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Kentucky Annual Economic Report 2007

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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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From the Director . . .

The Center for Business and Economic Research (CBER) is pleased to publish the 35th 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 2007 report contains seven articles. These articles cover a wide variety of topics from the expected growth of the state and national economics to an examination of why Kentucky has long been one of the poorest states in the country. A theme of this annual report is an examination of current issues that face citizens and policy makers in the state such as: the effectiveness of various policies in promoting the economic development of the state, the efficiency of the Kentucky state government, the efficiency of the tax system in Kentucky, and the impact of possible minimum wage legislation on workers in Kentucky.

In putting together this issue we have drawn on the expertise of the faculty, staff and students at the University of Kentucky. Contributors include six faculty members and one economics graduate students. As has been the tradition for this report we have assembled some of the best economists in the state to write about important regional and national issues.

Our lead article is by myself along with Kenneth Sanford, who is a graduate student in the Department of Economics. This article examines what factors can account for Kentucky's persistent poverty. One of the striking findings in this report is that Kentucky's low stock of knowledge combined with the rural nature of the state's economy, can explain much of the difference in income between Kentucky and the average U.S. state.

The next article, by Dr. David Wildasin an Endowed Professor of Public Finance in the Martin School of Public Policy and Administration as well as the Director of the Institute for Federalism and Intergovernmental Relations, examines the tax system in Kentucky. In this article Dr. Wildasin reviews the status of local government finance in Kentucky and discusses some of the key findings and recommendations of the Task Force on Local Taxation. He points out that informed analysis of local tax policy in Kentucky is hampered by inadequate data on local government finances and that this lack of data has severely limited the recommendations of the Task Force. He identifies some of these deficiencies and issues that require further study if the General Assembly hopes to make sensible reforms to the tax system.

Dr William Hoyt, a Gatton Endowed Professor of Economics examines the efficiency of the state and local governments in Kentucky by comparing spending on programs in Kentucky with spending on similar programs in neighboring states. He finds that per capita state and local spending in Kentucky is higher because of Kentucky's smaller population, more centralized spending and the large number of local governments in Kentucky.

Another article by me and Dr. Aaron Yelowitz, who is an Associate Professor of Economics, examines the impact on the Kentucky economy of raising the minimum wage in Kentucky. We find that increasing the minimum wage will provide only a small amount of help to most poor workers, but will result in a number of workers losing their job. Increasing the minimum wage will also cost consumers in Kentucky because of an increase in costs to business that will be passed onto consumers in the form of higher prices. We suggest that an alternative method for helping poor workers would be to adopt a state-level Earned Income Tax Credit, similar to what has been done in a number of other states.

The next two articles are by Dr. Jenny Minier, an Associate Professor of Economics and Dr. Christopher Jepsen, an Assistant Professor of Economics and the Associate Director of CBER. These articles look back at the performance of the national and state economies over the recent period and provide forecasts for the coming year. The article by Dr. Minier discusses the national economy and focuses on the good news and the bad news from the past year. She concludes that the future looks fairly positive, with slower but still positive growth for 2007.

The article by Dr. Jepsen primarily focuses on the Kentucky economy. He predicts that the Kentucky economy will experience growth of slightly below 2% in the coming year, which is somewhat slower than the predicted growth in the U.S. economy. He also expects unemployment to remain fairly stead at 5% and that inflation in the state will continue to be moderate, with prices expected to grow by 2.5%.

The final article in the report is written by Anna Stewart, Senior Economic Analyst at CBER and Vlad Sushko a research associate at CBER. In this article Ms. Stewart reports on the results of the annual survey of business confidence CBER conducts for the Associated Industries of Kentucky. This survey asks businesses about their performance over the past year and their expectation about the coming year. Based on the results from this survey it appears that businesses owners are relatively optimistic about the economy in the coming year, but not as optimistic as in the previous year.

In the past year we have worked on a number of important projects at the Center for Business and Economic Research. Some of you may have already read about our project for the Cabinet for Economic Development looking at the impact of tax incentives on the Kentucky economy. We have also recently prepared a report for the Kentucky Office of Energy Policy examining changes Kentucky may need to make in order to attract firms in the "new energy" sector. Finally, we have looked at spending on education in Kentucky for the Kentucky Chamber of Commerce.

Change seems to be a fairly constant recent theme at CBER. As many of you know I completed my first year as Director of CBER and am now half way through my second year. In addition, over the last year we hired a new Associate Director, Christopher Jepsen. Chris comes to us from the Public Policy Institute of California, so he has ample experience doing the high quality policy relevant work for which CBER in known. We also lost our full-time research associate, Vlad Sushko, who left to pursue a graduate degree in economics at the University of California—Santa Cruz. However, we have added a number of new graduate research assistants to the CBER staff who have provided outstanding assistance throughout the year.

Center for Business and Economic Research

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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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Dr. William H. Hoyt

Dr. William H. Hoyt is Director of Graduate Studies and a Gatton Endowed Professor of Economics at the University of Kentucky, He was previously Professor, and Associate Professor of 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*.

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 hisappointment 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 English Language Learners, community colleges, 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 ofEducation Review.

Dr. Jenny Minier

Dr. Jenny Minier is an Associate Professor of Economics at the University of Kentucky. She earned her Ph.D. in economics from the University of Wisconsin-Madison in 1998, and was a faculty member at the University of Miami (FL) prior to her appointment at the University of Kentucky. Her research interests include economic growth, technological change, and international trade. She is currently working on projects including how to account for mismeasured determinants of economic growth, the relationship between financial markets and economic growth in developing countries, and the political economy of U.S. trade policy. Her research has been published in journals such as the Journal of Monetary Economics, Review of Economics and Statistics, and the Journal of Economic Growth.

Kenneth P. Sanford

Kenneth Sanford is a graduate research assistant at the University of Kentucky. He received his B.S. in economics from Florida Southern College in Lakeland, FL in 2002. Kenneth is in his 3rd year of graduate studies in the Economics Ph.D. program at the University of Kentucky. His primary research interests include issues in Environmental Economics, Industrial Organization and Regional Economic Growth.

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Anna L. Stewart

Anna Laura Stewart is an Economic Analyst for the Center for Business and Economic Research. Ms. Stewart has a B.B.A. in economics from Morehead State University and a M.A. from the Patterson School of Diplomacy and International Commerce at the University of Kentucky. Ms. Stewart provides economic analysis for the Center including economic impact analysis. Prior to joining CBER, Ms. Stewart served as a research fellow at the Indiana Economic Development Council, the economic development research and planning mechanism of the Indiana State Government. located in Washington, D.C., specializing in local development internationally.

Vladyslav Sushko

Mr. Vladyslav Sushko is currently enrolled in the PhD program at the University of California, Santa Cruz. Mr. Sushko received a BA in economics with Japanese from the University of Kentucky in December of 2004. While at the University of Kentucky, Mr. Sushko worked as a Research Assistant for the Center for Business and Economic Research. He has contributed to numerous articles for CBER including the past two AIK Business Confidence surveys.

Dr. Kenneth R. Troske

Dr. Kenneth R. Troske is Director of the Center for Business and Economic Research 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. 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. including the role of temporary help firms in facilitating the transition from welfare-to-work. 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*.

Dr. Aaron Yelowitz

Dr. Aaron Yelowitz is currently an Associate Professor in the Department of Economics at University of Kentucky. He also is a joint faculty member in the Martin School of Public Policy and Administration at University of Kentucky. He is also a Research Associate at National Bureau of Economic Research, a Faculty Affiliate at the Joint Center for Poverty Research, and a Research Associate at Institute for Research on Poverty, and the economics department liaison for the UK Center for Poverty Research. He serves as an associate editor for the *Journal of Public Economics*.

Dr. David E. Wildasin

Dr. David E. Wildasin holds an Endowed Chair in Public Finance in the Martin School of Public Policy and is also a Professor in the Department of Economics. He serves as Director of the Institute for Federalism and Intergovernmental Relations. He received a B.A. in Economics from the University of Virginia and a Ph.D. in Economics from the University of Iowa. His teaching and research interests are in public, urban, regional, and international economics, with a special emphasis on federalism; his recent research includes work on fiscal policy issues in the context of European economic integration and on intergovernmental fiscal relations in developing countries.

Table of Contents

Kentucky has long been one of the poorest states in the country. In order to change this fact we need to first understand what factors can explain cross-state differences in income. In this paper we focus on four factors: differences in the stock of knowledge in a state; differences in the business climate in the state; state-level differences in infrastructure; and differences in the industrial structure in the state. We find that the most important factor determining wealth is a state's stock of knowledge – the education level of its residents and the amount of innovative activity that occurs in the state. State infra-structure is also an important determinant as is the industrial structure of the state, although to a lesser degree. Cross-state differences in business climate do not account for any of the cross-state differences in income. These results show that if policy makers in Kentucky want to increase income in Kentucky they need to focus on ways to increase the stock of knowledge in the Commonwealth.

This is a time of increased interest in local government finance in Kentucky, as evidenced by the creation of a Task Force on Local Taxation, established by the General Assembly. The final report of the Task Force offers significant recommendations, including an amendment of the state constitution that would provide the General Assembly with the flexibility to institute new sources of local revenues. The present paper reviews the status of local government finance in Kentucky and discusses some of the key findings and recommendations of the Task Force. As the Task Force report clearly recognizes, informed analysis of local tax policy in Kentucky is hampered by inadequate data on local government finances. This paper identifies some of these deficiencies, as well as a number of important policy issues that require further policy analysis, particularly if the General Assembly entertains significant reforms of local taxation.

Politicians, citizen watchdogs groups, the media, and voters all frequently express concerns about state and local government spending, particularly if they feel tax dollars are being wasted. While the measurement of government "waste" is beyond the scope of this study, I offer some comparisons of government spending by function between Kentucky and its neighboring states. I find that our spending, on a per capita basis, is generally within the range of our neighbors. In addition, I also examine how spending on a per capita basis varies with some of the characteristics of the states. I find that per capita state and local government spending in Kentucky is higher than the average of these states because of its smaller population, more centralized spending, and large number of local governments. However, its lower average wages and demographics act to reduce its predicted spending.

Table of Contents

Why is Kentucky so Poor?

A Look at the Factors Affecting Cross-State Differences in Income

Kenneth Sanford & Kenneth Troske

Kentucky has long been one of the poorest states in the country. In order to change this fact we need to first understand what factors can explain cross-state differences in income. In this paper we focus on four factors: differences in the stock of knowledge in a state; differences in the business climate in the state; state-level differences in infrastructure; and differences in the industrial structure in the state. We find that the most important factor determining wealth is a state's stock of knowledge – the education level of its residents and the amount of innovative activity that occurs in the state. State infra-structure is also an important determinant as is the industrial structure of the state, although to a lesser degree. Cross-state differences in business climate do not account for any of the cross-state differences in income. These results show that if policy makers in Kentucky want to increase income in Kentucky they need to focus on ways to increase the stock of knowledge in the Commonwealth.

Introduction

Kentucky has long been one of the poorest states in the country. In 1939 Kentucky ranked 44th out of 48 states in terms of per capita personal income (Bauer, Schweitzer and Shane, 2006). In 1970 Kentucky ranked 44th out of 50 states in terms of per capita personal income and in 2004 Kentucky was still the 6th poorest state in the union with a per capita income of $27,151 compared to the average for the entire country of $33,041. Using an alternative measure of income, Gross State Product per capita, Kentucky also ranks quite low. In 2004 Kentucky ranked 41st with a GSP per capita of $32,943. On top of this already low level of income, Kentucky has experienced fairly slow growth in output in recent years. Between 1997 and 2004 Kentucky had an average annual growth in real Gross State Product (GSP) of 1.6 percent, ranking 43rd in terms of growth in GSP relative to the rest of the states. Without increasing the growth in income in the Commonwealth, it is unlikely that Kentucky will move from the bottom of the income distribution in the near future.

One obvious question is, "Are there identifiable factors that can explain why Kentucky remains mired at the bottom of the income distribution?" A number of factors have been offered to explain Kentucky's low income. One of the more prominent explanations has been the historically low level of education in Kentucky. Clearly this was part of the motivation behind the Kentucky Education Reform Act of 1990 and the Post Secondary Education Reform Act of 1997 (known as HB1). The education explanation appears credible since in 2005 Kentucky ranked 49th in the percent of the adult population with a high school degree and 47th in the percent of adults with a college degree. Other explanations have focused on Kentucky's relatively low concentration of "high technology" employment as a contributor to our low ranking. Again, this argument is bolstered by a recent report from the Milken Institute (DeVol and Koepp 2004) in which Kentucky ranks 48th in their State Technology and Science Index. More generally, the overall focus of Kentucky's economy, which has historically been concentrated in manufacturing, mining and agriculture, may explain the poor performance. More recently, policy makers have been examining what is perceived as the poor business environment in Kentucky, with efforts to lower taxes on business and to make Kentucky a "Right-to-Work" state. Arguments can be made supporting each of these as a possible reason for the poor performance of the economy, and it seems likely that all play some role. However, before we can develop sound policies to address the problem of low income in the state, it is important to determine which factors are the most important in hindering Kentucky's growth.

In this paper we present the results from an analysis examining what factors account for the largest share of cross-state differences in wealth. We focus on four possible explanations for the differences in wealth across states: differences in the

stock of knowledge in a state; differences in the business climate in the state; state-level differences in infrastructure; and differences in the industrial structure in the state. We draw on data from a number of different sources covering the period from 1969-2004. We use the results from our analysis to see how changes in various aspects of the Kentucky economy are predicted to change the wealth of the citizens of Kentucky. The results from our analysis provide a guide to policy makers in Kentucky on what issues to focus on when addressing the persistent problem of low income in the state.

Measures of Income and the Possible Factors Affecting Income

What we ultimately are interested in understanding is differences in the ability of citizens in a state to produce goods and services in a year—what is commonly called income. To do this we measure income in a state as per capita Gross State Product (GSP). This measure of aggregate economic activity is strongly correlated with per capita personal income but personal income includes net transfers for various social assistance programs while GSP does not include these transfers. Since transfer payments represent payments to citizens in a state because they have low income and not because they are more productive, we do not want to include transfer payments in our measure of income. Ultimately it is difference in per capita GSP which measure differences in productivity in a state, so we will focus on this measure when analyzing the determinants of income in a state.

We consider four possible explanations for Kentucky's low productivity; differences between Kentucky and other states in: the stock of knowledge; the business climate; state-level infrastructure; and the state's industrial structure. We use three different variables to capture the stock of knowledge in a state: the percent of individuals 25 years old and older with a high school degree; the percent of individuals 25 years old and older with a college degree, and the stock of patents per capita. We use the stock of patents per capita as a

measure of the stock of knowledge as patents are a commonly used measure of technology or innovation. If a state is more innovative then we expect companies in that state to use more productive techniques and therefore tend to produce more output. To construct the stock of patents per capita variable for a state we start by obtaining yearly data on the number of patent issues in a state per year for the period 1963-2004.[1] We treat the number of patent issues in 1963 as the stock of patents in the state in that year. To estimate the stock of patents in a state in 1964 we depreciate the stock in 1963 by 5 percent and add the total number of new patent issues in the state in 1964.[2] We then repeat this step every year to obtain our estimate of the stock of patents for a given year. We then divide this stock by the total population in a state in a year to adjust for differences in the size of a state.[3] Annual estimates of the percent of the population 25 years of age and older with a high school diploma and college degree for 1969 through 2004 were constructed from the March supplement of the Current Population Survey.[4]

We will use three variables to capture the business climate in a state—total personal income taxes collected in a year divided by total income in the state; total business taxes collected in a state divided by total income in the state, and a variable indicating whether the state is a right-to-work state in a year.[5] We have included a measure of personal income taxes as a measure of business climate because previous research has shown that business owners care about personal income taxes as much, if not more, than business taxes when deciding where to locate

Figure 1: Real Gross State Product Per Capita (2000 dollars)
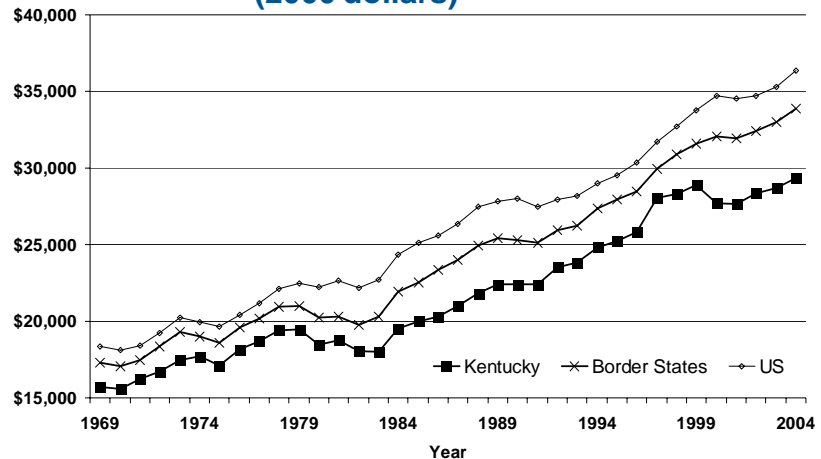
their business (Hoyt and Harden, 2005). Right-to-work laws ban union or closed workplaces. Many view this legislation as pro-business since it weakens the bargaining power of unions. Our measure will indicate whether a state has passed right-to work legislation prior to a given year.

We measure the infrastructure in a state using two variables, the percent of a state's population living in an urban area and the stock of highway capital per capita. Highway capital is a commonly used measure of infrastructure. To construct our estimate of the stock of highway capital in a state we start by obtaining data on annual highway capital expenditures in a state for the period 1950-2004.[6] We then use the same technique we used when constructing the stock of patents in a state. In particular, we treat a state's capital expenditures on highways in 1950 as our estimate of the stock of highway capital in 1950. To estimate the stock of highway capital in 1951, we depreciate the stock from 1950 by 5 percent and then add total expenditures on highways in 1951. We then repeat these steps every year to obtain our annual estimate of highway capital in a state. We then divide by the population of a state in a given year to adjust this measure for differences in the population of a state. The percent of population living in an urban area will help identify positive or negative agglomeration effects, that is, how state population density affects growth.[7]

To capture the industrial structure of a state we will measure the percent of the state's workforce in the following industries: agriculture; mining; construction; transportation; wholesale trade; retail trade; finance, insurance and real estate; and government.[8]

Throughout our analysis we are going to concentrate on the period from 1969 to 2004. We focus on this period primarily due to data restrictions, for many of our variables we simply do not have data earlier than 1969. However, this is also a period which has seen a number of significant changes in the structure of the economy, so this is a good period to study. Because a number of our variables are frequently missing for Alaska and Hawaii, we have dropped these states from the analysis and focus on cross-state differences in productivity among the 48 contiguous U.S. states.

Comparing Trends in Kentucky with the U.S. and the Region

We start our analysis with Figure 1 which plots real per capita GSP for Kentucky from 1969-2004 as well as average real per capita GSP over this period for all 50 states and for the states that boarder Kentucky—Tennessee, Missouri, Ohio, Illinois, Indiana, Virginia and West Virginia.[9] This figure makes clear that while GSP per capita has risen in Kentucky over this time period, it has risen at a faster rate for the nation as a whole as well as in the surrounding states. This means that, relative to the typical state in the U.S. and the typical boarder state, output per person in Kentucky is lower now than 30 years ago.

Next we examine our three measures capturing the stock of knowledge in a state. We start with Figure 2 which presents the percent of adults in the state with at least a high school diploma. We can see in this figure that while Kentucky has seen an increase in the share of adults in the state with a high school diploma, we still have a smaller share of adults with a high school degree than the typical state. In addition, we can see that the share of adults with a high school diploma in our border states has actually risen relative to the U.S. and by 2004 a larger percentage of adults in these states have a high school diploma compared with the typical state.

Figure 2: Percent of Population Age 25 and Older With a High School Diploma

Figure 3: Percent of Population Age 25 and Older With a College Degree

Figure 3 shows the percent of adults with a college degree in Kentucky, in the states bordering Kentucky and in the entire country. Here we see that while the percent of adults with a college degree has risen in Kentucky, it has risen by a slower rate than it has in the rest of the country, so that by 2004 Kentucky lags even further behind the typical state than we did in 1970. Since less educated workers tend to be less productive, the relatively low level of educational attainment in Kentucky is likely to be a significant factor in accounting for the low productivity of Kentucky workers. Also of note is the convergence Kentucky has experienced in population of high school graduates as compared the US, versus the lack of convergence in college degree holders as compared to the US. If the percent of the population with a college degree matters with respect to GSP per capita growth, Kentucky's lack of convergence to national levels might be a primary contributor to the Commonwealth's low per capita GSP.

Figure 4: Stock of Patents Per Capita

Figure 4 presents patent stock per capita for Kentucky, the border states and in the average state in the U.S. This figure shows that Kentucky ranks far below the average state in the U.S. and the average border state in terms of the stock of patent per-capita. One interesting item seen in this figure is that the years from 1969-1976 and the years from 1995 to 2004 are periods in which there was a significant increase in the amount of innovation occurring in the country. However, it appears that Kentucky did not experience higher growth in innovative activity in either of these periods. The large and growing gap in patent capital between Kentucky and other states also appears to be a likely explanation for the slow

Figure 5: Corporate Net Income Tax Revenue as a Percent of Total Personal Income

growth in GSP per capita in Kentucky.

In Figures 5 and 6 we examine the sources of income tax-based revenues for Kentucky, its bordering states and the US. In Figure 5, we can see that Kentucky annual corporate net income taxes as a percent of total personal income rose between 1969 and 1974, but has fallen fairly steadily since 1974, and now lies below the 1969 rate. Figure 6 reflects common trends in both Kentucky and other US states average taxes over recent history. Personal income tax revenues at the state level appear to be increasing faster than total personal income. When viewed together, the two graphs indicate that over the past 35 years the bulk of the growth in taxation at the state level has come from increases in personal income taxes rather than by from increases in corporate tax revenue. If high rates of personal income taxes do slow growth in a state, then Kentucky's position as a relatively high tax state may help account for Kentucky's slower growth in income over this period.

In Figures 7 and 8 we look at industry structures as an explanation for differences in state productivity. Two industries that we believe might influence the aggregate output of a state are manufacturing and financial services. Figure 7 indicates that while there has been a decrease in manufacturing employment as a percent of total over the past 35 years in Kentucky, the region and the country as a whole, the decline in Kentucky is much smaller than the decline in the entire U.S. and in the border states. The national decline in manufacturing

Figure 6: Personal Income Tax Revenue as a Percent of Total Personal Income
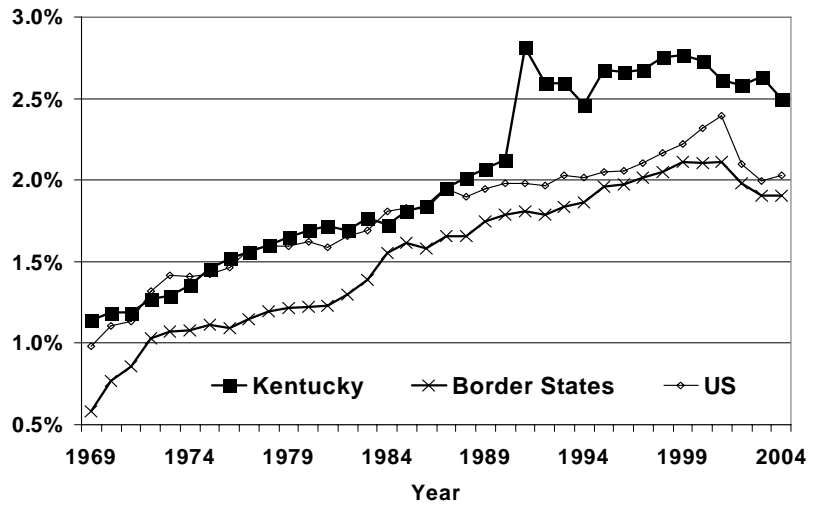
Figure 7: Share of Total Employment in Manufacturing
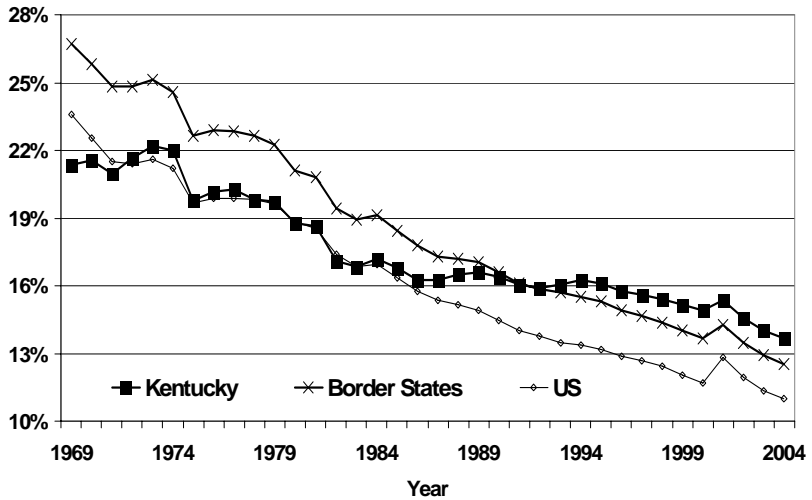
Figure 8: Share of Total Employment in Finance, Insurance and Real Estate
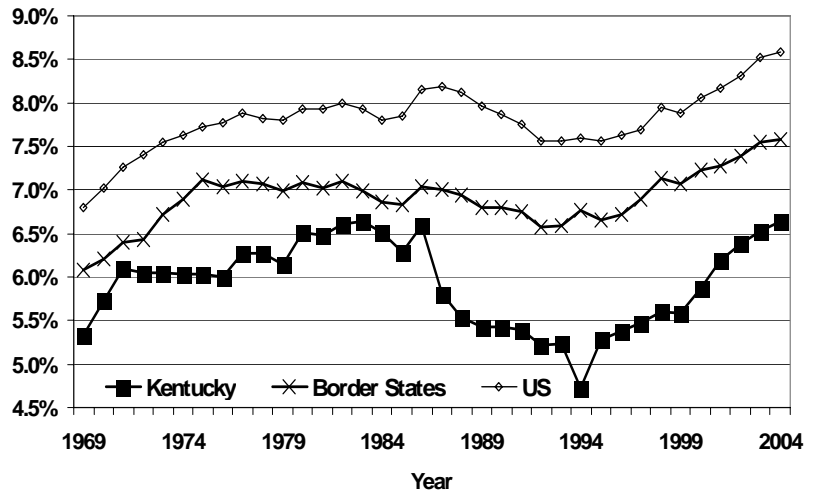
employment is typically associated with increases in productive technologies that result in higher output per worker and, holding output fixed, fewer workers. Kentucky's relatively large manufacturing segment suggests that Kentucky has less technologically advanced manufacturing compared with neighboring states. Figure 8 presents the percent employment in finance, insurance and real estate (FIRE) over time. Although in both Kentucky and the border states FIRE employment has trended upward over time the Commonwealth lags bordering states. Since workers in FIRE tend to be more productive than workers in other industries, Kentucky's persistently low share of workers in FIRE is another potential explanation for Kentucky's low productivity.

residents is another factor that can help account for Kentucky's low productivity.

Figure 10 shows the stock of highway capital per capita. This figure shows that Kentucky spends more money per capita than either the typical state in the country or in the region, and that this difference in highway expenditure has been increasing over time. This means that by 2004, Kentucky has a significantly higher stock of highway capital per-capita than the average state. Whether this helps or hurts Kentucky depends on whether money spent on highways is always productive.

Based on our graphical analysis it appears that a number of different factors could explain Kentucky's relatively low income. In order to quantify the effect of each factor and to determine which factors have the largest impact, we turn to regression analysis. We undertake this analysis in the next section.

Accounting for the Differences in GSP Per Capita

We use ordinarily least squares regression analysis to examine factors which account for the differences across states in output per person. The regression model presented is based on neoclassical growth theory and is similar to the regression model in Bauer, Schweitzer and Shane (2006). The log of GSP per capita is

Figure 9: Percent of Population Living in an Urban Area
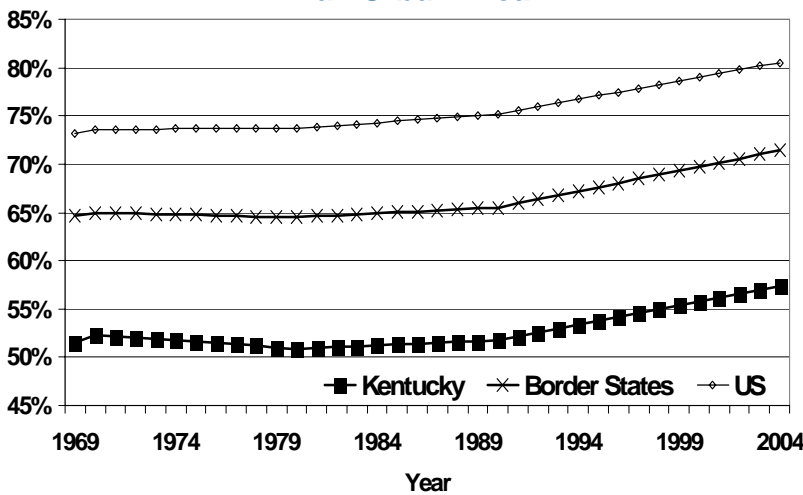
In Figures 9 and 10 we present the trends in our two variables measuring state infrastructure. Figure 9 shows the percent of a state's population living in an urban area. This figure shows quite clearly that, relative to the typical state in the U.S. or the typical border state, Kentucky has always had a much smaller share of its population living in cities and there has been very little change in this relative difference over time. Since workers in urban areas tend to have access to more productive capital than workers in rural areas, the fact that Kentucky has more rural

Figure 10: Stock of Highway Capital Per Capita
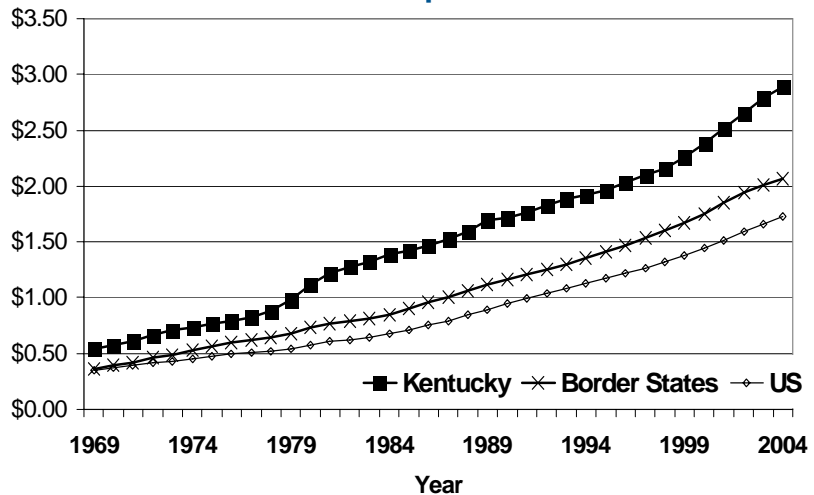
Table 1: Regression Estimates
(All variables are 5-year lags)

Variables	Coefficient	(SE)
Knowledge Variables...		
Patent Capital per capita	42.755***	(6.940)
Percent of adults with high school diploma	0.117*	(0.069)
Percent of adults with college degree	0.389***	(0.098)
Business Climate Variables		
Total Corp. taxes divided by total personal income	-0.231	(1.439)
Personal Inc taxes divided by total personal income	1.092**	(0.525)
State is Right-to-Work State	-0.041***	(0.014)
State Infrastructure Variables		
Highway Capital $000's per capita	-0.068***	(0.009)
Percent Urban Population...	0.275**	(0.113)
Industrial Structure Variables		
Agriculture as a percent of total state non-farm employment	4.383***	(1.567)
Mining as a percent of total state non-farm employment	-1.159***	(0.333)
Construction as a percent of total state non-farm employment............	-0.403	(0.352)
Manufacturing as a percent of total state non-farm employment	-0.387**	(0.170)
Transp. and utilities as a percent of total state non-farm employment ..	2.341***	(0.692)
Wholesale trade as a percent of total state non-farm employment	-0.005	(0.592)
Retail trade as a percent of total state non-farm employment	0.782**	(0.320)
FIRE as a percent of total state non-farm employment	1.949***	(0.348)
Government as a percent of total state non-farm employment	-0.731***	(0.231)
Additional Controls..		
5-year lagged GSP per capita	0.296**	(0.036)
Observations	1488	
R-squared	0.99	

Note: Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Regression also includes time and state controls.

the dependent variable and the set of independent variables include measures used to capture state differences in: stock of knowledge; business climate; state infrastructure; and industrial structure. Following a standard neo-classical growth model, we also include a lag of the dependent variable in the regression. Finally, in order to capture unmeasured differences across states and over time, we include state and year fixed effects in the regression. Our estimation, which includes state and time controls with a lagged dependent variable on the right-side of the equation does create some statistical problems; however, the long time period used in our analysis limits the degree of such problems.

Another concern about this regression is that some of the variables may be contemporaneously correlated with the error term in the regression, which would result in biased estimates of the coefficients. Following the analysis in Bauer, Schweitzer and Shane (2006) we use a five year lag for all the independent variables (except for the state and year fixed effects) to adjust for this dependence. Given the structure of this model, the interpretation of the coefficients on the independent variables is how changes in the value of the variable affect state-level productivity five years later.

The results from our regression are presented in Table 1. The numbers in parenthesis are the standard errors of the estimates and the stars next to the coefficients indicate the statistical significance of the estimate. In order to simplify the table we do not report the coefficient estimates for the state or year fixed effects.

The first three rows in Table 1 list the coefficients on the variables measuring the stock of knowledge in the state. As is shown, all three variables are positive and statistically significant—states that have more educated workers and a higher stock of patents per capita are more productive. This is hardly surprising since it is quite similar to the findings from other research (e.g. Bauer, Schweitzer and Shane, 2006). Given that Kentucky ranks low in all three measures, these results help explain why Kentucky is a low productivity state.

Our next three variables capture the business climate in the state. Here we have what might be viewed as surprising results. First we see that corporate income tax revenue relative to total personal income is not significantly related to state productivity. While it might seem surprising that the level of corporate taxes in a state is not strongly related to wealth in a state, it is consistent with previous research examining the relationship between corporate taxes and state growth (Hoyt and Hardin, 2005).

We also see that personal tax revenue as a share of total personal income is positively related to output per person in a state. While this result is difficult to interpret since we have not included any measures of state expenditures other than highway expenditures, one explanation might be that states with more productive workers can afford to provide higher levels of government services.

The final measure of business climate is the variable indicating whether the state is a right-to-work state. The negative coefficient on this variable shows that states that became right-to-work states tended to experience slower growth after adopting right-to-work legislation.

The next two variables capture differences in state infrastructure. The coefficient on the variable measuring the stock of highway capital is negative and significant showing that, conditional on tax revenue, states that have spent more on their highways are less productive. The likely explanation is that states that spend more on highways tend to spend less on productivity enhancing items such as education. The coefficient on the urban population variable shows that states with a large percentage of urban residents, on average, experience higher output per capita. Since Kentucky has a relatively large amount of highway capital and a relatively large rural population, these findings also help explain why Kentucky remains a poor state relative to other states in the country.

The final set of variables measure the industrial structure of the state. While a number of these coefficients are significant, two are notable. First, the coefficient on the share of workers in manufacturing is negative showing that states with a large share of workers in manufacturing are less productive. In contrast, the positive coefficient on FIRE employment shows that states with a large share of employment in this industry are more productive. Since Kentucky has an above average share of workers in manufacturing and a below average share of workers in FIRE, these results again account for Kentucky's low wealth.

While the regression analysis suggests there are a number of variables that can account for Kentucky's low productivity, the results in Table 1 do not show

Table 2: Impact on 2004 Gross State Product Per Capita in Kentucky By Changing Variables

	Gross State Product Per Capita	Percent of U.S. Average
Actual Value in Kentucky in 2004	32,145	85%

Predicted Value in Kentucky in 2004 if Kentucky Had the U.S. Average of:

Stock of Knowledge	36,100	96%
Business Environment	32,063	85%
Infrastructure	34,894	93%
Industrial Structure	33,379	88%

which variables account for the largest share of the difference between Kentucky and the typical state in output per person. To examine which of our variables have the biggest impact on GSP per capita, Table 2 shows how GSP per capita in Kentucky in 2004 would be predicted to change based on the results of our regression if we change the values of our various sets of variables. The first row of this table shows that the actual value of per capita GSP in Kentucky was $32,145 in 2004, which was 82 percent of average per capita GSP in the U.S. Row 3 shows that our regression model predicts that GSP per capita in Kentucky in 2004 would have been $36,100, and 96 percent of the U.S. average, if Kentucky had the same stock of patent capital, the same percent of adults with a high school diploma and the same percent of adults with a college degree as the average state in the U.S. By varying these three variables we would expect output per person in Kentucky to rise by over 12 percent. This represents a large increase in overall productivity. Looking at the rest of Table 2 shows that a state's stock of knowledge has the largest impact on the wealth in the state.

The next row of Table 2 shows that changing the variables measuring the business environment in the state—personal and corporate taxes as a share of personal income and whether the state is a right-to-work state—has very little impact on the wealth of the state. In contrast, row 5 shows that if we reduce the stock of highway capital in the state and increase the percent of individuals living in urban areas to the U.S. average—that is change the infrastructure of Kentucky—then the model predicts GSP per capita in Kentucky would jump to $34,894 or to 93 percent of the U.S. average. These variables are predicted to have the second largest impact on state productivity. Finally, if we gave Kentucky the same industrial structure as the average U.S. state then the model predicts Kentucky would have GSP per capita of $33,379, which is a 4 percent increase in output per person.

To summarize, the analysis in Table 2 shows that the variables measuring the stock of knowledge in the state are estimated to have the greatest impact on a state's productivity. The variables measuring a state's infrastructure are also predicted to have a significant impact on productivity in a state. Finally, a state's industrial structure also has some impact on a state's productivity, but the variables we use to capture the business climate in a state do not appear to have any impact on wealth in the state.

Conclusion

Kentucky has been one of the poorest and least productive states in the country for as long as we have been recording these statistics. The results in this study show that changing Kentucky's ranking requires some dramatic changes in the state's economy. To begin with, Kentucky will need to increase the stock of knowledge in the state by increasing the amount of innovative research occurring in the state and by significantly increasing the educational level of workers in the state, and in particular, increasing the number of college educated workers. These changes will only occur if Kentuckians begin to realize the fundamental importance of education and research in creating wealth, and begin placing much greater emphasis on these activities. Kentucky will also need to change how it spends its money by reducing the share of spending on roads and highways in the state and increasing the share of spending on productive activities such as education. In addition, there needs to be an increased emphasis on urbanization in the state if Kentucky hopes to increase its relative wealth. Finally, Kentucky will have to place greater emphasis on newer, more innovative industries such as the information and financial industries. Unless the citizens of Kentucky undertake these fundamental changes Kentucky will continue to be one of the poorest states in the Union.

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DeVol, Ross and Rob Koepp. "State Technology and Science Index: Enduring Lessons for the Intangible Economy." Milken Institute. March 2004.

Hoyt, William H. and J. William Harden. "MSA Location and the Impact of State Taxes on Employment and Population: A Comparison of Border and Interior MSA's." mimeo, University of Kentucky. September 2005.

Footnotes

1 These data are available from the U.S. Patent and Trademark Office. We use data on Utility patents issued since these are patents issues for process or product innovation.

2 The state where the patent is issued is identified using the patent owner's state of residence.

3 This method is identical to the method used in a similar study by Bauer, Schweitzer and Shane (2006). The same protocol is also used to determine the stock of highway capital.

4 In the early 1970's the CPS does not allow for the unique identification of some states with small populations. Instead, the CPS created regions for these years. For these years, the non-uniquely identified states are assigned the value of the region.

5 Tax variables were obtained from the U.S. Census Bureau's State Government Finances Historical Database; Right-to-work data were obtained from the National Institute for Labor Relations Research.

6 These data are available from the U.S. Census Bureau's State Government Finances Historical Database.

7 U.S. Census Bureau's Decennial Census of Population. Intercensal estimates of population density were linearly interpolated.

8 Bureau of Economic Analysis: Regional Economic Information Systems (REIS) data.

9 Throughout this report we have adjusted all dollars for inflation using the U.S. GDP-Price Index. All dollars are reported in constant 2000 dollars.

Local Government Finance in Kentucky: Time for Reform?

David E. Wildasin[*]

This is a time of increased interest in local government finance in Kentucky, as evidenced by the creation of a Task Force on Local Taxation, established by the General Assembly. The final report of the Task Force offers significant recommendations, including an amendment of the state constitution that would provide the General Assembly with the flexibility to institute new sources of local revenues. The present paper reviews the status of local government finance in Kentucky and discusses some of the key findings and recommendations of the Task Force. As the Task Force report clearly recognizes, informed analysis of local tax policy in Kentucky is hampered by inadequate data on local government finances. This paper identifies some of these deficiencies, as well as a number of important policy issues that require further policy analysis, particularly if the General Assembly entertains significant reforms of local taxation.

1. Introduction

As all Kentuckians are aware, tax reform in the Commonwealth has been the focus of concerted attention in the past few years. We have already seen significant modifications of the state's tax structure, including such noteworthy changes as the elimination of the corporation license tax. Possible reform of local government taxation is now on the agenda: a Tax Force on Local Taxation, established in 2005 by House Bill 272, has devoted a year of effort to the study of local tax issues and has recently (June, 2006) issued its final report. What are some of the concerns that have prompted this examination of local government finance? What has the Task Force proposed? What issues require further analysis? The issuance of the Task Force report makes this an opportune time to review the status of local government finance in Kentucky, to examine the findings and recommendations of the Task Force, and to consider some of the policy options facing the citizens of the Commonwealth. These are the goals of the present paper.

Because of the complexity of local government structure and financing, Section 2 begins with a concise overview of the system of local government finance in Kentucky. This system is an outgrowth of a body of constitutional and statutory control and regulation of local governments which define the taxing powers of these units of government. Section 3 describes the most important of these constraints and discusses some of their possible effects. With this background, Section 4 turns to a review the Task Force report. Section 5 concludes.

2. Local Government Structure and Finance in Kentucky and the Nation

As is true in many states, the system of local government finance in Kentucky is a somewhat intricate affair. There are many types of local governments, performing an extraordinary variety of tasks, and deriving revenues from many diverse sources. The great British economist Alfred Marshall is purported to have said that "all short statements about economics, with the possible exception of this, are false;" the same can certainly be said about local government finance. Still, it is important to see the forest for the trees. At the risk of some oversimplification, this section begins with a review of some of the key elements of local government structure and finance in Kentucky and relates these to the rest of the nation.[1]

2.1 Structure and Financing of Local Government in Kentucky: A Concise Summary

Types of Local Governments. First, it is important to realize that there are many different types of local government in Kentucky, as in all states. Of greatest importance are Kentucky's counties, municipalities, school districts, and "special districts."

Kentucky is a "county-rich" state: its 120 counties, serving a population of just 4.1 million, have a mean population of only about 35,000. There are several large counties, and these contain a large fraction of the state's total population; the remainder thus have quite modest numbers of residents. (By way of contrast, the state of California has only about half as many counties (58), with a total state population of about 36.1 million – over 600,000 residents per county.) Counties play a particularly important role in providing public services outside of municipal boundaries, in regulating land use and development, and as administrative units of government.

Kentucky's 433 municipalities vary widely in size. They are grouped into 6 administrative classes, based mainly on population. Louisville/Jefferson County is the only city of the "first class" in the state. Cities with populations between 20,000 and 100,000 and Lexington/Fayette County, a total of 13 altogether, constitute the second class. There are 19 third class cities (8,000-20,000 population) and more than 100 cities each in the fourth, fifth, and sixth classes. The last of these classes consists of 176 cities with populations under 1,000. Municipalities are important providers of public services within their boundaries.

Public education services are provided by nearly 200 local school districts in Kentucky. To a much greater degree than other local units of government, school districts depend on state government financial assistance, which accounts for about half of aggregate school district revenues. This financial assistance is delivered through a complex formula system that presumably attempts to achieve some state educational policy goals, and a discussion of school district financing therefore quickly becomes entangled in issues of educational policy. These issues go beyond the scope of the present essay, which is limited to some general remarks about the overall structure of state/local financing for education and about the advantages and disadvantages of more or less decentralization of education finance. (For further discussion of school finance, see Wildasin (2001, pp. 90-101).)

Another important but very heterogeneous category of local governments in Kentucky are the so-called "special districts." These units, sometimes created as sub-entities of other localities, provide park, flood control, transportation, fire, emergency, sanitation, health, and other services. According to the 2002 Census of Governments, Kentucky has 720 special districts. This count, however, excludes numerous other agencies and authorities which, to some degree, fall under the control of other units of government but which also possess some degree of independent authority, including the authority to issue debt.

Revenue Sources for Local Governments. In general, local governments in Kentucky depend upon property taxes, "occupational license" taxes (imposed on the earnings of individuals and on the incomes of businesses), and taxes on insurance premiums as their principal sources of *tax* revenue. School districts derive revenues from taxes imposed on the gross receipts of utilities; as of 2005, this tax, formerly collected at the local level, is administered at the state level with proceeds transferred to school districts. Taxes on telecommunications, also previously imposed by local governments, are now collected at the state level as well, with revenues paid out to localities in amounts corresponding to previous local collections. Local governments also rely on various nontax sources of revenue and on transfers from the state government; the latter are particularly important for school districts.

The key features of this system of finance are readily summarized. In order to provide some quantitative perspective, Table 1 provides basic data on the financing of local government and of state and local government combined for Kentucky and for all state and local governments in the US for 2003-2004.

First, Kentucky has a relatively *centralized* system of finance: local governments raise only 40% of total state/local revenues, compared to the US average of 58%. In Kentucky, the state government is "large" relative to local governments.

Second, state aid to local governments in Kentucky is not markedly different from that in the rest of the nation: 44% of local government revenue derives from intergovernmental transfers, compared

TABLE 1: Level and Composition of State and Local Government Revenues, Kentucky and U.S., 2003-2004

(Dollar figures in thousands.)

Kentucky

Revenues, type	State & local government combined	Share of general revenue (%)	Share of own-source general revenue(%)	Share of tax revenue	Local government	Share of general revenue (%)	Share of own-source general revenue (%)	Share of tax revenue
General revenue	22,982,302	100%			9,184,914	100%		
Intergovernmental revenue	6,241,782	27%			4,030,875	44%		
From Federal Government					347,912	4%		
From State government					3,682,963	40%		
General revenue from own sources	16,740,520	73%	100%		5,154,039	56%	100%	
Taxes	11,460,494	50%	68%	100%	2,997,094	33%	58%	100%
Property	2,136,455			19%	1,680,995			56%
Sales and gross receipts	4,313,337			38%	307,030			10%
General sales	2,477,717			22%	11,684			0%
Selective sales	1,835,620			16%	295,346			10%
Motor fuel	476,605			4%	-			0%
Alcoholic beverage	79,104			1%	-			0%
Tobacco products	20,627			0%	-			0%
Public utilities	207,280			2%	207,280			7%
Other selective sales	1,052,004			9%	88,066			3%
Individual income	3,629,392			32%	809,999			27%
Corporate income	381,538			3%	-			0%
Motor vehicle license	207,904			2%	2,590			0%
Other taxes	791,868			7%	196,480			7%
Charges and misc. general revenue	5,280,026	23%	32%		2,156,945	23%	42%	

United States Total

Revenues, type	State & local government combined	Share of general revenue (%)	Share of own-source general revenue(%)	Share of tax revenue	Local government	Share of general revenue (%)	Share of own-source general revenue (%)	Share of tax revenue
General revenue	1,889,740,590	100%			1,094,729,372	100%		
Intergovernmental revenue	425,682,586	23%			430,114,245	39%		
From Federal Government					50,988,684	5%		
From State government					379,125,561	35%		
General revenue from own sources	1,464,058,004	77%	100%		664,615,127	61%	100%	
Taxes	1,010,277,275	53%	69%	100%	419,863,497	38%	63%	100%
Property	318,242,461			32%	307,528,431			73%
Sales and gross receipts	360,628,892			36%	67,303,155			16%
General sales	244,891,334			24%	46,942,486			11%
Selective sales	115,737,558			11%	20,360,669			5%
Motor fuel	34,943,572			3%	1,181,153			0%
Alcoholic beverage	4,985,706			0%	392,410			0%
Tobacco products	12,625,780			1%	322,515			0%
Public utilities	21,426,576			2%	10,717,400			3%
Other selective sales	41,755,924			4%	7,747,191			2%
Individual income	215,214,667			21%	18,959,532			5%
Corporate income	33,715,793			3%	3,486,756			1%
Motor vehicle license	18,708,983			2%	1,372,855			0%
Other taxes	63,766,479			6%	21,212,768			5%
Charges and misc. general revenue	453,780,729	24%	31%		244,751,630	22%	37%	

Source: Bureau of the Census

to 39% for the nation as a whole. As is true for other states, transfers from the Federal government are not a very substantial source of local government revenues in Kentucky.

Third, turning now to the composition of own-source revenues (i.e., revenues other than transfers from higher-level governments), note to begin with that Kentucky's localities depend heavily on nontax sources of revenue, which account for fully 42% of all local government own-source revenues. In this respect, Kentucky's localities are somewhat less tax-dependent than local governments elsewhere, which obtain 37% of their own-source revenues from nontax sources.

Fourth, property taxes are the most important source of tax revenue for localities in Kentucky, accounting for about 58% of all local taxes. This figure is much lower in Kentucky, however, than in the rest of the nation, where localities obtain almost three-fourths (73%) of their tax revenues from property taxes. Kentucky localities differ quite dramatically from those elsewhere in that they raise more than one-fourth (27%) of their tax revenues from "occupational license taxes," treated for Census purposes as a form of income tax. Note that general sales taxes account for significant amounts of local government revenues in the US as a whole. At present, localities in Kentucky are not permitted to utilize such taxes and therefore derive no revenues from them.

Local Taxation in Kentucky and the US. Putting some of these basic facts together, it is apparent that Kentucky's combined system of state and local government finance differs from the rest of the nation in two important and related respects. First, government revenues in Kentucky depend heavily on state-level taxation, with relatively little revenue derived from local governments. Secondly, Kentucky's fiscal system depends comparatively heavily on individual income taxation and is less property-tax dependent than other states. In fact, in their relative importance, individual income and property taxes in Kentucky are almost precisely an inversion of the national average: in Kentucky, property and income taxes account for 19% and 32%, respectively, of combined state/local tax revenues, whereas the corresponding figures for the nation are 32% and 21%. The extra share of income taxes in Kentucky arises entirely from local taxation: at the state government level alone, individual taxes

account for 32% of total tax revenues both in Kentucky and for all state governments in the nation as a whole. This testifies to the important and rather unique role of "occupational license taxes' in local government finance in Kentucky.

In summary, compared to national averages, Kentucky's combined state/local fiscal system is "over-weighted" at the state level and "under-weighted" at the local level, and it is "over-weighted" toward income taxation and "under-weighted" toward property taxation, mainly because of the heavy dependence of localities on occupational license taxes. These characteristics of Kentucky's fiscal system are of long-standing and have been amply documented in other studies, including Boardman (2006), Hoyt (2001), Martie (2001), and Wildasin (2001).

2.2 Potential Structural Reforms

Differences between Kentucky's fiscal system and those found elsewhere in the nation provide no *a priori* indication that Kentucky's policies are better or worse than those found elsewhere. To begin with, policymakers and voters in different states and localities may select different policies because these jurisdictions differ in their economic structure, population characteristics, and other fundamental attributes. They may also have different policy preferences. And, finally, there is no magic formula that dictates what system of taxation is "best" for any one level of government or for a state and local fiscal system. Nevertheless, comparisons of fiscal systems can usefully highlight important distinctions and suggest potentially fruitful lines of analysis. They also indicate likely feasible (though not necessarily desirable) avenues of policy reform.

On the basis of the simple comparisons just provided, there is a reasonable presumption that Kentucky's localities could, if desired, assume greater responsibility for financing public services and that the state government could reduce the overall level of revenues that it collects. It is important to remember, however, that localities in Kentucky are no more heavily dependent on state government fiscal transfers than localities in other states, that is, the lower level of local revenue collection in Kentucky is accompanied by lower levels of local relative to state government expenditures. Thus, if Kentucky were to attempt to mimic the national average fiscal balance between state and local

governments, "decentralization" on the revenue side (increasing the weight of local relative to state taxes) would have to be accompanied by comparable decentralization on the expenditure side.

This immediately raises a fundamental issue, sometimes called "the assignment problem" in the literature of fiscal federalism: which government responsibilities are or should be assigned to each level of government? A rebalancing of state/local spending in Kentucky away from the state government would entail some shifting of expenditure responsibilities to local governments. Such a shift could take place in many ways, either by explicit transfer of functions from state to local governments or, more implicitly, simply by cutting state spending and leaving it to local governments to decide whether to increase local spending on the same or similar functions, to expand spending in other areas, or simply to maintain current local spending and functions, resulting in a net shrinkage of combined state and local spending (and taxation). A transfer of responsibility for the maintenance of certain roads from the state to county governments exemplifies the first option. The second option might be illustrated by a cutback in state spending on natural resources, public safety, or financial support for local school districts. Local governments are already actively involved in each of these functional areas and, if desired, could augment their spending in each in response to cutbacks in state services. In the absence of state mandates, the extent of any such adjustments would be left to the discretion of local governments and it is likely that different localities would respond in different ways, depending on individual circumstances and on the nature of the change in state government policy (Of course, all of these possible adjustments could occur in reverse if, initially, the state government *increases* its involvement in and spending on roads, natural resources, public safety, or elementary and secondary education.) From these remarks, it should be clear that reassignments of functions between state and local governments can certainly affect the levels of state and local taxation, but that such reassignments can also have many other important effects. In particular, changes in functional assignments involve the expenditure side of state and local government finance, first and foremost, while carrying important implications for the revenue side as well.

Closely related to the assignment problem is the issue of government structure. For instance, consider whether Kentucky should retain its "county-rich" organizational structure. Transportation and communication costs have fallen dramatically since most of Kentucky's counties were created in the period 1810-1830. It is possible that many counties could be usefully consolidated, thus, effectively, "reassigning upward" some of the functions now performed by counties with very small numbers of residents to new, larger county units. Conceivably, consolidated county governments, perhaps equipped with larger and more professional administrative staffs than can now be sustained, would be better able to manage complex tasks. They might therefore be better candidates for "downward reassignment" of some functions now performed at the state government level, allowing the state government to streamline its operations. This restructuring of county governments could thus facilitate a shift in the state's fiscal balance away from the state government and toward the local governments.

Of course, any such initiative would be a major undertaking and it is being discussed here mainly in order to illustrate the nature of the subtle and complex consequences that can follow from changes in government structure. A less dramatic reform that nonetheless raises similar issues of structure, functional assignment, and finances would be an overhaul of the system of special districts and other special public authorities in Kentucky. The numbers, functions, and financing of these special entities could either be expanded or contracted, allowing for growth or contraction of the local government sector as a whole or of a reconfiguration of responsibilities and funding among local governments. As discussed in Section 4, their status at present is quite murky because little information about their activities is readily available. A thorough inventory of these units of government and of their finances might motivate a serious reconsideration of their role in the system of local governance in Kentucky.

3. State Regulation of Local Taxation

As we have seen, local governments utilize a diverse array of revenue instruments, including property taxes, occupational license taxes, and nontax revenues and charges. All of these revenue instruments must comply with the fundamental constraints imposed by the state constitution as well

as with statutory controls imposed by legislative action. This section describes the main features of existing controls on local taxing powers.

The constitution recognizes the power of localities to tax property, subject to limits on maximum tax rates. In particular, Section 157 limits the maximum municipal tax rates to $0.75-$1.50 per dollar of assessed valuation depending (inversely) on city size, and to $0.50 per dollar of assessed valuation in all counties. In addition, under Section 181, the General Assembly may authorize localities to impose excise taxes and "license fees" on many "trades, occupations, and professions," providing the constitutional sanction for local occupational taxes and for taxes on insurance premiums. Section 181 is interpreted to preclude local sales taxes (LRC (2006b, p. 12)). It also specifically prevents the state from collecting taxes on behalf of local governments, which may preclude some types of "revenue sharing" arrangements, as discussed further below. The main statutory controls on local taxation pertain to property taxes and occupational license taxes. (Tax rates on insurance premiums are not limited by statute.) These constraints warrant further discussion.

HB44. Perhaps the best-known limitation on local taxation is House Bill 44 (HB44), enacted in 1979, which limits local property tax revenues for counties, cities, school districts, and special districts to a *rate of growth* of 4% annually.[2] This statute is sometimes claimed to have had a variety of effects, for good or ill. Presumably, its basic goal is to restrain local property taxation and, as we have seen, Kentucky is indeed a state with comparatively low levels of local property taxation. Whether Kentucky's below-average utilization of property taxes is attributable to the action of HB44 is very difficult to determine, however. It is true that property taxes played a somewhat less prominent role in local government finances after 1979. As reported in Boardman (2006, Table 1), county governments derived 29.8% of their revenues from property taxation in 1977, but only 22.3% in 1982. This percentage share has continued to fall over time and now only amounts to 12.5%. It should be noted, however, that county governments obtained 39.2% of their revenues from property taxes in 1972, which is to say that property tax revenues had already declined substantially in importance during the period 1972-1977, two years *prior* to the passage of HB44. For other units of government, as well, reliance

on property taxation has fluctuated over time. Over the decade 1972-1982, city governments obtained about 20% of their revenue from property taxes, but this share has varied in the 12-14% range since that time. School districts obtained about 25% of their revenues from property taxes in 1972 and 1977. While this percentage fell markedly in 1982, to less than 15%, state government financial support for schools increased substantially at the same time. Since the early 1980s, school district dependence on local property taxes has risen, reaching almost 23% in 2002 – nearly equal to the 26% share of the pre-HB44 1970s. In short, the observed variations in reliance on property taxation during the period 1972-2002, by type of locality and over time, do not reveal any clear-cut effect that is readily attributable to HB44.

Of course, whatever its effects on aggregate levels of local property tax revenues, it is possible that HB44 has constrained property taxes for some specific localities at particular points in time. Unfortunately, direct evidence on this point is largely unavailable. HB44 has been in operation for more than a quarter century, during which time property valuation administrators for every county have filed documentation annually with state authorities certifying HB44 compliance for every local government within their counties. In principle, this documentation could have been compiled and published annually, providing a rich body of data on growth in property tax revenues, assessed valuations, and tax rates for all local governments in the state. In practice, it appears that no such compilation has taken place, and thus these data have been largely unavailable for the purposes of policy analysis and evaluation. The Task Force report (LRC (2006a, p. 4)) cites Wildasin (2001) (using data on county governments for 1998-2000) and the results of a 2005 survey of county governments by the County Judge Executives Association, both of which find that a minority of county governments are limited by HB44 constraints. There are apparently no other sources that report on the extent to which HB44 constraints have been binding on other types of local governments or for other periods of time. Thus, regrettably, the proximate effects of Kentucky's quarter-century experiment with property tax limitation are all but impossible to ascertain.[3] This is only one of several fundamental informational deficiencies that hamper the analysis of local taxation in Kentucky, as discussed in more detail below.

Note, however, that the effects of HB44, if they exist at all, may not necessarily take the form of binding constraints on local government property tax revenue. The *prospect* of limited growth in property tax revenues may have stimulated local governments to develop and utilize various other tax and non-tax sources of revenues that would otherwise have not been exploited. Furthermore, it is possible that the state government has offered more generous fiscal assistance to local governments during the past quarter-century because of concerns that local revenues would be unduly constrained by the operation of HB44. Finally, it is possible that HB44 has led to a proliferation of special districts which are not limited in the amount of property taxes they can collect at their inception since HB44 only constraints revenue growth relative to prior periods. For any or all of these reasons, the number of instances in which HB44 is strictly binding on local revenues in a given year may be rather small even though its impact on local government finance and local government structure may be important. Short of the development of a model of the fiscal interactions between state and local governments, there is no way to know whether this may be the case.

In summary, the fact that constraints on growth in property tax revenues appear not to be binding for most counties in recent years may justify a mild presumption that HB44 has had comparatively little effect on local governments and that its removal would therefore have rather modest consequences. In this case, HB44 adds complexity to state/local fiscal relations with little real benefit or harm. Beyond this, deficiencies in data and a lack of analytical effort imply that very little is known about the effects of HB44 on local government finances in Kentucky. For HB44 detractors and defenders alike, this is a highly unsatisfactory state of affairs, providing fertile ground for speculation but limited factual and analytical support for the preservation, removal, or modification of restrictions on local property taxes.

Occupational license taxes. Occupational license tax rates are also restricted by state statute for some units of government. In particular, school district occupational tax rates cannot exceed 0.5%, except for Jefferson County (Louisville), which may impose a rate as high as 0.75%. County governments may impose occupational taxes up to a rate of 1%, except for Louisville/Jefferson County for which special regulations apply. Municipalities generally are not restricted as to the tax rates they may impose.

To conclude this section, we have seen that local governments in Kentucky are subject to a somewhat complex set of limitations on their taxing powers. Their power to tax property is subject to constitutionally-imposed rate limitations as well as to HB44 limitations on the annual growth of property tax revenues. Comparatively few localities appear to be directly affected by these limitations, although they may have had important indirect effects by stimulating other sources of funding for local governments. Occupational license taxes are widely utilized by local governments. Cities are generally not limited in the license rates that they may apply, unlike counties and school districts. Local governments may also impose taxes on insurance premiums, at rates that are not subject to statutory limits. There are constitutional limitations on the ability of localities to impose general sales taxes, as well as on the ability of the state government to impose taxes on behalf of local governments.[4]

4. The Task Force Report

The Final Report of the Task Force on Local Taxation makes several recommendations. Its first and most important substantive recommendation concerns an amendment to Section 181 of the state constitution. As discussed above, this provision has been interpreted to limit the ability of local governments to impose general sales taxes and the ability of the state government to develop a system of revenue sharing with local governments. The Task Force report does not directly advocate the use of local sales taxes nor does it provide any specific recommendations regarding state-local revenue sharing; its recommendation is more limited in scope, merely proposing a constitutional amendment that would allow for the possibility of such reforms, should the legislature wish to consider them. A second focus of the Task Force report is the status of special districts: 4 of its 11 recommendations ask for better reporting by special districts and better monitoring of their fiscal affairs. Several other recommendations urge improved coordination between local governments and improvements in local tax administration. The Task Force also proposes the establishment of a "local government financial database" that would "provide relevant information about local government finances to decision makers," and, one might imagine, also to the public at large. It is clear from this

recommendation, and from those pertaining to special districts, that the deliberations of the Task Force were hampered by deficiencies in the existing systems for collection and reporting of information regarding local government finances. Let us consider the main Task Force recommendations and some of the policy issues that they raise.

Local Sales Taxation. The charge to the Task Force indicated that it should explore the possibility of local sales taxation as one method for "generating a comparable amount of local revenue," that is, as a potential replacement for local revenues now obtained from other sources. In a similar vein, the Task Force, in its recommendations, recognizes that if the General Assembly were to allow localities to impose sales taxes, it could also attempt to constrain the use of other local taxes so as to keep total local revenues at current levels. In practice, the introduction of the sales tax as a new revenue instrument for local governments could well result in increases in revenues for some localities, perhaps accompanied by decreases for others. The report does not discuss whether sales taxes would be used by counties, cities, school districts, special districts, or by some combination of all of these. If experience in other states can be used as a guide, a local sales tax would likely be utilized mainly by localities in the largest metropolitan areas in the state, as smaller governments would struggle with the administrative complexities associated with its implementation. Given the economic importance of the state's largest metropolitan areas, the introduction of such a tax could have a perceptible impact on aggregate local revenues which could, however, be offset by limiting other revenue sources.

If the local sales tax is viewed as a potential substitute for existing taxes, would it be used to reduce local property, income, or insurance premium taxes? The sales tax might be used to supplement or substitute for the insurance premium tax; both are levied on the revenues or sales of businesses, and thus share some administrative similarities, but of course the sales tax would be much broader in its application. On the other hand, because of its breadth and because taxes on earnings are (very) broadly similar in their economic effects to taxes on consumption, a local sales tax might be viewed as a substitute for local occupational license taxes. Localities differ, of course, in the extent to which their residents earn income or make purchases within their own boundaries. A locality with many residents that

commute to places of employment in other jurisdictions may collect relatively little revenue from a tax on earnings, whereas major employment centers can derive significant revenues from the earnings of non-resident workers; similarly, jurisdictions with major shopping centers might use a local sales tax to obtain revenues generated by sales to non-residents as well as residents. For these reasons, a switch from local occupational to local sales taxes could have important differential revenue impacts across localities. As a third possibility, the introduction of local sales taxes could be accompanied by further restrictions on property taxation. The local sales tax differs quite substantially, both in administrative terms and in terms of its economic effects, from local property taxes.

The overall policy advantages or disadvantages of any of the above tax substitutions are not immediately apparent and cannot be ascertained without further analysis.[5] Presumably such analysis would underpin any future deliberations by the General Assembly, should Section 181 be amended to permit local sales taxes.

Revenue Sharing. The charge to the Task Force also specified that it should consider the desirability of revenue sharing for local governments, and the Task Force indeed recommends that Section 181 be amended in order to allow such policies. The form, magnitude, and purpose of such revenue sharing is little discussed in the Task Force report, however. The report expresses some concern that a revenue sharing system might result in reductions in local tax effort, stating that "any revenue sharing programs implemented should require a specified level of local effort before a local government is permitted to participate. … The concept is that local governments should help themselves before seeking assistance from Frankfort."

In principle, revenue sharing systems can be devised to serve a variety of different policy objectives. For instance, they can be used to overcome administrative hurdles to the use of certain taxes by lower-level governments. As an illustration, suppose that it were considered desirable to make the local occupational tax on individuals more like the state income tax by broadening its base to include nonwage income while simultaneously preserving exemptions, deductions, credits, and other special features commonly found in personal income taxes. Local governments might find it cumbersome to implement

such a tax, and it would impose nontrivial compliance costs on taxpayers. As an alternative, the state could share which each locality a portion of the income tax revenue that it derives from the taxpayers located there.

On the other hand, revenue sharing systems can be designed to advance quite different goals. For instance, HB44 or rate limits on local occupational taxes may constrain local revenues to an undesirable degree, perhaps leading local authorities to "seek assistance from Frankfort" in order to meet urgent expenditure needs. A system of state-local fiscal transfers could be devised that would put additional resources at the disposal of local authorities, based on some measure of fiscal need (e.g., inversely related to per capita income or assessed property valuation) or in accordance with some other criteria.

Designing a revenue sharing system that achieves its intended objectives is no simple matter, however. The Task Force recognizes that fiscal transfers to local governments may result in reductions in local taxes rather than increased funding for local services, effectively substituting state funding for local own-source revenues. The Task Force suggests that such transfers can be conditioned on local fiscal effort, for instance by requiring localities to utilize their local property taxes up to some specified levels. It is also possible to devise revenue sharing formulae that provide additional funding for localities that display high levels of tax effort. In practice, however, it is difficult to prevent the erosion of local own-source revenues, and the attempt to do so can easily give rise to very complex monitoring and enforcement requirements. For example, suppose that localities maintain their property tax collections in order to comply with revenue-sharing regulations while simultaneously reducing their use of charges, fees, and other nontax revenue sources. In this case, the net effect of revenue sharing transfers from the state to recipient localities would be to replace local nontax revenues by state government revenues. As is evident from Table 1, local governments in Kentucky derive more revenue from such nontax sources than they do from property taxation, so there is ample scope for localities to reduce their overall revenue-raising efforts while maintaining or even increasing property tax revenues. In an attempt to maintain overall fiscal effort, therefore, the state might be led to monitor and regulate local use of nontax revenues in addition to property or other major taxes. The ensuing magnification of state control over the details of local finance and policies would likely entail a substantial loss of local fiscal and policy autonomy, substantial administrative complexity and cost, and reduced overall responsiveness of local fiscal policies to the demands of local residents.

The prospect of such a policy evolution highlights the importance of achieving the utmost clarity in the formulation of fundamental policy objectives and of using the simplest and most direct methods to achieve them. For instance, if localities are perceived to have insufficient revenues at their disposal, it is crucial to determine why this should be the case. Local revenue inadequacy might result from the operation of state government limitations on local taxing powers such as HB44, in which case deregulation of local taxes may be a more transparent and effective policy option than the creation of a revenue sharing system, with its associated new body of regulatory constraints. On the other hand, revenue insufficiency may be important mainly for a subset of localities, distinguished by type (county, municipal), by levels of income or development, or by size. Clear identification of underlying policy concerns is critically important for the design and implementation of effective reforms.

As the foregoing remarks indicate, revenue sharing systems can be developed for many different policy purposes – to allow recipient governments to utilize new revenue sources with minimum administrative complexity, to transfer resources to lower-level governments with high fiscal "needs," to shift the overall burden of financing state and local government away from the latter and toward the former, or for any number of other reasons. The optimal design of a revenue sharing system depends crucially on the policy objectives it is intended to achieve. If Section 181 is amended to allow the introduction of some form of revenue sharing, the important task of defining the purposes of such a program and the examination of alternative means to those ends still lies ahead.

Special Districts and Compilation of Local Fiscal Data. As attested by the reliance of the Task Force and other analysts on US Census data, and as already indicated by some of the preceding discussion, the state of Kentucky has not as yet developed an adequate system for the compilation and reporting of data on local government finances. The situation regarding special districts, public authorities, and

other special governmental entities is particularly problematic. Theoretically, every unit of government in the state is supposed to file an annual uniform financial information report (UFIR), but testimony before the Task Force indicated that compliance with this requirement is poor. At present, it appears that there is no reliable and comprehensive compilation that identifies these governmental units and that can be used to analyze their revenues, expenditures, borrowing, or other financial and fiscal data. Under these circumstances, the Task Force was unable to examine in any systematic way the role of these governmental entities in Kentucky's fiscal system.

This situation can be remedied relatively easily and at modest cost, as the Task Force has recommended. Until this is done, policy analysis and evaluation is undermined and the state is exposed to potentially significant financial risks. To gauge the kinds of risks that may be involved, consider the findings of a study by Bridges (2005), which attempts to gather data on borrowing by public authorities in several metropolitan areas in Kentucky. This study examines six large jurisdictions (Jefferson and Fayette counties, Bowling Green, Florence, Owensboro, and Paducah) and finds that special public authorities within some of these jurisdictions account for 80% or more of total local indebtedness. Information about this borrowing is not readily available to the public, and thus the residents of localities in the Commonwealth may be exposed to significant liabilities associated with the activities of public authorities of which they are unaware.

More generally, as noted already in connection with HB44, there is a dearth of information regarding local fiscal policies in Kentucky. It is often argued that local governments, being "closer to the people," can be monitored and controlled relatively easily by their residents, creating a presumption that they are more responsive to local demands than higher-level governments. This basic perspective, articulated in a classic paper by Tiebout (1956) and developed in an extensive literature for the past half century, is based partly on the presumed public availability of information about local policies. In the absence of such information, local governments may be "captured" by interest groups or may simply fail to perform in accordance with the demands of local residents.[6]

The absence of adequate data regarding local finances undoubtedly limited the scope of Task Force activities. The establishment of a special Task Force to examine local finances is an unusual event, and it is a pity that the Commonwealth has missed an exceptional opportunity for a more thorough investigation of important policy issues due to the poor quality of local financial and fiscal data. Future policy deliberations can be significantly enhanced by the development of modern financial reporting systems for all local governments within the state, including regular and transparent publication of fiscal data for public use.

5. Conclusion

The Task Force on Local Taxation has touched upon several important issues and has left others for future discussion and analysis. Its recommendations for constitutional amendments highlight the desirability of enhanced flexibility for the General Assembly to introduce new financing options for local governments. The Task Force report does not, however, examine the potential desirability of enhanced flexibility for local taxation within the existing constitutional boundaries. In particular, it recognizes the potential importance of HB44 restrictions on local property taxation but does not seriously consider the potential advantages, in the form of increased local revenue autonomy, that might flow from the relaxation or removal of these restrictions. The Task Force report also has little to say about statutory limitations on local occupational tax rates. There may be sound reasons for states to impose limits on local taxes, although the competitive pressures under which localities operate also constrain local taxation even in the absence of statutory restraints. But, in any event, a review and reconsideration of the specific types local tax limitations in Kentucky is in order. For instance, after more than 25 years of HB44 property tax limitations, is there any basis for a presumption that a limit of 4% annual growth in property tax revenues serves public interests better than a limit of 3%, 5% or no limit at all? Is there a persuasive justification for limits on occupational tax rates for counties and school districts but not for municipalities? On what basis can the present limits on occupational tax rates be justified? In the absence of careful review and analysis, predicated on the availability of underlying

fiscal data, the present system appears to be somewhat haphazard in design and it effects, largely unknown.

The Task Force identifies serious limitations in the availability of basic information concerning local government finances and recommends that these deficiencies be remedied. Especially given the current state of data management technologies, the cost of these remedies is modest and the benefits – to policymakers, to analysts, and, above all, to the general public – are great. If these recommendations are implemented, researchers and analysts, both within the public sector as well as outside, will be able to shed significant new light on local fiscal policies and their impacts. This information would be of great value in future deliberations regarding the possible introduction of local sales taxation, revenue sharing, or other policy options. In addition, better data on local finances can assist in the monitoring and control of borrowing and financial management by special districts and public authorities, thus reducing financial risks for the Commonwealth's fiscal system as a whole and perhaps reaping some benefits in the form of reduced borrowing costs as well.

The development of local government finances in Kentucky is still a work in progress. Major policy issues regarding government structure, the assignment of functional responsibilities among levels of government, and the proper sphere of local revenue autonomy await further analysis. If the recommendations of the Task Force are followed, these issues will soon command the attention of policymakers and the public. Immediate improvements in data and support for significant analytical work can help to provide a foundation for more informed evaluation of the policy options that are likely to arise.

Endnotes

1. Several studies and reports may be consulted by readers seeking more detailed information about local government finance in Kentucky. Hoyt (2001) and Boardmand (2006) have contributed important treatments of this subject in previous issues of the *Kentucky Annual Economic Report.* In connection with the work of the Task Force on Local Taxation, the Legislative Research Commission (LRC) (n.d., 2006a) has prepared very informative surveys and reviews of local taxation, including much more detail than is provided below concerning the laws regulating local government finance. Wildasin (2001) also reviews local government finance issues in Kentucky. All of these studies also contain references to additional sources of information on this subject.

2. For the sake of simplification, this discussion omits some of the technical details of HB44 and other regulations governing local taxation. For more discussion, see, e.g., Wildasin (2001) and LRC (n.d., 2006a). It should be explicitly noted that the voters in any locality always have the prerogative, through special referenda, to approve revenue growth in excess of the 4% limit.

3. Assuming that annual PVA documentation has been preserved, it would likely be possible, at comparatively modest cost, to compile these data and thus to provide a meaningful foundation for the evaluation of HB44's impact.

4. It should be noted, however, that the recent state tax reform transferred the responsibility for the collection of taxes on telecommunications services from localities to the state government, with the revenues to be distributed to the localities in accordance with their previous levels of collections. Although this arrangement presumably conforms with Section 181 of the constitution, it could be characterized as a system of state collection of revenues on behalf of local governments.

5. In weighing the attractiveness of possible tax substitution reforms, it is important to consider interactions between the Federal and state tax systems. Local occupational and property taxes are generally deductible for purposes of Federal personal income taxation, reducing the net burden of these taxes, while the deductibility of sales taxes has varied substantially over time. In the absence of deductibility, sales taxation is less appealing.

6. Other local revenue instruments, such as tax increment financing or selective local economic development incentives, should also be transparently reported so that citizens can monitor their use and so that their impacts may be assessed.

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Differences in State and Local Government Spending between Kentucky and its Neighbors: How Much and Why?

William Hoyt

Politicians, citizen watchdogs groups, the media, and voters all frequently express concerns about state and local government spending, particularly if they feel tax dollars are being wasted. While the measurement of government "waste" is beyond the scope of this study, I offer some comparisons of government spending by function between Kentucky and its neighboring states. I find that our spending, on a per capita basis, is generally within the range of our neighbors. In addition, I also examine how spending on a per capita basis varies with some of the characteristics of the states. I find that per capita state and local government spending in Kentucky is higher than the average of these states because of its smaller population, more centralized spending, and large number of local governments. However, its lower average wages and demographics act to reduce its predicted spending.

Introduction

Concerns about and calls for eliminating government waste are frequent topics of political rhetoric at all levels of government and throughout the country. While politicians may frequently disagree about the merits of many federal, state, or local programs, they seem united in ensuring that tax dollars are not "wasted". Indeed, efforts at "eliminating" government waste and inefficiency have been found in administrations headed by both Republicans and Democrats.

While the media has, on occasion, brought examples of gross or fraudulent waste to public attention, both in Kentucky and elsewhere, there have been few studies, by the media or scholars, that have attempted to examine these concerns in a more systematic and thorough way.

In the language of economists, waste is generally referred to as inefficiency. However, the definition of inefficiency for an economist often differs from how a layman might define inefficient, with the economists' definition generally being much broader. Economists generally think of three aspects of efficiency: *productive, allocative,* and *technical.* For an economy to be efficient it must be efficient in all these aspects. *Productive* efficiency refers to producing the "right" amount of goods and services, that is, balancing the desires of consumers with the costs of production in determining how much is produced. *Allocative* efficiency refers to ensuring that the goods and services produced by the economy are, in fact, allocated among people in an appropriate way with

those who benefit the most, in terms of their willingness to pay for a good, receiving it. Finally, *technical* efficiency refers, in its simplest terms, to produce goods and services in a cost minimizing way.

It is probably this notion of *technical* efficiency that coincides most closely with the layman's notion of efficiency and the concerns about the lack of efficiency in government – the costs of producing government goods and services are simply too high. To be sure, while we frequently hear about concerns about unnecessary government "Pork Barrel" projects such as "Bridges to Nowhere" that would be considered examples of *productive* efficiency, probably most public concerns still focus on the notion that production of government services require the use of too many resources, particularly labor, relative to what might be expect for the same or similar services in the private sector.

While this notion of waste is easy to understand and provide example of, efforts at providing more than anecdotal evidence have proven to be more difficult. The difficulties in determining whether a government is producing services efficiently or which governments are comparatively more efficient primarily arise for two reasons. First, it is difficult to measure the "output" of most government services. For some government goods and service, there are at least some crude measures, for example, cost per lane mile for highways or cost per inmate day for corrections. For others, such as administrative or police services, for example, it is very difficult to

conceive of any measure other than per capita cost. Of course, using these crude measures ignore the issue of the quality of services – are per capita administrative costs higher in one state than another because of greater inefficiency or higher quality, perhaps in the form of faster response time to concerns, reduced waiting times, etc.

In addition to difficulties associated with quantifying output, there are additional difficulties in trying to understand and identify differences in the cost of producing government goods and services among states or localities. Even if we are comfortable measuring the output of a state highway department as the number of lane miles constructed or maintained, it is unrealistic to think that maintenance costs are the same in a flat state (Illinois) and a mountainous state (West Virginia) or possibly the same for a state subject to lengthy winters and frost (Indiana) and a state with a more moderate climate (Tennessee). Even more extreme may be the relationship between inputs or expenditures in primary and secondary education.

Given these difficulties in measuring the output and cost of producing government services, our goal here is much more modest than attempting to determine whether Kentucky is producing its services relatively more or less efficiently than its neighbors. Instead, we have two objectives: First, document some of the differences in spending among Kentucky and its neighboring states. While differences in spending are not, in themselves, evidence of inefficiency, substantial differences between the costs in Kentucky and its neighbors might suggest the need for a closer examination of the provision of this good or service.

Second, we use statistical (regression) analysis to attempt to determine what factors seem to influence state and local (per capita) spending in Kentucky and its neighboring states for the years of 1992, 1997, and 2002. We focus our analysis on the determination of total state and local spending and administrative spending. An earlier study, Hoyt et. al. (2005), considers the determinants of spending for a number of additional government functions. Broadly we can think of the determinants of the expenditures on government services as falling into three categories: demographic and economic characteristics of the state, the structure of the state and local governments within a state; and a set of unidentified factors influencing costs. The first set of determinants includes the population and the composition of the population such as race, age, and education level and characteristics of its economy such as median income and unemployment rate. These factors are likely to affect both the cost of providing the services as well as the demand for these services. At least in the short term, these factors might be considered beyond the control of the state. The second set includes characteristics of the state's government structure including the local share of expenditures, the number of local governments, and the sources of revenue for the state. These are factors that are at least conceivably in the control of the state or local governments in a state. Of particular interest is at what level of government are the expenditures made and the revenues collected within a state. Finally, there is a "state-specific fixed effect," the unexplained, time-consistent difference in spending in a state from the average of the states. It is tempting to consider this unexplained component of costs as

Table 1: Population and Population Composition of Kentucky and its Neighbors, 2000

State	Population		Urban		African-American		Hispanic		Household with Children under 18		Households over 65	
	# (2003)	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Kentucky	*4,117,827*	*7*	*55.8*	*8*	*7.3*	*8*	*1.5*	*8*	*33.0*	*5*	*31.6*	*7*
United States	290,809,777		79.2	2	12.3	4	13.7	1	33.5	2	33.1	4
Illinois	12,653,544	1	87.8	1	15.1	3	12.3	2	33.6	1	32.6	5
Indiana	6,195,643	4	70.8	5	8.4	7	3.5	4	33.4	3	32.2	6
Missouri	5,704,484	6	69.4	6	11.2	6	2.1	6	32.4	6	34.4	2
Ohio	11,435,798	2	77.4	3	11.5	5	1.9	7	32.2	8	33.9	3
Tennessee	5,841,748	5	63.6	7	16.4	2	2.2	5	32.2	7	31.5	8
Virginia	7,386,330	3	73.0	4	19.6	1	4.7	3	33.2	4	29.3	9
West Virginia	1,810,354	8	46.1	9	3.2	9	0.7	9	29.3	9	37.5	1

Source: Census of Population & Housing, 2000

Table 2: Income and Employment Measures for Kentucky and its Neighbors, 2000

	Median Household Income		Income below poverty level		Median Earnings		Employed	
	2000$	Rank	%	Rank	2,000$	Rank	%	Rank
Kentucky	*33,672*	*7*	*15.8*	*2*	*20,951*	*7*	*44.5*	*8*
United States	.		12.9		.		45.8	
Illinois	46,590	2	10.7	6	25,890	1	47	5
Indiana	41,567	3	9.5	9	23,229	4	48.8	1
Missouri	37,934	5	11.7	5	21,751	5	47.5	4
Ohio	40,956	4	10.6	7	23,949	3	47.6	3
Tennessee	36,360	6	13.5	3	21,700	6	46.6	6
Virginia	46,677	1	9.6	8	25,357	2	48.2	2
West Virginia	29,696	8	17.9	1	19,159	8	40.5	9

Source: Census of Population & Housing, 2000

a measure of the relatively efficiency of a state in producing its good or services. While this unexplained difference could well be due to relative inefficiency or efficiency, we resist the temptation to label it such. As with significant differences in the actual per capita costs, significant differences in the unexplained component in costs might indicate the need for further examination of efficacy in the provision of the service.

A Comparison of the Socio-Demographic and Economic Characteristics of Kentucky and its Neighbors

As discussed, part of our objective is to relate the costs of government goods and services to the socio-demographic and economic characteristics of a state as we believe these may be important factors in determining the costs of producing these services. *Table 1* provides data from the 2000 Census of Population on Kentucky and its neighbors. As the table shows Kentucky has a smaller population than all of its neighbors and a lower percentage of African-Americans and Hispanics with the exception of West Virginia. It ranks in the middle with respect to households with children under 18 and near the bottom with respect to the number of households with a head over the age of 65.

As shown in *Table* 2, Kentucky's mean income, mean earnings, and percentage of adult population ages 18–65 employed are above only that of West Virginia and its poverty rate is only above West Virginia's. Finally, *Table 3* shows the relative education of the adult (over the age of 25) population of the states in 2000. Again, only West Virginia has a lower level of education.

Patterns in Aggregate State and Local Spending

Figure 1 gives a pattern of total state and local *direct* spending as a fraction of income for Kentucky,

Table 3: Educational Attainment of Residents of Kentucky and its Neighbors, 2000

	Less than High School		High School Graduate		Some College		Some College or Associate		College or More	
	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank
Kentucky	*25.9*	*1*	*33.6*	*4*	*18.5*	*8*	*23.4*	*8*	*17.1*	*8*
United States	19.7	4	28.6	7	20.9	3	27.2	2	24.4	3
Illinois	18.4	7	27.8	8	21.6	2	27.7	1	26.1	2
Indiana	17.8	8	37.2	2	19.7	7	25.5	6	19.4	7
Missouri	18.6	5	32.8	5	21.9	1	27	3	21.6	4
Ohio	17	9	36.1	3	19.8	6	25.7	5	21.1	5
Tennessee	24.1	3	31.6	6	20	5	24.7	7	19.6	6
Virginia	18.5	6	26	9	20.4	4	26	4	29.5	1
West Virginia	24.8	2	39.5	1	16.6	9	20.9	9	14.8	9

Source: Census of Population & Housing, 2000

Figure 1:State & Local Government Direct Spending, Share of Income
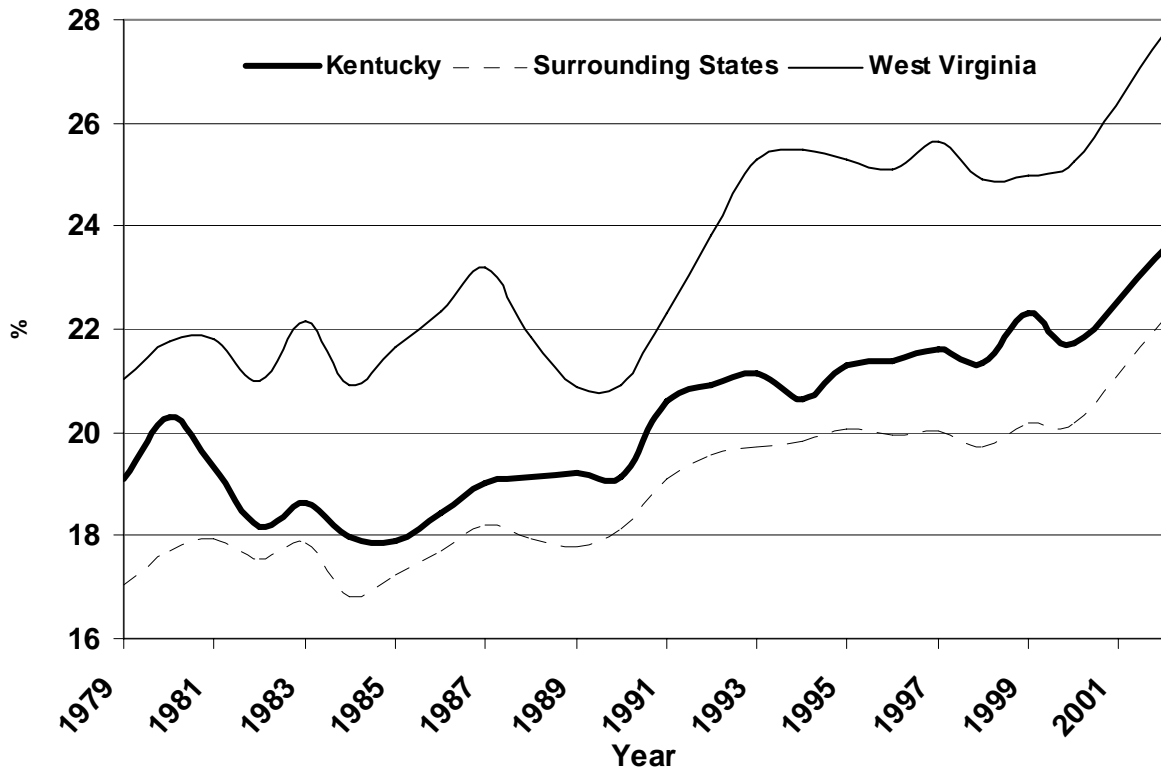
Source: U.S. Census Bureau, Governments Division. Annual Survey of Government Finances.

Figure 2:State & Local Government Direct Spending, Per Capita
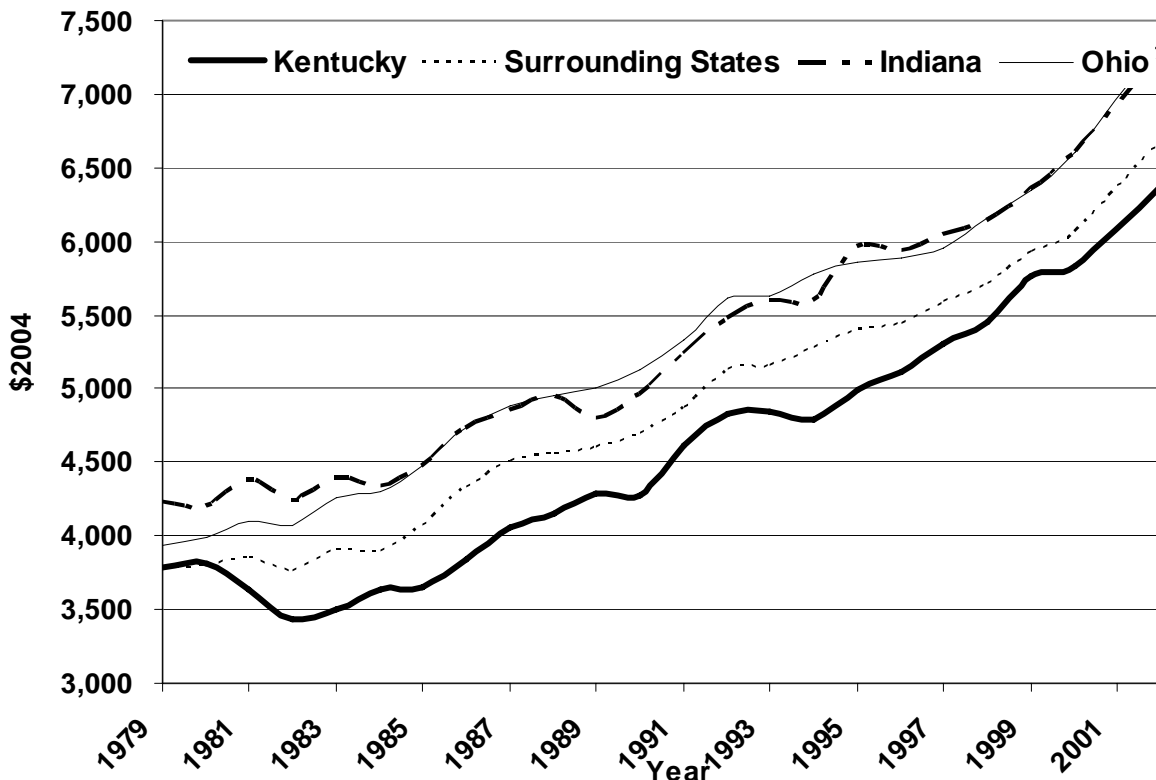
Source: U.S. Census Bureau, Governments Division. Annual Survey of Government Finances.

Figure 3:State and Local Employment, Percentage of Total, 1979-2004
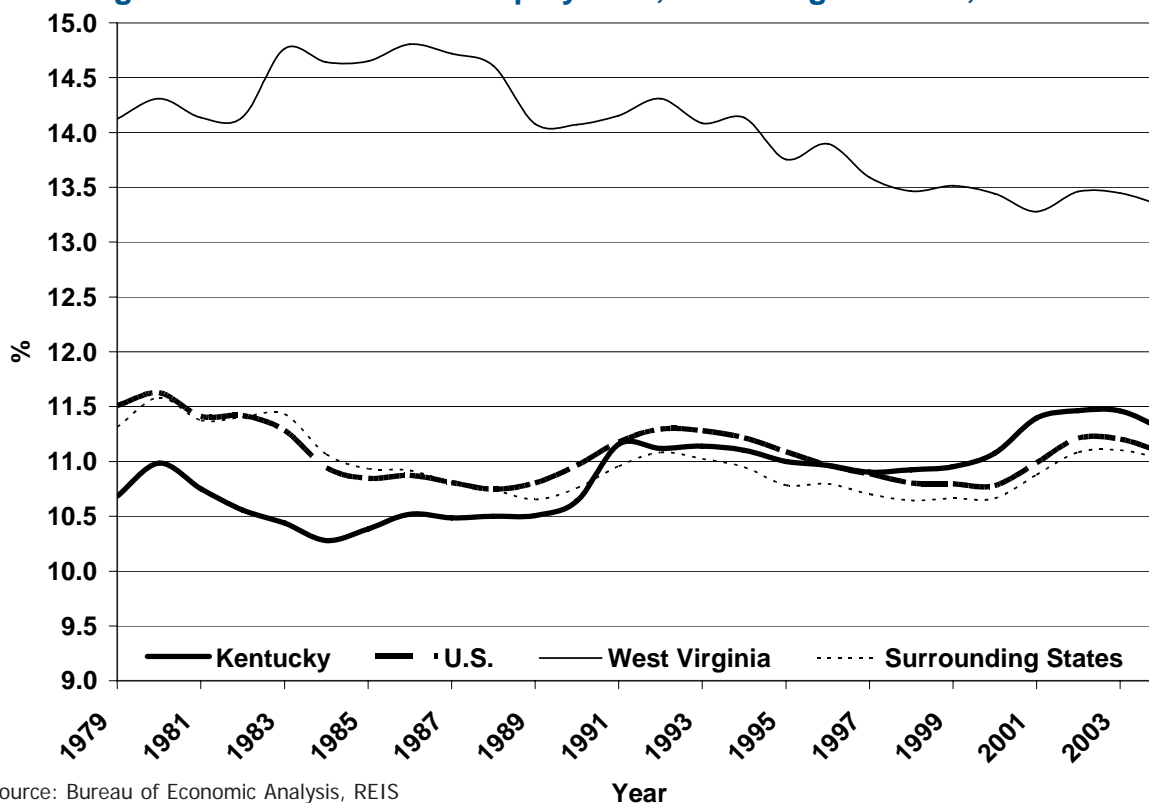
Source: Bureau of Economic Analysis, REIS

West Virginia, and the average of Kentucky's neighbors from 1979 to 2002. West Virginia is included because its spending was so much greater than the other states. Note that while Kentucky's spending, as a fraction of income, is somewhat greater than the average of its neighbors, it essentially follows the same pattern. Note that a very different relationship between Kentucky and its neighboring states spending is found in *Figure 2* when state and local spending is measured on a per capita basis rather than as a fraction of income. In this case, Kentucky is spending somewhat less than its

neighbors and Indiana and Ohio, not West Virginia and Kentucky, are the high spending states. That the lower income states, West Virginia and Kentucky, have higher spending as a fraction of income but generally lower on a per capita basis suggests that spending increases appreciably with income.

Figure 3, depicting the state and local government employment as a percentage of total employment within a state, gives a different perspective on the extent of state and local services in the economies of the states. Here Kentucky follows a pattern very similar to that of its neighbors and the U.S. with West

Table 4: State and Local Government Employment per 1,000 Residents, Selected Years

	Employment per 1,000			Rank			Annual % Change
	1992	1997	2002	1992	1997	2002	
Kentucky	*52.47*	*53.14*	*56.25*	*3*	*4*	*2*	*0.70*
United States	51.68	53.60	54.29	4	3	4	0.49
Illinois	47.51	50.35	51.08	9	8	9	0.73
Indiana	52.48	52.75	52.81	2	5	7	0.06
Missouri	47.64	54.10	55.12	8	1	3	1.47
Ohio	48.29	50.24	53.37	7	9	5	1.01
Tennessee	49.68	52.01	52.91	6	6	6	0.63
Virginia	54.60	53.81	56.40	1	2	1	0.33
West Virginia	50.31	50.70	51.61	5	7	8	0.26

Source: Bureau of Economic Analysis, REIS

Table 5: Salaries, Average for All State and Local Government Employees, Indexed and Adjusted for Inflation

	Monthly Salary, $2002			Rank			Annual % Change
	1992	1997	2002	1992	1997	2002	
Kentucky	*2853*	*3122*	*2648*	*3*	*4*	*6*	*-0.74*
United States	2943	3203	2780	2	2	3	-0.57
Illinois	2824	3194	2677	5	3	5	-0.53
Indiana	2849	3069	2746	4	6	4	-0.37
Missouri	2701	2918	2527	9	9	8	-0.66
Ohio	2960	3287	2889	1	1	2	-0.24
Tennessee	2722	2937	2614	7	8	7	-0.4
Virginia	2707	3009	2504	8	7	9	-0.78
West Virginia	2740	3075	2926	6	5	1	0.66

Based on: U.S. Bureau of Census, Census of Governments and Autho'rs adjustments

Virginia again being a very significant outlier. In contrast, *Table 4* shows that West Virginia has a very low rate of employment per capita with Virginia and Kentucky having the highest per capita state and local employment. That West Virginia has the highest rate of state and local government employment as a fraction of its total workforce but lowest on a per capita basis can easily be explained by the lowest rate of employment among adults ages 18 to 65 there.

Finally, *Table 5* reports on the average earnings (per month) for all state and local employees adjusted for inflation and indexed by average private earnings in the state. The effect of indexing by average private earnings is to deflate the earnings in those states in which private earnings are higher and to inflate them in states with lower private earnings. This is done to reflect the belief that in a competitive labor market, salaries and wages of public employees should reflect the earnings of workers in the same occupations in the private sector. Of course, if states have very different mix of private and public employment,

indexing is not giving an accurate indication of the prevailing private sector earnings in a similar occupation. Having offered this proviso, comparing indexed earnings to nominal earnings across states is still probably a better indication of the relative wage costs in the public sector. As *Table 5* shows, indexed wages are highest in West Virginia and those in Virginia are the lowest with Kentucky's in the middle. In fact, nominal average monthly earnings in Virginia in 2002 were $450 more per month than they were in West Virginia; however, private earnings per month were 23% more in Virginia a significantly greater gap than found in earnings in the public sector.

Differences in State and Local Spending by Government Function

As we examine more rigorously in the next section, some of the differences among states in government spending appear to be related to the mix of spending

Table 6: Share of State in State and Local Government Expenditures, 2002, By Function

	Higher Education	Primary and Secondary Education	Public Welfare	Health	Highways	Correction	Parks and Recreation	Financial Administration	Judicial and Legal Services
Kentucky	*100*	*67*	*99*	*51*	*81*	*65*	*47*	*74*	*82*
United States	84		85	53	61	68	16	55	46
Illinois	68	37	96	81	45	72	7	47	28
Indiana	100	55	89	73	64	74	11	51	30
Missouri	80	39	97	71	59	76	9	55	50
Ohio	92	49	80	30	54	77	11	54	17
Tennessee	100	48	98	75	64	58	26	38	47
Virginia	97	44	79	47	82	69	13	58	46
West Virginia	99	68	100	71	94	85	53	75	68

Source: Author's calculations using data from Census of Governments

Table 7: State & Local Government Expenditures, 2002

	Direct Expenditures			Current Expenditures			Central Administration			Financial Administration			Corrections		
	Per capita	Rank	% Change	Per capita	Rank	% Change	Per capita	Rank	% Change	Per capita	Rank	% Change	Per Inmate	Rank	% Change
Kentucky	*6,073*	*6*	*3.3*	*4,398*	*8*	*3.0*	*69*	*4*	*7.2*	*60*	*6*	*2.1*	*27,233*	*6*	*2*
United States	7,110	1	2.8	5,210	1	2.7	63	5	2.2	66	3	3.0	.	.	.
Illinois	6,944	3	3.5	4,810	4	3.6	90	1	4.5	64	5	3.4	30,133	3	2
Indiana	5,896	8	3.5	4,689	5	3.0	85	2	2.5	45	7	0.7	29,014	4	0
Missouri	5,826	9	3.8	4,328	9	3.6	56	6	4.5	43	8	3.5	20,706	7	2
Ohio	7,009	2	4.1	4,934	3	3.4	51	7	4.0	131	2	8.2	28,904	5	2
Tennessee	6,328	5	1.8	5,077	2	2.9	43	9	3.6	27	9	0.6	19,402	8	-6
Virginia	5,994	7	2.3	4,547	7	2.7	51	8	2.3	65	4	2.6	31,557	2	2
West Virginia	6,609	4	3.5	4,642	6	3.2	80	3	6.6	137	1	7.8	38,374	1	3

	Primary and Secondary Education			Higher Education, State Appropriation			Health			Hospital			Highways		
	Per Student	Rank	% Change	Per Student	Rank	% Change	Per capita	Rank	% Change	Per capita	Rank	% Change	Per capita	Rank	% Change
Kentucky	*7,536*	*7*	*2.22*	*6966*	*2*	*8.88*	*178*	*5*	*7.3*	*175*	*8*	*-1.0*	*477*	*1*	*2.6*
United States				6262	4	1.48	206	3	3.2	304	4	0.1	402	5	1.7
Illinois	8,967	1	2.12	7984	1	4.70	238	2	6.3	176	7	0.5	451	2	1.2
Indiana	8,268	4	2.43	4761	9	-3.09	110	9	2.3	357	2	-0.1	330	7	1.9
Missouri	7,699	6	2.20	6605	3	0.57	124	8	0.9	305	3	4.6	436	3	3.2
Ohio	8,928	2	2.03	5535	6	1.75	270	1	4.9	208	6	-0.1	359	6	1.1
Tennessee	6,489	8	3.20	5241	7	-0.60	179	4	4.5	391	1	0.8	306	8	-1.1
Virginia	7,928	5	2.40	5810	5	3.69	156	6	0.9	281	5	1.8	426	4	1.7
West Virginia	8,451	3	2.64	4824	8	5.66	128	7	1.5	158	9	-1.3	576	1	3.9

	Judicial Services			Natural Resources			Parks and Recreation			Police			Public Welfare		
	Per capita	Rank	% Change	Per capita	Rank	% Change	Per capita	Rank	% Change	Per capita	Rank	% Change	Per capita	Rank	% Change
Kentucky	*77*	*5*	*3.6*	*74*	*3*	*-1.1*	*63*	*8*	*0.9*	*133*	*8*	*2.5*	*1,164*	*2*	*3.5*
United States	109	2	2.7	76	2	1.4	105	2	2.7	224	2	2.5	835	6	2.7
Illinois	88	4	2.8	51	5	5.0	201	1	4.0	256	1	2.9	749	8	1.3
Indiana	62	9	3.3	58	4	3.6	77	5	6.5	145	7	4.0	780	7	3.9
Missouri	66	8	2.3	49	6	-1.2	76	7	1.6	180	5	3.1	948	4	4.2
Ohio	119	1	4.5	37	8	1.9	91	3	4.4	212	3	3.0	852	5	2.7
Tennessee	73	6	3.0	43	7	-0.2	76	6	1.4	169	6	3.3	1,091	3	5.2
Virginia	90	3	4.2	30	9	-2.8	87	4	3.0	180	4	1.8	497	9	3.0
West Virginia	69	7	4.7	99	1	2.3	63	9	3.4	104	9	4.5	1,183	1	4.2

Source: Author's calculations using data from Census of Governments

between the state and local governments. In *Table 6* we list the share of the state government in state and local spending by function for 2002. Kentucky is, in most functions, much more centralized than most of its neighbors with West Virginia again being the exception. The tendency towards centralization in Kentucky is most apparent in primary and secondary education, highways, and parks and recreation.

Table 7 provides a summary of state and local expenditures for 2002 for a number of government functions. These are measured on a per capita basis with exceptions

being education services, measured on a student basis, and corrections measured on an inmate basis.

As with total state and local spending, for most government functions Kentucky generally ranks in

Table 8 Highway Expenditures, Per Mile Traffic Flow $2002 for 1999

	Road Miles			Lane Miles		
State	Local	State	Combined	Local	State	Combined
Kentucky	*7*	*55*	*24*	*4*	*25*	*12*
Missouri	11	42	19	5	19	9
Indiana	9	121	23	5	48	11
Tennessee	10	90	23	5	36	11
West Virginia	24	27	26	12	13	13
Illinois	20	117	32	10	45	15
Ohio	21	102	36	10	41	17
Virginia	44	41	41	20	19	19

Source: Federal Highway Administration

Table 9: Average Tuition in Public Higher Education Institutions, Selected Years ($2002)

	1997	Rank	2000	Rank	2002	Rank	Annual % Change
Kentucky	*2595*	*6*	*3329*	*4*	*3291*	*7*	*4.9*
Illinois	1608	8	1926	8	2217	8	6.6
Indiana	3725	3	4294	1	4848	2	5.4
Missouri	4322	1	3095	6	3332	6	-5.1
Ohio	3755	2	4199	2	5090	1	6.3
Tennessee	2412	7	3154	5	3887	3	10.0
Virginia	3533	4	3548	3	3597	4	0.4
West Virginia	2893	5	2990	7	3392	5	3.2

Source: The NCHEMS Information Center (www.higheredinfo.org)

the middle to low range on per capita spending. Exceptions are public welfare and highways and higher education (per student). Of course, while public welfare is state-administered, spending and revenues are in large part federally funded and, of course, means tested, reducing much of the discretion of the state. A significant share of highway funding also comes from federal funds as well. *Table 8* provides an alternative measure of highway costs, cost per mile of traffic flow. By this measure, Kentucky's highway costs are relatively low, perhaps an indication of a great deal of out-of-state traffic on Kentucky roads.

Kentucky's high level of state appropriations per student for higher education probably reflects a relatively small share of funds for its public colleges and universities coming from tuition or private funds as shown in *Table 9*.

Based on the rather simplistic measure of costs per capita, barring any dramatic differences in either the quality and extent of services or the costs of

producing services between Kentucky and its neighboring states, there appears to be little evidence that Kentucky is producing these services in either an unreasonably costly way or extraordinarily cost-effective manner. In the next section, we examine the determinants of government service costs more rigorously.

Determinants of Differences among States in the Costs of Government Services

While the preceding section documents differences in the costs of government services among Kentucky and its neighbors, it offers no explanation as to why these differences might arise. Here, using findings of Hoyt et. al. (2005), we discuss some of the determinants of these differences in spending. As discussed in the *Introduction*, we consider two broad categories of characteristics of the state: socio-economic factors, presumably outside the control of governments, and characteristics of its government structure. Socio-economic factors include the population, poverty rate, median income, unemployment rate, the ratio of employment to population, the fraction of the population that is African-American, the fraction Hispanic, the fraction Native American, the fraction of the population living in an urban area, and median age.

Characteristics of the state government structure include average county population, average

Table 10: Sources of Differences among States in State and Local Government Expenditures

	(a) Difference from Mean	(b) Pop-lation	(c) Expend-iture Share	(d) # of Local Govern-ments	(e) Source of Revenue	(f) Relative Earnings	(g) Income-Employ-ment	(h) Demo-graphics	(i) Explained	(j) Difference between Explained & Actual
Kentucky	*-221*	*707*	*399*	*77*	*-55*	*-450*	*-33*	*43*	*688*	*-849*
Illinois	466	-1,435	-253	28	92	764	-49	-75	-928	991
Indiana	-389	251	-79	40	-17	-157	132	137	307	-744
Missouri	-562	396	-12	111	95	-111	84	76	639	-1,117
Ohio	504	-1,161	82	-16	-125	37	60	118	-1005	1,078
Tennessee	189	362	-307	11	283	-219	-15	38	153	71
Virginia	-161	-75	27	-333	-120	387	-75	13	-176	-30
West Virginia	174	1,663	542	160	-208	-701	-139	-306	1011	599

Source: Hoyt et.al. (2005)

Figure 4: Economies of Scale for Total State and Local Expenditures

Source: Hoyt and Garen (2004)
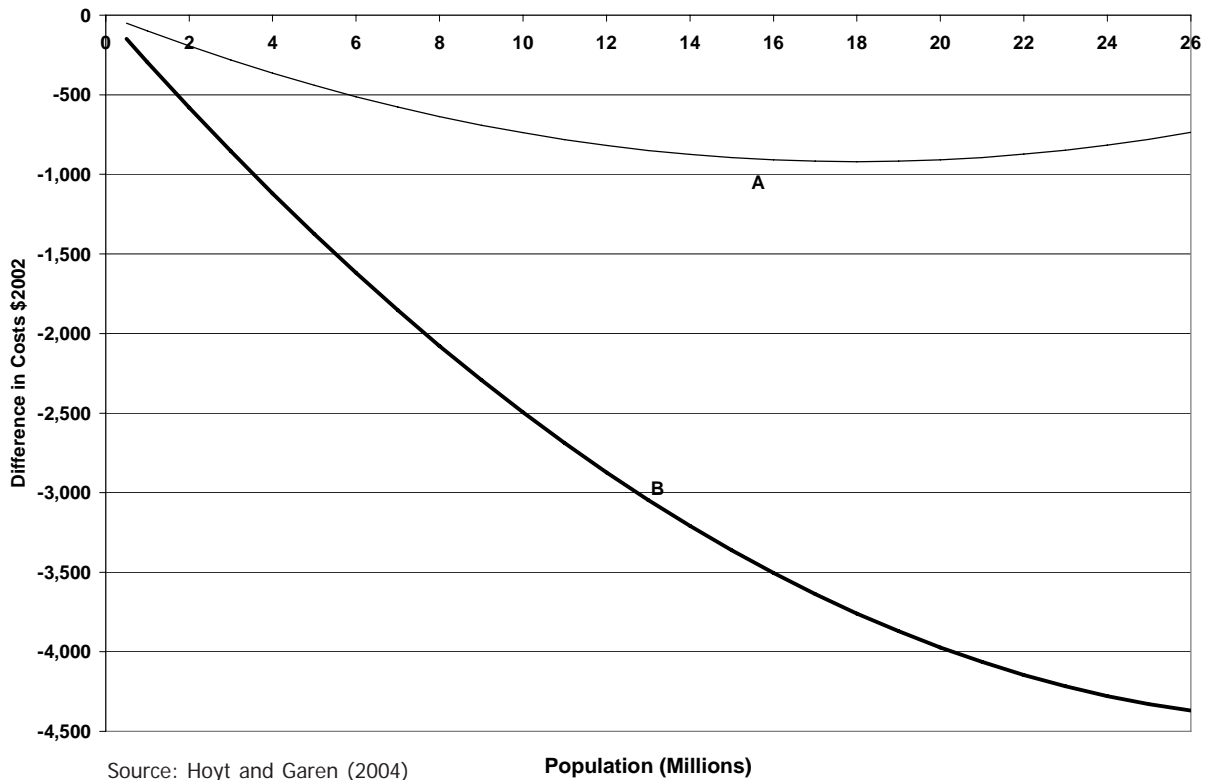
municipal population, and the average number of students per school district. These factors are intended to reflect the existence of economies or diseconomies of scale in local governments. Also included were measures of the state share of expenditures, the fraction of state and local revenue coming from the federal government, and the fraction of local revenue coming from the state government to determine if either the level of the source or spending influenced the level of spending. Also included was our measure of public earnings relative to private earnings in the state. Finally, the composition of the upper and lower house (% Democrat) and the affiliation of the Governor are included as characteristics of the government.

While Hoyt et. al. (2005) examines the determination of spending for a number of government functions; here we only discuss their findings for total state and local spending and for state and local administrative spending. Based on the estimation in Hoyt and Garen (2004), *Figure 4* characterizes the estimated relationship between total state and local spending per capita and state population for a regression in which only the only

factor considered was population (line A) and a regression which controlled for the other factors discussed in the preceding paragraph (line B). Based on population alone, the predicted difference in per capita spending between the state with the largest population (Illinois, 12,653,544) and smallest (West Virginia, 1,810,354) is $675 per capita, with West Virginia having the greater spending. In contrast when controlling for other factors likely to influence total state and local spending, spending in West Virginia is predicted to exceed spending in Illinois by over $2,100 per capita. In fact, in 2002 state and local spending in West Virginia was over $300 less per capita than in Illinois.

If, as according to our regression results, increases in the population of the state reduce per capita spending other factors must explain the relatively low per capita spending in the Kentucky, Missouri, and West Virginia. Column (a) of *Table 10* reports the difference in total state and local government spending per capita between each state and the mean of the eight states. Columns (b) – (h) decompose the predicted difference in spending among the states based on our estimation results.

Table 11: Sources of Differences among States in Administrative Expenditures

	Deviation from Mean	Pop-lation	Expend-iture Share	# of Local Govern-ments	Source of Revenue	Relative Earnings	Income-Employ-ment	Demo-graphics	Explained	Difference between Explained & Actual
Kentucky	*-60*	*142*	*16*	*10*	*-19*	*-3*	*3*	*-113*	*36*	*96*
Illinois	22	-146	-9	5	16	6	-16	188	44	22
Indiana	2	25	-3	6	13	-1	9	-38	11	10
Missouri	-78	40	0	16	-21	-1	19	-32	21	99
Ohio	100	-120	3	0	11	0	4	-19	-120	-220
Tennessee	-92	36	-10	-5	-18	-2	14	5	20	112
Virginia	2	-9	1	-36	28	3	-16	84	55	53
West Virginia	45	175	18	14	-29	-5	-15	-189	-32	-76
Mean		308								

Source: Hoyt et.al. (2005)

Each of these columns represents expenses predicted to be above or below those of the average due to that factor. For example, because expenditures are predicted to be lower as population increases and Kentucky's population is below the average of the states, its per capita spending is predicted to be $707 more per capita (column (b)). Because more centralized spending (more by the state) is found to increase total spending and Kentucky has a greater share of its spending done by the state government, its per capita spending is expected to be $399 more (column (c)). The large number of local governments in Kentucky or, more precisely, small population per governmental unit, results in a slight increase in per capita expenditures ($77) as does its demographics ($43). Centralized revenue collection, lower public earnings, and lower income and average earnings are all predicted to reduce spending relative to average of the states. Column (i) provides the totals of columns (b) – (h). For Kentucky, this total is $688, meaning that based on its characteristics and our estimate of the relationship between the characteristics of these eight states and per capita spending, Kentucky's per capita spending should be $688 more than the average. In fact, as reported in column (a), Kentucky's spending is $221 below the average. Then the difference between these two numbers, $849, is the unexplained difference for Kentucky. If we believed we had fully captured the determinants of both the demand and costs functions for government services, we might reasonably assert that this difference reflects "waste", that is, unexplained differences in costs. However, lacking the confidence to make such an assertion, we might make the safer assertion that Kentucky's total expenditures do not seem excessive given the composition of its population, its economy, and the structure of its government.

As another example of this type of exercise in explaining the determinants of government costs, *Table 11* provides a decomposition of the determinants of state and local per capita administrative costs based on an analogous regression. Again, Kentucky's actual costs are below the mean (-$60) with qualitatively similar impacts of the alternative factors on predicted costs. However, in this case, explained costs are $36 greater than the mean of the states meaning that Kentucky's per capita administrative costs are $96 than expected given its characteristics.

Conclusion

While undoubtedly important, answering the questions whether or how efficiently government services are provided is likely to prove difficult for a number of reasons. Perhaps the greatest single detriment to the determining the efficacy of public service provision is the absence of a market for these services which would offer a "market-test" of whether they were efficiently provided. In the absence of a viable market for government services, we rely on less direct methods of ascertaining the existence and extend of inefficiency in their production and provision. However, attempts to compare the costs of public services across state and localities is impaired by difficulties in measuring output or controlling for differences in the quality of public services. Accounting for inefficiency is further

plagued by the fact that characteristics of the state, particularly its population, may affect the costs of providing services to its residents.

With these caveats in mind, here we compare the expenditures on, not the efficiency in provision of, state and local government services between Kentucky and its surrounding neighbors. In terms of total state and local expenditures and for most government functions, on a per capita basis generally Kentucky spends below the average. While higher education appropriations and highway spending are notable exceptions, the higher education appropriations appear to offset lower tuition and while highway spending is high on a per capita basis it is relatively low when adjusting for traffic volume. In addition to documenting differences in spending between Kentucky and its neighbors, we also estimate a relationship between government expenditures and characteristics of the state that are likely to influence government expenditures including socio-demographic and government structure ones. Our results suggest that per capita government expenditures are negatively related to state population and positively related to the number of local governments in a state, suggesting economies of scale in the provision of government services. As Kentucky has a smaller population than all but one of its neighbors and far more governments per capita, these factors tend to increase expenditures in Kentucky. Lower public earnings and demographics act to reduce expenditures on government services in Kentucky.

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The Minimum Wage and Kentucky's Working Poor:

Low Hours or Low Wages?

Kenneth R. Troske and Aaron Yelowitz

Many policymakers in Kentucky have suggested raising the state's minimum wage as a way to help poor families. In this report, we examine which Kentucky workers would be helped and hurt by a $7 minimum wage in Kentucky. The results indicate that both the poor families, which the minimum wage increase is intended to help, and the state as a whole would be, if anything, less well off if the wage was raised. We investigate the earned income tax credit as an alternate method of assisting poor families and find it to be less disruptive and more likely to assist the targeted recipients.

Introduction

It has now been almost 10 years since the last increase in the federal minimum wage. After adjusting for inflation, the minimum wage is at its lowest level in over 50 years. That has led 18 states and the District of Columbia to increase their minimum wages. In the November 2006 election, voters in six additional states raised the minimum wage. A natural question is whether Kentucky should follow suit. To answer this question we examine the effects of raising the minimum wage for workers in Kentucky to $7 an hour, or $1.85 an hour more than the current federal minimum wage.

Most supporters of increasing the minimum wage argue that it would help workers in poor families (the "working poor") by providing them with a "livable wage." They also argue that it is the socially fair thing to do. Unfortunately, as anyone who has closely studied the minimum wage knows, increases in the minimum wage have a very small impact on poverty. In addition, the impacts of the minimum wage are far from fair by any measure—the minimum wage tends to provide a small amount of help to the most-skilled low-wage workers while imposing a severe hardship on the least-skilled low-wage workers. Finally, by lowering the demand for less-skilled labor among employers, increasing the minimum wage actually exacerbates the primary problem faced by workers in poor families—they are poor because they are out of the workforce for more than four months out of the year, not because they earn exceptionally low wages.

The goal of this report is to use a large representative data set, the March 2005 Current Population Survey (CPS), to document which Kentucky workers are helped and hurt by the proposed increase in the minimum wage. Along the way we will present estimates of how many Kentucky workers would lose their jobs if the minimum wage were raised from $5.15 to $7 an hour. Finally, we will suggest some alternative policies that are much better targeted towards the working poor because they address the root causes of poverty. These alternative policies could potentially have a much larger impact on poor working families in Kentucky.

A Description of the Current Population Survey

The primary dataset used in our analysis is the 2005 March CPS Annual Social and Economic Survey (U.S. Department of Commerce, Bureau of the Census, 2005). We begin our report with a brief description of these data.

The CPS is a credible and widely respected survey. The March 2005 CPS surveys nearly 77,000 households and asks questions that specifically address issues of employment and wages. It is administered by the Bureau of the Census for the Bureau of Labor Statistics and has been conducted for more than 50 years.[1] The response rate for the March survey is exceptionally high for a voluntary, household-based survey.[2] The sample is scientifically selected to represent the civilian non-institutional

population. The Census Bureau states that the CPS sample provides estimates for the nation as a whole and contributes to model-based estimates for individual states and other geographic areas. The CPS is conducted by telephone and in-person (and thus includes residences without telephones).

The March 2005 CPS surveyed 210,648 people across the nation (76,447 households), and 3,033 people in Kentucky (1,138 households). When appropriately weighted, the estimated population count from the CPS is 291,156,238 for the United States and 4,074,129 for Kentucky. The count for Kentucky exactly matches published Census tabulations, while the count for the United States appears to be subject to a trivial amount of rounding error.[3] Unless otherwise noted, all estimates in the paper are based on the weighted data.

The 2005 March CPS also identifies a number of localities in Kentucky, including Bowling Green, Lexington, Louisville, and northern Kentucky. These localities, when weighted, represent more than 40 percent of Kentucky's population, with Louisville and northern Kentucky alone representing 30 percent. Identification of these localities is important, because a significant portion of Kentucky's population lives in "border cities" where businesses can move across state lines (to Indiana, in the case of Louisville, and Ohio, in the case of northern Kentucky) in response to an increase in the cost of doing business in Kentucky. In such cases where businesses could move yet remain in the same labor market, one might expect that some jobs would be shifted from Kentucky to other states if employers were suddenly forced to pay higher wages to some workers in Kentucky. In our analysis of the labor market, we make adjustments for such border cities.

Employment information in the CPS is elicited for all household members age 16 and over. The survey asks all adults questions about usual hours worked per week, annual earnings, weeks worked per year, employer's industry and firm size. Typically, a single CPS respondent reports for everyone in the household, although telephone call-backs to obtain particular items of information known only by someone else in the household are fairly common.[4]

The CPS provides demographic information for all respondents on age, education, race, ethnicity, gender, marital status, and disability. It also provides sufficient information to identify family relationships across household members. This information is critical for classifying low-wage workers.

Characteristics of Low Wage Workers

We will use the CPS data to produce a picture of what type of workers earn wages below the proposed $7 minimum wage and what type of workers are from poor families. If workers earning wages below the proposed minimum wage look like workers from poor families, then we would conclude that changes in the minimum wage could help workers from poor families. However, if the two populations look very different, then it is more difficult to imagine how changes in the minimum wage could help workers in poor families.

Table 1 presents, successively, summary statistics for non-elderly adults (those aged 16 to 64), adult workers, low-wage workers, and workers in poor families. We define low-wage workers as those workers who are earning less than $7 an hour according to the CPS, since these are the workers that will be most affected by the change in the minimum wage.[5] We classify workers as being in poor families using the poverty line defined by the U.S. government. In the U.S. the poverty threshold is fixed (in real dollars) over time but varies by the number of individuals living in the household. In 2004 a four-person household consisting of two adults and two related children was considered poor if total household income was less than $19,157.

Looking at Table 1 we see that 2.01 million of Kentucky's 2.69 million non-elderly adults, or 75 percent, worked during 2004, with the average worker's age being 38.5 years. Among all workers, family income averaged more than $65,000 and just 10 percent lived in poverty (all dollar amounts are expressed in 2006 dollars). The average wage among all workers was nearly $18.32 per hour. In addition, the average worker received approximately $1.03 per hour in employer contributions to health insurance plans.

Approximately 19 percent of all workers are low-wage workers earning less than $7 per hour. These workers are clearly different from higher-wage workers, yet they are also different from workers who live in poverty. Low-wage workers are much younger, on average. The average age of low-wage workers is 32.1, making the typical low-wage worker more than six years younger than the typical adult worker. Among low wage workers 52 percent are teenagers

TABLE 1
Summary Statistics of Kentucky Adults, 2004
(Author's tabulation of 2005 March CPS)

	All non-elderly adults	All workers	Workers Under $7 Per Hour	All Poor Workers
Weighted Sample in Kentucky	2,696,043	2,012,061	380,929	201,300
Individual Demographics				
Age in years	39.1	38.5	32.1	32.2
Aged 16 to 19	7.9%	5.3%	16.8%	10.1%
Aged 20 to 29	22.7%	24.9%	36.3%	41.0%
Aged 30 to 39	19.1%	21.0%	18.5%	23.7%
Aged 40 to 49	22.7%	25.3%	14.5%	12.8%
Aged 50 to 59	21.0%	18.8%	11.1%	11.1%
Aged 60 to 64	6.7%	4.6%	2.9%	1.4%
Married	53.7%	56.7%	33.8%	29.9%
Male	49.5%	51.1%	42.0%	43.3%
No High School Diploma/GED	21.3%	13.4%	32.0%	27.8%
Enrolled in School	9.9%	7.0%	23.2%	11.8%
White	90.7%	90.9%	90.6%	88.9%
African-American	7.2%	7.1%	7.8%	6.7%
Individual Work Behavior				
Worked in 2004	74.6%	100.0%	100.0%	100.0%
Uninsured	19.0%	18.4%	37.0%	50.5%
Employer Health Insurance In Own Name	43.6%	54.1%	20.3%	19.8%
Adult has disability	13.2%	3.6%	5.8%	3.5%
Annual hours worked		1831.3	1441.2	1219.6
Usual Work Hours Per Week		39.3	35.9	36.0
Weeks Worked in 2004		45.5	39.2	33.0
Wage Rate		$18.32	$5.63	$7.14
Wage Gap to $7.00		$0.26	$1.37	$1.03
Health Insurance Hourly Rate		$1.03	$0.22	$0.72
Under $7.00 Per Hour		19%	100%	69%
Annual Cost of Raising Wage		$368.72	$1,947.60	$1,390.49
Family Characteristics				
Family Total Income	$58,601.86	$65,107.69	$34,355.79	$8,619.94
Number of Family Members	2.7	2.8	2.7	2.5
Number of Children Under 18	0.7	0.7	0.7	1.0
Under 100% of Poverty	16.5%	10.0%	36.2%	100.0%
Over 400% of Poverty	36.1%	41.9%	15.3%	0.0%
How Worker Fits Into Household				
One worker (single or married) with kids		11.7%	12.5%	29.2%
Worker lives with parent or relative		15.5%	28.0%	12.1%
Two workers in married couple with or without kids		45.8%	25.6%	16.8%
One worker (single or married) without kids		20.7%	21.9%	24.4%
Non-relative		6.3%	12.0%	17.6%

Notes: Authors' tabulation of 2005 March CPS, covering the 2004 calendar year. All dollar amounts are expressed constant 2006 dollars. Wage rate is computed by dividing annual earnings by the product of usual hours worked per week and weeks worked; non-negative values of the wage rate that were below $5.15 were then imputed as $5.15 an hour. The CPS asks only individuals aged 16 to 24 whether they are enrolled in school; the analysis assumes no adults age 25 and over are enrolled in school.

or in their twenties, compared with 30 percent of all workers. They are also far more likely to be single and enrolled in school: only 33 percent of low wage workers are married compared to 56 percent of all workers, while nearly one-quarter of low wage workers are still in school compared with only 7 percent of adult workers.
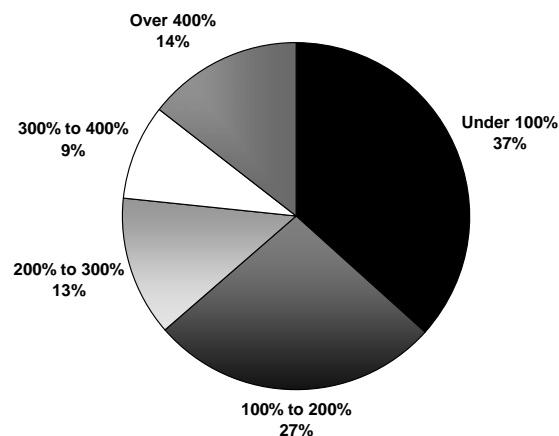
Although the average wage rate among low-wage workers is only $5.63 per hour, these workers tend to live in households that are far from poor. The average family income of low-wage workers exceeds $34,000. As Figure 1 shows, slightly more than one-third of workers live in families with incomes below 100 percent of the poverty line, and just as many live in families with incomes at least 200 percent of the poverty line. Perhaps most relevant, however, is how the worker fits into the household. As we can see in Figure 2, only 12 percent of low wage workers are sole-earners supporting children. The most common living arrangement for a low-wage worker is with his or her parents (or other relatives), which is the living arrangement of 28 percent of low-wage workers. More than 25 percent are spouses in two-earner families, and 33 percent are either childless workers or non-relatives in the household (e.g., roommates). Thus, the notion that raising the minimum wage primarily benefits poor working families is mistaken. (See, for example Economic Policy Institute's web site, http://www.epinet.org/content.cfm/issueguides_minwage_minwagefacts). These figures should dispel the notion that poverty and low wages are synonymous.

The notion is further dispelled by looking at workers in poor families. Returning to the final column of Table 1, here we see that 64 percent of workers in poor families are between 20 and 39 years old compared with only 54 percent of low wage workers. In addition, only 11.5 percent of workers in poor families are in school, a number that is almost double that of all adult workers but well below the number for low-wage workers. However, the most striking difference between low-wage workers and workers in poor families concerns their wages. The average wage among workers in poor families is $7.19 per hour – higher than a $7 per hour minimum wage. More than one-third of workers in poor

families have wages above the proposed minimum wage. The key difference between poor workers and the typical adult worker is in hours of work —workers are poor because, on average, they work 1,236 hours per year compared with 1,831 hours per year for all adult workers. As we will show in Table 4, the poverty rate could be dramatically lowered if less skilled adults worked full-time throughout the year. Finally, when we look at how workers in poor households fit into the family we see that 29 percent of workers in poor families are sole workers in families with children, in contrast to the 12 percent of low-wage workers.

Clearly there are some significant differences between the typical low-wage worker who would be affected by an increase in the minimum wage and the typical worker in a poor household. Minimum wage workers tend to be young, are likely to be enrolled in school and live with a parent or relative who still works. Research by Carrington and Fallick (2001) also finds that minimum wage workers typically earn the minimum wage for a relatively short period of time. All of this suggests that the majority of minimum wage workers are young workers in the early part of their careers who earn the minimum wage for only a short period. In contrast, the typical worker in a poor household is older, earns a wage above $7.00 an hour and is the sole worker in a family with children. The primary reason workers tend to be poor is not due to low wages, but is due to working fewer hours than the typical adult worker. Given these differences between low wage workers who would be affected by the

Figure 1
Poverty Status of Low Wage Workers

proposed change in the minimum wage and poor workers, it seems highly unlikely that an increase in Kentucky's minimum wage would have much impact on poor workers.

Effect of Kentucky's Proposed Increase in the Minimum Wage

We now use the CPS data to estimate what effect the proposed minimum wage increase would have on the Kentucky labor market and on workers. One of the fundamental principles of economics is that if the price of a good increases the demand for that good will fall. Another way of stating this principle is that demand curves slope downwards. This principle has been well documented and shown to be true for goods as varied as apples, gasoline and (most important for our purposes) labor. This means that if the price or wage for labor is increased then the demand for labor will fall. The only question is: by how much will demand fall?

Economists use a concept called elasticity to measure how responsive the demand for a good is to changes in the price of the good. The elasticity indicates how much the demand for a good will decline when the price of the good increases by 1 percent. For example, if the elasticity of a good is -0.5 this means that a 10 percent increase in the price of a good will lead to a 5 percent decrease in the demand for the good. In a report published by the Show-Me Institute David Neumark (2006) has reviewed the economics literature estimating how responsive labor demand is to changes in the minimum wage.

According to Neumark the best estimates of the elasticity fall in the range of -0.1 to -0.3, meaning that a 10 percent increase in the minimum wage will lead to a fall in labor demand of 1 percent to 3 percent. David Neumark and William Washer (2000) estimate an elasticity of -0.22.[6] When estimating the impact of the proposed increase in the minimum wage on the Kentucky labor market we will assume elasticities of -0.1, -0.22, and -0.3. However, there are reasons to believe that the impact of the proposed minimum wage increase would be larger in some parts of Kentucky than in others because the two major labor markets in Kentucky — Louisville and northern Kentucky — are both located on the borders of the state. This means that it would be relatively easy over the long run for business in these two areas to relocate to Indiana or Ohio, where the minimum wage has not changed, in reaction to the increase in the minimum wage in Kentucky. Therefore, we will also produce an estimate of the impact of the proposed increase in the minimum wage assuming an elasticity of -0.3 for workers in Louisville and northern Kentucky and assuming an elasticity of -0.22 for workers in the rest of Kentucky.

Table 2 contains our estimates of job loss from Kentucky's proposed new minimum wage. Using the March CPS, we estimate that there are 380,929 workers with hourly wage rates under $7.00. The first row in Table 2 presents our best estimate of the job losses that would occur in Kentucky with the proposed increase in the minimum wage. In this line we apply an elasticity estimate of -0.3 to workers in the two "border areas," Louisville and northern Kentucky, and an elasticity of -0.22 to workers in the rest of Kentucky. When we do so, we find that the minimum wage increase would result in a loss of more than 24,298 jobs, representing 6.3 percent of low-wage employment. The other lines in Table 2 present estimates of the job loss assuming elasticities of -0.1, -0.22 and -0.3, respectively.

Table 3 profiles job losers and job keepers, based on our estimates from line 1 in Table 2. To create this profile, we examine the 380,929 low wage workers, separating them out into the 24,298 who would lose their
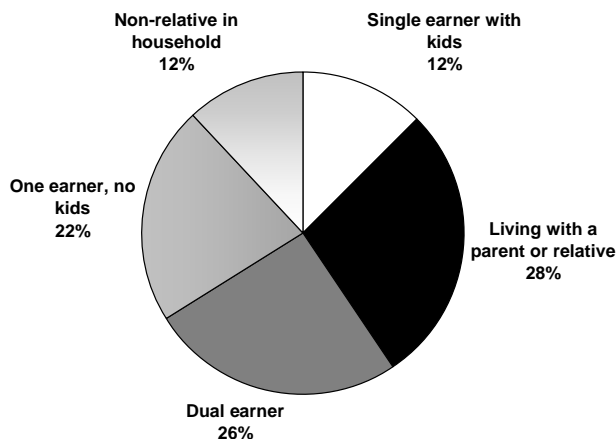
Figure 2
Household Structure of Low Earners

TABLE 2
Estimates of job loss by raising minimum wage to $7 per hour
(Authors' calculations using 2005 March CPS)

Elasticity	Job Loss	Low Wage Workers	% of Low Wage Workers
-0.22 except Louisville & Cincinnati	24,298	380,929	6.4%
-0.22	21,556	380,929	5.7%
-0.10	9,792	380,929	2.6%
-0.30	29,392	380,929	7.7%

jobs based on our calculations and the 356,631 who would keep them.[7] The most remarkable finding is that both groups look extremely similar in terms of demographics. Both those who keep their jobs and those who lose their jobs tend to be young (over 16 percent of both groups are under 20 years old) and still in school. In addition, neither group is particularly poor: the typical worker in each group lives in a household with around $32,000 in family income. In both groups more than ten percent of workers live in families with incomes that are over four times the poverty line. All of this provides further evidence that the minimum wage effects are not well targeted at the poor. The 356,631 workers who receive a pay raise (and keep their jobs) add $685 million in labor costs, while those who lose their jobs reduce labor expenditures by $183 million. In total, the labor costs of Kentucky businesses would likely increase by more than $500 million due to the minimum wage proposal.

One additional important fact to note is that the proposed increase in the minimum wage would result in relatively small gains in income experienced by some workers and in very large losses felt by other workers. On a per-worker basis, those who keep their jobs would see their incomes rise by $1,921 — an increase of 5.5 percent in their family incomes, while those who lose their jobs would see their incomes fall by $7,536 — a decrease of 24 percent in their family incomes. While it is impossible to assess whether the increase in income among those who keep their jobs is worth more than the loss in income suffered by those who lose their jobs, what is clear is that the rather small gain in income experienced by some workers would be paid for by a severe loss in income suffered by other workers.

Impact of the Minimum Wage, Work Hours and the EITC on the Poverty Rate

In the final part of our analysis we estimate the impact the $7 minimum wage would have on the poverty rate. Table 4 simulates poverty reductions from raising the minimum wage, and also considers how the poverty rate would change if, instead of raising the minimum wage, all low-wage workers and workers in poor families worked full-time (2,080 hours in a year, the product of 40 hours per week of work and 52 weeks per year). Finally, the table simulates the effects of a state-level earned income tax credit ("EITC") that matched the federal EITC.

The table presents poverty estimates for the 4.07 million individuals in all families, the 948 thousand individuals in families with a low wage worker, and the 754 thousand individuals in poor families. Among all individuals in Kentucky, the poverty rate was 18.5% in 2004. Among individuals in families with a low-wage worker, the poverty rate was 28.3%, and by definition, the poverty rate was 100% for individuals in poor families. The reason why the poverty rate in Table 4 differs for low wage workers is because this table includes other family members besides the low wage worker (e.g., non-workers, children, elderly, etc.).

Among individuals in families with low-wage workers — the only individuals for whom a higher minimum wage could reduce poverty — poverty rates would fall by 9 percent if the minimum wage was raised to $7 per hour, after accounting for hours reductions due to the higher wage floor. Although this reduction is certainly significant, it pales in comparison to the results of policies that would

TABLE 3
Job Losers and Job Keepers Under $7 Per Hour Minimum Wage
(Authors' tabulation of 2005 March CPS)

	Job Losers	Job Keepers
Weighted Sample in Kentucky	24,298	356,631
Individual Demographics		
Age in years	31.2	32.2
Aged 16 to 19	16.1%	16.8%
Aged 20 to 29	41.7%	35.9%
Aged 30 to 39	17.7%	18.5%
Aged 40 to 49	12.1%	14.7%
Aged 50 to 59	9.0%	11.2%
Aged 60 to 64	3.4%	2.8%
Married	31.6%	33.9%
Male	42.5%	42.0%
No High School Diploma/GED	29.2%	32.2%
Enrolled in School	22.6%	23.2%
White	88.7%	90.7%
African-American	9.3%	7.7%
Individual Work Behavior		
Worked in 2004	100.0%	100.0%
Uninsured	37.4%	36.9%
Employer Health Insurance In Own Name	19.6%	20.3%
Adult has disability	6.2%	5.8%
Annual hours worked	1412.7	1443.2
Usual Work Hours Per Week	36.0	35.9
Weeks Worked in 2004	38.7	39.2
Wage Rate	$5.34	$5.65
Wage Gap to $7.00	$1.66	$1.35
Health Insurance Hourly Rate	$0.24	$0.22
Under $7.00 Per Hour	100.0%	100.0%
Annual Cost of Raising Wage	$2,331.98	$1,921.41
Family Characteristics		
Family Total Income	$31,465.85	$34,552.69
Number of Family Members	2.6	2.7
Number of Children Under 18	0.7	0.7
Under 100% of Poverty	40.3%	35.9%
Over 400% of Poverty	12.8%	15.5%
How Worker Fits Into Household		
One worker (single or married) with kids	12.0%	12.5%
Worker lives with parent or relative	28.0%	28.1%
Two workers in married couple with or without kids	23.6%	25.7%
One worker (single or married) without kids	23.7%	21.8%
Non-relative	12.8%	12.0%
Increase In Wage Bill For Job Keepers		$685,233,656
Decrease In Wage Bill For Job Losers	-$183,130,894	
Total Increase In Wage Bill		$502,102,762

Notes: Authors' tabulation of 2005 March CPS, covering the 2004 calendar year. All dollar amounts are expressed constant 2006 dollars. Wage rate is computed by dividing annual earnings by the product of usual hours worked per week and weeks worked; non-negative values of the wage rate that were below $5.15 were then imputed as $5.15 an hour. The CPS asks only individuals aged 16 to 24 whether they are enrolled in school; the analysis assumes no adults age 25 and over are enrolled in school.

TABLE 4
Impact of Policies on Poverty Rates

	All individuals	Individuals in families with low wage worker	Individuals in poor families
Baseline Poverty Rate	18.50%	28.27%	100.00%
Raise Minimum Wage to $7 with hours reduction	17.90%	25.72%	96.79%
Full time, full-year work for non-elderly adults	16.58%	20.04%	89.64%
State level EITC equal to federal EITC for adults not enrolled in school	17.28%	26.69%	93.44%
Population	4,074,129	947,953	753,608

encourage workers to work full-time. The poverty rate among this group falls by 29 percent by simply bringing low-wage workers and non-working adults up to full-time, full-year work, *at their existing wages.* Lastly, we observe that a state-level EITC that matched the federal EITC reduces poverty among this group by a smaller amount than the minimum wage.

Next, we turn to the 754 thousand poor individuals in Kentucky. As we have shown in Table 1, poor workers live in quite different circumstances than low-wage workers, and different policies are socially desirable if the ultimate goal is to alleviate poverty. Raising the minimum wage would remove approximately 24 thousand individuals from poverty. Increasing work effort among adults would remove 78 thousand individuals from poverty and raising the EITC would remove nearly 50 thousand from poverty.

The first column shows the overall effect on poverty in Kentucky. Raising hours of work reduces poverty rates by nearly two percentage points.[8] In this case we observe that raising the minimum wage would have a trivial effect on overall poverty. For example, the poverty rate would fall by 0.6 percentage points after we account for the resulting loss in jobs. The numbers in Table 4 again demonstrate that the problem of poverty stems from a lack of work hours much more than from low wages. What is particularly insidious about increasing the minimum wage is that it provides employers with an incentive to *decrease* the hours of low wage workers—which has exactly the opposite effect that we need to decrease poverty among poor workers. Instead we should consider adopting or expanding programs that are designed to encourage poor workers to enter the labor market or to work more hours.

The best way to increase the hours worked by workers in poor families depends on the reasons why workers are not working full-time. Three possible reasons why workers in poor families work so few hours are: that poor workers do not have enough incentive to work or to work more hours; that poor workers lack the necessary skills to obtain full-time jobs; or that poor workers have situations—such as taking care of children or transportation issues—that make it very costly for them to work at full-time jobs. However, we already have a number of government programs designed to help workers with these problems. First, the Earned Income Tax Credit (EITC) is a program that gives poor workers a tax credit if they work but have low earnings. The EITC has historically provided very modest tax credits for childless households and more substantial credits to households with children (while differentiating between households with one child and those with more than one child).

The major advantage that the EITC has over the minimum wage is that instead of providing a wage subsidy for relatively wealthy teenagers, the EITC is directly targeted at workers in poor households. Initially, the EITC is phased-in with a "credit rate," which is, in essence, a wage subsidy. From 1994 onward, this subsidy has been equal to 34 percent for one-child households and 40 percent for two-plus child households. In 2006, the maximum subsidy was $2,747 for a household with one child and income between $8,080 and $14,810, and $4,536 for a household with two or more children and income between $11,340 and $14,810. A full-time worker in these circumstances who earned the minimum wage could be entitled to a tax credit as high as $4,285.[9] After household income exceeds $14,810, the credit is gradually phased out. Households with incomes exceeding $36,348 would not be eligible for the EITC in 2006.[10]

The EITC moves many workers out of poverty.[11] The EITC provides a strong incentive for poor individuals who are currently not working to begin

working, and it provides incentives for poor workers who are doing some work to increase the amount that they work. In fact, many researchers have attributed much of the dramatic decline in the number of families on welfare in recent years to the increases in the EITC in the 1990s (Blank, 2002).

Fourteen states and the District of Columbia supplement the federal EITC with a state-level EITC. These states include two of Kentucky's neighbors—Illinois, and Indiana. Other states with a state EITC include Iowa, Kansas Michigan, Oklahoma and Wisconsin. In most of these states, the state-level EITC is simply a fixed percentage of the federal EITC. The percentage varies by state and exceeds 30 percent some cases. For example, in Kansas, the state-level EITC provides a credit equal to 15 percent of the federal EITC. Thus, a household in Kansas could receive a cumulative tax credit as high as $5,216.[12] Almost all workers would escape poverty if they worked full time and received a state-level EITC at this level. For example, a single parent working full-time, with two children, would need a wage rate of $5.48 per hour to escape poverty if the federal and state EITC refunds were counted in poverty calculations.[13] A much more effective policy for reducing poverty than increasing the minimum wage would be for Kentucky to follow the lead of neighboring states and, instead of raising the minimum wage, adopt a state-level EITC.

As part of welfare reform in the 1990s, the federal government increased the availability of child care subsidies and increased spending on job training programs designed to increase the skills of poor workers. These programs have the distinct advantage that they are much better targeted towards the poor than increases in the minimum wage, and they therefore have a much larger impact on poverty than any proposed minimum wage increase.

Conclusion

The advocates of raising the minimum wage are driven by the best of intentions. Poor families in Kentucky face many challenges, and it's appropriate to consider ways to help them. In crafting anti-poverty programs, it's important to consider the costs of the programs. A law that imposes a large cost on the economy while achieving only small reductions in poverty is bad public policy.

Unfortunately, most of the benefits of a minimum wage hike would go to people who don't need them.

The vast majority of workers who would enjoy higher wages under the proposal do not live in poor households. Almost a quarter of low-wage workers are students, and more than 28 percent of low-wage workers live with their parents. Only 12 percent of low-wage workers are single parents. On the other side of the ledger, the costs of the minimum wage hike would be large. We estimate that 24,000 workers would lose their jobs. And businesses would face $500 million in increased labor costs.

A far more cost-effective strategy for combating poverty is to expand the Earned Income Tax Credit, a program whose benefits are narrowly targeted at those who need help the most. We estimate that an expansion of the EITC would be more than twice as effective at reducing poverty as an increase in the minimum wage. And it would help poor workers without destroying jobs or imposing hundreds of millions of dollars of higher labor costs on Kentucky employers.

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The Stata data and programs used in the analysis are available at: http://gatton.uky.edu/faculty/yelowitz/kentucky.htm

Endnotes

1. See http://www.bls.census.gov/cps/overmain.htm.
2. The CPS has a large percentage of in-person interviews that improves coverage and reliability and leads to a very high response rate. Interviewers use laptop computers to administer the interview, asking questions as they appear on the screen and directly entering the responses obtained. Households are interviewed eight times over the course of sixteen months. During the first and the fifth interviews, an interviewer usually visits the sample unit. Almost all of the remaining interviews are conducted by telephone. Even though the CPS is a voluntary survey, the March interview of recent years has between 92 and 93 percent of the eligible households providing basic labor force information, and between 80 and 82 percent of the eligible households completing the ADS supplement. For the March 2002 basic CPS, the nonresponse rate was 8.3 percent. The nonresponse rate for the March supplement was an additional 8.6 percent, for a total supplement nonresponse rate of 16.2 percent. See http://www.bls.census.gov/cps/ads/1995/sdacodes.htm, http://www.bls.census.gov/cps/ads/1995/smethovr.htm, and http://www.bls.census.gov/cps/ads/2002/S&A_02.pdf for additional discussion.
3. See http://pubdb3.census.gov/macro/032005/health/h05_000.htm.
4. See http://www.bls.census.gov/cps/ads/1995/sdacodes.htm.
5. Wage rates are computed by dividing an individual's annual earnings by annual hours of work (the product of weeks worked and usual hours worked per week). Since the CPS data reflect the 2004 calendar year, the wage rates were converted into 2006 dollars by inflating them by 7.7%. For workers under the $5.15 federal minimum, wage rates were bottom-coded at $5.15 per hour. This procedure in the March CPS yields a higher proportion of low-wage workers than one would obtain in the Merged Outgoing Rotation Groups. A key advantage of the March CPS for our purposes is its comprehensive questions on family income, which is important for the poverty simulations. In addition, wages over the course of an entire year reflect sporadic temporary work and short jobs, both of which may not be well captured in the ORG.
6. Yelowitz (2005a,b) finds significant effects of Santa Fe's citywide minimum wage. The unemployment rate among less-educated workers increased, while weekly hours fell. After adjusting the estimates for the fact that only 55% of workers were covered (because the $8.50 ordinance only affected firms with 25 or more employees), he estimates an elasticity of -0.24. See http://www.SantaFeLivingWage.com for these calculations.
7. Specifically, for each low-wage worker in the CPS, we compute the percent change in the wage rate to move that worker to the higher $6.50 wage floor. Then we apply the -0.22 elasticity (or -0.30 in St. Louis and Kansas City), to compute the percent change in employment. Finally, we multiply the result by the CPS sample weight to compute the number of workers who lose their jobs and the number who keep their jobs. Those new weights—which add up to the initial number of low wage workers—are used to compute the summary statistics in Table 3. To illustrate, imagine a worker in the CPS with a given set of characteristics who initially has a wage rate of $5.50 per hour, lives in St. Louis, and has a sample weight of 1,300 (meaning that individual represents 1,300 people similar to himself). In that case, the change in the wage rate is 18.2 percent (=6.50/5.50 - 1). Applying this percentage increase in the wage floor results in a 5.5% reduction in employment (the elasticity of -0.3 = -5.5%/18.2%). Therefore, 72 of the 1,300 workers would lose their jobs (multiplying the 5.5% employment reduction by the sample weight of 1,300) and these 72 people all have the same characteristics. We would apply such a procedure for all low-wage workers, giving one set of sample weights for job losers, and another for job keepers. We then compute the summary statistics for individuals we identify as losing and keeping their jobs using the sample weights. A similar approach is taken in MacPherson (2006).
8. When computing poverty rates for full-time, full-year work, we imputed wage rates for non-workers with a procedure suggested by Heckman (1979). We use number of family members and number of children to identify the model) in the third column. For such workers, we bottom-coded predicted wages at $5.15 per hour.
9. This is the tax credit a worker would receive if they had a spouse and two children, earned $5.15 an hour and worked 2080 hours in the year.
10. See http://www.taxpolicycenter.org/TaxFacts/TFDB/Content/PDF/eitc_parameters.pdf.
11. The official definition of poverty ignores transfers such as the EITC when computing poverty rates. The maximum credit in 2003 was $4,204 (Green Book, 2004, 13-38), and the average family credit was $1,784. In 2002, the poverty rate would have fallen from 12.1% to 8.2% if non-cash benefits (such as the EITC) had been included (Green Book, 2004, Table H-7, p. H-11).
12. See http://www.taxcreditresources.org/pages.cfm?contentID=39&pageID=12&Subpages=yes.
13. See http://aspe.hhs.gov/poverty/06poverty.shtml

The U.S. Economy in 2006:

Mixed Signals

Jenny Minier

The U.S. economy grew at a moderate pace in 2006, despite slowdowns in the housing market and manufacturing industries. Strengths included stock market gains and low unemployment. In this article, I discuss the economic events of 2006 and their implications for 2007. I am cautiously optimistic that the economy will continue to grow at moderate rates into 2007.

Introduction

The economy was filled with mixed signals throughout 2006. Although bad news in the housing market and manufacturing industries (particularly the auto industry) filled the headlines, the stock market saw large gains in the second half of the year, unemployment remained low, and falling gas prices helped maintain consumer spending in the face of falling housing wealth.

In addition, GDP growth was quite volatile over the first three quarters of 2006, sending further mixed signals. In the first quarter, GDP growth as estimated by the Bureau of Economic Analysis was at a remarkably healthy 5.6% annual rate, seasonally adjusted – quite a dramatic increase over the 1.8% growth of the fourth quarter of 2005. In the second quarter, growth in real GDP slowed to a 2.6% annual rate, due largely to a slowing of personal consumption and exports and a large decrease in residential fixed investment. The slowing continued somewhat in the third quarter, in which growth was estimated at 2.2%, although this was significantly above the advance estimate (released in October) of 1.6%. (If the advance estimate of 1.6% had held, it would have been the slowest growth rate in over three years.) The continued deceleration, although smaller than anticipated, was due mainly to a continued decrease in residential fixed investment and increased imports. In October, the Bush administration lowered its official forecast for GDP growth to 3.1% in 2006 and 2.9% in 2007. The forecasts in June had been significantly higher, at 3.6% and 3.3%, respectively.

First, the Bad News, Part 1: the Housing Market

The slowdown in the housing market was one of the biggest stories in the U.S. economy in 2006. After several years of rapidly appreciating home prices, particularly in parts of the South and West, sales stagnated for both new and existing homes. Industry analysts expect both markets to be down overall for the year, with existing home sales predicted to fall by 9% and new home sales to fall by 17%. In the market for existing homes, the number of homes for sale nationwide increased from 2.8 million in September 2005 to 3.7 million in September 2006, indicating a large increase in the average time to sell a property. The situation is unlikely to improve quickly, since housing starts (the number of residential units on which actual construction – not permits – began during the period) fell by 27% over the year ending in October 2006, which is the largest one-year decline since March 1991. Figure 1 illustrates both of these sharp drops in housing starts (monthly data at a seasonally-adjusted annual rate), as well as the fairly steady upward trend between 1991 and 2005.

The general consensus seems to be that the housing market peaked in August 2005, although with only a few exceptions, most local markets have seen only slight decreases in median prices. According to the National Association of Realtors, the median price of an existing home sold in October 2006 was $221,000, a drop of 3.5% since October 2005. This was a record decrease, and significantly larger than the previous record of 2.1% in November 1990.

Figure 1: Housing Starts
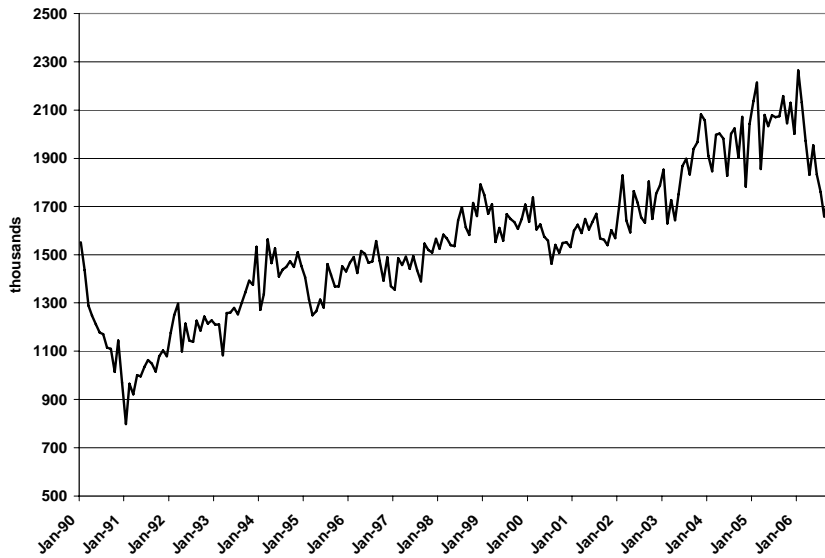
Seasonally adjusted, annual rate. Data source: U.S. Census

The record high median price of $230,000 was reached in July 2005, and the current median is only 4% below that level. This moderate decrease suggests that – at least so far – there is no evidence that there was a national "housing bubble," (a "bubble" is said to occur when increases in housing prices are due purely to speculation and unrelated to fundamentals).

The underlying reasons for the housing slowdown are hard to pinpoint. Realtors are inclined to blame the media for highlighting the slowdown and referring to a housing market bubble, leading consumers to be more cautious. Although interest rates have increased fairly rapidly – the Federal Reserve's interest rate target has increased from 2.5% in February 2005 to 5.25% today (a target set in June 2006) – mortgage rates are still near 45-year lows. Figure 2 shows average interest rates on 30-year conventional mortgages (the most commonly held mortgage). After a sharp increase in the late 1970s and early 1980s, the trend has been steadily downward, and the increase over the last year or so still leaves mortgage rates very low by historical standards.

Although many economists believe that the worst of the housing slowdown is over – indeed, the number of homes sold in November increased by 0.5% – the effects on the economy may continue for some time. In early October, Federal Reserve Chairman Ben Bernanke referred to the "substantial correction" occurring in the housing market, and predicted that the slowdown would continue to hurt the economy into the early part of 2007.

The most direct effect of a weak housing market on the economy is through reduced employment in the construction industry and associated suppliers (including the real estate and mortgage industries); construction (including non-residential construction) accounts for nearly 10% of U.S. GDP. In addition, changes in housing wealth have implications for consumption, since housing wealth constitutes a significant part of the average American's holdings of wealth. Although housing is an illiquid form of wealth, people can access that wealth fairly easily through instruments like home

Figure 2: 30-Year Conventional Mortgage Rate
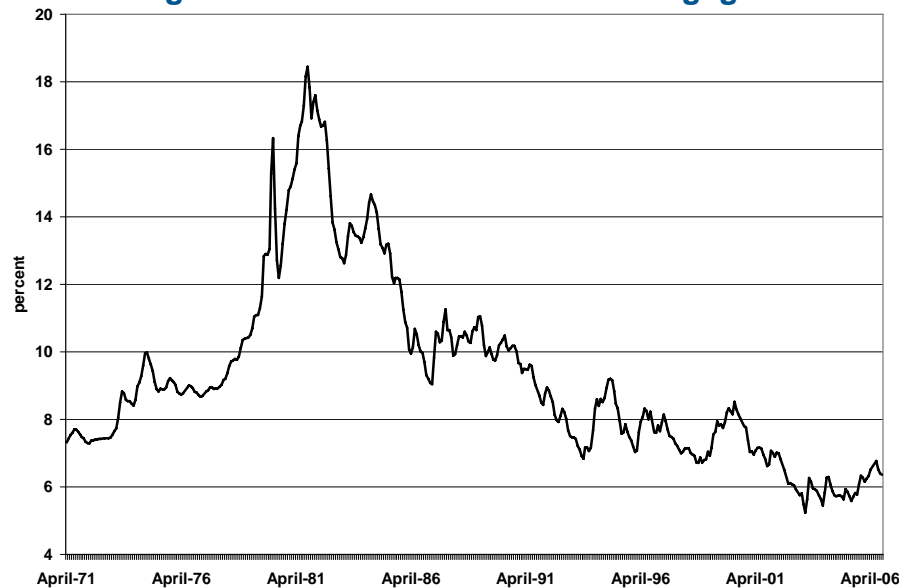
Data source: Federal Reserve Bank of St. Louis

equity loans and mortgage refinancing. As a result, the decrease in housing wealth (as well as the associated reduction in perceived liquidity, as people come to believe that it would take longer to sell their home) has implications for consumption. Several recent studies find evidence that the effect of a change in housing wealth on consumption is significantly higher than a change in stock market wealth (see, for example, Case, Quigley and Shiller (2005)).

The Bad News, Part 2: Autos and Manufacturing

Demand for durable goods – large-ticket items expected to last for at least three years – plunged in October by 8.3%, according to the Commerce Department. Although this is the largest decline since July 2000, it partly reflects a significant decrease in commercial airplane orders, which had tripled in September, allowing for an 8.7% increase in that month. (Commercial aircraft orders, of course, are very volatile from month to month.) Durable goods orders have either fallen or remained essentially unchanged since July 2006, except in September. Excluding transportation, durable goods orders fell by 1.7% in October.

Both Ford and General Motors have continued to struggle this year. By the end of November, Ford had already lost approximately $7 billion in 2006, and forecasts a loss of around $10 billion on the year as a whole (and expects to lose $17 billion more over 2007-2009); GM lost over $10 billion in 2005. By 2007, manufacturing employment at domestic auto companies' plants is expected to be 130,000 less than in 2003. Ford's "Way Forward" plan called for 14 plants to be closed, and a reduction of 30,000 workers (38,000 had accepted buyouts by November). GM, whose reduction in the workforce began earlier than Ford's, has announced that 35,000 U.S. workers – nearly one-third of its hourly paid workers – have accepted their buyout options, and is in the process of closing 12 North American plants.

Now for the Good News, Part 1: The Stock Market

One of the bright spots in the second half of the year was the stock market. In October, the Dow Jones Industrial Average (DJIA) reached its previous closing high of 11,750.28 (set in January 2000), and quickly surged past 12,000 with a string of record-setting

closes. The DJIA began the year at 10,739.75, and climbed over 11,600 in May before falling back to levels seen earlier in the year in June and July. In mid-July, however, the average began its climb upward to record levels.

Other widely followed indices – the more broad-based S&P 500 and the NASDAQ composite – were both up approximately 10% for the year, although (as of the end of November) the S&P 500 was more than 10% below its March 2000 record, while the NASDAQ composite was more than 50% below its March 2000 peak.

The Good News, Part 2: Unemployment

In other positive news, the unemployment rate has trended downward for some time. After remaining at over 5% from September 2001 through November 2005, the national unemployment rate has stayed consistently below 5% since then, ending at 4.4% in October 2006. This continues a downward trend since the unemployment rate hit 6.3% in June 2003. However, even here the news was somewhat mixed: at the end of November, new claims for unemployment benefits rose by 34,000 when they were expected to fall by 9,000. As of press time, it was unclear whether this was a random fluctuation or indicative of a trend upward in unemployment, perhaps due to layoffs in construction and manufacturing industries.

Interestingly, labor force participation rates have also fallen since 2001, after increasing fairly steadily since 1965, although not by enough to explain the decrease in unemployment rates (someone who is not actively looking for a job is considered to be not participating in the labor market, and so is not considered unemployed). Although the decrease in labor force participation has been small – the rate in October was 66.2%, relative to a peak of 67.2% in March 2001 – the rate has not risen above 66.5% since November 2002. Economists attribute this to primarily three reasons: (1) the aging of the population – although the oldest baby boomers have not (quite) reached official retirement age, and they are working more than earlier generations after age 55, labor force participation is generally lower among older workers; (2) the increase in women entering the labor force has slowed, and the

percentage of women working has actually decreased slightly from its peak in 1999; and (3) the employment rate of teenagers (age 16-19) has fallen dramatically. The percentage of teenagers working has fallen by approximately ten percentage points since the 1990s (from over 50% to slightly more than 40%).

Aaronson et al. (2006) suggest that these are structural changes, and that the trends are likely to continue (with the possible exception of the baby boom generation, whose labor force participation rate is hard to predict). Lower labor force participation rates could have effects on potential GDP growth (the growth rate at which output can expand without increasing inflation), as a reduced workforce would put upward pressure on wages.

The Good News, Part 3: Fuel Prices

By the end of November, the national average price of a gallon of regular gas stood at $2.24, almost exactly the level as of January 2006. Gas prices had remained elevated from April through the summer, and peaked at an average price of over $3.00 during August. Although the sustained high gas prices have had some effect on consumer behavior (for example, high gas prices are one of the most common explanations for the U.S. automakers' recent troubles, since Japanese and European cars tend to be more fuel-efficient than American ones), the decrease in gas prices since the summer months is also credited with reviving consumer spending during the fall months, and taking some of the edge off of concerns about overall inflation. On average, 3.6% of an American household's budget goes to gas and oil, a figure that has been remarkably constant for decades (Cambridge Energy Research Associates).

The Trade Deficit and the Value of the Dollar

One aspect of the macroeconomy that has multiple implications for the economy's overall performance in 2007 is our international position with respect to international trade, net foreign investment, and the value of the dollar. The (monthly) international trade deficit on goods and services decreased to $64.3 billion in September 2006, after reaching a record high of $69.0 billion in August, while the much-discussed deficit against China constitutes $23 billion of that. This large trade deficit has contributed to the falling value of the dollar: by
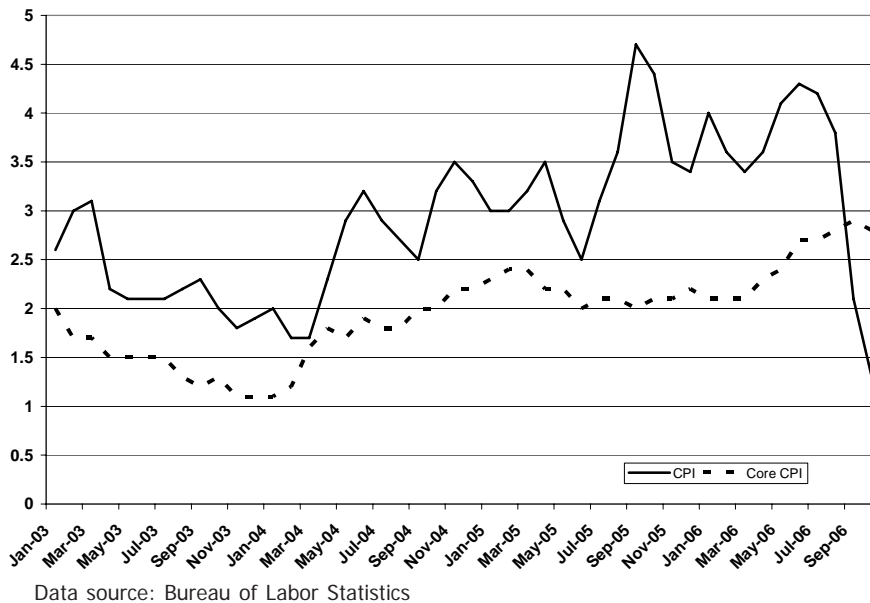
the end of November, the dollar had fallen against the euro to a 20-month low of $1.318 per euro (in January, it traded at $1.198 per euro). The depreciating dollar is largely due to concerns about the size of the trade deficit: such a large trade deficit is sustainable only as long as foreigners are willing to purchase U.S. assets. When a country runs a trade deficit – importing more goods and services than it exports – it must sell domestic assets to foreigners to finance the difference. As long as foreigners are willing to purchase assets (real estate, financial assets, etc.), this also allows the country running the trade deficit to have investment higher than its domestic savings levels, allowing for increased economic growth. Investment financed by foreigners has benefited the U.S. tremendously over the last few decades, allowing for higher rates of investment and economic growth than would otherwise be possible given very low U.S. savings rates (a combination of high federal budget deficits and low personal savings rates). The falling dollar will, of course, have feedback effects into the trade deficit: as the dollar decreases in value, our exports become cheaper and imports become more expensive to us, which should reduce the size of the trade deficit. Reducing the trade deficit will also force the amount of net foreign investment to decrease.

Inflation

On the inflation front, the Federal Reserve aggressively raised its interest rate target from 2.5% in February 2005 to 5.25% in June 2006. Since then, the Fed has not made any changes, although members of the Federal Open Market Committee have continued to hint that they are carefully watching for signs of increasing inflation. Statements toward the end of the year by Federal Reserve Chairman Ben Bernanke suggest that he will continue to monitor inflation, even if GDP growth slows further. In late November, Bernanke stated that the risks to inflation were "primarily to the upside," causing second thoughts among the many Fed watchers whose predictions were that the Fed's next move would be a rate *cut* sometime in early 2007.

Although overall inflation has moderated as energy prices have decreased since the summer, core inflation (which excludes food and energy prices) has remained relatively high. Figure 3 shows both measures as 12-month changes. The solid line represents the overall CPI, while dashed line is the

Figure 3: Inflation, 12-month change

Data source: Bureau of Labor Statistics

economic policy: the most high profile economic legislation will likely be an increase in the federal minimum wage to $7.25, which incoming House Speaker Nancy Pelosi has vowed will be passed within the first 100 hours of the Democrats taking office in January. (The current federal minimum wage of $5.15 was established in 1997, although many states have higher minimum wages.) The higher minimum wage is unlikely to have a

core CPI. Note that the large drop in the CPI in September and October of this year primarily reflects the high levels following Hurricane Katrina in those months of 2005, due largely to significant increases in fuel prices.

Housing costs make up nearly 40% of the core CPI, so one might expect that the cooling housing market would provide a damper on inflation. Paradoxically, the opposite seems to be true. Because of concerns about the housing market, increasing numbers of people are choosing to rent their homes instead of purchase them. This increased rental demand has driven up rents. In the construction of the CPI, the cost of housing to people who own their homes is imputed from rents on comparable properties. Although the actual cost of housing has not generally changed, the imputed rent has actually increased. Some have argued that imputed rent should be dropped from the CPI calculations because of this sort of statistical anomaly (indeed, European governments have done this), but such a significant change in the computation of the CPI would not be taken lightly.

Outlook for 2007

In short, the economy looks to continue on a path of relatively low – but not negative – growth into 2007. The Democrats newly in control of the U.S. Congress are unlikely to make drastic changes to

significant overall impact on wage costs or prices, as only about 5% of the U.S. labor force is directly affected by the minimum wage. In other legislation with economic ramifications, the Democrats are likely to be more protectionist with respect to trade policy, and to try to target tax cuts more at the middle class. They have also made fiscal responsibility part of their campaign platform, although many of their proposals would be expensive, and it is not clear how revenue would be raised to fund them without increasing the budget deficit. Divided governments, however, are often effective at introducing some discipline into the budget process. At any rate, the Democrats assuming control of Congress in January is unlikely to cause a significant change in course to the U.S. economy.

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Case, Karl E., John M. Quigley, and Robert J. Shiller (2005), "Comparing Wealth Effects: The Stock Market vs. the Housing Market," *Advances in Macroeconomics*, Berkeley Electronic Press, 5(1).

Recent Economic Developments in the United States and Kentucky:

Implications for 2007

Christopher Jepsen

This article summarizes recent economic developments in the United States and in Kentucky. It covers the substantial growth in GDP over the last few years. The article also looks at labor market conditions, prices including energy prices, monetary policy, and housing conditions. Economic conditions in Kentucky are also discussed. The article concludes with forecasts for both the nation and Kentucky. The national economy is expected to grow by more than 2.0% in 2007, compared to growth in Kentucky of slightly less than 2.0%.

I. Introduction

The biggest headlines of the last couple of years have been the War on Terror and volatile energy prices. Although the Gulf Coast hurricanes of 2005 added further, temporary volatility to energy prices, they do not seem to have permanently altered the national or state economy. The once-robust economy began to show signs of weakness late this year. Thus, the experts predict lower growth for 2007 than in 2005 and 2006.

The Kentucky economy is expected to behave similarly to the national economy. Historically, the two economies behave similarly, although they have begun to diverge slightly. State GDP has grown more slowly than the nation in 2004 and 2005, and unemployment levels in the state have started to rise even though national levels have continued to fall. Due to these differences, state economic growth is expected to be smaller than national growth in 2007.

II. Recent Trends in the U.S. Economy

A. Gross Domestic Product (GDP)

The United States emerged from a recession in late 2001. Figure 1 illustrates GDP growth from the beginning of 2003 through the third quarter of 2006. As shown in the figure, real GDP grew steadily throughout 2003 and 2004, with slower growth in 2005. Growth slowed even further during the first three quarters of 2006.

B. Labor Market Conditions

Although GDP began to grown in 2001, labor market conditions did not improve until well into 2003. Figure 2 shows the seasonally-adjusted

Figure 1: Real U.S. GDP 2003-I to 2006-III
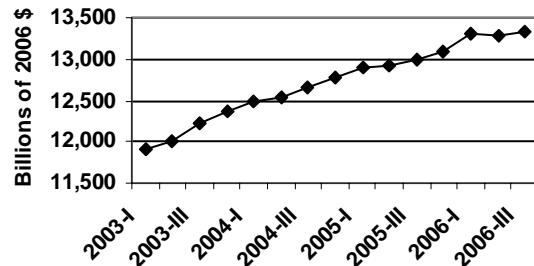
Source: Bureau of Economic Analysis

unemployment rate. Despite GDP growth, unemployment grew throughout the first half of 2003. Since reaching a peak in June 2003 of 6.3%, unemployment has fallen to 4.4% in October 2006. This decrease is to nearly one-third of the June 2003 level, illustrating a substantial decline.

### Figure 2: U.S. Unemployment Rate
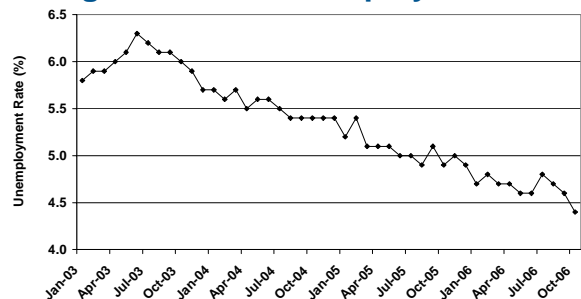
Source: Bureau of Labor Statistics

As expected, the drop in unemployment was accompanied by an increase in payroll employment, as illustrated by Figure 3. Such an increase is not automatic, as the unemployment rate excludes people

who are not actively seeking employment. Thus, the unemployment rate can drop if more unemployed people find jobs or if more unemployed people stop looking for work. The figure shows that more people are finding jobs. The labor force participation rates have remained relatively constant in the past three years (not shown).

Figure 3: Total U.S. Nonfarm Payroll Employment
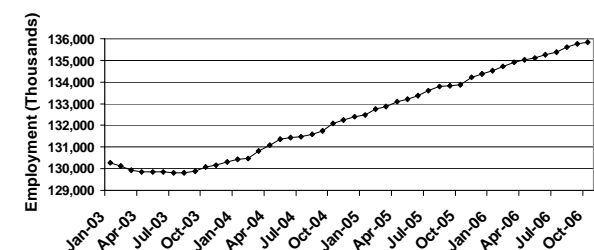
Source: Bureau of Labor Statistics

C. Prices

With sizable increases in GDP and employment, the Federal Reserve has worried about corresponding increases in prices. Table 1 shows recent inflation rates, measured as the percentage change in the yearly average Consumer Price Index (CPI). The table contains annual rates because there is considerable month-to-month variation in the change in the CPI. The inflation rate for all items averaged 2.3% in 2003, but price pressures continued to rise in 2004 and inflation increased at the rate of 2.7%. This trend continued in 2005. The price level jumped up for the second half of 2005, due to the large increase in the price of petroleum products in response to the Gulf Coast hurricanes. As petroleum produced returned to normal at the end of the year, prices dropped

Table 1: Recent Inflation Rates

|	All Items	All Items Less Food and Energy
2001	2.8%	2.6%
2002	1.6%	2.4%
2003	2.3%	1.4%
2004	2.7%	1.8%
2005	3.4%	2.2%
2006	3.1%	2.3%

Source: Bureau of Labor Statistics

substantially. Still, the average inflation rate for the year was 3.4%. In 2006, price increases have been more modest, with an inflation rate of 3.1%.

The final column in Table 1 shows the percentage change in the so-called "core" inflation rate. This tracks changes in the CPI less food and energy. The core inflation rate in 2003 was 1.4% and rose to 1.8% in 2004. It continued to rise in 2005 and 2006, with rates of 2.2% and 2.3%, respectively. Although these prices do not explicitly contain energy prices, energy costs are one set of input costs for producing these goods and services.

How volatile have energy costs been? Figure 4 shows crude oil prices since 2003. There was a strong, but somewhat erratic, uptrend in energy prices even before the Gulf Coast hurricanes of 2005. Crude oil prices rose from around $30 per barrel in mid-2003 to nearly $55 per barrel in the summer of 2005. Prices continued to climb in 2006, reaching almost $75 per barrel in the summer. However, prices have fallen dramatically since then, with prices under $60 a barrel in October.

Figure 4: U.S. Crude Oil Spot Price January 2003 - October 2006
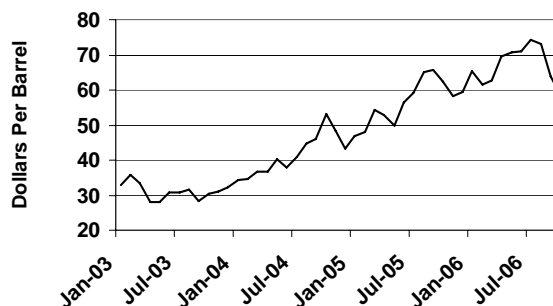
Source: Energy Information Administration

D. Monetary Policy

The Federal Reserve began to worry about inflation in 2003, as employment levels began to increase and GDP continued to grow. Before that time, the Federal Reserve gradually lowered the Federal Funds rate, reaching a historic low of 1% for 18 months starting in January 2003.

By the middle of 2004, the unemployment rate had dropped to 5.4% although inflationary concerns continued. Consequently, the Federal Reserve began raising the Federal Funds rate, starting in July 2003. It has continued to raise rates steadily, so that the Federal Funds rate is 5.25% as of November 2006.

Figure 5 contains the federal funds rate, the three-month Treasury rate, and the 10-year Treasury rate since 2003. It shows the clear, upward movement in the federal funds rate. The three-month Treasury rate has tracked the federal funds rate very closely. Somewhat puzzling is the behavior of the longer term, 10-year Treasury rate. Normally, long-term interest rates move with short-term term rates. However, the 10-year Treasury rate did not trend upward until early 2006; since then, it has followed the short-term rate and the Federal Funds rate.

Figure 5: Interest Rates, January 2003 - October 2006
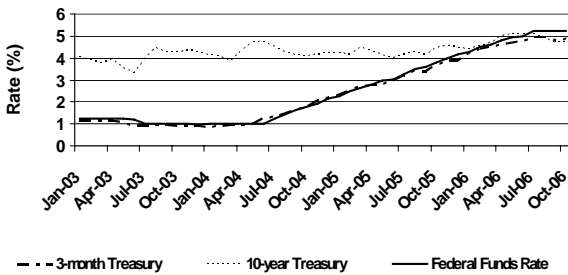
Source: Federal Reserve Bank

E. Housing

Housing construction is another indicator of economic well-being. Figure 6 illustrates the number of housing starts since January 2003. Housing starts increased in 2003 and 2004, although there were sizable fluctuations in 2004. The market leveled off in 2005. There was a spike in housing starts early in 2006, followed by a steady decline through August. The housing market picked up slightly in September, but fell dramatically to a four-year low in October.

Figure 6: New Residential Housing Starts in U.S.
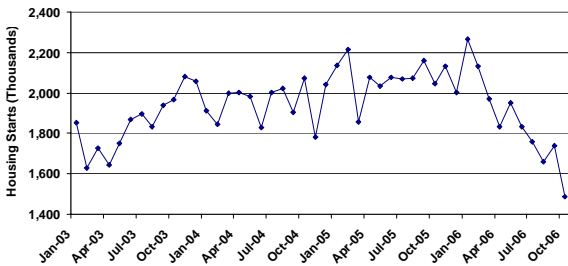
Source: U.S. Census Bureau

The trend in new housing prices generally followed the trend in housing starts. Prices climbed steadily from the start of 2003 through mid-2006. Prices peaked in April 2006 and have been falling since then, with a sizable decline between July and September. However, median new home prices climbed substantially in October. Existing home prices fell more gradually over the same period.

II. The Kentucky Economy

The Kentucky economy tends to move closely with the national economy. For example, both the state and national economies began their latest economic recovery in 2001. Specific aspects of the state economy are discussed in more detail in this section.

A. State-Level Gross Domestic Product

State-level GDP was formerly known as Gross State Product. Like the national GDP, state GDP measures the value of goods and services produced. The difference, of course, is that state GDP measures state production rather than national production. State-level GDP numbers are reported annually. Table 2 reports recent GDP growth for Kentucky and the nation.

Table 2: U.S. and Kentucky Real GDP Growth

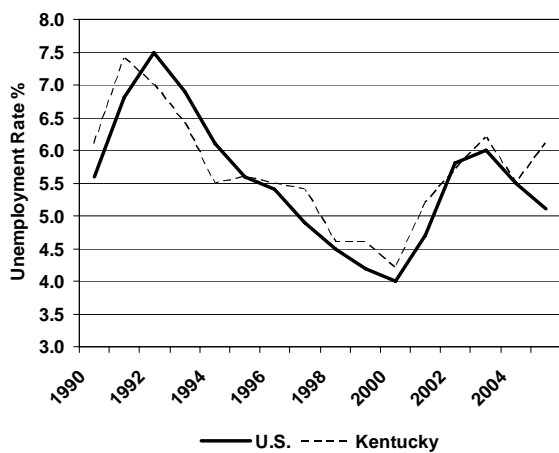|	U.S.	Kentucky
2001	0.9%	0.2%
2002	1.5%	3.0%
2003	2.6%	2.4%
2004	4.2%	3.0%
2005	3.6%	3.0%

Source: Bureau of Economic Analysis

Both the U.S. and Kentucky economies grew sluggishly in 2001, with growth rates under 1%. Kentucky actually grew noticeably faster than the U.S. economy in 2002, with a solid growth rate of 3.0%. Kentucky remained at the 3.0% level in 2004 and 2005, whereas the nation grew at 4.2% in 2004 and 3.6% in 2005. Even though the national growth rate declined between 2004 and 2005, Kentucky's growth rate remained constant.

B. Unemployment and Employment

The U.S. and Kentucky unemployment rates have generally trended downward over the past two and a half years. Figure 7 plots annual unemployment rates for the U.S. and Kentucky from 1990 to 2005. During this time period, the two annual rates are nearly identical except for 2005. During the most recent recession, unemployment rates for both series peaked in 2003 and subsequently declined.

Figure 7: U.S. and Kentucky Unemployment Rates (1990-2005)

Source: Bureau of Labor Statistics

Kentucky's unemployment rate diverged from the national rate in 2005. Specifically, Kentucky's rate rose to 6.1% in 2005, but the national rate declined to 5.1%. Preliminary data for 2006 (through October) suggest that Kentucky's unemployment rate decreased slightly more than the national rate decreased, but a sizable gap still exists. Although the 2005 increase is somewhat unexpected, the general conclusion is that patterns of employment and unemployment in Kentucky are much like those in the rest of the nation. Thus, despite unexpected recent numbers, it is anticipated that Kentucky's unemployment rate will follow the national rate pretty closely.

Figure 8 plots the percentage change in total employment, both for the U.S. and for Kentucky. The two employment patterns are similar, although Kentucky's employment changes are more volatile than the nation's. Thus, the upward trend in Kentucky's unemployment rate is not associated with a dramatic decrease in employment, suggesting that the unemployment numbers are unexpected.

### Figure 8: Percentage Change in U.S. and Kentucky Employment
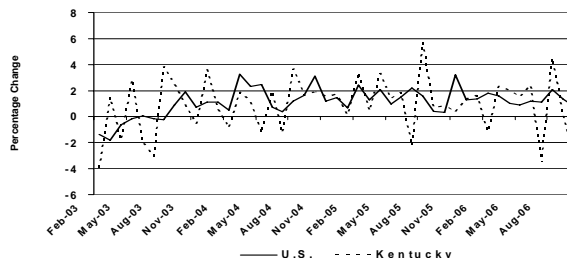
Source: Bureau of Labor Statistics

C. Gas Prices

One concern, both nationally and in Kentucky, is the recent volatility of gasoline prices. Figure 9 displays the average gasoline prices for 2005 and 2006. Gasoline prices were indeed volatile over this stretch. The Gulf Coast Hurricanes explain the spike in prices in late 2005, but the spike in the summer of 2006 harder to explain. It is generally attributed to a host of factors including increased demand and political unrest in North Korea and the Middle East (particularly Lebanon and Iran). The prices of gasoline in Kentucky and in the country were extremely similar throughout the period. Prices were slightly lower in Kentucky, likely due to lower gasoline taxes. Diesel prices displayed a similar pattern, although diesel prices showed less volatility than gasoline prices.

Figure 9: Nominal Gasoline Prices in the U.S. and Kentucky
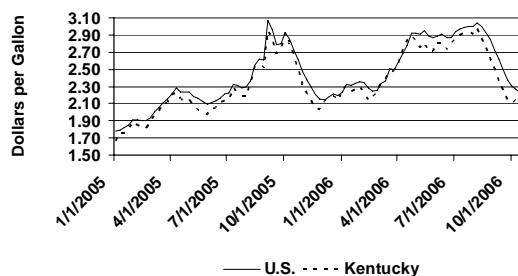
Sources: Kentucky Energy Watch, AAA, and Energy Information Administration

D. Housing

One concern with the Kentucky economy is the recent softening of the housing market. Figure 10

illustrates changes in housing permits, a useful indicator of housing construction. Although Kentucky has more volatile changes in housing permits than the nation, the state's housing starts follow a similar pattern to that of the nation. Housing construction is a volatile industry, so the large fluctuations in the table are to be expected.[1] Thus, any potential softening of the national housing market will affect Kentucky.

Figure 10: Changes in U.S. and Kentucky Housing Starts
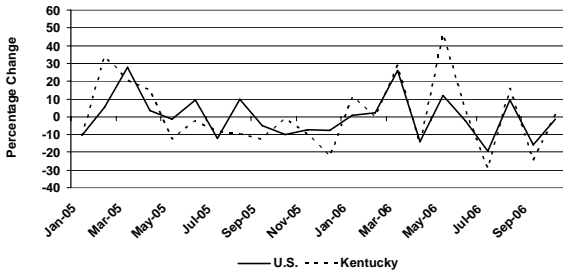
Source: U.S. Census Bureau

III. Conclusions

The national economy grew in 2006 at a slower pace than 2005. GDP growth was small in 2006, and is expected to rise approximately 2.5% in 2007. Labor market conditions were generally favorable, although unemployment is currently so low that further reductions will likely be minimal. Specifically, unemployment will remain relatively constant in 2007, at a little under 5.0%. Inflation has been sizable in the last two years, largely due to summer spikes in energy prices. Barring future spikes, prices should remain stable in 2007, with inflation around 2.5%.

The Kentucky economy generally follows the national economy. Although state economic trends have begun to diverge slightly from the national conditions, there is little reason to expect further divergence. Over time, GDP and labor market conditions should mirror that of the nation. Other factors, such as gas prices and housing starts, already look similar to the nation. Given the slightly adverse GDP and labor market growth, the forecast for Kentucky is for growth of slightly less than 2.0%. The state unemployment rate will likely be around 6.0%.

Endnotes
1 National data are often adjusted for seasonal changes in construction, but state data are not typically adjusted. The interpretations presented here assume that any seasonality affects the nation and Kentucky similarly.

AIK Business Manufacturing Confidence Survey

Vladyslav Sushko and Anna Laura Stewart

The Kentucky Manufacturing Business Confidence Survey is produced each year through the joint efforts of the Associated Industries of Kentucky and the Center for Business and Economic Research. The survey asks businesses to report on their actual performance over the past year and to make predictions for the next year in areas such as employment, sales, profits, capital expenditures, and industry production. Among other findings, the 2006 survey reveals that growth remains strong but that inflation may be distorting business expectations regarding future profits and capital expenditures. In 2006 hiring conditions were slightly higher than in 2005, and have come a step closer to the robust sales conditions. Both reported sales and hiring conditions are at their highest since the survey began in 1999. Future expectations in the manufacturing sector also indicate that Kentucky manufacturers view their business conditions more favorably than those of the entire industry. A substantial presence in the number of businesses that do not expect additional growth in the next 12 months suggests that business conditions in the Kentucky manufacturing sector are unlikely to improve any further during 2007.

INTRODUCTION

The December 2006 Manufacturing Business Confidence Survey is the fourth year of a merged research effort between the Associated Industries of Kentucky (AIK) and the University of Kentucky Center for Business and Economic Research (CBER). This year, CBER surveyed 1,860 manufacturing establishments. The sample was constructed using a Selectory® database compiled by Dun & Bradstreet, which includes data on all U.S. businesses. Using the Selectory® database, CBER surveyed all Kentucky manufacturing establishments with 15 or more employees. Collectively, these manufacturing establishments employ over 252,100 people. According to the Bureau of Labor Statistics, seasonally adjusted manufacturing employment in Kentucky in October of 2006 was 256,000. This means that manufacturing establishments in our survey sample employ approximately 98 percent of all manufacturing workers in the state. These businesses also generate annual sales in excess of $95 billion.

Map 1 illustrates Kentucky manufacturing businesses' distribution by area development districts (ADDs). As expected, the manufacturing establishments are most densely concentrated in the area known as the "urban triangle," defined by Lexington, Louisville, and Cincinnati Metropolitan Areas. On the map, this region is approximated by KIPDA, Northern Kentucky, and Bluegrass ADDs. This region is also well interconnected via I-64, I-71, and I-75. The Western Kentucky region, except for the Purchase ADD, also contains a significant number of manufacturers. Here again transportation plays a major role, as I-24, I-65, I-164 as well as Bluegrass and Western Kentucky Parkways provide major transportation arteries in and out of the region.

Map1: Business Density
By Area Development District

Note: Only manufacturers with 15 or more employees were considered

The survey asked businesses to report on their performance during the past 12 months using a number of economic indicators such as employment, sales, and profits. Survey respondents were asked to choose one of the following options when describing their business's performance according to each indicator: decrease, no change, or increase. The survey also asked businesses to indicate their expectations for the same indicators for the next 12 months. Two hundred and fifty five businesses responded and another 64 surveys were undeliverable resulting in a response rate of approximately 14 percent. Eighteen percent of respondents were members of the AIK.

The survey respondents represent over $14.5 billion in 2005 sales and 22,752 jobs. As expected, the majority of manufacturers are located in counties that have, or are next to, an interstate or highway (especially if the Bluegrass and Western Kentucky parkways are included as major highways) which pass through or near most of the population centers in the state.

STATEWIDE PERFORMANCE

For the majority of those surveyed, sales, capital expenditures and profits have risen during 2006 and a majority of businesses expect a continued increase in 2007. Other indicators, such as employment and industry production, have also been increasing or have remained steady for a majority of the manufacturing establishments who responded. Maps 2 and 3 illustrate Kentucky's manufacturing sector performance by ADD in sales and employment through a diffusion index. The diffusion index allows one to compare changes where 'no change' is one of the possible responses. The index is calculated by adding the number of "increases" to half the number of "no changes," then dividing this sum by the double of the total number of responses, and finally multiplying the result by 100. Within the index, a value below 50 suggests deterioration in sales or employment over the period and a value above 50 implies a net-improvement in sales or employment.

Map2: Sales Performance Index
by Area Development District

Map 2 shows manufacturing sales performance across the state by area development district (ADD) through the diffusion index. Map 3 shows the same relationship but for the employment index (hiring conditions). Overall, 11 out of 15 ADDs register at above 50 index points for both sales and employment, confirming once again that Kentucky manufacturing growth remains relatively strong. Comparing Maps 2 and 3 to Map 1 shows that manufacturing business performance in Kentucky is not necessarily correlated with business density. Although the Big Sandy ADD has less than 100 manufactures, compared to over 300 in the Bluegrass ADD (see Map 1), it has on average outperformed Bluegrass ADD in both sales and employment during 2006. Maps 2 and 3 also illustrate a significant performance gap across the state between sales and employment. While 5 ADDs exhibit stellar performance in sales (Map 2), only 2 of them (Green River and Big Sandy) show similar hiring conditions (Map 3). On the negative side, Gateway ADD has joined Kentucky River ADD this year with sales performance below 25 index points. In addition, Lake Cumberland ADD, whose hiring conditions have registered at below 50 index points in the past, has also shown a similar decline in sales during 2006. Combined with rise in both sales and employment indexes overall (as will be shown in detail in the next sections), the divergence in manufacturing business performance illustrated by the maps suggests that the overall growth in manufacturing is not been distributed equally throughout the state.

Map3: Hiring Performance Index
by Area Development District

both sales and employment indexes, at 71.9 and 63.1 index points respectively, are at their highest levels recorded by this survey. The trend seen in Figure 1 is generally consistent with U.S. GDP growth which leveled off in 2005 after a period of rapid recovery from 2001 to 2004. Another trend involves the gap between sales and employment indexes. As Figure 1 shows, negative growth in the manufacturing sector during 2001 was first reflected by the drop in employment index. Moreover, the gap between sales and employment performance has widened over the period of recovery from 2001 until 2004. This is consistent with national labor market trend after 2001 called the "jobless recovery." However, the 2006 data show a greater relative increase in the employment index of almost 3 points compared to a more modest 1.2 point increase in the sales index. Whether this increase will lead to a convergence in sales and employment indexes, as has been the case during the late 90's, is not yet clear.

HISTORICAL TREND

Figure 1 illustrates the reported performance of Kentucky manufacturers in sales and employment from the past 8 years through the diffusion index. Sales and employment from all manufacturing establishments in Kentucky are differentiated from sales and employment from AIK members. That is, the survey sample for the years 1999-2002 and 2005-2006 includes both AIK and non-AIK members whereas the survey sample for 2003-2004 includes AIK members only.

When compared with past survey results, 2006 data indicate that following the post recession recovery from 2001 through 2004 Kentucky manufacturers have maintained steady growth in both sales and employment through 2006. Currently,

2006 CONDITIONS

Table 1 shows the reported performance of each business indicator during 2006 for the Kentucky manufacturing sector. Sales show the largest increase with 65 percent of survey respondents reporting an

Figure 1
Manufacturing Sector Performance in Selected Indicators
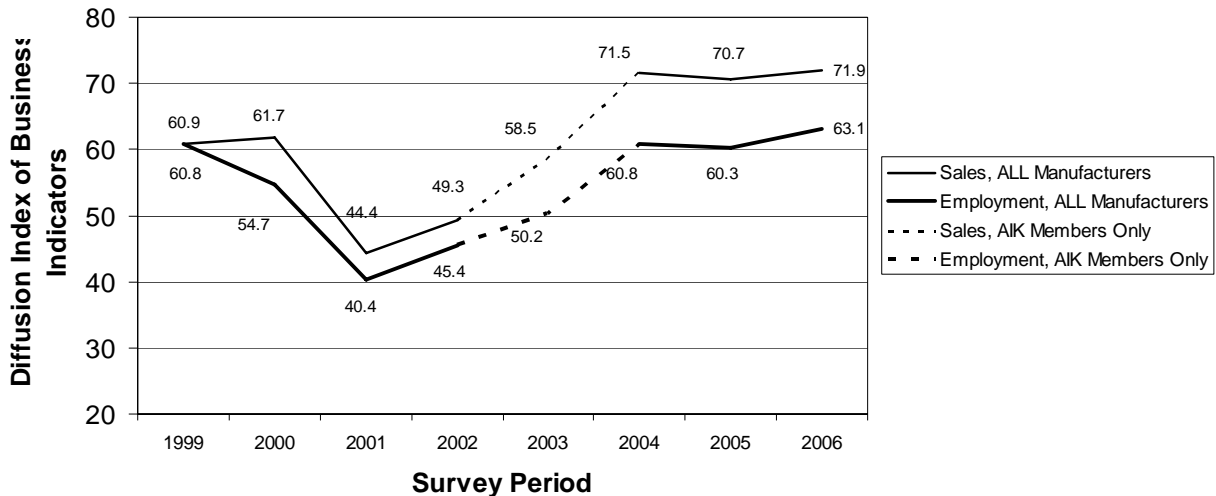
increase in sales over the last 12 months. Fifty seven percent of manufacturing establishments also reported a rise in profits during the same period. At the same time, 21 percent and 25 percent reported a decline in sales and profits, respectively. These numbers indicate a wide range in performance in the manufacturing sector over the past year. Both sales and profits are largely dependent on past production orders and therefore should be considered lagging indicators. Business indicators that represent short-term future investments and have more predictive power, such as employment and capital expenditures registered slightly lower during the past 12 months. Forty-five percent of manufacturers have increased employment while 55 percent have either decreased or maintained employment at the same level as in 2005. In addition, fifty two percent of respondents report an increase in capital expenditures while forty one percent report no change in this indicator during 2006.

Table 1
Conditions Past 12 Months

	Decrease	No Change	Increase
Employment	19.3%	35.3%	45.4%
Sales	21.3%	13.7%	65.1%
Profits	25.4%	17.2%	57.4%
Capital Expenditures	7.3%	41.1%	51.6%
Industry Production	21.6%	29.5%	49.0%

    Figure 2 shows a comparison of current conditions with conditions reported in the 2005 survey. Reflecting the steady growth of the Kentucky manufacturing sector, the percentage of manufacturers that report an 'increase' grew for every
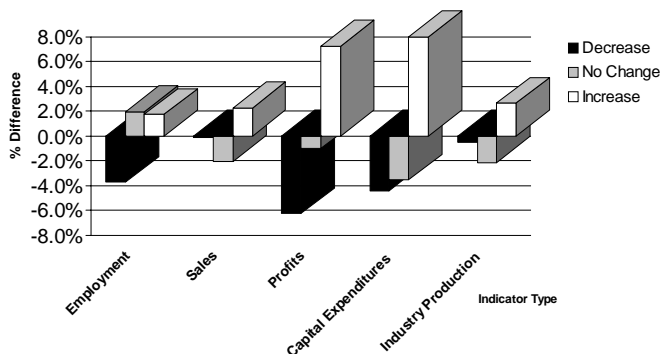
Table 2
Expectations Next 12 Months

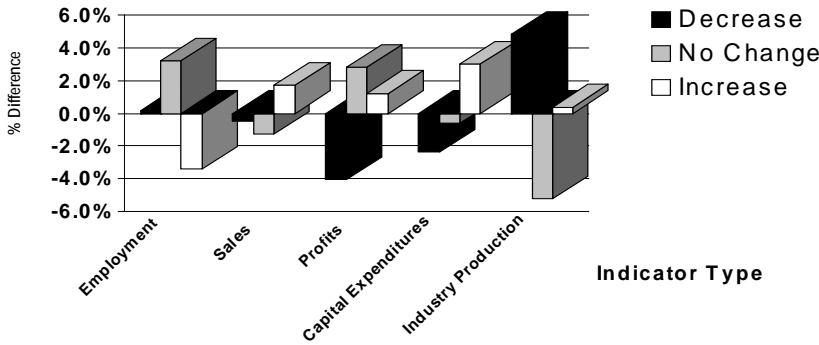|	Decrease	No Change	Increase
Employment	8.2%	47.7%	44.0%
Sales	7.8%	23.1%	69.1%
Profits	7.3%	27.9%	64.8%
Capital Expenditures	6.7%	43.7%	49.6%
Industry Production	15.6%	33.8%	50.6%

business indicator. Compared to the 2005 survey, profits and capital expenditures show the most significant changes with 7.3 percent and 8 percent growth in the number of businesses that experienced an 'increase' compared to last year. The percentage point change in the number of businesses reporting a rise in employment, sales, and industry production was significantly lower with 1.7, 2.3, and 2.6 percentage points respectively. Such a gap, which exceeds 5 percentage points for most of these variables, may in part be explained by a recently accelerated pace of inflation. Since employment, sales, and industry production are measured in quantities of labor or output by most businesses, they should be interpreted differently from profits and capital expenditures, which are measured in dollars. Given a 3.2 percent annual inflation leading up to November 2006 it is likely that a number of businesses would overstate their "real" profits and expenditures, a story told by Figure 2. Thus, the comparison of responses about current conditions to the previous survey shows both the steady growth of the Kentucky manufacturing sector and inflation fueled by steadily growing national economy and the rising costs of energy.

Expectations for 2007

    In previous surveys, the majority of businesses have been optimistic about the near future, and the same is true for the 2006 survey as well. Table 2 shows the manufacturing sector expectations for the next 12 months in selected business indicators. Expectations from the 2006 survey remain optimistic with 69 percent and 65 percent of manufacturing establishments anticipating further increase in sales

Figure 2
Comparison of Current Conditions with Previous Survey

Figure 3
Comparison of Future Expectations with Previous Survey

Such varying relative changes in expectations for these five business indicator are unusual, especially because in the past surveys expectation changes for capital expenditures and industry production have closely resembled each other. As in the case with current conditions, inflation may explain some of these differences. Expectations for variables measured in dollars (i.e. profits and capital expenditures) show an increase on the positive side, while expectations for variables measured in quantities of labor or output (i.e. employment and industry production) exhibit a net shift towards lower expectations. Comparing these two opposite dynamics it is reasonable to assume that some businesses overstate their profits and capital expenditures by not properly accounting for inflation. This in turn causes them to overstate expectations for these business indicators as well, leading to the opposing expectation shifts between these variables and the employment and industry production variables seen in Figure 3. We left sales expectations out of this comparison, because whether survey respondents measure sales in dollars or output quantity is ambiguous given just the survey results.

and profits, respectively. Businesses are less optimistic when it comes to employment, capital expenditures, and industry production: 44 percent of survey respondents anticipate further growth in employment, 50 percent expect a rise in capital expenditures, and 51 percent expect an increase in industry production. Since employment and capital expenditures represent business investments in the short term future, these indicators tend to approximate the actual outcomes in the next 12 months more accurately than sales and profits expectations, which tend to be overstated.

Figure 3 is analogous to Figure 2 in the previous section, except the same analysis is applied to future expectations. As Figure 3 shows, business expectations have changed differently since 2005 depending on the parameter in question. Positive expectations for sales and capital expenditures have grown by 1.7 and 3.0 percentage points respectively, absorbing an equal share of negative and neutral expectations from a year ago. Expectations for future profits also show positive net change with a 4.0 percentage point decline in negative expectations which translated into growth in neutral and positive expectations of 2.8 and 1.2 percentage points respectively. The opposite is true for expectations about employment and industry production in the next 12 months. Positive expectations for employment have decreased by 3.4 percentage points translating into a 3.2 percentage point growth in neutral expectations and a slight growth in negative expectations of 0.2 percentage points. In addition, negative expectations for industry production in the next 12 months increased by 4.8 percentage points and constitute the largest shift of any variable in Figure 3.

Accounting for the Expectation Bias

Historically, survey respondents tend to be overly optimistic (albeit to varying degree) about the near future. This implies that there exists a fairly constant higher expectation bias among survey respondents. This bias can be roughly approximated by comparing reported business conditions from a given period with the expectations for that period in a previous survey. Calculating the expectation bias allows for an approximation of business conditions in the manufacturing sector in the next 12 months based to these expectations.

Because the Kentucky manufacturing sector entered the current phase of the business cycle during 2004 (see Figure 1), we estimate the expectation bias

based only on survey years 2004 through 2006. Taking the average of the differences between the reported performance of each indicator in 2005 and 2006 with the expectation for that indicator in 2004 and 2005 respectively, yields the average error in expectation for the 2 year period in percentage points. Table 3 demonstrates how expectations for each business indicator differ from the reporting on that indicator the following period. Profits followed by sales are the two most overstated variables in terms of positive expectations with 11 and 6 percentage point error on average. They are also the most understated in terms of negative expectations, with 16 and 12 percent error on average. Expectations for future employment and industry production on the other hand tend to be more conservative, with approximately 3 percent error on the positive side, and thus closer to the actual reported performance of these indicators.

Subtracting the error terms in Table 3 from expectations given in Table 2 yields the prediction of Kentucky manufacturing sector performance in these indicators during 2007 based on expectations alone. We necessarily assume that survey respondents use information about the economy and their business to guide their expectations and are not merely guessing. Figure 4 demonstrates expected changes in each parameter analogously to Figures 2 and 3 based on these expectations while accounting for the bias. Every business indicator except for industry production is likely to slow in growth. Industry production business indicator itself is likely to decline. The share of manufacturers with neutral performance is likely to increase by anywhere from 3.4 percentage points in sales to 7.4 percentage points in capital expenditures. Figure 4 also shows that survey respondents expect all of the increases in neutral performances in 2007 to be driven mainly by a fall in the share of businesses with current increases in these parameters ranging from a 2.4 percentage point fall in sales category to a 4.7 percentage point fall in capital expenditures category. Combined, these data indicate an expectation of a very slight slowdown in growth in the Kentucky manufacturing sector, but no major change in the overall business conditions during the next 12 months. Lower expectations for industry production compared to other business indicators mean that manufacturers generally view conditions in Kentucky more favorably than the national industry conditions as a whole.

Table 3
Average Expectation Error (Bias)

	Decrease	No Change	Increase
Employment	-9.9%	6.7%	3.3%
Sales	-12.4%	6.0%	6.4%
Profits	-16.2%	5.5%	10.7%
Capital Expenditures	2.3%	-5.0%	2.6%
Industry Production	-10.0%	5.9%	4.1%

Figure 4
Expected Change, Next 12 Months
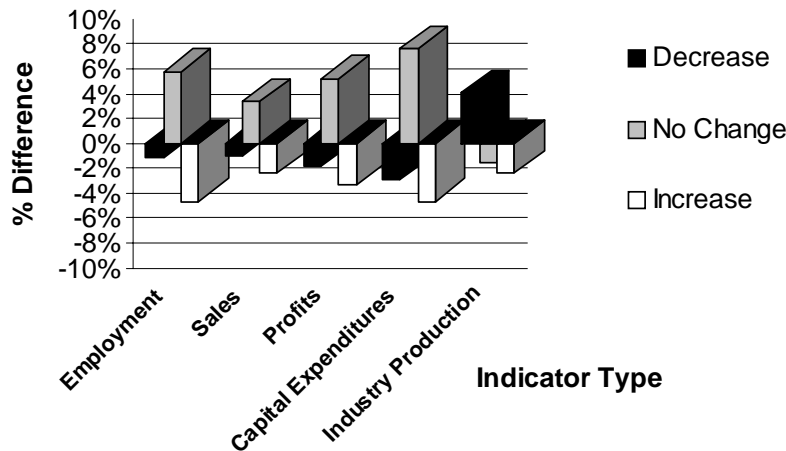
CONCLUSIONS

The results of the 2005 Kentucky Manufacturing Business Confidence Survey show that the manufacturing sector remains strong and that survey respondents have higher expectations for the Kentucky manufacturing sector than for the industry as a whole. Business performance, especially in sales, has remained as high as in 2006, but is unlikely to improve any further during 2007. Hiring conditions have slightly increased compared to 2005, but are unlikely to increase any further in 2007. Moreover, the survey results indicate that manufacturers do not expect hiring conditions to reach the same levels as the sales conditions, as has been the case prior to 2000. Finally, business' relatively high assessments of growth in profits and capital expenditures without the matching growth in sales, employment, and industry production reflect the effects of inflation on Kentucky's manufacturing sector.

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