top one percent. Then for these high income levels, the differences in mean income become very pronounced with the mean income for the highest income households in Kentucky having a much lower average income – on the order of $25,000 for the 95th – 99th percentile and $55,000 for the 99th – 100th percentile.

Figure 3c: Difference in Cross-border Household Income



Source: IPUMS

5. Concluding Remarks

While there are significant differences in the tax instruments used by Kentucky and its neighbors, the level of total state and local taxes and, perhaps, more relevant, state and local own-source revenue are quite similar, with Kentucky being one of the lowest taxed states on a per capita basis. However, when based as a share of income, Kentucky's taxes are higher. This is primarily due to the fact that incomes are lower in Kentucky than all its neighbors except West Virginia. This and the centralized nature of revenue collection in Kentucky explains the high individual income tax rates. The tax burdens imposed by the individual income tax rate in Kentucky are generally higher than those in the states its shares the largest borders with – Indiana, Ohio, and Tennessee. It is also the case that along these borders the highest income households in Kentucky have much lower incomes than those in its neighbors.

Recent Economic Performance of Regions Around Kentucky

Paul Coomes & Barry Kornstein

This article examines the latest data on jobs, population, human capital, and housing to gain insights into how differently our regions have developed over the last decade. There is great variation around the state, with areas like Bowling Green, Richmond-Berea and Clarksville-Hopkinsville posting strong growth in jobs and population, and areas like Ashland, Middlesboro and Paducah continuing to lose people due to the lack of job growth. The overall impression is one of a fairly robust economy down the north-south corridors around Interstates 65 and 75, particularly to the south, and of contraction at the far eastern and western parts of the state.

The year 2010 has arrived, quite quickly it seems to some of us. It feels like just a short time ago that people were worried about massive computer failures as clocks, designed for the ancient 1900s, could not adjust to the new millennium. We survived that, and subsequently absorbed the attacks of September 2001, a mild recession that same year, the bursting of a housing price bubble mid-decade, a financial crisis, gasoline prices over four dollars a gallon, and a major recession the last two years. On the positive side, since 2000 we have had great increases in productivity, low inflation and interest rates, a five year stock market boom, strong growth in housing units and home ownership, and recently a personal savings rate above five percent – the highest since 1998. As the tumultuous decade comes to an end, it is a natural time to look back at the performance of regions around Kentucky.

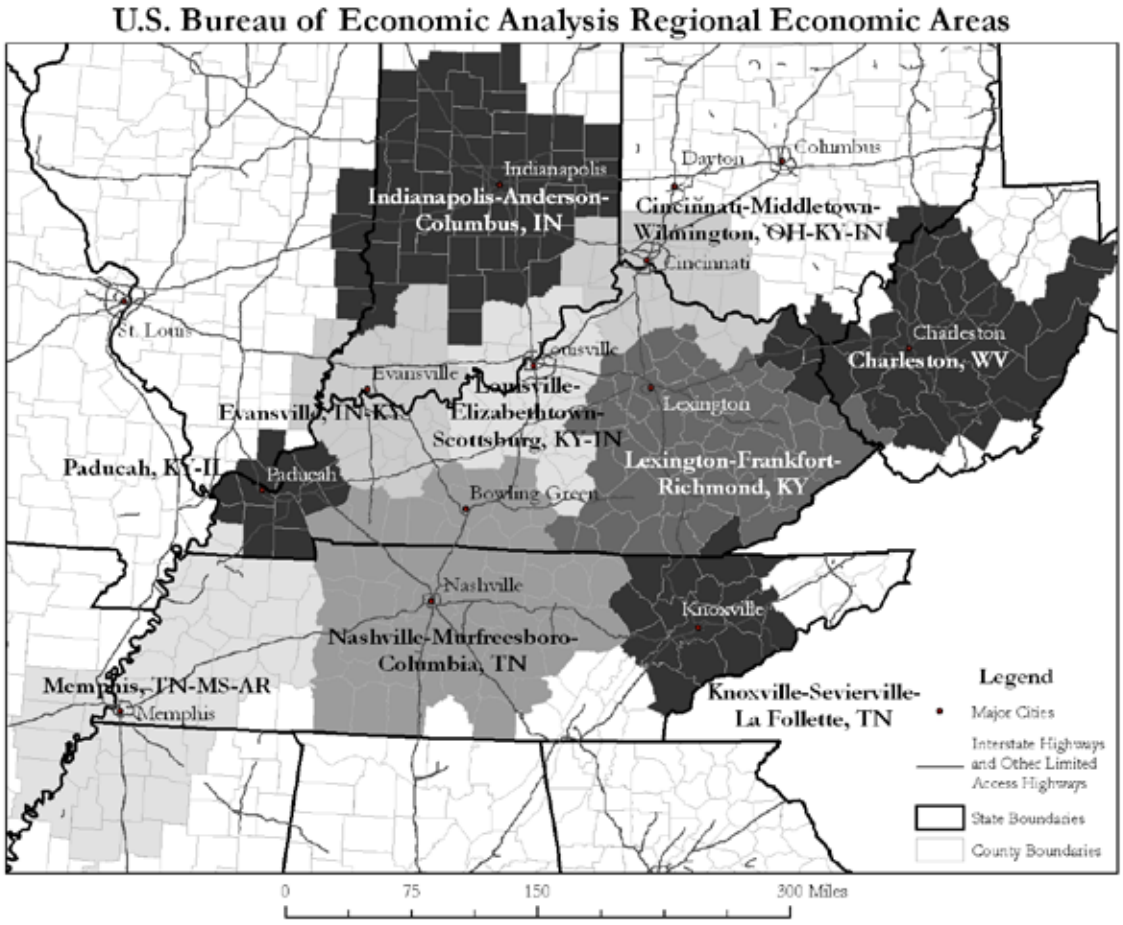
We have rolled up available data on jobs, population, human capital, and housing to gain insights into how differently our regions have developed over the last decade[1]. We find that there is great variation around the state, with areas like Bowling Green, Richmond-Berea and Clarksville-Hopkinsville posting strong growth in jobs and population, and areas like Ashland, Middlesboro and Paducah continuing to lose people due to the lack of job growth. The overall impression is one of a fairly robust economy down the north-south corridors around Interstates 65 and 75, particularly to the south, and of contraction at the far eastern and western parts of the state.

There are several interesting ways to define economic regions, and data considerations affect our choices in this report. Metropolitan and micropolitan areas are probably the closest geographic construct to what economists consider as markets – for labor, housing, shopping, health care, entertainment. These include counties that have strong economic interactions with each other, but exclude counties that are not highly connected to an urban core. A wider construct, defined by the US Bureau of Economic Analysis (BEA), is called an Economic Area. These include all counties in the United States, with each county, no matter how rural, assigned to the nearest major urban area. These Economic Areas provide a good geographic scope for looking at markets for infrequent big ticket purchases, like vehicles, appliances, airplane trips, heart surgeries, the arts, and cultural activities. They conform fairly closely to TV media markets, the residence of hospital patients, the service areas for major airports. It turns out state boundaries, especially one so porous as Kentucky's, is not a very useful geographic delineation in regional economic studies.

Consider first the BEA Economic Areas containing Kentucky counties, and for reference the Indianapolis area that is adjacent to three others, is included.

1 For a retrospective look at the previous decade, see Paul Coomes and Michael Price, "The Economic Performance of Regions in Kentucky", May 2001, available at http://monitor.louisville.edu kentucky/KyRegionsED.pdf

Figure 1



There are ten of these, all crossing a state border, as shown in Figure 1. A quick review is insightful. Starting at the far east, we have the Charleston economic area, which includes the Huntington-Ashland MSA. Proceeding counter-clockwise, we come to the Cincinnati area, then Louisville, Evansville, Paducah, Memphis, Nashville, Lexington, and Knoxville. The Memphis and Knoxville areas have only a few Kentucky counties, but economic statisticians have discerned a tendency for residents of those Kentucky counties to interact more with the out-of-state urban center than with an urban center in Kentucky. The Lexington Economic Area comes closest to being composed of just Kentucky counties.

Which of these large regions have grown the fastest the last decade? For brevity, we show only the total population and job growth in our exhibits, but the pattern is fairly clear. Table 1 shows the total population in 2007, with growth calculations for the prior ten years. The Tennessee regional economies have outperformed the others, with the Nashville and Knoxville areas in a league of their own. They posted population growth of 12 to 17 percent, nearly twice the rate of the solid Cincinnati, Louisville, and Lexington areas in the center. The slowest growth was in the tails, in the Charleston, Paducah, and Evansville Economic Areas.

Looking back over three decades we can see

Figure 2

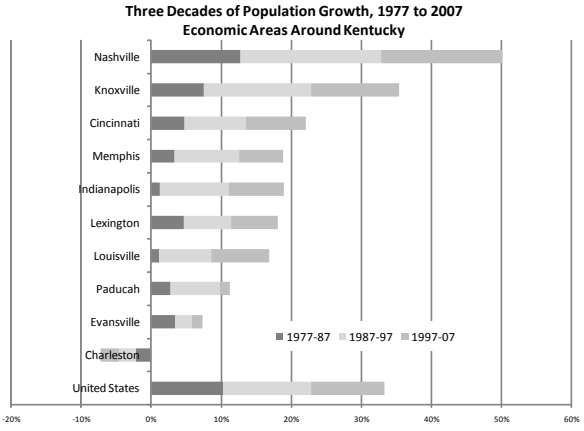


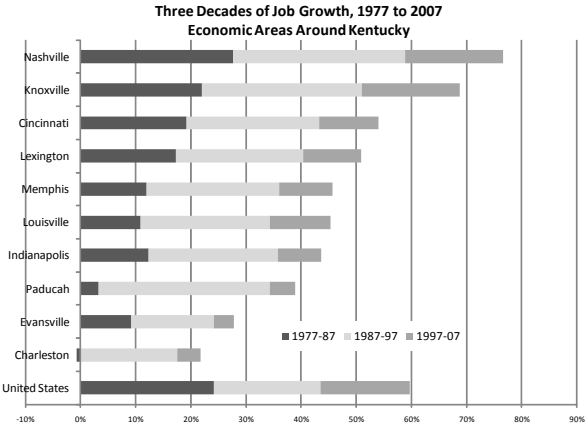
Table 1: Population Growth, 1997 to 2007			
	Population, 2007	Growth	Rate
Charleston, WV	1,186,005	-32,917	-2.7%
Cincinnati-Middletown-Wilmington, OH-KY-IN	2,351,587	186,934	8.6%
Evansville, IN-KY	750,294	11,551	1.6%
Indianapolis-Anderson-Columbus, IN	3,330,982	243,225	7.9%
Knoxville-Sevierville-La Follette, TN	1,181,649	131,742	12.5%
Lexington-Fayette-Frankfort-Richmond, KY	1,505,544	94,349	6.7%
Louisville-Elizabethtown-Scottsburg, KY-IN	1,537,997	117,577	8.3%
Memphis, TN-MS-AR	1,992,378	117,685	6.3%
Nashville-Davidson-Murfreesboro-Columbia, TN	2,737,954	404,398	17.3%
Paducah, KY-IL	241,811	3,265	1.4%
United States	301,290,332	28,643,407	10.5%

this same regional pattern compounding over time. Figure 2 provides a thirty year summary for population growth, and Figure 3 provides a summary for job growth. It seems clear that strong job growth is a requirement for population growth. Indeed, the Charleston Economic Area posted modest job growth in the 1987-1997 and 1997-2007 decades, but still lost population. These data are consistent with our long-held observation that places around the middle of the United States - without beaches, mountains, or other people and human capital magnets - tend to only have population growth when there is strong job growth.

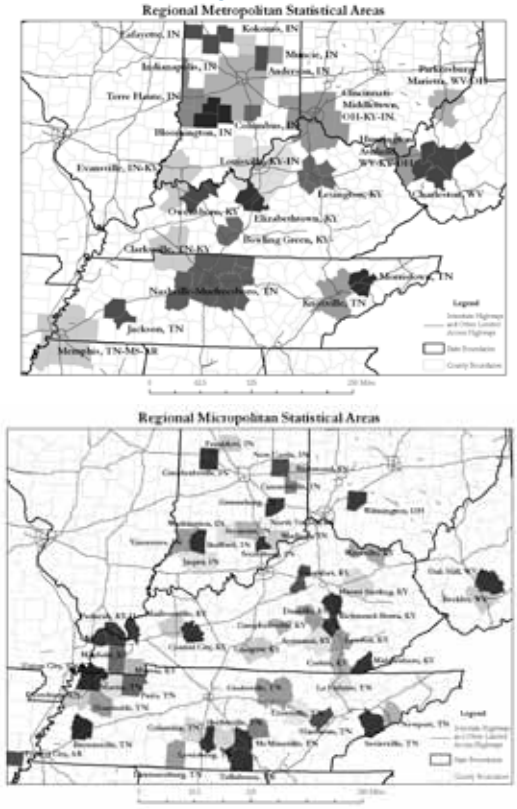
Next we zoom in tighter, looking at the metropolitan (Figure 4) and micropolitan statistical (Figure 5) areas that contain Kentucky counties. There are nine such metropolitan areas, with a total population of 5.1 million. And there are 17 such micropolitan areas, with a population of about 800,000. A micropolitan area must contain a minimum core county population of 25,000, whereas a metropolitan area needs a minimum population of 50,000 residents. Again, note how many of these cross, or are adjacent to, state borders. The largest two, Cincinnati and Louisville, contain 1.4 million Kentucky residents, but 2.0 million residents of Indiana and Ohio.

The regional pattern for job and population growth is similar that for the bigger economic area construct, though the more fine grained data highlights some interesting geographic detail. In terms of population (Figures 6a and 6b), the Richmond-Berea, Bowling Green, Clarksville-Hopkinsville, and Lexington markets have grown the fastest over the last decade. Note that two of these are part of the larger Nashville Economic

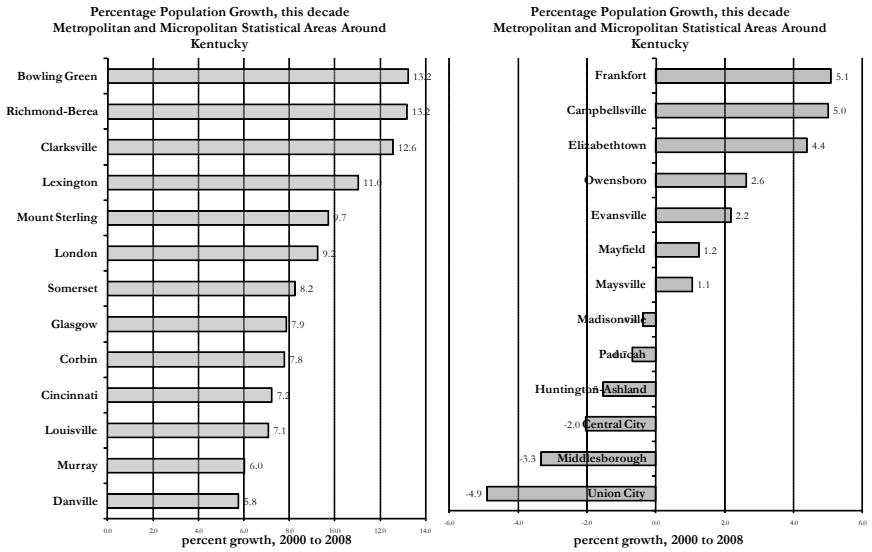
Figure 3



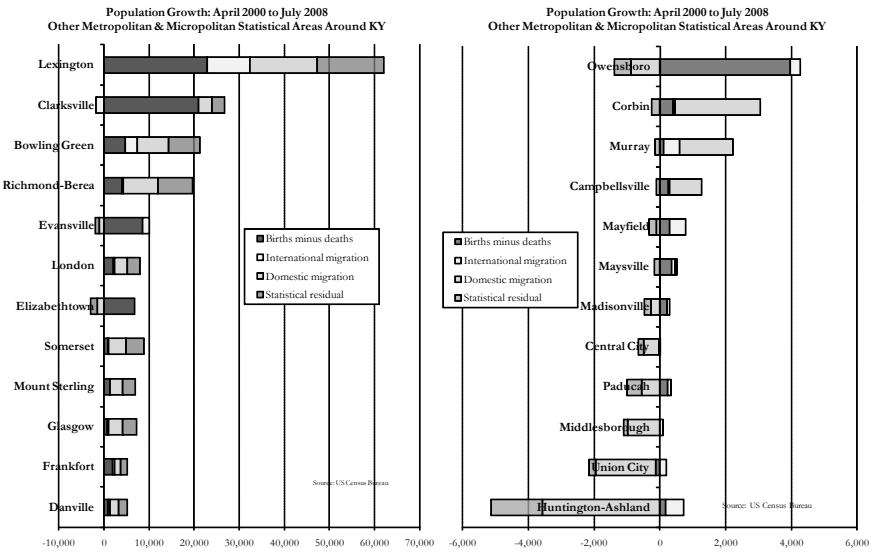
Figures 4 & 5



Figures 6a and 6b



Figures 7a and 7b



Area. Mount Sterling, London, Somerset, Glasgow, and Corbin have also posted relatively high growth rates. One can see that almost all the fast growing markets are along Interstate 65 or 75. Almost all the retracting markets are in the far east or west of Kentucky.

We can get some further insights by decomposing the growth in population into its prime components. Natural increase is the difference between births and deaths. International migration is the net movement of foreign-born people into an area. And domestic migration is the net movement of people from other parts of Kentucky and the United States. The recent data are summarized in Figures 7a and 7b, with the large Cincinnati and Louisville MSAs removed we can zoom in on the others[2]. One can see that population growth around our two major military posts – Fort Campbell in the Clarksville-Hopkinsville MSA and Fort Knox in the Elizabethtown MSA – is due primarily to high volume of babies born to the families of soldiers. Population growth in the Lexington and Bowling Green MSAs comes from all sources, reflecting their youthful college populations, the inflow of foreign graduate students, and their strong job growth attracting people in from surrounding counties. The Richmond-Berea micropolitan area is growing rapidly, as Eastern Kentucky University and Berea College attract students and faculty from outside the area. Mount Sterling is the only market off the north-south interstate corridors that seems to be growing rapidly, though many residents there commute to Lexington to work.

The contracting markets in the far east and west have generally lost population, despite having more births than deaths, suggesting that young people are moving to the faster growth employment centers in the middle of the state. The Huntington-Ashland, Union City, Middlesboro, Paducah and Central City areas have all lost population this decade due to out-migration.

Figure 8 summarizes job growth over the past ten years, setting the 1998 equal to 100. Only about half of the metropolitan areas have grown as fast or faster than the US as a whole; most other markets around Kentucky grew at half the rate or less.

2 The growth for the Cincinnati MSA was 98,000 in natural increase, 18,000 international migration, but a net loss of 19,000 to domestic migration. (There is, however, a large statistical residual for the Cincinnati metro area, since the net growth in population this decade was 145,000). The growth for the Louisville MSA was composed of 43,000 in natural increase, 12,000 international migration, and 29,000 domestic migration.

Figure 8

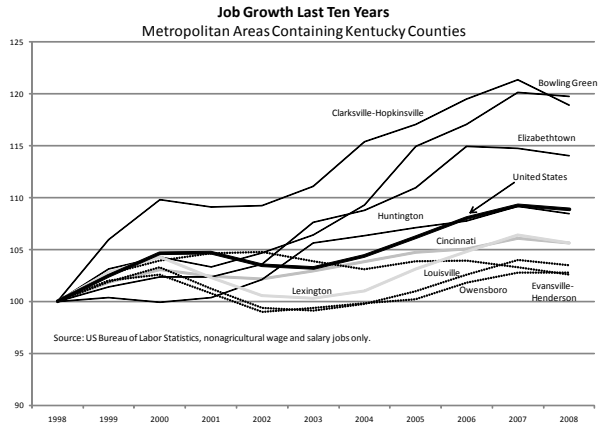
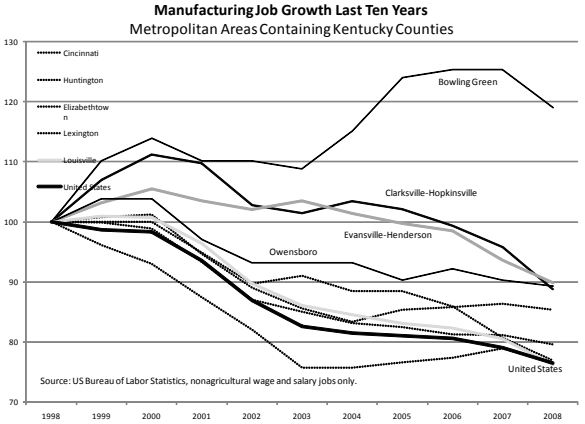


Figure 9



A comparable calculation for just manufacturing employment is shown in Figure 9. Here the Kentucky metros compare more favorably to the US, though all but Bowling Green have fewer manufacturing jobs in 2008 than they did in 1998. The Clarksville-Hopkinsville and Evansville-Henderson metros competed well for a decreasing national manufacturing job base.

Formal education has never been so important to economic success. Nationally, the fastest growing sector for jobs has been the high end office sector.

Figure 10

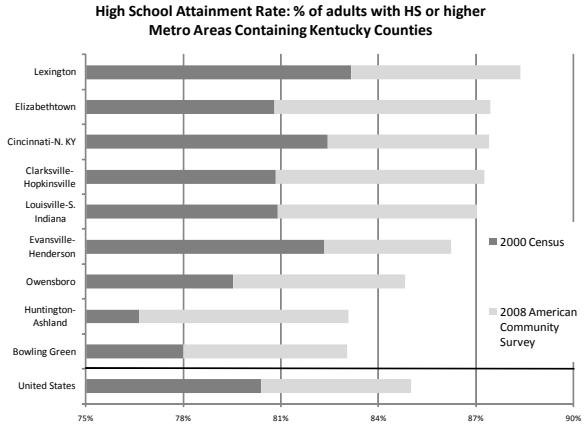
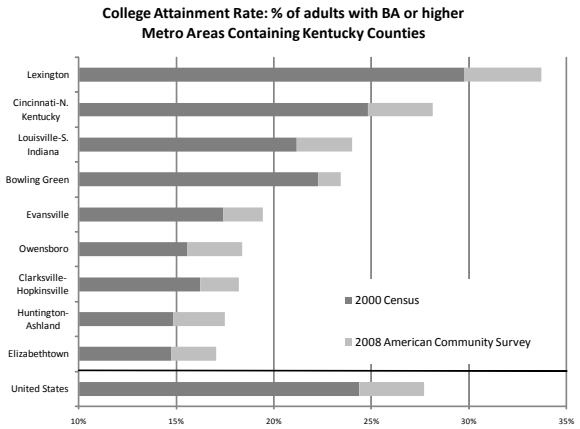


Figure 11



We have organized estimates on educational attainment just published by the US Census Bureau for 2008 and compared them to the results of the 2000 Census. See Figures 10 and 11. There has been continuing progress in Kentucky markets, but the gap with the US remains. One positive sign is that now only two of our MSAs have an adult high school attainment rate below the national average. By contrast, only two of the nine have a college attainment rate above the nation. One expects moderately sized cities with large universities to have high college attainment rates – they have a relatively high concentration of very educated faculty members and graduate students. This explains the top ranking for Lexington, and Bowling Green's improvement over its ranking for high school attainment. Of more challenge, and arguably of more economic importance, is the relatively low college rate for the Louisville metropolitan area, easily Kentucky's largest population center. Louisville has long lagged other comparably sized markets around the country in terms of human

This includes occupations in law, accounting, engineering, architecture, advertising, public relations, computer design, and consulting. These jobs pay well and typically require at least a bachelor's degree. In terms of employment, this sector has grown faster than manufacturing and the other good producing sectors have shrunk. Developing and attracting well-educated residents may be the most certain path to prosperity for Kentucky as a whole, and we remain far behind most states in this regard.

Figure 12

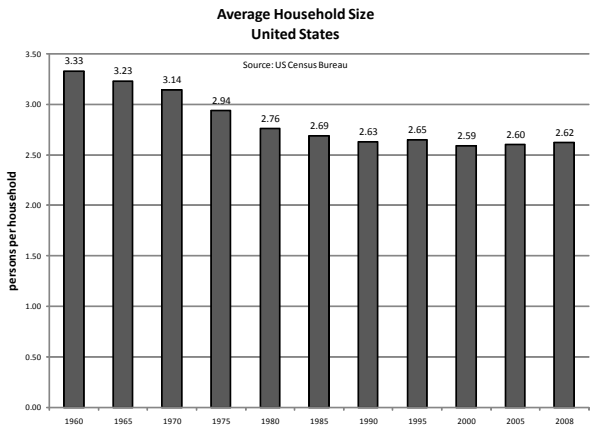
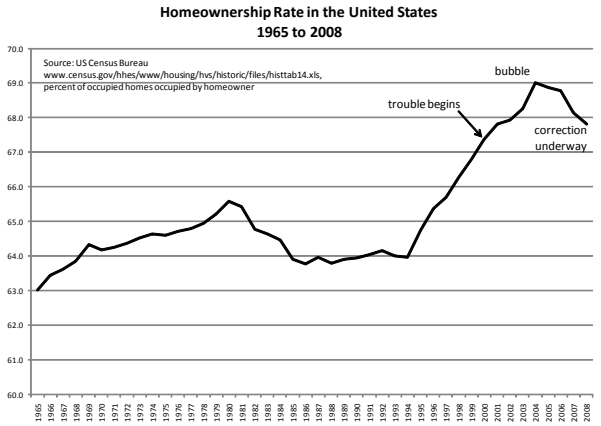


Figure 13



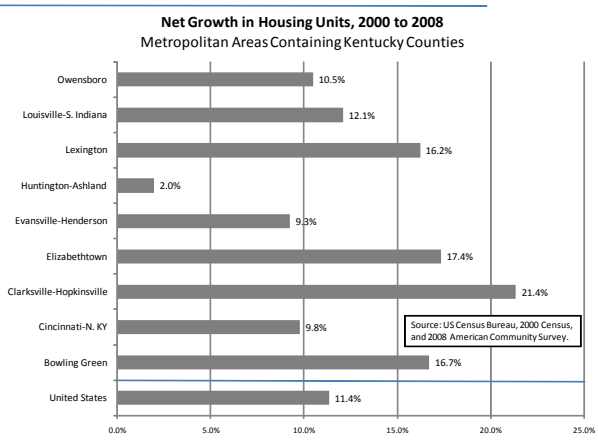
capital, and despite the growth in number of residents with a college degree this decade has not posted gains against the competition.

Lastly, we have examined recent data on housing growth and prices in our regional economies. The recent severe recession was caused as much by a housing price bubble and overbuilding as by any other culprit. While there is little evidence of a price bubble in any of our markets, there was significant overbuilding of housing units in most metropolitan areas containing Kentucky counties. There appears to be large stock of vacant homes and apartments, which will take years to absorb through population growth.

Before presenting the regional estimates it is worth a considering two fundamental national forces that supported the long housing boom that ended around 2006. In Figure 12 we show four decades of decline in the number of persons per household. This decline is due to a trend towards fewer children, more divorces, and people living longer (often alone). This would have created a demand for housing units, even without population growth. For example, over the decade of 1990 to 2000 the number of people per household in the Louisville metro area fell from 2.57 to 2.46. This alone, even if the area had had no population growth, was enough to support 17,000 more occupied housing units, about one-third of what we observed. Note, however, that the long decline in persons per household appears to be over. This removes one of the most important sources of growth in the housing market, so that we should expect much slower growth indefinitely.

In Figure 13 we show four decades of the rate of homeownership in the US. This is a measure of the number of occupied housing units that are occupied by their owners, as opposed to renters. Historically the rate has hovered around 64-65 percent, presumably reflecting some long-term factors like the need for students, young families, highly mobile people, and those unable to work to rent instead of own housing. Note that the rate started to climb rapidly in the late 1990s, as low mortgage rates and federal programs enticed marginal households into ownership. The resultant demand for new housing contributed to the overbuilding this decade, the real estate speculation that led to the housing price bubble, as well as the foreclosure problems of marginal home buyers, as well as real estate investors who saw vacancies rise and monthly rents stagnate. Thankfully, the national home ownership rate has been slowly falling to something more sustainable.

Figure 14



We now turn again to comparisons of estimates from the 2000 Census and the 2008 American Community Survey, to discern any patterns in housing markets around our region. The strongest growth rates, in terms of sheer housing units (Figure 14), were in the two military-oriented markets, Clarksville-Hopkinsville and Elizabethtown MSAs,

Figure 15

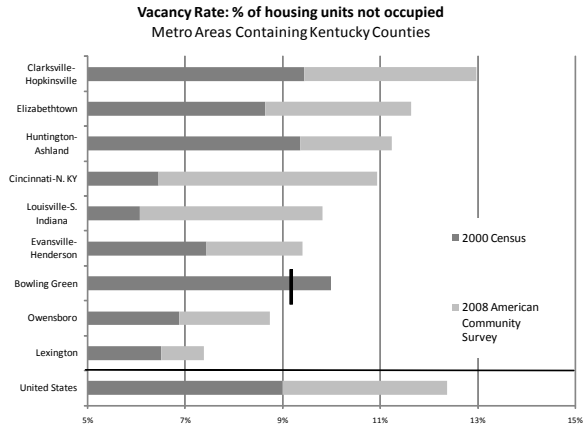
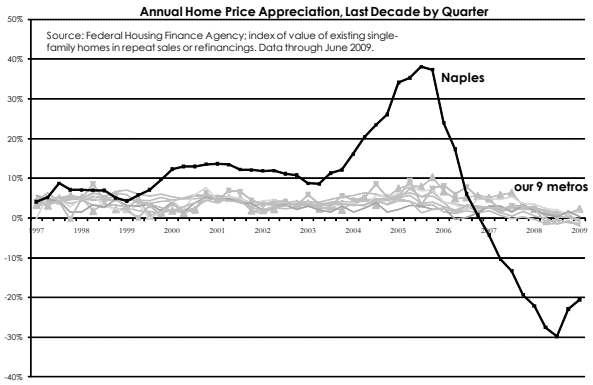


Figure 16



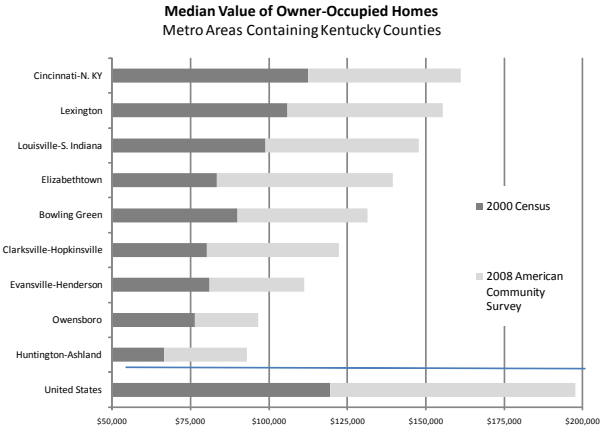
and in the Bowling Green and Lexington MSAs. All four the posted growth rates above 16 percent, stronger than the comparable national measures. Louisville, Owensboro, Cincinnati, and Evansville-Henderson had growth similar to that for the US. The Huntington-Ashland MSA actually added to its housing stock, despite losing population, with the decline in number of persons per household explaining the apparent discrepancy.

Note, however, that many Kentucky area markets are apparently overbuilt. The vacancy rate in the Clarksville-Hopkinsville MSA jumped from 10 to 13 percent this decade (Figure 15). Elizabethtown, the other major Army-oriented market, had a similar jump it is vacancy rate. Interestingly, the vacancy rate fell in the Bowling Green MSA, suggesting that a strong growth in housing supply was accompanied by a strong growth in housing demand. Also, note that the Lexington market has the lowest vacancy rate in 2008, as builders apparently did not overshoot the way they did in most other markets.

Finally, we examine data on housing price appreciation over the past decade. We use the resale/appraisal data from the Federal Housing Finance Agency, which compares the value of existing homes over time, as triggered by a resale or a reappraisal. We have calculated year-over-year percent changes in the house price indexes for the nine MSAs containing Kentucky counties, as shown in Figure 16. For a reference, we show the comparable growth in housing prices in Naples FL. It is now well-understood that the housing price bubble was most pronounced in the 'sand states': California, Nevada, Arizona and Florida. Many of those markets saw peak annual home price increases of 40 percent, as the speculative buying fed on itself in 2004 and 2005. Naples was the poster child of this group of markets, though plots for places like Las Vegas, Phoenix, and Los Angeles look very similar. The long drop into negative territory the last three years reflects the correction that is underway. Indeed, the upturn (though still negative) over the last year suggests that a bottom has been found and the housing recovery there is underway. Note the contrast between Naples and our nine MSAs. There was apparently no bubble to pop in our region. Indeed there is little basis for the fear many readers felt, as they heard national (and unfortunately some local) news reports suggesting that their real estate wealth was evaporating because of the housing crisis.

One final piece of evidence that real estate values here have held up well during the bursting of the national housing bubble is the growth in median home values so far this decade. Note in Figure 17 the fairly strong growth in all Kentucky area markets since 2000. Homes remain inexpensive compared to the US average, giving our region a competitive strength for people and companies considering a

Figure 17



move, especially those from coastal cities. And the solid growth in home values since 2000, combined with our traditionally high rates of home ownership and relatively low amounts of mortgage debt, suggests that the net worth of Kentuckians rose considerably this decade.

Labor-Market Returns to Kentucky's Community Colleges

Christopher Jepsen*

This article looks at the labor-market returns to Kentucky community colleges' degrees, diplomas, and certificates. Associate's degrees and diplomas are associated with increases in quarterly earnings of approximately 20 percent for men and 40 percent for women. Certificates are associated with quarterly earnings increases of 9 percent for men and 3 percent for women. With respect to fields of study, health and vocational fields have higher returns than business and services fields. There are no clear regional patterns in the returns to degrees, diplomas, and certificates, but there is substantial regional variation in the returns to all three awards. All three awards are associated with higher employment probabilities, with noticeably smaller probabilities for certificates.

I. Introduction

The income distribution in the United States has widened over the last few decades. The economic returns for high school graduates have declined substantially and job opportunities for less-skilled workers are becoming more limited. In response, the Kentucky Community and Technical College System (KCTCS) offers several post-secondary awards including certificates and diplomas as well as associate's degrees. This article summarizes recent research on the labor-market returns to KCTCS as reported in Jepsen and Troske (2009), although it also draws on findings from Blomquist et al. (2007, 2009) and Jepsen, Troske, and Coomes (2009).

This article uses data from KCTCS to measure the individual labor-market returns to associate's degrees, diplomas, and certificates. The KCTCS student-level data contain information on student characteristics such as age, race and sex; information on all courses taken by the student; and information on all credits, certificates, diplomas or associate's degrees earned. These data are matched with quarterly earnings data collected by the state's unemployment insurance system. Total earnings from all covered jobs are available for each individual from the first quarter of 2000 through the third quarter of 2008. All earnings data are reported in 2008 dollars to control for inflation. Our focus is on two cohorts of students: the cohort of students who started at KCTCS from summer 2002 to spring 2003 and the cohort who started at KCTCS from summer 2003 to spring 2004. Students from earlier cohorts have little if any pre-KCTCS earnings data, and students from later cohorts have little if any post- KCTCS earnings data. The appendix in Jepsen and Troske (2009) contains more information on the data and methods.

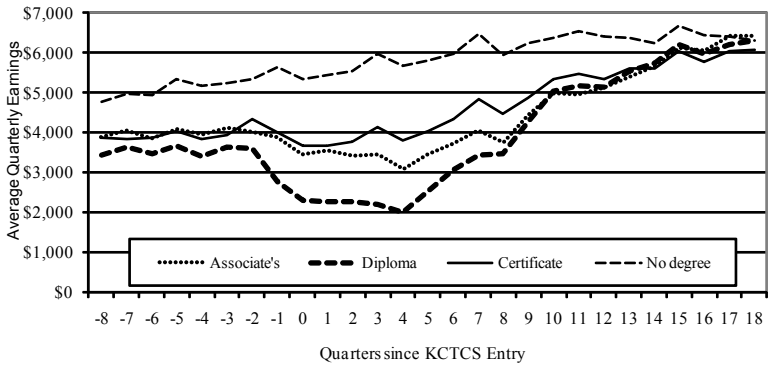
In all analyses, the interest is in the highest award received. An associate's degree is considered the highest award offered because it typically requires the most course work. A diploma is considered the second-highest award offered. A certificate is considered the third-highest award offered because it typically requires the least course work of the three awards. For example, a person with a diploma and a certificate has a diploma as his/her highest award.

II. Earnings Patterns by Highest Award

The analysis of labor-market returns begins by looking at earnings patterns by highest award. Figure 1 contains the average quarterly earnings

* I thank my co-authors (Glenn Blomquist, Paul Coomes, Brandon Koford, and Kenneth Troske) for their collaboration on the community college projects summarized in this article. I thank Christina Whitfield and Alicia Crouch at KCTCS for assistance in obtaining and using KCTCS administrative data and Darshak Patel for excellent research assistance. Ken Walker and Christina Whitfield provided valuable comments on all the KCTCS projects summarized in this article.

Figure 1: Average Quarterly Earnings by Highest Award, Men



Source: Author's calculations based on KCTCS administrative data.

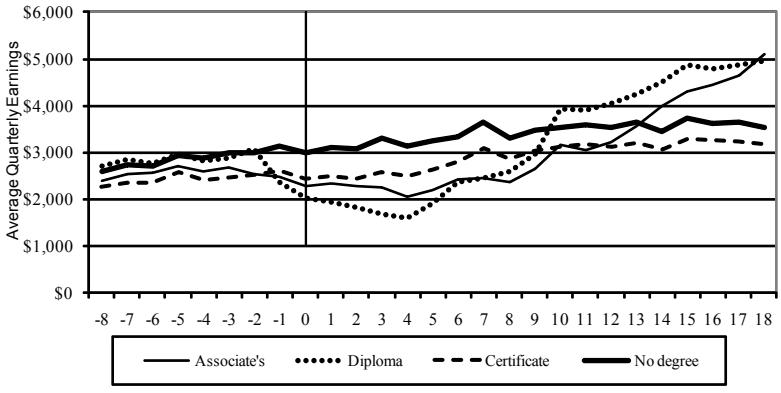
for men by highest award, where each quarter is measured relative to initial attendance at KCTCS. The quarter when the student first attended KCTCS is measured as 0 on the horizontal axis of the graph. The first quarter before the student attended KCTCS is measured as –1, and the first quarter after the student attended KCTCS is measured as 1. For example, consider a student who first attended KCTCS in fall 2002. For this student, quarter 0 is July-September 2002; quarter –1 is June-August 2002; and quarter 1 is October-December 2002. Time is measured relative to entrance at KCTCS, rather than calendar quarter, for two reasons. First, students enter KCTCS at different time periods between summer 2002 and spring 2004. Quarterly earnings at a particular calendar quarter, such as the first quarter of 2006, will measure students with different levels of KCTCS schooling. Second, this arrangement of quarters allows us to illustrate clearly pre-KCTCS differences in earnings. This technique is common in evaluations of job-training programs, where researchers are concerned about the similarity of recipients and non-recipients prior to participation in job-training programs. Analogous comparisons can be conducted for participation in KCTCS.

Figure 1 has several interesting patterns. Men who attend KCTCS without receiving an award have the highest pre-KCTCS earnings, with average quarterly earnings in excess of $5,000 in most quarters. As mentioned previously, all dollar figures are reported in 2008 dollars. Individuals who eventually receive an award have relatively similar pre-KCTCS earnings of approximately $4,000 a quarter, although the average pre-KCTCS earnings are slightly lower for individuals who eventually receive a diploma. However, these award earners – especially those who receive diplomas – experience a substantial decrease in earnings the quarter before entering KCTCS. This decrease may reflect the reasons for attending KCTCS, such as losing a job or voluntarily reducing hours of work.

Average quarterly earnings for award recipients begin to increase dramatically approximately four quarters after entering KCTCS. By 18 quarters after entering KCTCS, the earnings for the four groups of individuals are relatively equal.

Figure 2 illustrates average quarterly earnings for women by highest award. There are noticeable differences between men and women. Women have lower average earnings than men. In the quarters prior to KCTCS attendance, average quarterly earnings are relatively similar across the four education levels, except for the decline in average earnings for award recipients starting in the quarter before KCTCS attendance. As with men, average quarterly earnings for women with awards start to increase around four quarters after KCTCS attendance. The low earnings in the first few

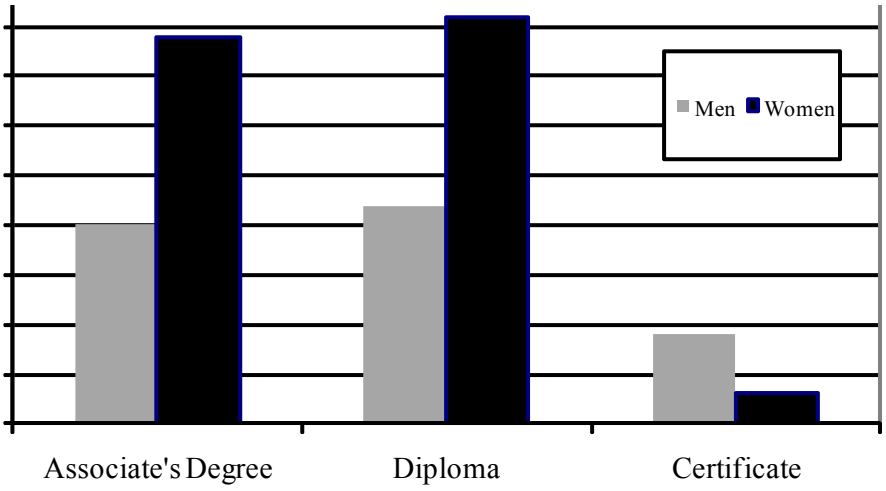
Figure 2: Average Quarterly Earnings by Highest Award, Women



Source: Author's calculations based on KCTCS administrative data.

periods after KCTCS entry likely reflect a reduction in working hours due to KCTCS attendance. For women with diplomas and associate's degrees, average earnings dramatically increase around eight or so quarters after KCTCS attendance. By 18 months after initial KCTCS enrollment, the average quarterly earnings of diploma and associate's degree recipients substantially exceed average earnings of women who did not receive an award. Women with certificates have the lowest average earnings 18 months after initial KCTCS attendance.

Figure 3: Statewide Earnings Returns to Highest Award by Gender



Source: Author's calculations based on KCTCS administrative data.

The graphs suggest that men who receive associate's degrees, diplomas, and certificates and women who receive associate's degrees and diplomas have sizable increases in earnings, at least compared to individuals who attend KCTCS but do not receive an award. For women, the increase is particularly large. In contrast, women who receive certificates do not have a large increase in average quarterly earnings.

Although these graphs provide a useful starting point for the discussion of labor-market returns, they look only at differences in average earnings between the four groups indicated in the graphs. They do not control for any differences between the four groups. For example, the graphs illustrate that individuals who receive awards have a sizable decline in average quarterly earnings the quarter before they first attend KCTCS. Because this drop does not occur for individuals who attend KCTCS but do not receive an award, this difference suggests that other differences may exist between award recipients and non-recipients. Figures 1 and 2 will not capture these differences, nor will they capture any other differences such as differences in age or length of KCTCS enrollment. Therefore, in the remainder of this article, multivariate regression analysis is used to study differences in labor-market returns to certificates and diplomas. The details of the model are in the appendix of Jepsen and Troske (2009).

III. Statewide Returns to Associate's Degrees, Diplomas, and Certificates

Figure 3 illustrates the individual earnings returns associated with three types of KCTCS outcomes discussed above: associate's degrees, diplomas, and certificates. The returns are reported as the percentage change in earnings for each quarter after receiving the award.[1] Returns are calculated separately for men and for women.

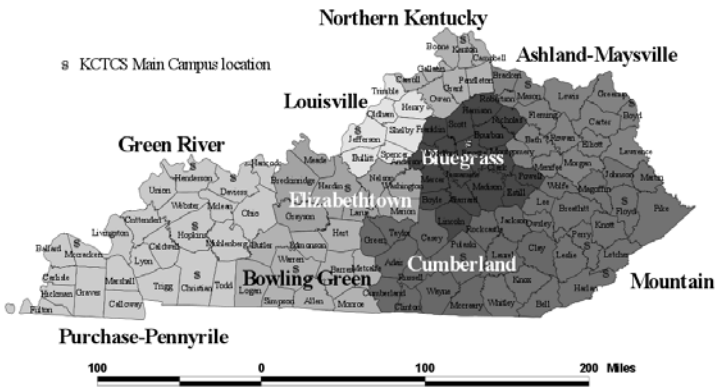
Both men and women have large labor-market returns for associate's degrees and diplomas, with slightly higher returns to diplomas. The returns are 20 to 22 percent for men and 39 to 41 percent for women. These results are consistent with labor-market returns for Kentuckians in 2000 Census data, and they are consistent with other studies of labor-market returns that use statistical techniques such as fixed effects or instrumental variables (Card, 1999).

The labor-market returns for certificates are much more modest than those for diplomas or associate's degrees. Men have higher earnings of 9 percent, and women have higher earnings of 3 percent. The smaller returns for women are in contrast to the much higher returns for women (relative to men) for associate's degrees and diplomas. At the same time, Figure 2 illustrates

1 To be consistent with previous work on returns to schooling, we express our log coefficients in terms of percentages. However, the precise interpretation of a coefficient b in percentage terms is (eb-1), where e is the exponential function. For comparison, a log coefficient of 0.4 is approximately 49 percent and a log coefficient of 0.2 is around 22 percent.

that women with certificates had much smaller growth in average earnings compared to women with diplomas or associate's degrees. One explanation for these lower returns, which is discussed in Jepsen and Troske (2009), is that women with certificates often pursue additional schooling. Because workers tend to have lower earnings while in school, the returns to education will be lower for groups that have a substantial number of award recipients enrolled in school after receiving their highest award. If the returns to an award are allowed to differ between in-school periods and out-of-school periods, then the returns for all awards in the post-school periods are higher than the returns reported in Figure 3.

Figure A-1: Kentucky Geographic Regions



Based upon U.S. Census Bureau Public Use Microdata Areas (PUMAs) and KCTCS campus enrollment clusters (based on students' counties of residence).

IV. Labor-Market Returns by Field of Study

Students receive certificates and diplomas in many different subject areas, and it is unlikely that the labor-market returns are identical across areas. Therefore, this section looks at labor-market returns to six different fields of study: humanities, other academics, business, health, services, and vocational. These categories have sufficient numbers of certificate and diploma recipients to estimate returns, with the exception that only 11 men receive business diplomas. Given this small sample size, returns for men with business diplomas are not reported. KCTCS does not offer diplomas and certificates in humanities or other academic fields.

Table 1 contains the returns for associate's degrees, diplomas, and certificates by field of study. The table shows that there is substantial variation in earnings returns by field of study, award, and gender. Associate's degrees in humanities have negligible effects of earnings, but associate's degrees in other academic subjects are associated with earnings gains of 25.8 to 32.6 percent for men and women, respectively. Business-related associate's degrees are associated with 16 percent earnings increases for women, but business- and services-related awards are not associated with higher earnings for either diplomas or certificates. In fact, service-related certificates are associated with lower earnings of nearly 10 percent for men. In contrast, health-related associate's degrees and diplomas are associated with large earnings increases for men and even larger increases for women. For example, the earnings gains for health-related diplomas are 35.5 percent for men and 50.8 percent for women. Health-related certificates have no apparent boost in earnings for men, but they are associated with higher earnings of 4 percent for women. Vocational associate's degrees and diplomas also lead to substantial increases in earnings: around 23 percent

Table 1: Statewide Earnings Returns for Field of Study by Gender

	Associate's Degree		Diploma		Certificate	
	Men	Women	Men	Women	Men	Women
Humanities	-3.2%	3.5%				
Other Academic	25.8%	32.6%				
Business	1.7%	15.7%		4.6%	-4.0%	-0.1%
Health	57.8%	75.0%	35.5%	50.8%	-4.6%	4.0%
Services	-4.2%	1.5%	-0.3%	2.1%	-9.4%	4.5%
Vocational	23.3%	19.7%	22.9%	21.4%	12.4%	6.1%

Source: Author's calculations based on KCTCS administrative data.

for men and 20-21 percent for women. Vocational certificates have higher earnings for men (12 percent), but they have little discernable increase in earnings for women.

V. Labor-Market Returns by Region of Kentucky

So far this article has looked at statewide returns to associate's degrees, diplomas, and certificates. This section considers regional variation in the labor-market returns. The state is divided into ten regions, as shown in Figure A-1. Ten regions are chosen rather than looking at each of the 16 colleges separately because some of the smaller colleges are too small to study independently. I estimate the labor-market returns separately for each of these ten regions. Within each region, separate estimates are provided for men and for women.

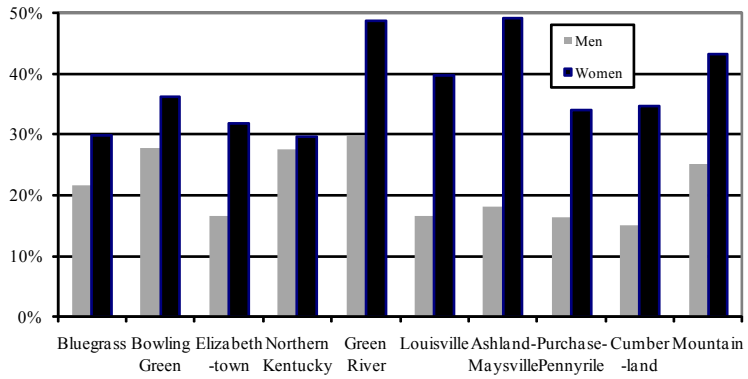
Figure 4 contains the estimated returns to associate's degrees for each of the 10 regions. As in the statewide results (Figure 3), men have smaller returns than women in each region. For men, the regions with the lowest returns are Cumberland (15 percent), Louisville (16 percent), Purchase-Pennyrile (16 percent), Elizabethtown (17 percent), and Ashland-Maysville (18 percent). The highest returns are for Green River (30 percent). Although Bowling Green (28 percent) and Northern Kentucky (27 percent) have high returns, each of these two regions has fewer than 100 men with associate's degrees.

For women, each region has returns of 30 percent or higher. Green River and Ashland-Maysville have the highest returns at nearly 50 percent, whereas Northern Kentucky and Bluegrass have the lowest returns (30 percent).

Figure 5 contains the estimated returns to diplomas for each of the 10 regions. Again, men have smaller returns than women in each region, consistent with the statewide results. For men, the regions with the lowest returns are Bluegrass (16 percent), Purchase-Pennyrile (16 percent), and Elizabethtown (17 percent). Although Northern Kentucky has the highest returns for men (44 percent), it also has the fewest number of diploma recipients (33). In this region, and most regions, most men receive diplomas in vocational areas.

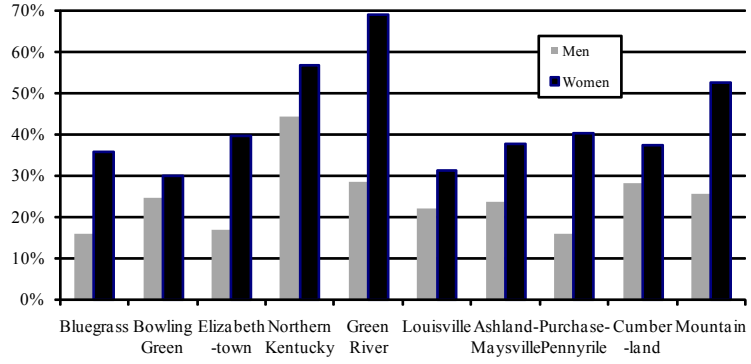
For women, each region has returns of 30 percent or higher. Bowling Green and Louisville have the lowest returns (30 and 31 percent, respectively), whereas Northern Kentucky and Green River have the highest returns (57 and 69 percent, respectively). In all these regions, the vast majority of women have diplomas in health-related

Figure 4: Earnings Returns to Associate's Degrees by Region and Gender



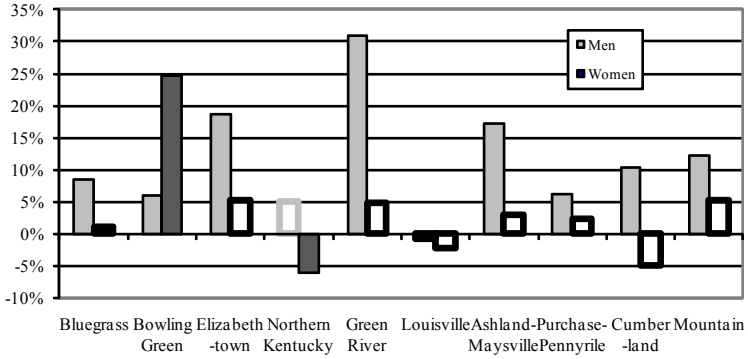
Source: Author's calculations based on KCTCS administrative data.

Figure 5: Earnings Returns to Diplomas by Region and Gender



Source: Author's calculations based on KCTCS administrative data.

Figure 6: Earnings Returns to Certificates by Region and Gender



Source: Author's calculations based on KCTCS administrative data.

fields, so for women with diplomas the variance in returns across regions appears to be variance in returns to health-related diplomas.

Figure 6 contains the returns for certificates. The bars that are statistically significant at the five percent level (two-sided test) are shaded; the bars that are not statistically different from zero are not shaded – instead they contain only the outline. Because all the estimates in previous tables were statistically different from zero, they were all shaded. Figure 6 contains several bars that are not shaded (i.e. are hollow) because many of the estimated returns are small and imprecisely estimated. Therefore, there is a nontrivial (i.e. greater than five percent) chance that the returns to certificates in these regions are zero.

The figure illustrates that certificates are associated with higher earnings for men in all regions except Northern Kentucky and Louisville. In most regions, the percentage increase in earnings associated with certificates is between 6 percent (Bowling Green) and 19 percent (Elizabethtown). Green River is an exception, where males with certificates have a 31 percent increase in earnings. There are 111 individuals with certificates as their highest degree in the region, and 83 of them have certificates in vocational subjects (a relatively high-earning major, as shown in Table 1).

In contrast, certificates are generally not associated with higher earnings for women. The exception is in Bowling Green, where women with certificates have higher earnings of nearly 25 percent. This region has a relatively large number of certificate recipients (226), and most of them (195) receive certificates in health-related fields. Women in Northern Kentucky actually have lower earnings of 6 percent after earning a certificate. Again, the region has a relatively high number of certificate recipients (205); most recipients have certificates in health-related (131) or service-related (57) fields. Thus, field of study is an unlikely explanation for the regional differences in returns to certificates among women. In most regions, however, I cannot reject the hypothesis that there is no change in quarterly earnings after receiving a certificate. It seems unlikely that certificates lead to large earnings increases for women in most parts of Kentucky.

VI. Employment Returns

Higher earnings are one labor-market outcome associated with the receipt of an associate's degree, diploma, or certificate. However, with the recent economic downtown and the increase in unemployment rates, employment is another beneficial labor-market outcome worthy of study. Some individuals may have high earnings, but also have a high likelihood of being laid off in the near future. Such individuals may be willing to accept an equal or even lower level of earnings in exchange for more stable employment.

This section shows the relationship between the receipt of a certificate or diploma and the likelihood of being employed. Specifically, the outcome of interest is whether or not an individual received earnings (measured by the unemployment insurance system) in a given quarter. Otherwise, the model and data are identical to the analysis of labor-market earnings. The only difference is that the outcome is now a dichotomous (i.e. yes or no) measure of quarterly employment rather than a measure of quarterly earnings.

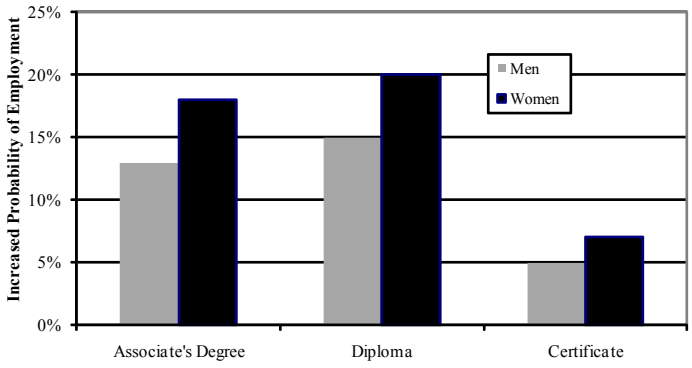
Figure 7 contains the change in likelihood (measured as percentage points) of employment associated with the receipt of an associate's degree, diploma, or certificate. As always, I provide separate estimates for women and for men. As with earnings (Figure 3), all awards lead to higher levels of employment for both men and women.

The figure shows large employment effects for associate's degrees, and the effects for diplomas

are even larger. The effects for men are 13 percentage points for associate's degrees and 15 percentage points for diplomas. The effects for women are larger: 18 percentage points for associate's degrees and 20 percentage points for diplomas. This pattern is similar to the pattern for earnings (Figure 3), where the earnings returns for associate's degrees and diplomas were larger for women than for men. Thus, men and women receive substantial labor-market benefits after receiving these two awards.

The smallest increases in employment are for certificates: men have a higher likelihood of employment of 5 percentage points, and women have a higher likelihood of 7 percentage points. It is interesting to compare the results with the earnings results in Figure 3. Certificates have a larger effect on earnings for men compared to women, whereas certificates have a larger effect on employment for women compared to men. Thus, men and women benefit from certificates in different ways.

Figure 7: Statewide Employment Returns to Highest Award by Gender



Source: Author's calculations based on KCTCS administrative data.

VII. Conclusion

This article documented the labor-market benefits from community college degrees, certificates, and diplomas. Both men and women received sizable increases in earnings after receiving associate's degrees and diplomas. Men had increased earnings of around 20 percent and women had increased earnings of around 40 percent. The earnings increases associated with certificates were smaller: 9 percent for men and 3 percent for women.

However, KCTCS awards degrees, diplomas, and certificates in many diverse fields of study. Degrees and diplomas in health-related and vocational-related fields of study were associated with sizable earnings increases for both men and women, although the results were larger for women. When separating certificates into specific fields of study, few certificates were associated with noticeable increases in earnings for men and women. The exception is that vocational certificates for men were associated with higher earnings of 12 percent.

I also considered differences in returns by region of study rather than field of study. The returns varied across the state, with no consistent patterns. For example, even though Northern Kentucky had among the highest returns for diplomas, it had among the lowest returns for certificates. Thus, there were no clear regional patterns in the returns to certificates and diplomas, but there was substantial regional variation in the returns to both awards.

Finally, the article investigated whether certificates and diplomas were associated with increased probabilities of employment, where employment was measured as having a job covered by Kentucky's Unemployment Insurance system. Degrees and diplomas were associated with larger increases in employment probabilities of 13-15 percentage points for men and 18-20 percentage points for women. Certificates were associated with higher employment probabilities of 5 percentage points for men and 7 percentage points for women. Degrees, diplomas, and, to a lesser extent, certificates are associated with positive labor-market outcomes for both men and women.

VIII. References:

Blomquist, Glenn, Paul A. Coomes, Christopher Jepsen, Brandon Koford, Barry Kornstein, and Kenneth Troske. 2007. *The Individual, Regional, and State Economic Impacts of Kentucky Community and Technical Colleges*. Report prepared for Kentucky Community and Technical College System.

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NAFTA and its Effects on the Economy of Kentucky

Rachel Keller & Dr. Kenneth Troske

Due to the natural variance among states and regions, NAFTA has affected specific areas of the United States differently, specifically in terms of international trade. We do not find definitive evidence that NAFTA has affected the volume of Kentucky exports to foreign countries. Greater GDP is associated with decreased trade with Kentucky, as is membership in the European Union. Membership in Mercosur does not have any discernable effect on trade. Finally, trade with Kentucky has increased rapidly in recent years.

Introduction

Since the North American Free Trade Agreement's (NAFTA) implementation on January 1st, 1994, economists across the western hemisphere have attempted to analyze its effects in an increasingly global economy. In adding Mexico to the U.S.-Canada Free Trade Agreement of 1989, NAFTA sought to gradually eliminate trade and investment barriers between the three nations and bolster the economic activity of each. Although the evaluation of NAFTA on a national scale is crucial in determining NAFTA's success or failure in the last fifteen years, regional and state assessments prove more accurate in describing specific impacts across the United States, as resources and industrial performance differ with even small movements in geographical location. This report provides an initial review of the existing literature on the regional after-effects of NAFTA before moving to its larger purpose of analyzing NAFTA's effects on Kentucky's economy. The study attempts to capture the impact of the trade agreement on a state largely overlooked in terms of extensive or intensive analysis.

Criticisms that began even before NAFTA's implementation have continued to challenge the mostly positive effects of the trade agreement. Although Ross Perot's "giant sucking sound" of American jobs across the Mexican border has yet to be heard, evidence of other criticisms is difficult to ignore (Wall, 2000; Hufbauer and Schott, 2005). Rothstein and Scott (2007) have condemned NAFTA as largely responsible for increased unemployment and decreased median wages for 29 states, and Hufbauer and Schott (2005) listed claims of continued illegal immigration, illegal drug trafficking, slow response to environmental concerns, insubstantial increases in real wages, and mounting wage gaps. However, these problems cannot be fully attributed to NAFTA. They have been influenced by other factors, such as premature economic actions taken by policy makers in anticipation of NAFTA, lengthy phase-ins, Mexico's peso crisis in 1994, and global movements toward freer trade, and they are often difficult to separate from specific NAFTA influences (Kumar, 2006; Hornbeck, 2004; Coughlin and Wall, 2002; CBO, 2003; Hufbauer and Schott, 2005). Many critics also feared that the liberalization of trade between the United States and its NAFTA partners would cause trade diversion from other world markets. However, Coughlin and Wall (2002) claimed an increase in average state exports to Asia in the wake of NAFTA, and Kumar (2006) cited increased Texan exports to all three markets. These findings suggest at least some level of trade creation, a proposal also found by Krueger (1999). Rather than having a moderately positive effect on the economies of member nations, some studies suggest that NAFTA simply continued trends already in motion before it was adopted (Hornbeck, 2004; CBO, 2003).

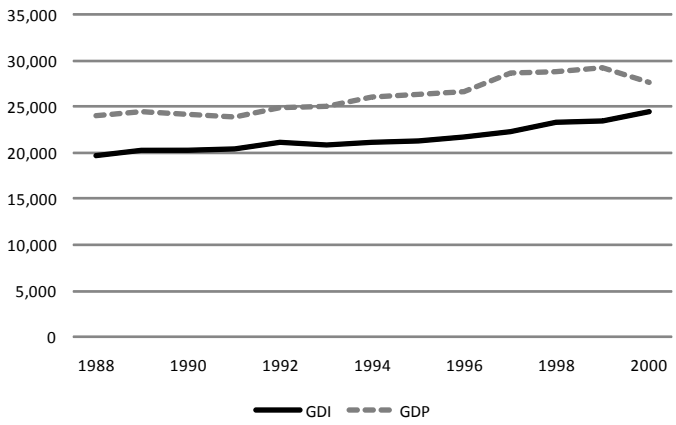
Although significant claims have been made against NAFTA, many of the problems associated with NAFTA and other foreign trade agreements (FTA) could be alleviated through enhanced adjustment programs for involved nations, including "longer tariff reduction schedules, use of special safeguards, removal of agricultural subsidies, and provision for regionally funded trade adjustment assistance and social safety net programs" (Hornbeck, 2004, pg. 6).

Improved integration of trade policy will help nations ease the transition into multilateral trade agreements, thus making it easier to separate specific FTA problems from transitional and adaptability challenges (Hornbeck, 2004; Audley, Papademetriou, Polaski, and Vaughan, 2003).

The majority of existing NAFTA literature claims that NAFTA has had a generally positive effect on all three economies, considerably boosting the volume and pattern of North American trade and at least slightly increasing U.S. GDP (Wall, 2003; CBO, 2003). U.S. merchandise exports to Mexico and Canada have increased by upwards of 15% by 2002, and U.S. total merchandise exports have increased by almost 8% (Coughlin, Wall, 2002). Total U.S. trade with Mexico and Canada increased 78% by 2002 (Hillberry, McDaniel, 2002). Specific effects vary between regions and states, with manufacturing industries and south-central U.S. experiencing the greatest benefits (U.S. Department of Commerce, 2003; Funk, Elder, Yao, Vibhakar, 2006). Export quantities to European, Asian, Latin American and Caribbean markets also vary among regions.

Coughlin and Wall (2002) report that "if NAFTA positively affected a state's exports to Canada or Mexico, it also tended to have a positive effect on the state's exports to Latin America and the Caribbean" (Coughlin and Wall, 2002, pg. 16). Export growth to Asia was more pronounced than in Europe, with 22 states increasing exports to Asia by at least 10% and 10 states increasing exports to Europe by at least 10% (Coughlin and Wall, 2002). Exports to the world have increased by at least 10% in 27 states with total U.S. trade to the world increasing by 43% (Coughlin and Wall, 2002; Hillberry and McDaniel, 2002). In terms of member support, NAFTA has helped Mexico by significantly increasing foreign direct investment and facilitating the approach of development levels in Canada and the U.S., and the agreement has benefited Canada by augmenting an already valuable trade agreement with the world's second largest economy (Lederman, Maloney, Servén, 2003; Hufbauer and Schott, 2005). According to existing literature, NAFTA has been, for the most part, a success for all three countries. Schott and Hufbauer (2005) describe the North American economy as being "more integrated and more efficient today than it would have been without NAFTA," (pg. 5). They add that, due to the absence of mandates and sufficient financial support, certain critical NAFTA foundations failed to meet expectations and therefore obscure notable achievements of the trade agreement.

Figure 1: Kentucky GDI and GDP per Capita (in 2000 dollars)

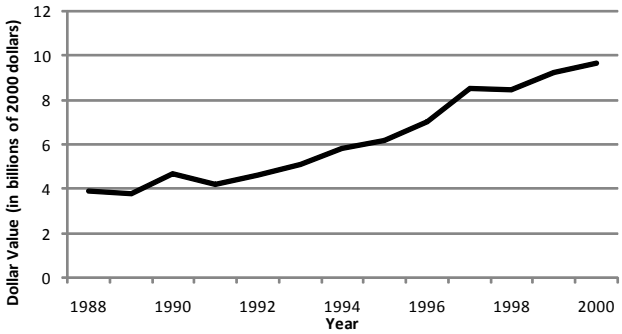


Source: Kentucky Cabinet for Economic Development

Data and Methodology

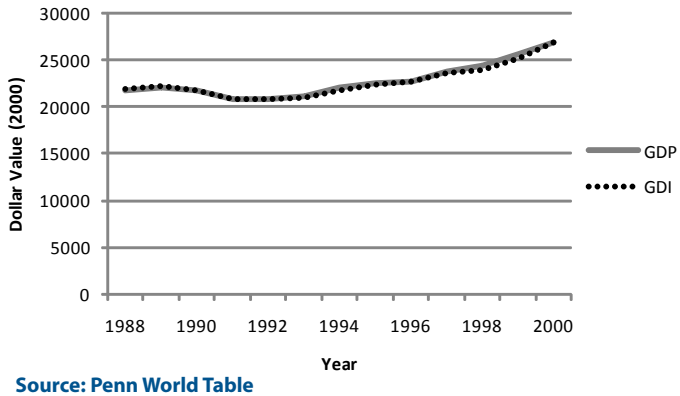
Several graphs are used to illustrate trade trends for Kentucky, Mexico, and Canada for the years 1988 through 2000. These graphs are helpful in highlighting the difference between general trade trends and specific NAFTA influence as described in the regression results below. Figure 1 describes Gross Domestic Product and Gross Domestic Income per Capita for Kentucky, measured in 2000 dollars. The graph indicates a slight but continuous economic improvement over those years. Figure 2 shows that Kentucky export totals have increased at a relatively steady rate through the year 2000. Figures 3 and 4

Figure 2: Kentucky Export Totals



Source: WISERTrade

Figure 3: Canada GDI and GDP per Capita

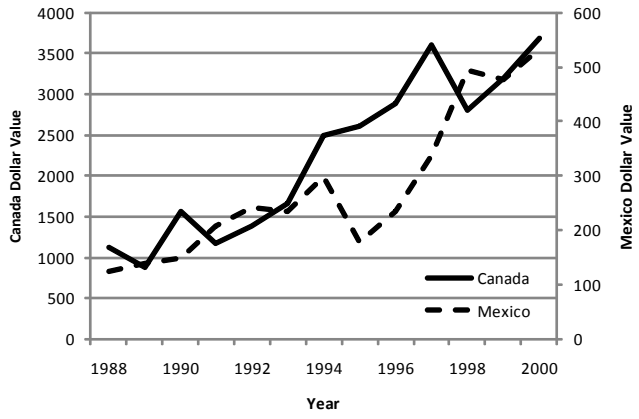


Source: Penn World Table

indicate GDP and GDI for Canada and Mexico, respectively. Overall, the graphs show relatively constant growth with two exceptions: a minor slump in the early 1990s for Canada and a drop for Mexico during the peso crisis in 1994. Figure 5 describes the dollar value of Kentucky exports to Canada and Mexico from 1988 through 2000. Although there is a generally positive trend for both countries, significant variation exists during those years.

This study uses the volume of Kentucky exports to the state's top 28 recipient countries from 1988 through 2000 to evaluate the effects of NAFTA on Kentucky trade. Modeling our study after the one completed by Cletus C. Coughlin and Howard J. Wall of the St. Louis Federal Reserve in 2002, *NAFTA and the Changing Pattern of State Exports*, we set up a regression equation to identify the consequences of NAFTA on Kentucky exports,

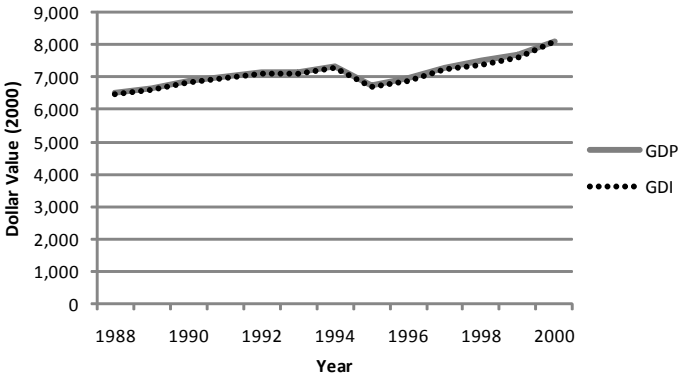
Figure 5: Kentucky Export Totals to Canada and Mexico



Source: Penn World Table

holding other variables constant. The dependent variable in our equation is the natural log of the total dollar value of Kentucky exports to the countries labeled as primary recipients of those exports. The independent variables include: the natural log of the GDP (Gross Domestic Product) of each of the 28 countries; indicator variables for the membership of each country in NAFTA, the European Union, and Mercosur (Southern Cone Common Market); and a variable for the year (1988 through 2000). Membership in other trade agreements would be expected to lower a nation's imports from Kentucky, and the year variable controls for factors such as globalization and the gradual lifting of trade barriers over a period of 15

Figure 4: Mexico GDI and GDP per Capita



Source: Penn World Table

years, as described in NAFTA. The final provisions of the agreement were implemented on January 1st, 2008. Similar to results found by Coughlin and Wall (2002), we expect to find that NAFTA had a modestly positive effect on Kentucky trade for those years.

We set up a regression equation based on the one used by Coughlin and Wall (2002) to identify the effects of NAFTA on international trade in Kentucky, specifically in comparison with other variables. The equation we used is provided below:

$$\ln(1+x) = \beta_0 + \beta_1 \ln GDP + \beta_2 NAFTA + \beta_3 EU + \beta_4 Mercosur + \beta_5 year + \varepsilon$$

We obtained export dollar totals to the top 28 countries from WISERTrade (World Institute for Strategic Economic Research) for the years

1988 through 2000. We used the SIC (Standard Industry Classification) system spreadsheets for exports to the top 28 destination countries for the state, based on statistics supplied by the Kentucky Cabinet for Economic Development describing Kentucky exports by country from 2004 to 2008. The countries we chose are those that appeared most frequently as top destinations over those years. The countries include: Canada, Japan, United Kingdom, France, Mexico, Germany, Netherlands, Brazil, Belgium, Australia, Ireland, Russia, Singapore, Philippines, Republic of Korea, Italy, United Arab Emirates, Hong Kong, Switzerland, China, Argentina, Taiwan, Malaysia, Spain, Venezuela, Honduras, Austria, and El Salvador.

The SIC data goes from 1988 through 2000. In 2000, the NAICS (North American Industry Classification System) replaced the SIC system, and researchers face considerable problems in trying to convert and compare data from one system to the other. Because of this difficulty, we only use data from 1988 through 2000. This is a considerable time period to study, regardless, and we will not have to deal with conversion errors. Future work may include NAICS data, but for now we will use SIC data as supplied by WISERTrade. The GDP for each country, in 2000 dollars, was obtained from Penn World Table, produced by the Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

We used dummy variables to indicate membership in NAFTA in or after 1994, the European Union in or after 1993, and Mercosur (Southern Cone Common Market), a regional trade agreement between Argentina, Brazil, Uruguay and Paraguay, in or after 1995. These variables will help to isolate the effects of NAFTA on Kentucky's economy from the possible effects of other trade unions implemented around the same time in other regions of the world. When all the data were collected, we used Stata (a statistical software package commonly used by economists) to run a country fixed effects regression. Country fixed effects control for the time-invariant characteristics of countries that make Kentucky more or less likely to trade with them. For example, Kentucky may be more likely to trade with Canada because it is similar to the United States, relative to other countries.

Although the regression results indicate that membership in NAFTA is associated with decreased Kentucky trade by 19.6 percent, the estimated NAFTA effect is imprecisely estimated, as illustrated by the large standard error of 0.254. For this reason, we are unable to conclude that NAFTA has a strong effect on the volume of Kentucky exports.

Regression Results

Variable	Coef.	Std. Err.	T	P > |t|
NAFTA	-0.1966088	0.2543132	-0.77	0.440
European Union	-0.9204221	0.1417052	-6.50	0.000
Mercosur	0.2655065	0.2539916	1.05	0.297
Natural Log Country GDP	-1.631483	0.8432914	-1.93	0.054
Year	0.1669471	0.0185744	8.99	0.000
Constant	-299.209	30.90628	-9.68	0.000

Membership in the European Union decreases trade with Kentucky by 92 percent, which is consistent with the expectation that membership in another trade agreement would decrease trade with Kentucky. Although membership in Mercosur is associated with decreased trade with Kentucky of 26.6 percent, the estimated Mercorsur effect is also imprecisely estimated. The standard error is 0.254, nearly as large as the coefficient. As with NAFTA, we are unable to conclude that Mercosur has a strong effect on Kentucky trade. This insignificance is not surprising, given that only two of the four members of Mercosur (Argentina, Brazil, Paraguay, and Uruguay) are among the 28 countries included in the study.

The regression results indicate that, contrary to expectations, trading with a wealthier country does not increase trade volume. In fact, for every additional 10 percent of GDP of the recipient country, Kentucky trade with that country decreases by 16.3 percent. This value is marginally significant at the 5 percent level. It is possible that particular Kentucky exports are undesirable to wealthier countries, and future work will explore this and other possible reasons.

The time trend variable is positive, which is consistent with the growing effects of globalization, the sharing of technology, and international interdependence. For each additional year, trade increased by 16.7 percent, which indicates particularly rapid growth during this time period.

Conclusion

In this study we attempt to capture the effects of NAFTA on Kentucky trade by using the volume of exports to the state's top 28 destination countries from 1988 through 2000. Although the graphs generally indicate relatively consistent economic growth in terms of trade and national wealth, such positive trends cannot be attributed to NAFTA without the results of regression analysis.

The regression results indicate that NAFTA has had no quantifiable effect on the volume of Kentucky exports to foreign countries. Membership in the European Union is associated with significantly decreased trade, but membership in Mercosur has no discernable effect on trade. Greater GDP is associated with markedly decreased trade with Kentucky, although only at a marginally significant level. Trade with Kentucky increased rapidly over time.

We plan to further our project over the next year by investigating the effects of NAFTA on Kentucky trade in terms of industry-level export data rather than total exports. We expect certain Kentucky industries to have benefited from NAFTA and others to have suffered, but our current regression equation is too broad to indicate any industry-level trends. We also hope to investigate the reasons for the unexpected decrease in trade with wealthier nations.

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