Kentucky Labor Supply and Demand Surveys

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Kentucky Labor Supply and Demand Surveys

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Executive Summary

The Center for Business and Economic Research at the University of Kentucky (CBER), along with its partners, the Survey Research Center at the University of Kentucky (UK-SRC), the Survey Research Center in the Urban Studies Institute at the University of Louisville (UL-SRC), and the Department of Economics at the University of Louisville, is pleased to present this final report on the findings of the Kentucky labor supply and demand surveys sponsored by the Kentucky Cabinet for Workforce Development. The two universities have put together a consortium including some of the best scholars in the region in the areas of labor economics, local economic development, and survey design and administration.

The study consisted of several major activities:

- Design and implementation of a statewide household survey to obtain data on underemployment.
- Design and implementation of a statewide survey of businesses to obtain data on fringe benefits, labor shortages and vacancies, and educational credentials.
- Statistical estimation using survey data, Census 2000 data, and ES-202 data to provide local estimates of underemployment, fringe benefits, labor shortages and vacancies, and educational credentials.
- Development of a web application to make the data available to all interested users. The current address of the site is http://kycwd.org/lmisurvey.htm.
- Development of plans to update the data in the future and to work toward building the data delivery capacity of the Kentucky Cabinet for Workforce Development.

The household survey yielded 3,285 completions across five regions (large urban areas, small urban areas, exurban areas, rural Appalachia, and the rural west) in the state with a response rate of approximately 40% in each region. The business survey yielded 3,649 completions and a 27.8% response rate across two sub-samples: establishments with less than 50 employees and establishments with 50 or more employees. The industry make-ups of the two sub-samples were remarkably similar to the industry make-ups of the population of small and large Kentucky business establishments. These survey data and our statistical estimation provide estimates for the following geographic groups within each category of data:

1. Underemployment:
    - Underemployment Population Counts: 10 Workforce Investment Areas (WIAs), 15 Area Development Districts (ADDs), 120 counties, 120 county groups (each county plus all of its surrounding counties)
    - Characteristics of the Underemployed and the Employed but not Underemployed: 5 labor supply survey regions (large urban areas, small urban areas, exurban areas, rural Appalachia, rural west).
2. Fringe Benefits:
    - Eight Fringe Benefit Measures (e.g., health insurance coverage, retirement plan coverage): 10 WIAs, 15 ADDs, 120 counties, 120 county groups, 19 industry groups
    - Remaining Fringe Benefit Measures: 10 WIAs, 15 ADDs, 25 large counties, 120 county groups, 19 industry groups
3. Job Shortages and Vacancies:
    - 11 WIAs, 15 ADDs, 25 large counties, 120 county groups, 19 industry groups
4. Educational Credentials:
    - 11 WIAs, 15 ADDs, 25 large counties, 120 county groups, 19 industry groups

Some findings from our supply side survey and statistical estimation are:

- We find that there are almost 355,000 underemployed persons in the state and that underemployment as a percentage of the labor force varies across Area Development Districts from 17.5% in the KIPDA ADD (Louisville area) to 22.5% in the Gateway ADD in northeastern Kentucky. The percentage of persons in the labor force who are either underemployed or unemployed varies from 20.4% in the Northern Kentucky ADD to 32.0% in the Kentucky River ADD in southeastern Kentucky.

- The underemployed have less education, are younger, are less likely to be married, more likely to be non-white, more likely to report physical limitations, more likely to be working in manufacturing than other industries, more likely to be working for private for-profit employers, less likely to be working for government employers, less likely to be self employed, less likely to be working in management, more likely to be working in office and administrative support jobs and have lower pay on average than those not underemployed. Some of the most striking of these findings across the five labor supply survey regions are:

- In exurban areas, 31.15% of those not underemployed have a bachelor's degree or more compared to 7.55% of the underemployed.
- In large urban areas, 63.58% of those not underemployed are married compared to 44.78% of the underemployed.
- In small urban areas, 20.51% of the underemployed are non-white while 7.02% of those not underemployed are non-white.
- In rural Appalachia, 16.67% of the underemployed report having a condition that limits physical activities, compared to 4.98% of those not underemployed.
- In large urban areas, 22.39% of the underemployed work in manufacturing compared with 10.4% of those not underemployed and 73.13% of the underemployed work in private for-profit firms compared to 55.49% of those not underemployed.
- In rural Appalachia, 14.56% of those not underemployed are self-employed, compared to 6.07% of the underemployed.
- In large urban areas, 29.85% of the underemployed are working in office and administrative support jobs, compared with 13.45% of those not underemployed.
- In small urban areas, 20.12% of those not underemployed are working in management, business or financial jobs compared with 8.98% of the underemployed.
- In small urban areas, the average hourly rate of pay for those not underemployed is $23.45 compared to $9.68 for the underemployed.

- The underemployed workers are not uniformly low skilled. In large urban areas, 41.79% of the underemployed report having a bachelor's degree or more, 19.4% report that they are in management, business, or financial jobs, and their average hourly rate of pay is $16.16. Further, the underemployed are in general more likely to be attending school than those not underemployed

- 32% of the part-time workers in small urban areas and 40% of part-time workers in rural Appalachia would like to obtain full-time employment.

- The rate at which full-time workers report that they are overqualified for their current job varies from 26.3% in the rural west to 33.8% in exurban areas. Of these workers, from 39.6% to 48.6% report that they are voluntarily overqualified.

- While 58.5% to 74.0% of the underemployed believe that their skills and training fit well with their current job, 84.8% to 95.4% believe they should have a better job and 92.5% to 96.1% of them believe they are qualified for a better job.

- Only 41.5% to 55.3% of the underemployed believe that they are appropriately compensated in their current job. They believe that they could obtain large increases in pay if they were to obtain a job that better fit their qualifications. These beliefs about pay increases range from 26.7% in large urban areas to 63.0% in rural Appalachia.

- Many of the underemployed report that they have attempted to improve their skills and training, ranging from 58.9% in the rural west and to 67.2% in large urban areas. Only 25.4% of the underemployed in rural Appalachia have access to tuition reimbursement programs compared to 51.3% in small urban areas.

- Longer commutes or relocation may be another option for the underemployed. 59.4% to 73.4% of them believe that they could find a better job within three months if they were willing to commute or relocate within 200 miles of their current residence.

From our demand side survey and statistical estimation we find:

- Health insurance availability varies significantly across regions of the state and by establishment size. For hourly workers in establishments with less than 50 employees, 59.4% are offered health insurance in the Buffalo Trace ADD in northeastern Kentucky while in the FIVCO ADD (Ashland area), 78.4% are offered health insurance. In establishments with 50 or more workers in these same ADDs, coverage rates are 92.9% (Buffalo Trace) and 91.2% (FIVCO). There is also significant variation in the availability of retirement plans across regions of the state and by establishment size.

- Our demand side survey asked employers to list high demand or difficult to fill jobs in their businesses. Jobs in high demand or difficult to fill vary significantly across regions of the state. Within the lists of the top 10 jobs by ADD and WIA, both high skill jobs such as in the health industry and low skill retail and restaurant jobs are represented.

- The percentage of jobs that are in high demand or are difficult to fill that require at least a bachelor's degree is typically higher than the percentage of Kentucky adults with a bachelor's degree. At the same time, the percentage of high demand or difficult to fill jobs that require a high school degree or less is typically also higher than the percentage of Kentucky adults with a high school degree or less. The percentage of high demand or difficult to fill jobs that require some college, an associate degree, or a postsecondary vocational qualification, while less that the Kentucky percentage of adults with this

qualification, is greater than the percentage of job openings nationally that require these qualifications.

We have developed plans for updating our estimates using combinations of existing data sets, surveys already scheduled at the national and state level for other purposes, updated versions of our household and business surveys, and current and updated versions of our statistical models.

Most important, these data will have several significant uses. Economic development efforts will be enhanced as potential new employers in the Commonwealth will be able to obtain information about labor market conditions in the area in which they are contemplating locating. More specifically, these businesses will have estimates of the number of underemployed workers in the region that might be available for work if they were able to obtain a more suitable match with their skills. They will also know which occupations are in high demand or are difficult to fill in the region. Potential new employers and existing employers will have information on fringe benefit packages in the region so they can determine whether they are offering a competitive compensation package. These new data will provide a more complete picture of the total compensation of workers and labor market conditions in Kentucky than has been available previously.

Introduction

The Center for Business and Economic Research at the University of Kentucky (CBER), along with its partners, the Survey Research Center at the University of Kentucky (UK-SRC), the Survey Research Center in the Urban Studies Institute at the University of Louisville (UL-SRC), and the Department of Economics at the University of Louisville, is pleased to present this final report on the findings of the Kentucky labor supply and demand surveys sponsored by the Kentucky Cabinet for Workforce Development. The two universities have put together a consortium including some of the best scholars in the region in the areas of labor economics, local economic development, and survey design and administration.

The study has consisted of several distinct activities. We designed and administered two separate statewide surveys during the first phase of the study. The household or labor market supply survey was designed to obtain information about underemployment of Kentucky's workforce. The business or labor market demand survey was designed to obtain information on high demand and difficult to fill jobs, educational requirements, and fringe benefits in Kentucky's labor markets. These surveys were designed during Summer and Fall 2001 and were launched late in 2001. The household survey was completed early in 2002 and the business survey continued until Summer 2002.

The next step was to prepare the data for statistical estimation by conducting preliminary analysis such as assigning occupational codes. Following that, we used the data for statistical estimation of underemployment, vacancies, educational requirements, and fringe benefits for regions and industries within the state. The data generated from this statistical estimation form the basis for the web application making these data available to any interested web user. In addition, we have plans for updating our estimates in the future. Finally, we have also been engaged in a series of meetings with staff from the Kentucky Cabinet for Workforce Development to discuss ways in which our data can be integrated with existing Cabinet databases and the overall capacity of the Cabinet to deliver data to interested users can be enhanced.

Each of these activities of the overall study is described in more detail in this report. In addition, we highlight some of the results of our estimation in tables and figures and describe the variables and geographic disaggregations available to users at the website. All of these data at http://kycwd.org/lmisurvey.htm were previously unavailable from existing data sources.

The data we have developed will have several important uses. Economic development efforts will be enhanced as potential new employers in the Commonwealth are able to obtain information about labor market conditions in the area in which they are contemplating locating. More specifically, these businesses will have estimates of the number of underemployed workers in the region who might be available for work if they were able to obtain a more suitable match with their skills. They will also know which occupations are in high demand or are difficult to fill in the region. Potential new employers and existing employers will have information on fringe benefit packages in the region so they can determine whether they are offering a competitive compensation package. These new data will provide a more complete picture of the total compensation of workers in Kentucky than has been available previously. In addition, our capacity building efforts will point the way toward updating and integrating the estimates into the existing databases of the Kentucky Cabinet for Workforce Development.

Methodology

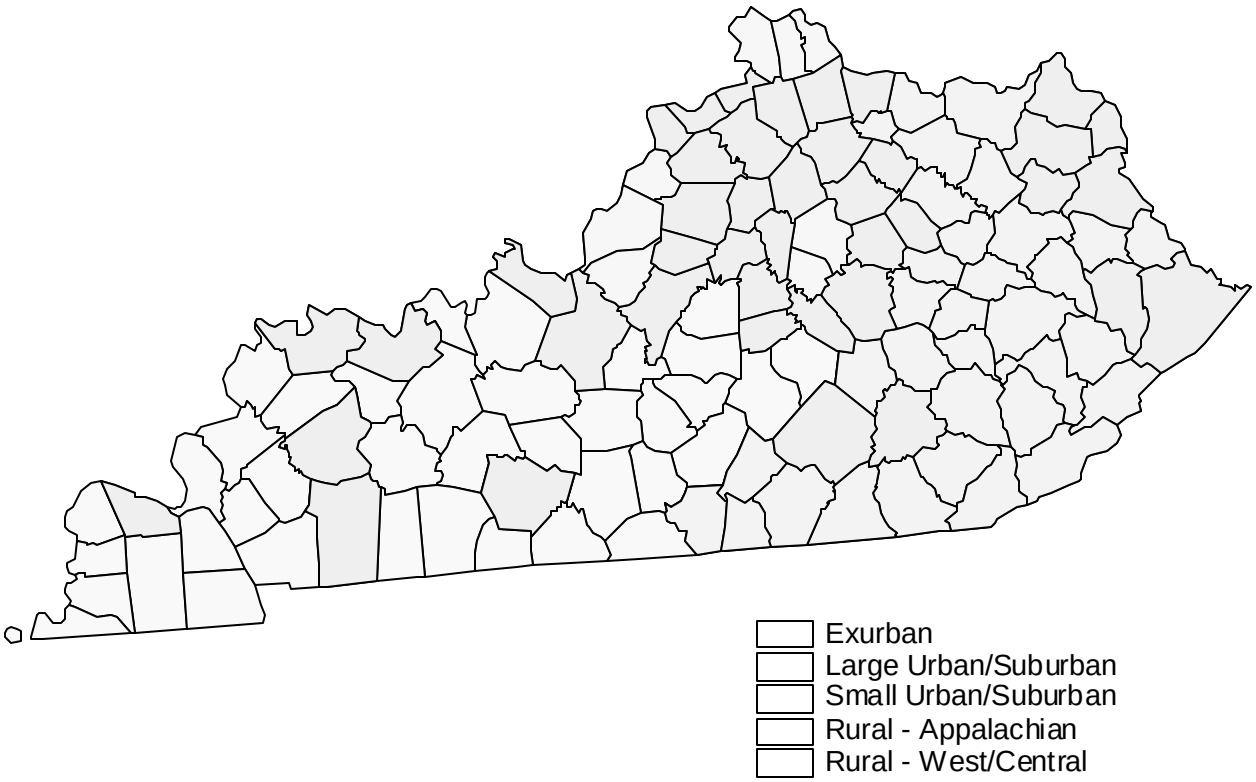
This section describes the design and implementation of the supply and demand surveys and the econometric methods used to generate the underemployment, fringe benefit, vacancy, and educational requirement data.

Supply Survey

The statewide labor supply survey of households was designed to determine the extent of underemployment in the Commonwealth. The survey instrument was developed by the UK – U of L Consortium research team and administered by the Survey Research Center at the University of Kentucky. The Commonwealth was stratified into 5 areas to provide initial regional variation in the responses to questions on underemployment. We hypothesized that underemployment patterns may differ by type of county. In particular, we suspected that workers in large urban counties (with thicker labor markets) would report less underemployment than those in remote rural counties. Based on population size and geographic location, we partitioned Kentucky's 120 counties in five types: large urban-suburban, small urban-suburban, exurban, rural Appalachia, and rural west. See Figure 1 for the designations.

The large urban-suburban category includes the core counties of the Louisville, Cincinnati-Northern Kentucky, and Lexington labor markets. The small urban-suburban category includes the counties that contain a city of sufficient size to support such urban services as a daily newspaper, a hospital, a shopping mall, or an airport. Exurban counties are rural in character, but close enough to major urban centers where residents can commute to a broad range of employment opportunities. The rugged landscape, dependence on extraction industries, and distinct culture of rural eastern Kentucky induced us to treat it as a category separate from the other rural counties in the state.

Figure 1: Counties in the Five Supply Side Survey Regions



The questionnaire was administered by telephone and was approximately 25 minutes in length. The sample was selected using a statewide Waksberg Random-Digit Dialing method. This gives every household in the sampled regions with a phone an equal probability of being selected. The sample was then pre-filtered for known non-working phone banks and known business numbers. The plan was to obtain approximately 625 completed interviews in each of five regions in Kentucky. This provides a margin of error of no more than ± 4% in each region at the 95% confidence level. Below we present the 3,285 completions broken down by region.

Table 1: Supply Survey Completions and Response Rates by Region

Region	Number of Completions	Response Rate
Large Urban	637	40.9%
Small Urban	658	40.5%
Exurban	650	41.5%
Rural Appalachian	680	40.2%
Rural West	662	43.8%

Once a private household was reached by telephone, the adult with the most recent birthday was asked to participate in case more than one eligible adult resides in the household. The questionnaire was pilot tested on a minimum sub-sample of 10 participants in each of the four regions. UK-SRC standard procedures are to attempt each number a minimum of 15 times as scheduled by computer to cover some attempts during all time windows – daytime, evening, and weekend. If an eligible respondent was reached who could not complete the interview at the time, UK-SRC scheduled up to 7 callbacks to complete the interview. Finally, UK-SRC attempted one refusal conversion for those reached who initially refused to participate. The response rates of 40-44% across regions that resulted from this procedure are typical for lengthy random household telephone surveys.

The survey also included a wide range of demographic questions, most importantly including the same set of demographic questions found in the Census 2000 "long form." Along with the demographic questions that match those in the Census 2000, there are a number of questions on previous job experience, as well as schooling and training to help determine the worker's qualifications for new jobs. We next asked a battery of questions to help determine the extent of the worker's underemployment and concluded the

survey with a series of questions on last year's income and employment experience, again to match questions of the Census 2000.

Demand Survey

The statewide demand side survey of businesses was completed to provide information on three broad categories of data needed by the Kentucky Cabinet for Workforce Development: short-term labor shortages/vacancies, benefits, and education credentials. The sample was drawn from the universe of businesses in the ES-202 data file at the Kentucky Cabinet for Workforce Development. The survey instrument was designed by the UK – U of L Consortium research team and administered by the Survey Research Center in the Urban Studies Institute at the University of Louisville. The research team worked with local and regional entities to obtain input on the question wording, survey design, for pilot testing, and for ways to maximize participation in the survey.

The demand survey consisted of two parts: the first part deals with difficult to fill jobs and the qualifications and educational credentials of workers needed to fill these jobs and the second deals with fringe benefits offered in the firm, such as paid leave, health insurance, and retirement benefits.

The survey was conducted by mail of a stratified sample of employee businesses. A mail survey was used because the questions tended to be very detailed (e.g. the characteristics of fringe benefits), and it is less burdensome for businesses to fill out the survey on their own schedule than to have to participate in a phone survey. We used a stratified sample of 14,996 businesses. We sampled the entire universe of establishments with 50 or more employees, and then took a random sample of smaller establishments across all industries. The original sample sizes were 5,913 in the universe of establishments with 50 or more employees and the 9,083 in the sample of establishments with less than 50 employees. Of the original sample, we obtained 13,128 valid addresses, 7,766 for the sample of small establishments, and 5,362 for the universe of large establishments. Invalid addresses were those returned as undeliverable or new addresses given that also remained undeliverable on subsequent mailings.

Each business establishment in the survey received an initial survey, and if they did not respond, a second copy of the survey. The first two mailings were sent to the tax address for the establishment in the ES-202 (Unemployment Insurance system) records with a cover letter from the Kentucky Cabinet for Workforce Development. We then conducted a third mailing of the survey using a cover letter under the signature of a local official, for example from the local

Workforce Investment Board. The third mailing was sent to the local address of the establishment in the ES-202 record if different from the tax address.

The number of completions and response rates after the three mail outs for the small and large establishment samples are shown below.

Table 2: Demand Survey Completions and Response Rates by Establishment Size Category

Establishment Size Category	Number of Completions	Response Rate
Less than 50 Employees	2,056	26.5%
50 or More Employees	1,593	29.7%
All Establishments	3,649	27.8%

These response rates are in line with those typically attained in mail surveys of this kind, especially with businesses as respondents. We were able to incorporate information about non-respondents from the original ES-202 records in our estimation of vacancies, educational requirements, and fringe benefits as we describe below. Thus, some data for all establishments in a geographic area are incorporated into the estimates that we generate in this study.

Data Reporting

Regional Groupings

We generate estimates for four regional groupings: counties, county groups, Area Development Districts (ADDs), and Workforce Investment Areas (WIAs). Each county's county group consists of itself and all of its contiguous counties in Kentucky. Thus, there are 120 county groups in Kentucky, with each county at the center of its own county group. Of course, each county will be in up to several county groups: its own group, and in a group corresponding to each county with which it shares a border. Figure 2 shows the counties in each of the 15 ADDs and Figure 3 shows the counties in each of the 10 WIAs.

Figure 2: Area Development Districts

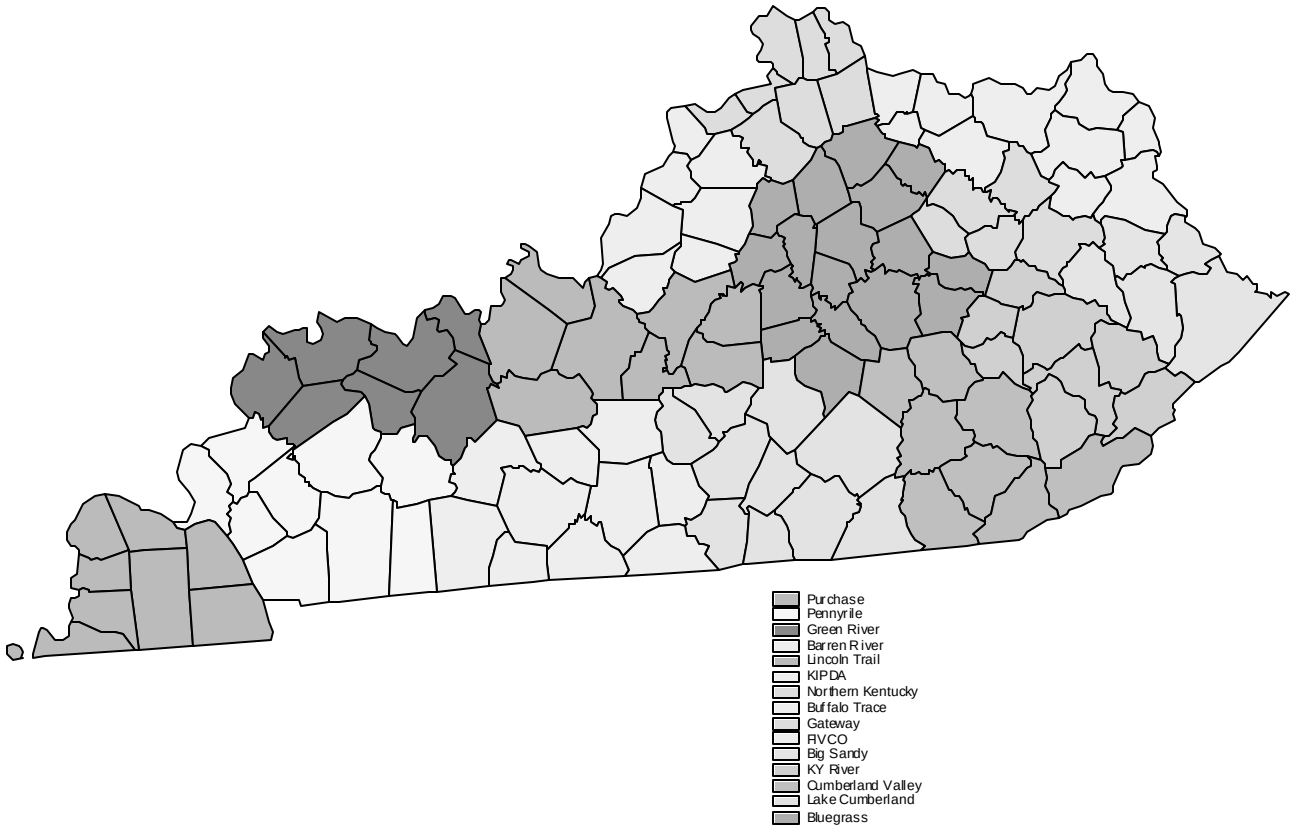
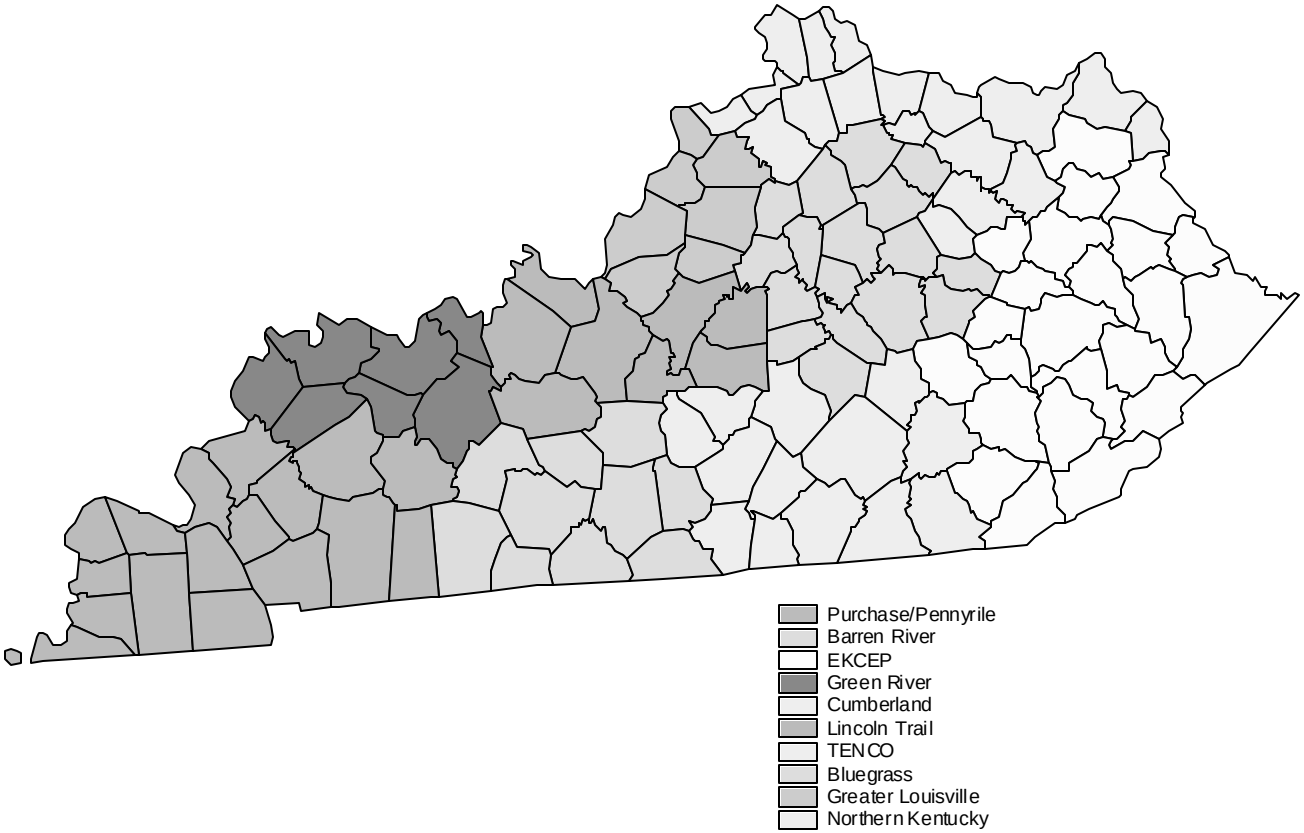


Figure 3: Workforce Investment Areas



Industry Groups

We report industry data in our demand side analysis using 19 industry groups. We were not able to report more disaggregated industry categories due to sample size concerns. These industries are defined using SIC codes (the codes available in the ES-202 data). Below is a table showing the 19 industry categories and the associated 2-digit SIC codes in the category.

Table 3 – Industry Groups Used in the Demand Side Analysis

Industry Group	Name	2-digit SIC Codes in Group
1	Agriculture, Forestry, Fishing	01-09
2	Mining	10-14
3	Construction	15-17
4	Durable Manufacturing	24,25, 32-39
5	Nondurable Manufacturing	20-23, 26-31
6	Transportation, Communications, Public Utilities	41-49
7	Wholesale Trade - Durables	50
8	Wholesale Trade - Nondurables	51
9	Retail Trade - Durables	52,57,59
10	General Merchandise and Food Retail	53,54,56
11	Automotive and Accessories Retail	55
12	Eating and Drinking Places	58
13	Finance, Insurance, Real Estate	60-67
14	Entertainment Related Services	70,78,79,84
15	Business Services	73,75,76
16	Professional Services	81,87
17	Personal and Health Services	72,80,88,89
18	Social and Community Organizations	82,83,86
19	Public Administration	91-97

Occupational Coding

For both the supply and demand surveys, we code occupations using the new 6-digit Standard Occupation Codes (SOC) or O*NET codes. Thus, our estimates of high demand or difficult to fill occupations use the O*NET

classification system. This will allow for future incorporation of information from the O*NET database on the characteristics of various occupations into the databases of the Kentucky Cabinet for Workforce Development. While not all databases within the Kentucky Cabinet for Workforce Development have converted to the new SOC or O*NET codes, all are moving in that direction and it is appropriate that we use the O*NET codes in this study.

Supply Side Statistical Analysis

One of the major aims of the supply side or underemployment part of the study is to generate estimates of the number of underemployed in each county. As described above, the survey data were collected for five regions of the state, and thus direct estimates are representative at only the regional level. Within each region, the number of respondents in most counties is too small to construct reliable estimates. Hence, we turn to statistical analysis of the underemployment survey data to estimate a predictive model of underemployment.

The variables included in the model were chosen for the most part to match those available in the Summary File 3 release of the Census 2000. The Summary File 3 contains social, economic, and housing characteristics complied from a sample of approximately 19 million housing units (about 1 in 6 households) that received the Census 2000 long form questionnaire. The Summary File 3 data provides counts of individuals in each county by gender for age groups, race, industry, occupation, and other demographic and economic characteristics. After we estimate our regression model explaining whether individuals in our data are underemployed based on the Census 2000 questions in the supply side survey we use the estimated coefficients of our model combined with counts in the Summary File 3 Census data to generate estimates of underemployment by county. We use the county estimates to aggregate the underemployment data into county groups, ADDs, and WIAs.

The study examines two definitions of underemployment: 1) those individuals who reported in the survey that they were working at part-time employment, but would prefer full-time employment, and 2) those individuals who answered yes when asked if they were "…overqualified for their job because they have more training and experience than is required to perform the job" and answered that this was not by choice and that they would rather have a different full-time job that better utilizes their education and experience.

In order to arrive at a predictive model, a number of different specifications were examined. The goal was to include variables that allowed prediction of the subpopulations of interest (males and females), and included

important predictors of underemployment, while still preserving parsimony. Including irrelevant variables simply taxes the model, while excluding important variables reduces the predictive power. The most important predictors included age and gender, industry and gender, and income. In general, women are less likely to be part-time seeking full-time work than men. This follows for two reasons: women are less likely to be in the labor force, and women working part-time have often chosen that status. Women are more likely to report being overqualified (that is employed full-time at a position that does not fully utilize their skills and education).

Demand Side Statistical Analysis

The demand side survey was in part designed to yield estimates of fringe benefits, job shortages and vacancies, and educational credentials for sub-state regions within Kentucky. We do this using two approaches. The first is to calculate weighted averages of the various measures for regions and large counties. The second is the construction of statistical models for several key fringe benefits that yield estimates at the county level for all 120 counties in the state.

In the process of constructing these estimates, we needed to address the issue of the proper weighting of the large and small sub-samples. The large business sample, those with 50+ employees, represents a much larger share of the total population of large businesses than does our small business sample. Thus, in aggregating data from the two sub-samples, we need to give a greater weight to observations from the small business sub-sample to account for the fact that each observation represents a larger number of businesses. Working in the opposite direction is the fact that larger businesses have more employees and thus they should be given a greater weight to account for their greater employment.

We use weights that account for both factors, thus giving averages for a representative worker in the group being considered. The data for each business are first multiplied by the number of workers in the establishment to account for employment there and are then multiplied by a factor that represents the number of workers in the population that are accounted for by each worker in the sample. For example, in a particular county, if there are 1,000 workers in businesses with over 50 employees and 500 of them work in businesses in our sample, then each employee in our sample represents 2 workers in the population. And if in a particular business there are 60 employees, the data reported by this business would have a weight of 2*60=120. In other words, the data for this business represents 120 workers in the county. The data for the

other businesses in the county are weighted in a similar way and then averages are calculated. In this way, when we calculate averages we incorporate information about the population of businesses in a county, county group, ADD, or WIA, whether or not they are part of our sample. We obtain information on the number of employees by county, county group, ADD, or WIA by establishment size from the ES-202 data.

The second approach is to estimate statistical models relating some important fringe benefits to variables that are available for the business from the ES-202 record. These variables include the number of employees at the establishment, the average earnings per worker at the establishment, the industry, and the county in which the business is located. Our models include all of these factors and we allow the effects of the variables to vary for businesses in the large establishment sample and in the small establishment sample. We estimate two sets of models: one set which includes a separate effect for each county and one set which does not include county specific effects.

The estimates of the models are then combined with county characteristics to obtain predictions of fringe benefits in each county. The county characteristics used are for the entire population of businesses in the county, not just those who responded to the survey. Thus, we incorporate the characteristics of all businesses in the county into our predictions, even though our models are estimated using only data from those businesses that responded to our sample. We weight our predictions in a similar fashion to that used for the calculation of averages for counties, county groups, ADDs, and WIAs. In particular, we weight the predictions by the total number of employees in small and large establishments in the region being considered in order to account for the fact that the number of workers employed by large and small establishments differs. Since we are using data for the entire population of establishments to generate our predictions, it is not necessary to further adjust the weights to account for the fact that each employee is accounting for multiple employees in the county or region as we did in the calculation of sample averages. We used the model with the county specific effects for the eight large counties that had at least 30 observations in both the small and large sub-samples. For these counties, we were confident that we had enough data to estimate county specific effects for large and small businesses. For the other counties, we used the models without county specific effects, which is a more appropriate specification. Instead of county specific effects, these models assume the underlying model is common across counties, which is less demanding of the data given the smaller sample sizes in each county.

New Labor Market Indicators Estimated in the Study

The Variables and the Regional, Industry, Worker, and Establishment Size Groupings Estimated in the Study

In this section, we describe the variables estimated in the study and the regional, industry, demographic, and establishment size groupings used to report the data. This provides a summary of the data available in our web application.

Underemployment

A summary of the regional groups, worker groups, and underemployment variables estimated in the study and available at the website is given in Table 4. By constructing statistical models explaining underemployment and using county level characteristics recently published in the Summary File 3 of the Census 2000 we are able to generate estimates of the number of underemployed by county. We aggregate these estimates to obtain estimates for county groups, WIAs, and ADDs. The Summary File 3 contains breakdowns of the population for males and females, so we generate separate estimates of underemployed males and females. We break up the population into six groups: three employed groups (including the underemployed), the unemployed, adults out of the labor force, and children.

Besides these counts of the underemployed and other segments of the population, we also provide information on various characteristics of the underemployed and the employed that are not underemployed. For example, we include demographic characteristics such as age and education levels, and economic characteristics such as wages. In addition, we include detailed information on the underemployed, such as their responses to questions about the reasons for their underemployment. In order to have sufficient sample sizes, we are only able to provide this information for the five original sampling regions for the statewide labor supply survey.

Table 4: Underemployment Data Available at the Web Application

Regional Groups	Worker Groups	Variables
A. Underemployment and Population Counts		
15 ADDs 10 WIAs 120 Counties 120 County Groups	1. Male Population 2. Female Population 3. Total Population	1. Employed, not Underemployed 2. Employed, but Underemployed Seeking Full-Time Work 3. Employed, but Underemployed Seeking a Better Job Match 4. Unemployed 5. Out of Labor Force 6. Children, Ages 0-17
B. Characteristics of the Underemployed and non-Underemployed		
5 Labor Supply Survey Regions	1. Underemployed 2. Employed but not Underemployed	1. Demographic and Economic Characteristics of the Underemployed and the Employed but not Underemployed 2. Detailed Questions on Underemployment

Fringe Benefits

A summary of the fringe benefit data generated in the study is contained in Table 5. Because of small sample sizes in some counties, it was not possible to provide simple averages in all counties. Therefore, as described above, we constructed statistical models for eight key fringe benefit variables and used those to generate county estimates. For these variables, we continue to report averages for ADDs, WIAs, county groups, and industries.

We report data for small, large and all establishments and for hourly full-time and salaried full-time workers. While we asked about part-time benefits in our survey, very few businesses provide benefits to part-timers, so we lacked sufficient sample sizes to report data on part-time fringe benefits. In addition, we lacked sufficient sample sizes (n<30) to confidently report separately the fringe benefit data for large and small establishments in agriculture and mining. Thus, for only 17 of the 19 industry groups do we report an establishment size breakdown of average fringe benefits. For all 19 industry groups we report overall averages. The first group of eight fringe benefit variables are shown in Panel A of Table 5.

The other fringe benefit variables (those not modeled statistically) generated in the study are shown in Panel B of Table 5. Sample size becomes an issue in this case. We feel confident in reporting averages for regional and establishment size groups in which we have 30 or more businesses on which to potentially base our estimates. Using this standard, while we are able to report averages for all ADDs, WIAs, county groups, and industries, we are only able to report averages for 25 of Kentucky's 120 counties. Establishment size breakdowns cause a further reduction in the groups for which we can report averages. While some counties may have 30 businesses that responded to the survey, they may not have had 30 businesses with less than 50 or 50 or more employees. For only 13 counties are we able to report averages for businesses with less than 50 employees and for 9 counties can we report averages for the 50 or more employees group. As mentioned above, for 17 of the 19 industry groups are we able to report averages for small and large establishments. Figure 4 provides a map of Kentucky counties showing the types of establishment size breakdowns available in each county for the demand side variables that are not modeled statistically.

Figure 4: Establishment Size Breakdowns in the Demand Side Average Data by County

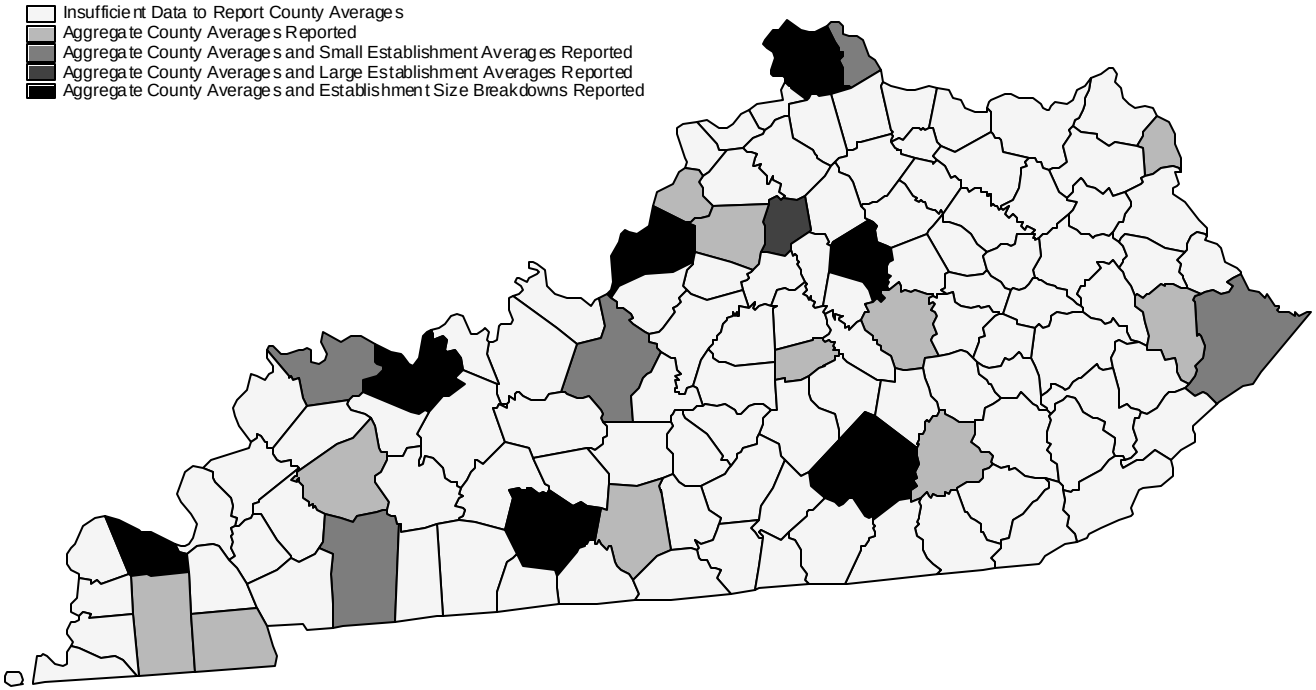


Table 5: Fringe Benefit Data Available at the Web Application

Regional and Industry Groups	Establishment Size and Worker Groups	Variables
A. Statistically Modeled Fringe Benefits		
15 ADDs 10 WIAs 120 Counties 120 County Groups 19 Industry Groups 17 Industry Groups for <50 Employees 17 Industry Groups for 50+ Employees	**Establishment Size:** 1. <50 Employees 2. 50+ Employees 3. Total **Worker Groups:** 1. Hourly Full-Time Workers 2. Salaried Full-Time Workers	1. Number of Paid Holidays 2. Number of Paid Vacation Days (First Year of Employment) 3. Maximum Number of Vacation Days 4. Number of Sick Days Earned Each Year 5. Percentage Offering Health Insurance 6. Percentage Offering Dependent Health Insurance 7. Percentage Offering Retiree Health Insurance 8. Percentage Offering Retirement Plan
B. Other Fringe Benefits		
15 ADDs 10 WIAs 25 Counties 13 Counties for <50 Employees 9 Counties for 50+ Employees 120 County Groups 19 Industry Groups 17 Industry Groups for <50 Employees 17 Industry Groups for 50+ Employees	**Establishment Size:** 1. <50 Employees 2. 50+ Employees 3. Total **Worker Groups:** 1. Hourly Full-Time Workers 2. Salaried Full-Time Workers	1. Health Insurance Variables 2. Retirement Benefit Variables 3. Other Benefits Variables (see lists below)

Table 5: Continued

Health Insurance Variables-

1. Percentage of Employees Eligible for Health Insurance
2. Percentage of Employees Participating in Health Insurance
3. Percentage of Plan Paid by Employer
4. Percentage of Dependent Health Insurance Plan Paid by Employer
5. Percentage of Retiree Plan Paid by Employer

Retirement Benefit Variables-

1. Percentage of Employees Eligible for Retirement Plan
2. Percentage of Employees Participating in Retirement Plan
3. Average Waiting Period for Participation in Retirement Plan

Other Benefits Variables-

1. Percentage Offering Profit Sharing
2. Percentage Offering Tuition Payments or Reimbursement
3. Percentage Offering Childcare Payments or Facilities
4. Percentage Offering Flextime

Job Shortages and Vacancies

A summary of the job shortages and vacancies data generated in the study and available in the web application is given in Table 6. The regional and industry groups are the same as those for the second set of fringe benefit variables described above and once again we provide data for small, large, and all establishments. For each regional, industry, and establishment size group, we generate a list of the top 10-25 difficult to fill or high demand occupations. The exact size of the list depends on the sample size. When fewer businesses report in a particular group, the list is shorter. For each listed occupation, we give the 6-digit O*NET occupation code, which will allow data from the O*NET database to be retrieved about the occupation, the typical required educational credential for the occupation, and the preferred experience level for the occupation as reported by employers in Kentucky in our survey.

Table 6: Job Shortage and Vacancy Data Available at the Web Application

Regional and Industry Groups	Establishment Size Groups	Variables
15 ADDs 10 WIAs 25 Counties 13 Counties for <50 Employees 9 Counties for 50+ Employees 120 County Groups 19 Industry Groups 17 Industry Groups for <50 Employees 17 Industry Groups for 50+ Employees	1. <50 Employees 2. 50+ Employees 3. Total	1. List of top 10 to 25 difficult to fill or high demand occupations 2. 6-digit O*NET occupation code for each listed occupation 3. Typical required education credential for each listed occupation 4. Typical preferred experience for each listed occupation

Educational Credentials

The data on educational credentials generated in the study and available in the web application are summarized in Table 7. The regional, industry and establishment size groups are the same as those used for the job shortage and vacancy data. We provide data on the percentage of difficult to fill or high demand jobs that require various levels of education: less than high school, high school or GED, some college, a vocational or associate degree, a bachelor's degree, or a graduate or professional degree.

Table 7: Educational Credentials Data Available at the Web Application

Regional and Industry Groups	Establishment Size Groups	Variables
15 ADDs 10 WIAs 25 Counties 13 Counties for <50 Employees 9 Counties for 50+ Employees 120 County Groups 19 Industry Groups 17 Industry Groups for <50 Employees 17 Industry Groups for 50+ Employees	1. <50 Employees 2. 50+ Employees 3. Total	Percentage of Difficult to Fill or High Demand Jobs Requiring Each of the Following Educational Credentials: 1. Less than High School 2. High School or GED 3. Some College 4. Vocational or Associate Degree 5. Bachelor's Degree 6. Graduate or Professional Degree

New Estimates of Underemployment, Fringe Benefits, Vacancies, and Educational Requirements

In this section, we show some estimates of the labor market variables included in the study. The estimates presented here are only a small part of the entire database available to users at the website, http://www/kycwd.org/lmisurvey. Here we provide some representative results on underemployment, fringe benefits, vacancies and educational requirements by Area Development Districts, Workforce Investment Areas, industries, counties, and county groups.

Underemployment

Our household survey and statistical modeling yielded estimates of the number of underemployed by county. In Table 8, we show our underemployment estimates aggregated up to the Area Development District level. The last row of Table 8 shows the statewide totals and averages. The first three columns give the number of underemployed in each ADD, the fourth column shows the percentage of the labor force in each ADD that is underemployed, and the last column shows the percent of the labor force that is underemployed or unemployed. The number of underemployed ranges from about 5,000 in Buffalo Trace to almost 78,000 in KIPDA (Louisville area). The percentage of the labor force that is underemployed varies from 17.5% in KIPDA to 22.5% in Gateway. When the unemployed are added to the underemployed,

the percentages vary from 20.4% in Northern Kentucky to 32.0% in Kentucky River. Statewide, there are almost 81,000 workers who are part-time but are seeking full-time work, and there are almost 274,000 full-time workers seeking a better job match. In addition, 18.4% of the labor force statewide are underemployed, and 24.1% are underemployed or unemployed.

Table 8 – Underemployed by Area Development District

Area Development District	Under-employed Seeking Full Time Work	Under-employed Seeking a Better Job Match	Total Under-employed	Pct of Labor Force Under-employed	Pct of Labor Force Under- or Un-employed
Barren River	5,815	17,857	23,672	18.8%	24.4%
Big Sandy	3,537	6,563	10,100	18.2%	27.9%
Bluegrass	14,868	51,075	65,943	18.3%	23.2%
Buffalo Trace	1,524	3,632	5,156	20.5%	27.5%
Cumberland Valley	5,927	12,254	18,181	20.7%	29.1%
FIVCO	2,853	8,327	11,180	19.8%	28.3%
Gateway	2,376	5,131	7,507	22.5%	29.8%
Green River	4,627	13,980	18,607	18.4%	24.5%
Kentucky River	2,685	5,720	8,405	20.6%	32.0%
KIPDA	13,729	64,030	77,759	17.5%	22.2%
Lake Cumberland	4,248	11,823	16,071	19.2%	26.1%
Lincoln Trail	5,356	17,189	22,545	19.1%	24.2%
Northern Kentucky	5,525	28,337	33,862	16.6%	20.4%
Pennyrile	4,334	15,165	19,499	19.6%	25.5%
Purchase	3,478	12,740	16,218	17.7%	24.0%
State Total	*80,882*	*273,823*	*354,705*	*18.4%*	*24.1%*

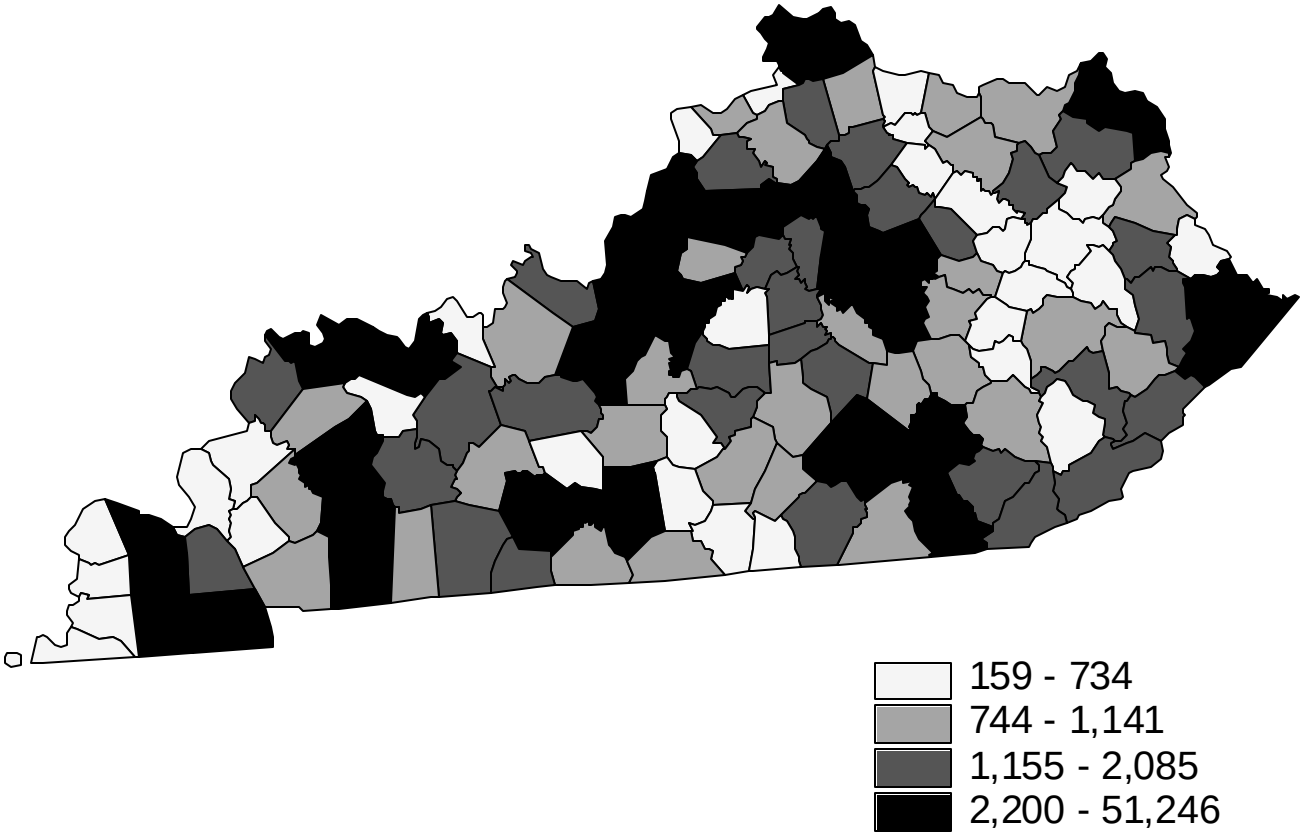
Table 9 shows the same data aggregated to the Workforce Investment Area level. The largest number of underemployed is in the Greater Louisville WIA, while the percent underemployed is highest in TENCO, and the percent underemployed or unemployed is highest in EKCEP. These data are somewhat different than those presented in Table 8 because the aggregations of counties for the 15 ADDs are somewhat different than for the 10 WIAs.

Table 9 – Underemployed by Workforce Investment Area

Workforce Investment Area	Under-employed Seeking Full Time Work	Under-employed Seeking a Better Job Match	Total Under-employed	Pct of Labor Force Under-employed	Pct of Labor Force Under- or Un-employed
Barren River	5,815	17,857	23,672	18.8%	24.4%
Bluegrass	14,868	51,075	65,943	18.3%	23.2%
Cumberlands	7,104	17,871	24,975	19.5%	26.2%
EKCEP	10,622	22,671	33,293	20.0%	30.2%
Green River	4,627	13,980	18,607	18.4%	24.5%
Lincoln Trail	5,356	17,189	22,545	19.1%	24.2%
Greater Louisville	13,279	64,030	77,759	17.5%	22.2%
Northern Kentucky	5,525	28,337	33,862	16.6%	20.4%
Purchase/ Pennyrile	7,812	27,905	35,717	18.7%	24.8%
TENCO	5,424	12,908	18,332	20.8%	28.2%
State Total	*80,882*	*273,823*	*354,705*	*18.4%*	*24.1%*

We next turn to county level data, which is presented in map form. Figure 5 summarizes the number of underemployed by county. Counties are divided into 4 groups or quartiles, ranging from the lowest number of underemployed to the highest number of underemployed. Of course using this approach, the larger counties tend to have the most underemployed and be in the highest quartile while the smaller counties are in the lowest quartile. For this map and all of the other subsequent maps, the exact estimates for each individual county are available at http://kycwd.org/lmisurvey.htm.

Figure 5: Number of Underemployed by County



In Figure 6, we present estimates of the percentage of the labor force unemployed or underemployed. As might be expected, many of the counties in the highest quartile are in Eastern Kentucky, while many of the larger urban counties are in the lowest quartile.

Table 10 shows some of the characteristics of the underemployed while Table 11 does the same for the employed who are not underemployed. Each table provides average characteristics for the five regions used to collect data in our supply side survey: large urban areas, small urban areas, exurban areas, rural Appalachia, and the rural west. There are several important differences between the underemployed and the employed who are not underemployed. Below we summarize these differences and highlight some of the more striking comparisons within regions.

The underemployed have less education, are younger, are less likely to be married and in general are more likely to be in school than the employed who are not underemployed. For example, 31.15% of those not underemployed in exurban areas have a bachelor's degree or more compared to 7.55% of the underemployed. In the same region, the underemployed are on average 36.45 years old while those not underemployed are on average 44.13 years old. In large urban areas, 63.58% of those not underemployed are married compared to 44.78% of the underemployed. In small urban areas, 17.95% of the underemployed are currently attending school compared with 10.36% of those not underemployed.

The underemployed are more likely to be non-white, more likely to report physical limitations, more likely to be working in manufacturing than other industries, and more likely to be working for private for-profit employers and less likely to working for government employers and less likely to be self employed. For example, in small urban areas, 20.51% of the underemployed are non-white while 7.02% of those not underemployed are non-white. In rural Appalachia, 16.67% of the underemployed report having a condition that limits physical activities, compared to 4.98% of those not underemployed. In large urban areas, 22.39% of the underemployed work in manufacturing compared with 10.4% of those not underemployed. In the same region, 73.13% of the underemployed work in private for-profit firms compared to 55.49% of those not underemployed. In exurban areas, 21.5% of those not underemployed work for government employers compared to 9.1% of the underemployed. In rural Appalachia, 14.56% of those not underemployed are self-employed, compared to 6.07% of the underemployed.

Finally, the underemployed are less likely to be working in management, more likely to be working in office and administrative support jobs, have lower

pay on average, and are less likely to be receiving health insurance benefits than those not underemployed. For example, in large urban areas, 29.85% of the underemployed are working in office and administrative support jobs, compared with 13.45% of those not underemployed. In contrast, in small urban areas, 20.12% of those not underemployed are working in management, business or financial jobs compared with 8.98% of the underemployed. In small urban areas, the calculated hourly rate of pay for those not underemployed is $23.45 compared to $9.68 for the underemployed. In rural Appalachia, 80.68% of those not underemployed report having employer-provided health insurance, compared to 65% of the underemployed.

This comparison of the characteristics of the underemployed and those not underemployed in Tables 10 and 11 show that on average, the underemployed have less schooling, are younger, are less likely to be working in managerial positions and are less likely to be self-employed. However, these are just general comparisons. These workers are by no means uniformly low skilled. For example, in large urban areas, the 41.79% of the underemployed report having a bachelor's degree or more, 19.4% report that they are in management, business, or financial jobs, and their average hourly rate of pay is $16.16. Further, as we have already noted, the underemployed are in general more likely to be attending school than those not underemployed, suggesting that some underemployed are attempting to improve their skills and training.

Table 12 provides more detailed information on the underemployed. The percentage of workers underemployed varies from 15.2% to 20.5% across the five regions, and underemployment rates are not consistently higher across regions for either men or women. Notably, 32% of the part-time workers in small urban areas and 40% of part-time workers in rural Appalachia would like to obtain full-time employment. The most important reasons given by part-time workers who do not want full-time employment are schooling or training, family or personal obligations or child care problems.

The rate at which full-time workers report that they are overqualified for their current job varies from 26.3% in the rural west to 33.8% in exurban areas. Of these workers, from 39.6% to 48.6% report that they are voluntarily overqualified. Only those who are involuntarily overqualified are included in the underemployed in our study. Of these workers, the reasons most often given for their underemployment are lack of job opportunities, low wages in available jobs, and geographic location. For example, in rural Appalachia, 91.7% of the involuntarily overqualified cite a lack of job opportunities, 79.2% cite low wages in available jobs, and 56.3% cite geographic location as contributing factors to their underemployment.

While 58.5% to 74.0% of the underemployed believe that their skills and training fit well with their current job, 84.8% to 95.4% believe they should have a better job and 92.5% to 96.1% of them believe they are qualified for a better job. In four of the five regions they are most likely to cite in order skills, experience, training, and education as reasons why they are qualified for a better job.

Only 41.5% to 55.3% of the underemployed believe that they are appropriately compensated in their current job. The underemployed believe that they would be paid on average $11.28 to $17.34 in jobs that matched their skills, experience and education. Further, many of the underemployed report that they have attempted to improve their skills and training, ranging from 58.9% in the rural west and to 67.2% in large urban areas. The ability to make these improvements is hampered for some of them by the lack of tuition assistance programs on the job. Only 25.4% of the underemployed in rural Appalachia have access to tuition reimbursement programs compared to 51.3% in small urban areas. Longer commutes or relocation may be another option for improving the lot of the underemployed. 59.4% to 73.4% of them believe that they could find a better job within three months if they were willing to commute or relocate within 200 miles of their current residence.

Figure 6: Percentage Underemployed Plus Unemployed by County

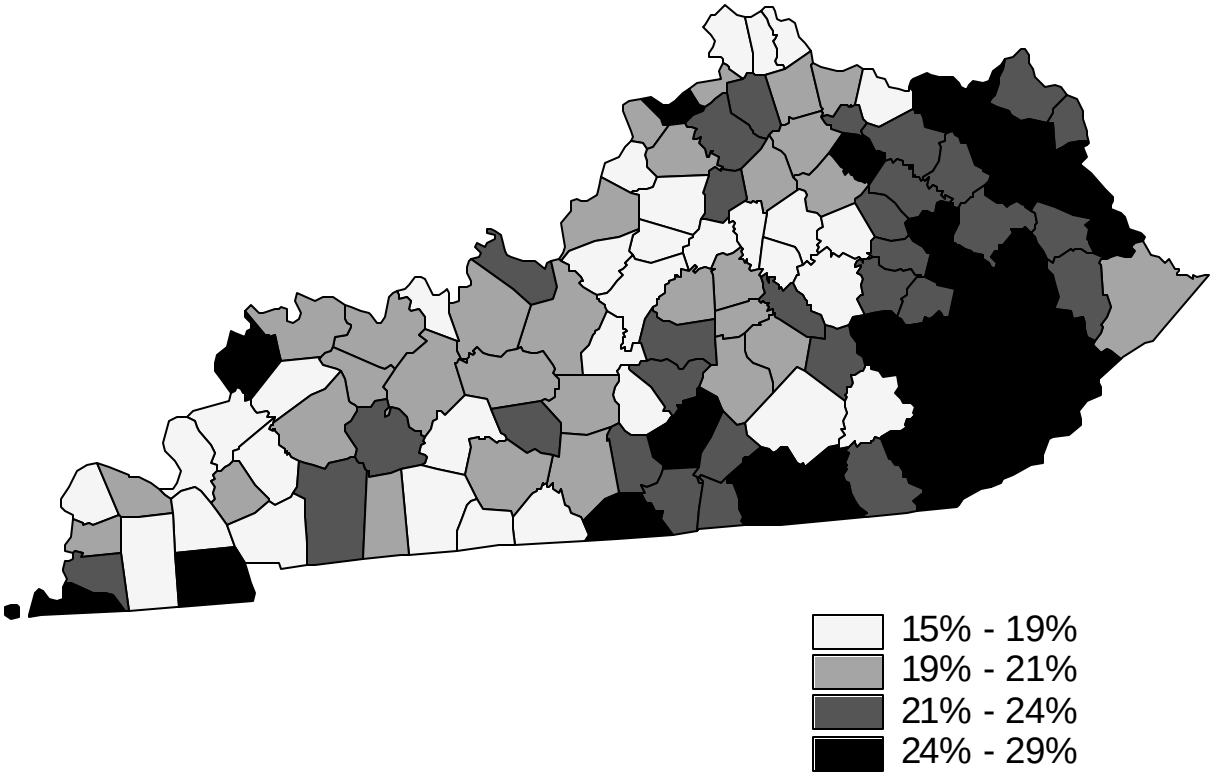


Table 10: Characteristics of the Underemployed

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Community Type					
Rural Farm	4.48%	11.54%	9.09%	18.18%	19.64%
Rural Non-farm	2.99%	19.23%	25.76%	25.76%	25.00%
Small Town	7.46%	41.03%	53.03%	51.52%	53.57%
Suburb	35.82%	6.41%	9.09%	1.52%	1.79%
City	47.76%	20.51%	1.52%	3.03%	0.00%
Don't Know	1.49%	1.28%	1.52%	0.00%	0.00%
Average Number of Children Under 18 in Household	0.79	0.91	0.85	0.98	1.05
Average Number of Children Under 15 in Household	0.61	0.76	0.64	0.79	0.82
Average Number of People Over 65 in the Household	0.09	0.15	0.11	0.11	0.09
Average Number of Grandchildren in Household	1.94	1.92	1.92	1.97	1.84
Average Length of Time Responsible for Grandchildren (Years)	5.0	3.67	3.0	1.97	3.0
Percent Married	44.78%	39.74%	54.55%	65.15%	58.93%
Percent Currently Attending School	14.93%	17.95%	9.09%	7.58%	5.36%
Highest Level of Schooling					
Less than High School	5.97%	15.38%	12.14%	6.07%	12.50%
High School Graduate	16.42%	29.49%	36.36%	40.91%	35.71%
Some College	25.38%	21.79%	27.28%	18.18%	33.93%
Associates or Vocational Degree	10.45%	8.97%	16.67%	10.61%	8.93%
Bachelors Degree	34.33%	14.10%	7.58%	19.70%	8.93%
Advanced Degree	7.46%	10.25%	0.00%	4.55%	0.00%
Average Age	37.38	34.58	36.45	35.64	39.52
Percent Hispanic	0.00%	3.85	1.52%	1.52%	0.00%
Primary Race Category Selected					
White	82.09%	79.49%	92.42%	93.94%	89.29%
Non-white	17.91%	20.51%	7.58%	6.06%	8.92%
Refused	0.00%	0.00%	0.00%	0.00%	1.79%

Table 10: Continued

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Percent with Certain Health Problems					
Deafness, Vision, or Hearing Problem	2.99%	5.13%	3.03%	7.58%	10.71%
Physical Limitation	7.46%	10.26%	21.21%	16.67%	7.14%
Learning Disability	1.49%	6.41%	10.61%	7.58%	5.36%
Percent with Problems Performing a Certain Task					
Dressing, Bathing, etc.	1.49%	0.00%	0.00%	1.52%	0.00%
Getting Around Outside the Home	1.49%	1.28%	1.52%	0.00%	0.00%
Working	0.00%	3.85%	3.03%	1.52%	3.57%
Percent that Work Full-Time or Part-Time					
Full-time	86.57%	69.23%	86.36%	72.73%	82.14%
Part-time	13.43%	30.77%	13.64%	27.27%	17.86%
Average Commute Time in Minutes	18.70	17.06	25.43	21.83	17.6
Broad Industry Category					
Manufacturing	22.39%	15.38%	22.73%	24.24%	30.36%
Wholesale	0.00%	1.28%	3.03%	6.06%	0.00%
Retail	11.94%	17.95%	18.18%	15.15%	23.21%
Other	65.67%	65.38%	56.06%	54.55%	46.43%
Class of Employer					
Private, profit	73.13%	56.41%	69.70%	63.64%	64.29%
Private, non-profit	7.46%	10.26%	7.58%	10.61%	3.57%
Local Govt.	7.46%	7.69%	1.52%	3.03%	3.57%
State Govt.	4.48%	6.41%	6.06%	10.61%	7.14%
Federal Govt.	1.49%	6.41%	1.52%	3.03%	3.57%
Self Employed, not incorporated	0.00%	2.56%	4.55%	4.55%	12.50%
Self Employed, incorporated	1.49%	6.41%	1.52%	1.52%	0.00%
Working without pay	0.00%	0.00%	0.00%	0.00%	0.00%
Don't Know	4.48%	3.85%	7.58%	3.03%	5.36%

Table 10: Continued

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Occupation					
Management, Business, & Financial	19.40%	8.98%	7.58%	7.82%	7.41%
Social & Physical Sciences	7.47%	2.56%	4.55%	4.69%	3.70%
Social & Protective Services	1.49%	2.56%	1.52%	4.69%	1.85%
Education, Legal, & Arts	2.98%	12.82%	0.00%	10.94%	3.70%
Health Care	2.99%	5.13%	9.09%	3.13%	9.26%
Food, Cleaning, & Personal Care	10.45%	5.12%	13.64%	12.51%	9.25%
Sales & Related	5.97%	14.10%	9.09%	12.50%	11.11%
Office & Administrative Support	29.85%	15.38%	16.67%	10.94%	20.37%
Farming, Fishing, & Forestry	0.00%	0.00%	3.03%	1.56%	0.00%
Construction and Extraction	0.00%	6.41%	9.09%	9.38%	1.85%
Installation, Maintenance, & Repair	5.97%	5.13%	3.03%	0.00%	1.85%
Production	5.97%	11.54%	12.12%	14.06%	18.52%
Transportation & Materials	5.97%	6.41%	10.61%	7.81%	11.11%
Other	1.49%	3.85%	0.00%	0.00%	0.00%
Benefits at Current Job					
Percent with Health Insurance	82.54%	69.12%	70.18%	65.00%	76.09%
Percent with Retirement Benefits	74.60%	54.41%	52.63%	58.33%	69.57%
Hourly Pay Rate	$16.16	$9.68	$13.27	$9.89	$11.27

Table 11: Characteristics of the Employed Who are Not Underemployed

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Community Type					
Rural Farm	3.76%	16.46%	23.36%	18.77%	26.50%
Rural Non-farm	6.07%	17.07%	16.82%	37.16%	21.77%
Small Town	9.25%	39.33%	52.65%	40.23%	48.90%
Suburb	32.66%	9.45%	5.92%	2.30%	0.95%
City	47.11%	17.38%	0.93%	0.38%	1.26%
Don't Know	1.16%	0.30%	0.31%	1.15%	0.63%
Average Number of Children Under 18 in Household	0.77	0.83	0.86	0.85	0.92
Average Number of Children Under 15 in Household	0.62	0.70	0.69	0.63	0.79
Average Number of People Over 65 in the Household	0.14	0.10	0.15	0.19	0.12
Average Number of Grandchildren in Household	1.92	1.96	1.93	1.97	1.97
Average Length of Time Responsible for Grandchildren in years	3.44	4.0	3.0	5.0	3.5
Percent Married	63.58%	68.29%	69.47%	68.97%	68.14%
Percent Currently Attending School	10.11%	10.36%	4.99%	6.89%	9.15%
Highest Level of Schooling					
Less than High School	6.66%	13.7%	11.83%	14.86%	11.04%
High School Graduate	19.65%	28.05%	32.4%	34.48%	43.85%
Some College	19.66%	17.68%	15.27%	18.78%	14.83%
Associates or Vocational Degree	10.69%	10.36%	9.35%	11.49%	8.51%
Bachelors Degree	27.17%	19.21%	19.94%	13.41%	12.30%
Advanced Degree	16.18%	10.97%	11.21%	6.89%	9.47%
Average Age (Years)	41.58	41.60	44.13	39.95	41.61
Percent Hispanic	2.02%	1.22%	0.00%	0.77%	1.26%
Primary Race Category Selected					
White	87.57%	92.68%	95.64%	97.70%	95.58%
Non-White	11.85%	7.02%	4.36%	2.30%	4.42%
Refused	0.58%	0.30%	0.00%	0.00%	0.00%
Percent with Certain Health Problems					
Deafness, Vision, or Hearing Problem	2.02%	4.88%	4.05%	1.92%	4.10%
Physical Limitation	6.36%	7.93%	8.72%	4.98%	3.47%
Learning Disability	3.76%	2.44%	3.43%	2.68%	3.79%

Table 11: Continued

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Percent with Problems Performing a Certain Task					
Dressing, Bathing, etc.	0.87%	0.91%	1.25%	0.00%	0.32%
Getting Around Outside the Home	0.87%	2.13%	1.56%	0.38%	0.63%
Working	3.18%	2.74%	3.12%	1.15%	1.89%
Percent that Work Full-Time or Part-Time					
Full-time	83.24%	84.15%	88.47%	89.27%	86.44%
Part-time	16.76%	15.85%	11.53%	10.73%	13.56%
Average Commute Time in Minutes	18.94	20.14	23.54	22.15	20.27
Broad Industry Category					
Manufacturing	10.40%	14.02%	18.69%	15.71%	21.45%
Wholesale	3.76%	3.35%	2.18%	1.92%	3.79%
Retail	12.43%	14.33%	10.59%	16.09%	13.25%
Other	73.41%	68.29%	68.54%	66.28%	61.51%
Class of Employer					
Private, profit	55.49%	56.40%	52.02%	49.43%	53.94%
Private, non-profit	12.14%	8.84%	11.84%	9.20%	5.68%
Local Govt.	7.51%	4.27%	6.54%	3.83%	3.47%
State Govt.	6.65%	8.23%	11.53%	14.94%	12.30%
Federal Govt.	3.18%	6.71%	3.43%	1.92%	3.15%
Self Employed, not incorporated	4.91%	7.32%	9.03%	11.11%	11.04%
Self Employed, incorporated	3.18%	3.96%	1.87%	3.45%	3.47%
Working without pay	0.58%	0.30%	0.31%	1.53%	0.32%
Don't Know	6.36%	3.96%	3.43%	4.60%	6.62%

Table 11: Continued

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Occupation					
Management, Business, & Financial	23.10%	20.12%	15.19%	12.74%	14.06%
Social & Physical Sciences	6.72%	4.26%	6.34%	3.09%	2.56%
Social & Protective Services	3.50%	4.26%	5.06%	6.17%	3.20%
Education, Legal, & Arts	12.29%	9.44%	9.49%	10.43%	8.31%
Health Care	9.94%	7.01%	11.71%	7.72%	6.71%
Food, Cleaning, & Personal Care	6.72%	5.48%	6.97%	8.49%	7.36%
Sales & Related	7.89%	7.62%	6.96%	9.65%	9.90%
Office & Administrative Support	13.45%	14.33%	11.39%	9.27%	12.78%
Farming, Fishing, & Forestry	0.29%	1.52%	2.53%	1.93%	1.60%
Construction and Extraction	2.92%	5.18%	3.16%	6.56%	5.75%
Installation, Maintenance, & Repair	3.51%	1.83%	3.80%	4.25%	2.88%
Production	4.68%	8.84%	11.08%	13.51%	17.57%
Transportation & Materials	4.39%	7.32%	6.01%	6.18%	6.71%
Other	0.58%	2.74%	0.32%	0.00%	0.64%
Benefits at Current Job					
Percent with Health Insurance	85.37%	79.78%	81.02%	80.68%	83.13%
Percent with Retirement Benefits	73.81%	73.65%	74.09%	69.08%	74.3%
Hourly Pay Rate	$20.82	$23.45	$17.38	$16.81	$15.22

Table 12: Detailed Information on the Underemployed

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Percent of Workers Underemployed	16.3%	19.3%	17.5%	20.5%	15.2%
Percent of Male Workers Underemployed	17.8%	16.5%	18.7%	22.3%	13.8%
Percent of Female Workers Underemployed	15.2%	22.0%	16.1%	18.9%	16.7%
Percent of Part-time Workers Wanting a Full-time Job	13.6%	32%	19.6%	40%	18.9%
Reason for not Wanting Full-time Job					
Child Care Problems	14%	23.5%	13.5%	18.5%	16.3%
Family / Personal Obligations	17.5%	23.5%	24.3%	29.6%	16.3%
Health / Medical Limitations	7%	2%	5.4%	7.4%	11.6%
School / Training	31.6%	19.6%	18.9%	18.5%	27.9%
Retired / Social Security Limitations	12.3%	15.7%	24.3%	14.8%	14%
Full-time Workweek<35 Hours	5.3%	9.8%	8.1%	3.7%	2.3%
Don't Know	10.5%	3.9%	5.4%	7.4%	11.6%
Refused	1.8%	2%	0%	0%	0%
Percent of Full-time Workers Overqualified, i.e., More Training or Experience than Necessary for Job	28.1%	31.1%	33.8%	29.3%	26.3%
Percent Who Are Overqualified By Choice	39.6%	47.1%	48.6%	40.7%	44.6%
Reasons for Being Involuntarily Overqualified					
Child / Dependent Care	11.9%	16.7%	20.3%	29.2%	26.1%
Lack of Transportation	1.7%	3.7%	5.1%	2.1%	4.4%
Geographic Location	25.4%	46.3%	47.5%	56.3%	58.7%
Lack of Job Opportunities	74.6%	92.6%	86.4%	91.7%	93.5%
Low Wages at Available Jobs	57.6%	72.2%	61.0%	79.2%	78.3%
Disability	3.4%	9.3%	6.8%	2.1%	2.2%
Lack of Support from Family	6.8%	11.1%	11.9%	8.3%	4.4%
Percent of Underemployed Who Believe that Skills, Education, Exp., etc. Fit Well with Current Job	67.7%	74.0%	68.2%	58.5%	63.6%
Percent of Underemployed Who Believe They Should have a Better Job	84.8%	94.9%	95.4%	90.8%	92.8%
Percent of Underemployed Who Believe They Are Qualified for Better Job	92.5%	96.1%	95.4%	95.3%	94.6%
Reasons Given by Underemployed for Being Qualified for Better Job					
Percent Qualified Because of Education	93.4%	72.0%	75.8%	77.0%	69.8%
Percent Qualified Because of Skills	90.3%	96.0%	96.8%	93.4%	98.1%
Percent Qualified Because of Experience	87.1%	88.0%	95.1%	83.6%	96.2%
Percent Qualified Because of Training	79.0%	84.0%	91.9%	81.9%	96.2%

Table 12: Continued

	Large Urban	Small Urban	Exurban	Rural Appalachia	Rural West
Percent of Underemployed Who Believe They are Appropriately Compensated	41.8%	50.0%	41.5%	44.6%	55.3%
Average Hourly Wage Underemployed Believe They Would be Paid in a Job that Matched Their Skills, Education, and Experience	$17.34	$11.21	$14.97	$12.71	$12.78
Percent of Underemployed Attempting to Improve Skills and Training	67.2%	60.2%	62.1%	61.5%	58.9%
Percent of Employers of Underemployed Offering Tuition Assistance	44.6%	51.3%	39.1%	25.4%	37.5%
Percent of Underemployed Who Believe They Could Find a Better Fitting Job in 3 Months if They Were Willing to Relocate or Commute within a 200 Mile Region	68.2%	71.0%	73.4%	61.3%	59.4%

Fringe Benefits

The fringe benefit estimates and those for vacancies and educational requirements come from the survey of employers. For fringe benefits, we focus on the availability of health insurance and retirement plans, since they make up the largest share of the cost of fringe benefits to employers and the value of the fringe benefit package to workers. In addition, health insurance coverage has been an important public policy issue for many years. These new data provide some of the first sub-state estimates of the availability of employer-provided health insurance in Kentucky.

Table 13 shows the percentage of hourly and salary workers offered health insurance and retirement plans by Area Development District. The data are shown separately for the two establishment size categories: less than 50 employees and 50 or more employees. The last row of the table gives the statewide averages. For small establishments, health insurance coverage rates for hourly workers are 70.4% statewide, ranging from 59.4% in Buffalo Trace to 78.4% in FIVCO. For salary workers, health insurance coverage rates in small establishments are 75.0% statewide, ranging from 34.5% in Gateway to 80.7% in KIPDA and Bluegrass. The lower rates for salary workers in small firms in some ADDs probably reflects the fact that some owners in small businesses do not retain coverage through their businesses and instead obtained coverage from some other source, such as through a spouse's plan at work. Retirement plan coverage for hourly workers in small establishments is 49.2% statewide, ranging from 32.7% in Gateway to 60.9% in FIVCO. For salary workers, retirement plan coverage is 52.6%, ranging from 23.4% in Gateway to 63.7% in FIVCO. Thus, in general, retirement plan coverage is lower than health insurance coverage.

In general, health insurance and retirement plan coverage rates are substantially higher in large establishments. Statewide, health insurance coverage is 94.9% for hourly workers and 97.3% for salary workers. For retirement plans, coverage rates are 83.4% for hourly workers and 85.5% for salary workers. Across ADDs, health insurance coverage rates range from 88.7% for hourly workers in Pennyrile to 99.5% for salary workers in Barren River and Gateway. Retirement plan coverage in large establishments ranges from 69.2% for hourly workers in Pennyrile to 95.6% for salary workers in Lincoln Trail.

Table 14 shows health insurance and retirement plan coverage rates by establishment size for Workforce Investment Areas. The results are similar to those in Table 10 for Area Development Districts except that the variation across areas is somewhat less because there are only 10 WIAs as opposed to 15 ADDs, reflecting somewhat greater aggregation of the data.

Table 15 provides estimates of health insurance and retirement plan coverage for the 19 industry groups and the last row shows statewide averages. In general, there is less variation in coverage across industries than across regions. This suggests for most workers, labor markets are regional rather than industrial in nature. Health insurance coverage for hourly workers is 85.1% statewide, and ranges from 57.6% in agriculture, forestry, and fishing to 97.8% in nondurable manufacturing. The same industries have the lowest and highest health insurance coverage rates for salary workers. For retirement plans statewide coverage is 68.5% for hourly workers and 70.7% for salary workers. Eating and drinking places have the lowest retirement plan coverage rates and social and community organizations (e.g., schools and universities) have the highest coverage rates for both hourly and salary workers.

Figures 7 to 10 show county data on the availability of health insurance and retirement plans. Since health insurance and retirement plan availability were two of the fringe benefit measures for which we have constructed statistical models, we have county-by-county estimates with which to construct the maps in Figures 7 through 10. The quartiles shown in these figures illustrate in general that these fringe benefits are more likely to be available to workers in urban counties and less likely to be available in rural areas.

Table 13: Percentage of Workers Offered Health Insurance and Retirement Plans, by Establishment Size and ADD

	Establishments Offered Less Than 50 Employees				Establishments Offered Greater Than 50 Employees			
ADD Name	**Pct of Hourly Workers Offered Health Insurance**	**Pct of Salary Workers Offered Health Insurance**	**Pct of Hourly Workers Offered Retirement Plan**	**Pct of Salary Workers Offered Retirement Plan**	**Pct of Hourly Workers Offered Health Insurance**	**Pct of Salary Workers Offered Health Insurance**	**Pct of Hourly Workers Offered Retirement Plan**	**Pct of Salary Workers Offered Retirement Plan**
Purchase	61.1%	67.9%	50.0%	52.6%	96.1%	95.6%	89.0%	93.5%
Pennyrile	67.6%	71.9%	43.4%	49.3%	88.7%	97.1%	69.2%	78.5%
Green River	75.9%	73.3%	53.9%	49.6%	96.5%	95.8%	78.7%	77.9%
Barren River	63.0%	72.4%	49.7%	61.3%	97.5%	99.5%	91.4%	92.9%
Lincoln Trail	72.0%	69.0%	47.0%	50.6%	98.0%	99.3%	94.0%	95.6%
KIPDA	73.4%	80.7%	49.9%	51.6%	95.5%	98.4%	84.5%	86.9%
Northern KY	73.5%	78.8%	47.1%	54.2%	97.0%	99.0%	80.6%	83.0%
Buffalo Trace	59.4%	67.4%	60.0%	50.7%	92.9%	96.4%	91.8%	91.8%
Gateway	65.2%	34.5%	32.7%	23.4%	93.1%	99.5%	85.5%	92.5%
FIVCO	78.4%	73.7%	60.9%	63.7%	91.2%	93.3%	83.8%	89.3%
Big Sandy	66.2%	64.8%	44.3%	41.6%	98.9%	95.1%	88.1%	88.1%
Ky River	73.2%	72.0%	56.9%	54.8%	96.8%	98.5%	89.4%	90.2%
Cumberland Valley	68.7%	71.1%	46.6%	47.1%	96.1%	95.6%	78.5%	78.3%
Lake Cumberland	65.4%	67.8%	45.3%	48.1%	94.6%	97.2%	83.8%	82.3%
Bluegrass	70.3%	80.7%	49.9%	57.4%	92.2%	95.7%	80.7%	82.1%
State Average	*70.4%*	*75.0%*	*49.2%*	*52.6%*	*94.9%*	*97.3%*	*83.4%*	*85.5%*

Table 14: Percentage of Workers Offered Health Insurance and Retirement Plans, by Establishment Size and WIA

	Establishments With Less Than 50 Employees				Establishments With Greater Than 50 Employees			
WIA Name	**Pct of Hourly Workers Offered Health Insurance**	**Pct of Salary Workers Offered Health Insurance**	**Pct of Hourly Workers Offered Retirement Plan**	**Pct of Salary Workers Offered Retirement Plan**	**Pct of Hourly Workers Offered Health Insurance**	**Pct of Salary Workers Offered Health Insurance**	**Pct of Hourly Workers Offered Retirement Plan**	**Pct of Salary Workers Offered Retirement Plan**
Barren River	63.0%	72.4%	49.7%	61.3%	97.5%	99.5%	91.4%	92.9%
Bluegrass	70.3%	80.7%	49.9%	57.4%	92.2%	95.7%	80.7%	82.1%
Cumberlands	66.9%	70.2%	43.6%	47.4%	96.7%	95.2%	82.3%	79.3%
EKCEP	69.7%	68.4%	51.0%	48.2%	95.1%	97.3%	85.0%	87.9%
Green River	75.9%	73.3%	53.9%	49.6%	96.5%	95.8%	78.7%	77.9%
Lincoln Trail	72.0%	69.0%	47.0%	50.6%	98.0%	99.3%	94.0%	95.6%
Greater Louisville	73.4%	80.7%	49.9%	51.6%	95.5%	98.4%	84.5%	86.9%
Northern Kentucky	73.5%	78.8%	47.1%	54.2%	97.0%	99.0%	80.6%	83.0%
Purchase / Pennyrile	64.1%	69.7%	47.0%	51.1%	92.7%	96.3%	79.9%	86.6%
TENCO	69.9%	58.6%	51.8%	48.5%	92.8%	95.8%	85.7%	90.0%
State Average	*70.4%*	*75.0%*	*49.2%*	*52.6%*	*94.9%*	*97.3%*	*83.4%*	*85.5%*

Table 15: Percentage of Workers Offered Health Insurance and Retirement Plans, by Industry Group

Industry Group	Pct of Hourly Workers Offered Health Insurance	Pct of Salary Workers Offered Health Insurance	Pct of Hourly Workers Offered Retirement Plan	Pct of Salary Workers Offered Retirement Plan
Agriculture, Forestry, Fishing	57.6%	64.3%	38.3%	41.8%
Mining	92.7%	93.3%	71.4%	73.5%
Construction	81.9%	74.0%	61.6%	54.7%
Manufacturing -Durables	96.8%	97.3%	82.4%	82.8%
Manufacturing -Nondurables	97.8%	98.7%	82.9%	83.5%
Transportation, Communications, Public Utilities	87.3%	88.2%	74.2%	72.1%
Wholesale Trade - Durables	86.7%	91.4%	67.8%	71.7%
Wholesale Trade - Nondurables	83.0%	94.1%	58.5%	64.3%
Retail Trade -Durables	79.4%	75.2%	53.1%	55.4%
General Merchandise and Food Retail	85.3%	77.4%	64.9%	60.1%
Automotive and Accessories Retail	84.4%	84.0%	58.3%	55.0%
Eating and Drinking Places	65.3%	82.0%	35.7%	40.5%
Finance, Insurance, Real Estate	78.1%	88.8%	63.4%	75.5%
Entertainment Related Services	74.1%	80.3%	48.3%	52.6%
Business Services	75.9%	82.2%	47.8%	54.4%
Professional Services	70.2%	88.0%	61.2%	76.0%
Personal and Health Services	89.5%	89.2%	76.0%	76.5%
Social/Community Organizations	91.3%	95.2%	86.3%	89.7%
Public Administration	83.5%	92.1%	80.2%	89.1%
State Average	*85.1%*	*88.1%*	*68.5%*	*70.7%*

Figure 7: Percentage of Hourly Workers Offered Health Insurance by County

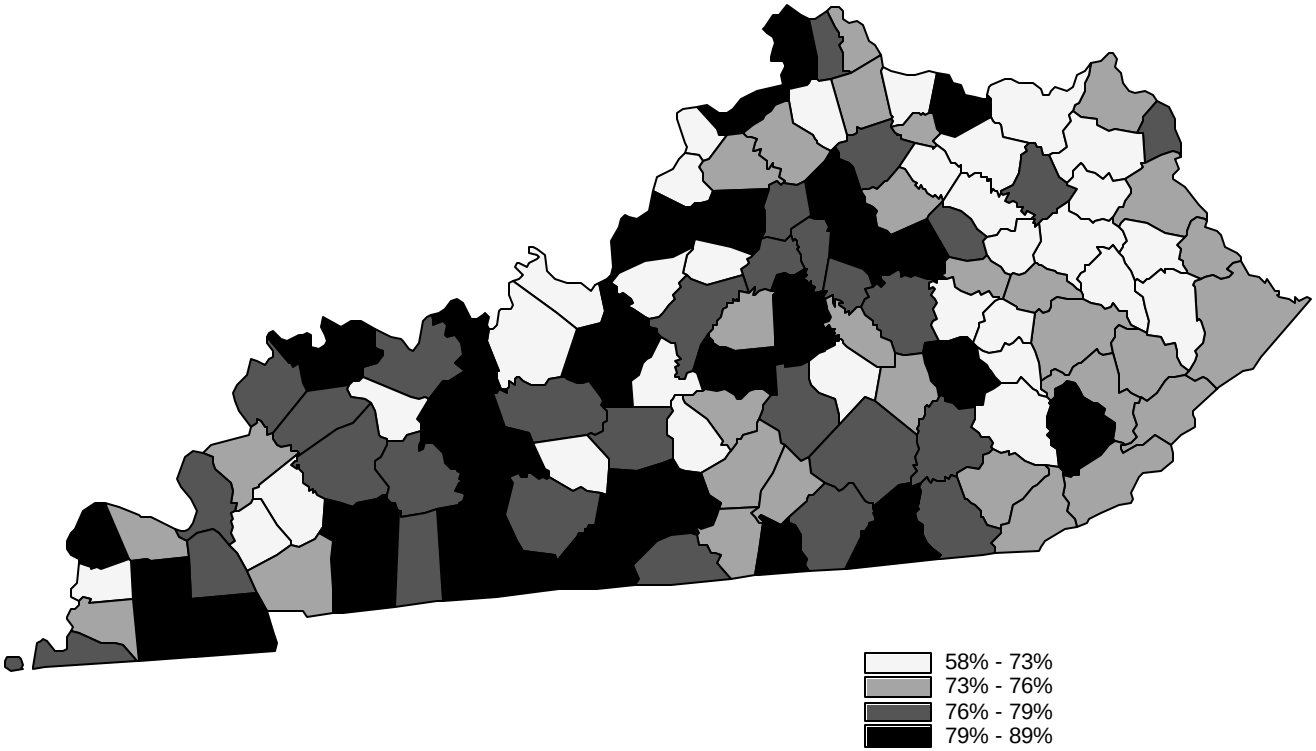


Figure 8: Percentage of Hourly Workers Offered a Retirement Plan by County

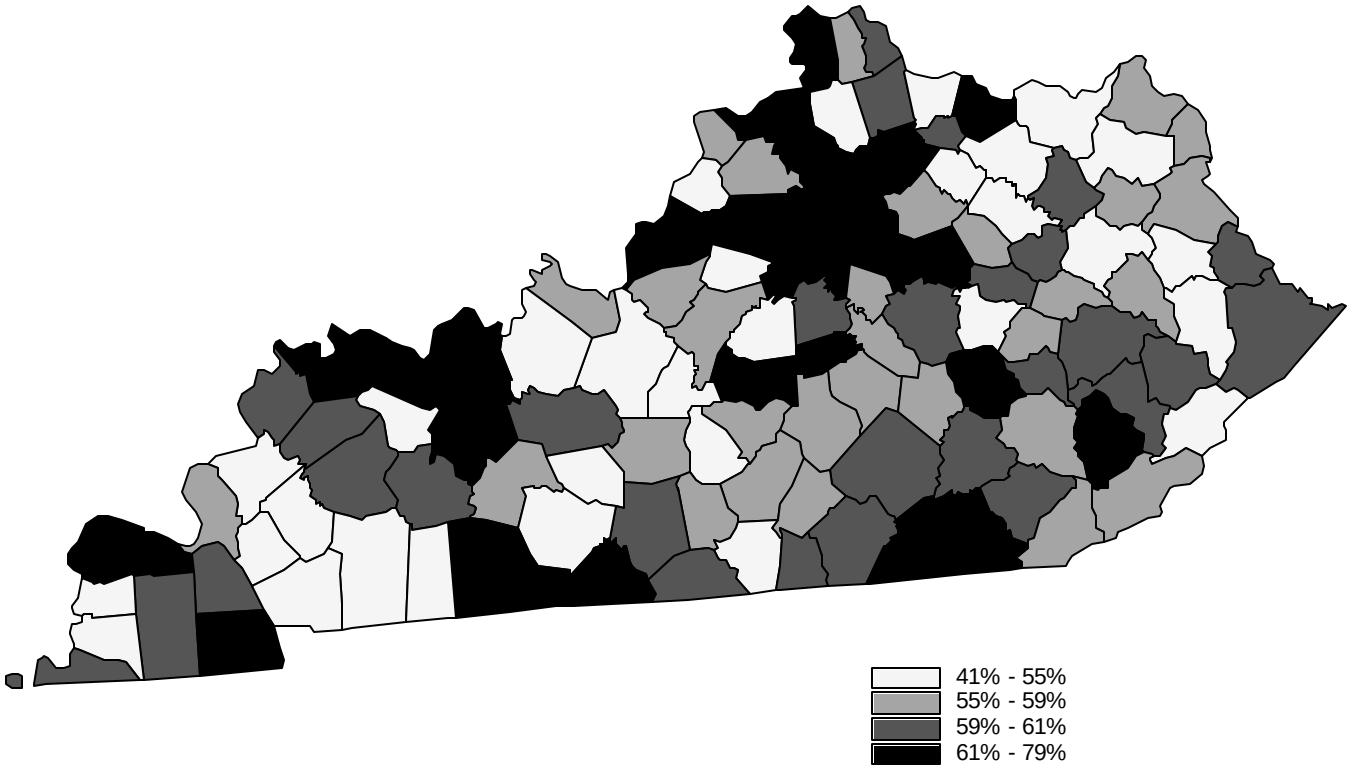


Figure 9: Percentage of Salary Workers Offered Health Insurance by County

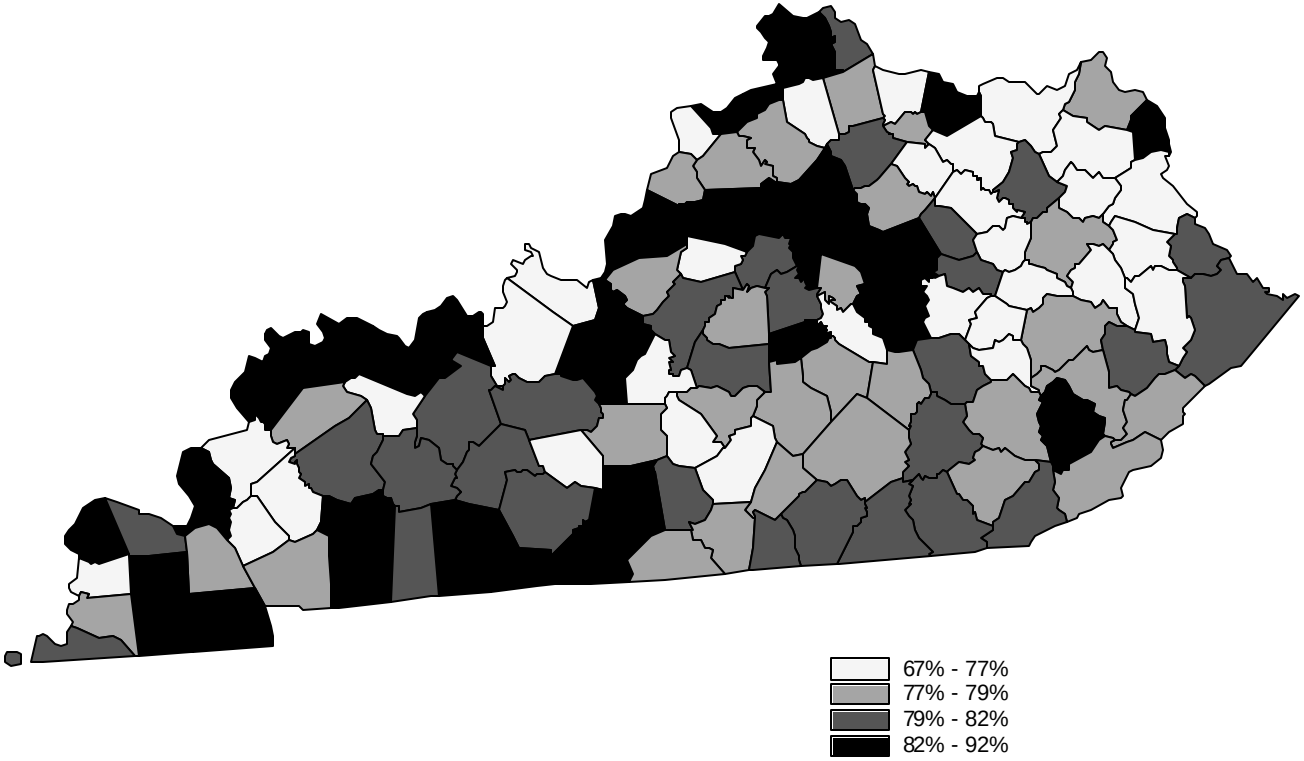
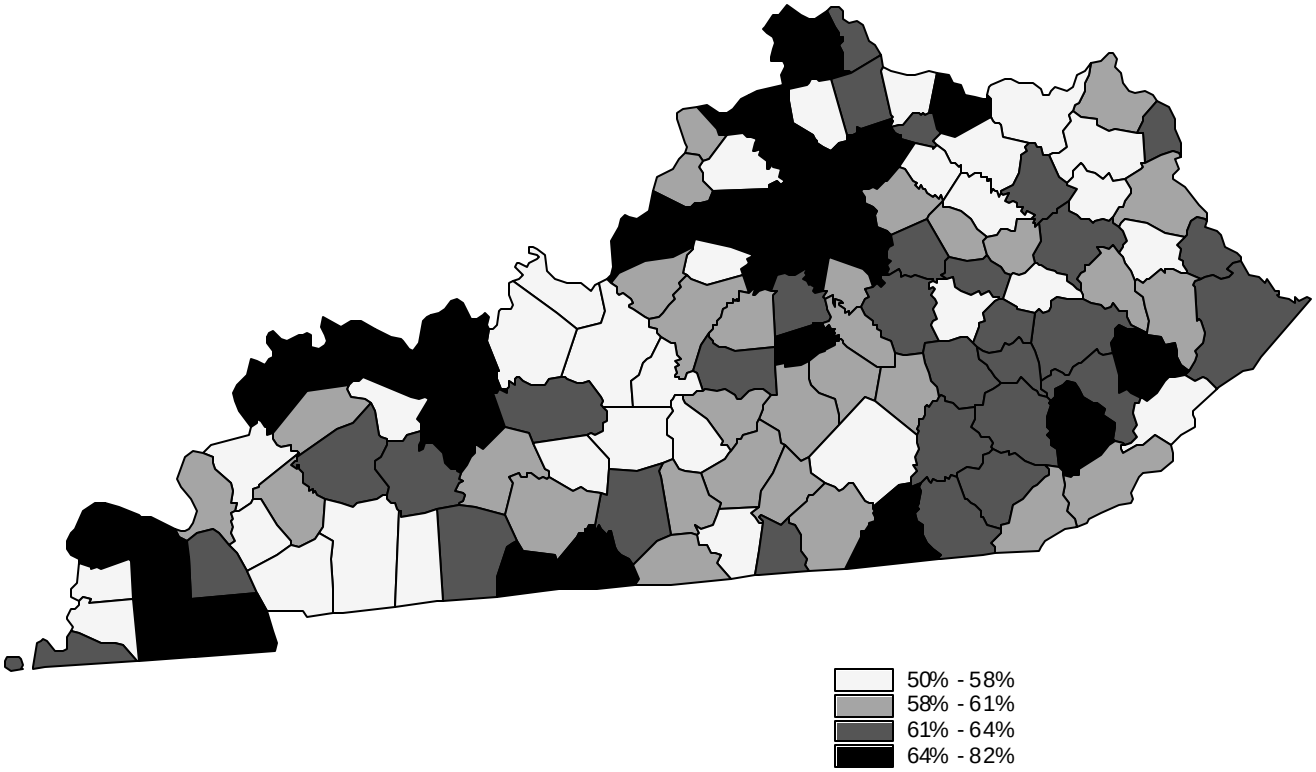


Figure 10: Percentage of Salary Workers Offered a Retirement Plan by County



Job Shortages and Vacancies

The vacancy portion of the demand survey asked employers to list jobs which were in high demand or that they were having a difficult time filling. We then compiled the employer responses and provide lists of the top jobs by Area Development District, Workforce Investment Area, county group, and for 25 of the larger counties. The data by county group and county are available at the website, http://kycwd.org/lmisurvey.htm. Below we show the top 10 jobs by Area Development District (Table 16) and by Workforce Investment Area (Table 17). The last column of Table 17 shows the top 10 jobs on a state-wide basis.

These rankings are weighted using firms' reports of the number of workers in the job rather than the number of actual openings, because for many jobs, firms report that they have no openings, probably due to the economic downturn. In other words, firms report that they have difficulty filling many occupations for which they currently have no openings. It appears that firms are telling us about their hiring difficulties in general rather than at the current time. So rather than exclude this information by only using occupations for which there are current openings, we include these reports and use the total number of workers in the occupation at the firm as weights. Thus, our rankings can be thought of as giving the top 10 high demand or hard to fill jobs in general as reported by firms, but we are unable to give estimates of the exact number of current openings in each occupation throughout the state or by region.

These lists show specifically the kinds of jobs that employers in different parts of the state mention frequently as being in high demand or difficult to fill. The jobs vary from region to region, with health care jobs such as registered nurses mentioned frequently.

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Table 16: Top 10 High Demand or Difficult to Fill Jobs by Area Development District

Ranking	Purchase ADD	Pennyrile ADD	Green River ADD	Barren River ADD	Lincoln Trail ADD
1	Cashiers	Grader/Bulldozer/Scraper Operators and Operating Engineers	Registered Nurses	Registered Nurses	Construction Laborers
2	Retail Salespersons	Registered Nurses	Waiters and Waitresses	Production Workers, All Other	Switchboard Operators, Including Answering Service
3	Elementary School Teachers, excluding Special Education	Secondary School Teachers, Except Special and Vocational Education	Retail Salespersons	Nursing Aides, Orderlies, and Attendants	Registered Nurses
4	Maintenance and Repair Workers, General	Production Workers, All Other	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Welders, Solderers, and Brazers
5	Insurance Claims & Policy Processing Clerks	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Agricultural Equipment Operators	Adjustment Clerks and Customer Service Representatives, Utilities	Heavy Truck Drivers and Tractor-Trailer Truck Drivers
6	Food Preparation Workers	Executive Secretaries and Administrative Assistants	Office Clerks, General	Office Clerks, General	Janitors and Cleaners, Except Maids and Housekeeping Cleaners
7	Office Clerks, General	Correctional Officers and Jailers	Welders, Solderers, and Brazers	Carpenters and Joiners	Therapists, All Other
8	Production Workers, All Other	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Automotive Master Mechanics, and Specialty Technicians	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Social Workers, All Other
9	Registered Nurses	Teacher Assistants	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Secondary School Teachers, Except Special and Vocational Education	Food Preparation Workers
10	Executive Secretaries and Administrative Assistants	Bookkeeping, Accounting, and Auditing Clerks	Cooks, Restaurant	Construction Laborers	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers

Table 16: Continued

Ranking	KIPDA ADD	Northern KY ADD	Buffalo Trace ADD	Gateway ADD	FIVCO ADD
1	Retail Salespersons	Registered Nurses	Sewing Machine Operators	Production Workers, All Other	Registered Nurses
2	Registered Nurses	Combined Food Preparation and Serving Workers, Including Fast Food	Postal Service Mail Sorters, Processors, and Processing Machine Operators	Shop, Alteration, and Custom Tailors	Tellers
3	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Retail Salespersons	Animal Breeders	Registered Nurses	Physicians and Surgeons, All Other
4	Production Workers, All Other	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Cashiers	Tellers	Executive Secretaries and Administrative Assistants
5	Nursing Aides, Orderlies, and Attendants	Personal and Home Care Aides	Production Workers, All Other	Correctional Officers and Jailers	Heavy Truck Drivers and Tractor-Trailer Truck Drivers
6	Adjustment Clerks and Customer Service Representatives, Utilities	Production Workers, All Other	Automotive Master Mechanics and Specialty Technicians	Cashiers	Office Clerks, General
7	Office Clerks, General	Tellers	Office Clerks, General	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	Nursing Aides, Orderlies, and Attendants
8	Automotive Master Mechanics and Specialty Technicians	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Bus Drivers, School	Food Preparation Workers	Maintenance and Repair Workers, General
9	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Nursing Aides, Orderlies, and Attendants	Registered Nurses	Directors, Religious Activities and Education	Retail Salespersons
10	Correctional Officers and Jailers	Secondary School Teachers, Except Special and Vocational Education	Truck Drivers, Light or Delivery Services	Electrical Power-Line Installers and Repairers	Treasurers, Controllers, Chief Financial Officers, and Financial Managers

Table 16: Continued

Ranking	Big Sandy ADD	KY River ADD	Cumberland Valley ADD	Lake Cumberland ADD	Bluegrass ADD
1	Mining Machine Operators, All Other	Grader / Bulldozer / Scraper Operators and Operating Engineers	Waiters and Waitresses	Retail Salespersons	Registered Nurses
2	Dry Cleaning Spotters, Precision Dyers, Laundry and Drycleaning Machine Operator	Insurance Claims and Policy Processing Clerks	Cooks, Restaurant	Production Workers, All Other	Secondary School Teachers, Except Special and Vocational Education
3	Office Clerks, General	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Registered Nurses	Special Education Teachers, Preschool, Kindergarten, and Elementary School	Production Workers, All Other
4	Security Guards	Registered Nurses	Automotive Master Mechanics and Specialty Technicians	Dental Assistants	Retail Salespersons
5	Registered Nurses	Freight, Stock, Material Movers, and Set / Studio / Stage Set-Up Workers	Production Workers, All Other	Sewing Machine Operators	Cashiers
6	Tellers	Healthcare Practitioners and Technical Workers, All Other	Nursing Aides, Orderlies, and Attendants	Heating, Air Conditioning, and Refrigeration Mechanics	Nursing Aides, Orderlies, and Attendants
7	Secretaries, Bookkeeping / Any Other Activity	Home Health Aides	Telephone Station and Other Communication Equipment Installers and Repairers	Freight, Stock, Material Movers, and Set / Studio / Stage Set-Up Workers	Waiters and Waitresses
8	Nursing Aides, Orderlies, and Attendants	Welders, Solderers, and Brazers	Food Service Managers	Emergency Medical Technicians and Paramedics	Freight, Stock, Material Movers, and Set / Studio / Stage Set-Up Workers
9	Bus and Truck Mechanics and Diesel Engine Specialists	Office Clerks, General	Animal Breeders	Secondary School Teachers, Except Special and Vocational Education	Library Assistants, Clerical
10	Service Station Attendants	Bus and Truck Mechanics and Diesel Engine Specialists	Shoe Machine Operators and Tenders	Switchboard Operators, Including Answering Service	Assemblers and Fabricators, All Other

Table 17: Top 10 High Demand or Difficult to Fill Jobs by Workforce Investment Area

Ranking	Purchase/Pennyrile WIA	Barren River WIA	EKCEP WIA	Green River WIA	Cumberland WIA
1	Registered Nurses	Registered Nurses	Registered Nurses	Registered Nurses	Retail Salespersons
2	Secondary School Teachers, Except Special and Vocational Education	Production Workers, All Other	Grader / Bulldozer / Scraper Operators and Operating Engineers	Waiters and Waitresses	Production Workers, All Other
3	Production Workers, All Other	Nursing Aides, Orderlies, and Attendants	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Retail Salespersons	Registered Nurses
4	Grader / Bulldozer / Scraper Operators and Operating Engineers	Freight, Stock, Material Movers, and Set / Studio / Stage Set-Up Workers	Mining Machine Operators, All Other	Door-To-Door Sales Workers, News and Street Vendors, and Related Workers	Automotive Master Mechanics, and Specialty Technicians
5	Cashiers	Adjustment Clerks and Customer Service Representatives, Utilities	Nursing Aides, Orderlies, and Attendants	Agricultural Equipment Operators	Special Education Teachers, Preschool, Kindergarten, and Elementary School
6	Retail Salespersons	Office Clerks, General	Waiters and Waitresses	Office Clerks, General	Switchboard Operators, Including Answering Service
7	Insurance Claims and Policy Processing Clerks	Carpenters and Joiners	Cooks, Restaurant	Welders, Solderers, and Brazers	Packaging and Filling Machine Operators and Tenders
8	Maintenance and Repair Workers, General	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Shop, Alteration, and Custom Tailors	Automotive Master Mechanics, and Specialty Technicians	Sewing Machine Operators
9	Executive Secretaries and Administrative Assistants	Secondary School Teachers, Except Special and Vocational Education	Office Clerks, General	Freight, Stock, Material Movers, and Set / Studio / Stage Set-Up Workers	Dental Assistants
10	Food Preparation Workers	Construction Laborers	Dry Cleaning Spotters, Precision Dyers, Laundry and Drycleaning Machine Operators and Tenders, Except Pressing	Cooks, Restaurant	Heavy Truck Drivers and Tractor-Trailer Truck Drivers

Table 17: Continued

Ranking	Lincoln Trail WIA	TENCO WIA	Bluegrass WIA	Greater Louisville WIA
1	Construction Laborers	Cashiers	Registered Nurses	Retail Salespersons
2	Switchboard Operators, Including Answering Service	Production Workers, All Other	Secondary School Teachers, Except Special and Vocational Education	Heavy Truck Drivers and Tractor-Trailer Truck Drivers
3	Registered Nurses	Tellers	Production Workers, All Other	Production Workers, All Other
4	Welders, Solderers, and Brazers	Registered Nurses	Retail Salespersons	Nursing Aides, Orderlies, and Attendants
5	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Office Clerks, General	Cashiers	Registered Nurses
6	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	Heavy Truck Drivers and Tractor-Trailer Drivers	Nursing Aides, Orderlies, and Attendants	Automotive Master Mechanics and Specialty Technicians
7	Therapists, All Other	Food Preparation Workers	Waiters and Waitresses	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers
8	Social Workers, All Other	Automotive Master Mechanics and Specialty Technicians	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Adjustment Clerks and Customer Service Representatives, Utilities
9	Food Preparation Workers	Retail Salespersons	Library Assistants, Clerical	Office Clerks, General
10	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Maintenance and Repair Workers, General	Assemblers and Fabricators, All Other	Carpenters and Joiners

Table 17: Continued

Ranking	Northern KY WIA	North Central KY WIA
1	Registered Nurses	Registered Nurses
2	Combined Food Preparation and Serving Workers, Including Fast Food	Packaging and Filling Machine Operators and Tenders
3	Retail Salespersons	Switchboard Operators, Including Answering Service
4	Freight, Stock, Material Movers, and Set/Studio/Stage Set-Up Workers	Maintenance and Repair Workers, General
5	Personal and Home Care Aides	Elementary School Teachers, Except Special Education
6	Production Workers, All Other	Medical and Clinical Laboratory Technicians
7	Tellers	Occupational Health and Safety Specialists
8	Heavy Truck Drivers and Tractor-Trailer Truck Drivers	Bakers, Bread/Pastry or Manufacturing
9	Nursing Aides, Orderlies, and Attendants	Inspectors, Materials, Mechanical, Precision Devices, Electrical/Electronic, and Production; including Testers, Graders, Sorters, Samplers, Weighers
10	Secondary School Teachers, Except Special and Vocational Education	Adjustment Clerks and Customer Service Representatives, Utilities

Educational Requirements

Finally, we show our new estimates of educational requirements for high demand and difficult to fill jobs as reported in our survey of Kentucky's employers. Table 18 shows the percentage breakdown by education level for Area Development Districts, Table 19 provides the same data for Workforce Investment Areas, and Table 20 is by industry. The last row of each table shows the statewide averages. These data show the education levels of jobs that employers in different parts of Kentucky are trying to fill.

One interesting comparison to make is between the educational requirements in our demand survey with the education level of Kentuckians as reported in the recent Census 2000. This is a way to compare the skill mix being demanded by employers with the supply of skills currently available in the state. If the skills employers are demanding are at a higher level than those currently available in the state, then the demand side of the labor market can be thought of as pulling up education levels in the state. On the other hand, if the skill mix being demanded by employers is at a lower level than currently available in the state, then the ultimate effect may be further problems with underemployment in the state.

In the Census 2000, for the 25 year old and over population, 26% reported less than a high school diploma, 34% had a high school diploma or equivalency as their highest level of education, 23% reported having some college or an associate degree, and 17% reported having a bachelor's degree or a graduate or professional degree. The statewide averages for educational requirements in high demand or hard to fill jobs are 21% for less than a high school diploma, 44% for a high school diploma, 17% for some college or an associate or vocational degree, and 18% for a bachelor's degree or a graduate or professional degree. Thus, the percentage of high demand jobs requiring a bachelor's degree or more is slightly higher than the percentage of individuals in the population age 25 and over with a bachelor's degree or more (18% vs. 17%). Similarly, the percentage of high demand jobs requiring a high school diploma or less is greater than the percentage of individuals age 25 and over with a high school diploma or less (65 vs. 60%). On the other hand, the percentage of high demand jobs requiring some college or an associate degree is somewhat lower than the percentage of the population age 25 and over with these qualifications (17 vs. 23%). Employers appear to want both more college graduates or above and more high school graduates or below than are available in the state.

The pattern is similar at the ADD level. Nine of the fifteen ADDs report higher percentages of jobs that require a bachelor's degree or more than the statewide percentage of individuals with a bachelor's degree or more as reported

by the Census 2000. At the same time, 12 of the 15 ADDs report a higher percentage of jobs that require a high school diploma or less than the Census 2000 statewide percentage of individuals with a high school diploma or less. And 14 of the 15 ADDs report a lower percentage of jobs that require some college or vocational or associate degree training than the Census 2000 statewide percentage of individuals having such qualifications.

Table 18: Percentages of High Demand or Difficult to Fill Jobs with Various Educational Requirements by Area Development District

	Educational Requirement					
Area Development District	**Less Than High School**	**High School**	**Some College**	**Vocational or Associate Degree**	**Bachelor's Degree**	**Graduate or Professional Degree**
1. Purchase	25%	35%	6%	10%	20%	3%
2. Pennyrile	22%	42%	2%	14%	18%	2%
3. Green River	20%	44%	3%	8%	23%	1%
4. Barren River	16%	50%	4%	16%	11%	2%
5. Lincoln Trail	14%	36%	2%	20%	11%	17%
6. KIPDA	20%	45%	9%	13%	8%	5%
7. Northern Kentucky	20%	46%	2%	19%	11%	1%
8. Buffalo Trace	10%	66%	0%	3%	20%	1%
9. Gateway	47%	38%	2%	4%	7%	2%
10. FIVCO	4%	42%	1%	24%	20%	8%
11. Big Sandy	18%	65%	2%	13%	2%	1%
12.Kentucky River	26%	53%	1%	5%	10%	5%
13. Cumberland. Valley	23%	47%	1%	6%	20%	3%
14. Lake Cumberland	37%	29%	2%	9%	10%	13%
15.Bluegrass	19%	45%	6%	12%	15%	3%
State Average	*21%*	*44%*	*4%*	*13%*	*13%*	*5%*

Note: Totals do not add to 100 in all cases due to rounding.

The picture is similar in Table 19 for Workforce Investment Areas. Six of the 10 WIAs demand a greater percentage of college graduates than the Census 2000 statewide percentage of college graduates, while all 9 of 10 WIAs demand a greater percentage of high school graduates or less than the Census 2000 statewide percentage, and all 10 WIAs demand a smaller percentage of those with some college, vocational or associate degree training than the Census 2000 statewide percentage with those qualifications.

Table 20 shows educational requirements by industry. There is more variation in educational requirements of high demand or hard to fill jobs across industries than across ADDs or WIAs. The percentage of high demand and hard to fill jobs requiring a high school diploma or less is greater than in the Census 2000 data in all but the Professional Services, Personal and Health Services and Public Administration. In other words, in all but these three industries, the percentage of high demand or hard to fill jobs in other industries requiring a high school diploma or less is greater than the population average with these educational qualifications. The same three industries, along with social and community organizations (e.g., educational institutions), have a greater percentage of high demand jobs requiring a college degree or more than the population average with a college degree or more. Only health services and automotive and accessories retail trade have a higher percentage of high demand jobs that require some college or an associate or vocational degree than the population average with these qualifications. Durable manufacturing; transportation, communications, and public utilities; construction; professional services; and public administration all have significant numbers of high demand or hard to fill jobs requiring some college, associate or vocational training, but still somewhat below the population average.

In other words, for most of Kentucky's industries, a disproportionate number of openings in high demand or hard to fill jobs are at the high school diploma level or lower. Statewide, we find that disproportionate numbers of openings are at both the high and low end of the educational spectrum. These findings fly in the face of suggestions that the educational qualification in the highest demand is the associate or vocational degree. For example, using projections for the year 2020, the South Carolina Governor's Workforce Education Taskforce (*Pathways to Prosperity: Success for Every Student in the 21st Century Workplace*, October 2001, Columbia, South Carolina) reports that 65% of jobs require an associate degree or postsecondary training below a bachelor's degree. However, recent national data on job openings in the year 2000 published by the U.S. Bureau of Labor Statistics (Daniel E. Hecker, "Occupational Employment Projections to 2010," *Monthly Labor Review*, November 2001, pp. 57-84) show that only 8.1% of job openings require an associate degree or postsecondary vocational award as their most significant source of education or training. Thus, when comparing our Kentucky data to these recent U.S. Bureau of Labor Statistics data, a different picture emerges. Kentucky has a higher percentage of its high demand or hard to fill job openings at the associate degree or postsecondary vocational training level than the national average.

One concern is whether or not our sample is representative of establishments in the economy. Our sample weighting has insured that our sample is representative of the distribution of establishment sizes in the

Kentucky economy. However, if we are oversampling industries that require low education qualifications, then our statewide estimates may be biased in favor of lower level jobs. However, this does not appear to be the case. In Table 21, we show the percentage industry breakdown for the two establishment size groups for our samples of respondents and for the universe of establishments in the Kentucky economy for the same 19 industry categories that we have used throughout this report.

While there are minor differences between the percentages of establishments sampled and in the universe, Table 21 shows that overall, the industry makeup of our sample respondents is very similar to the industry makeup of establishments throughout the economy. For example, among industries with a disproportionate number of high demand jobs with low educational requirements, some are slightly oversampled (manufacturing) and others are slightly undersampled (most of retail trade). All industries with a disproportionate number of high demand jobs with high educational requirements are slightly oversampled, which if anything would raise slightly the reported average educational requirements in our sample. There is also only slight under and oversampling of industries with substantial numbers of high demand jobs with requirements for associate or vocational training. But again, these differences are minor.

Thus, given our weighting and the results in Table 21, our samples are representative from both an establishment size and industry point of view. This suggests that the data that we report for fringe benefits, vacancies, and educational requirements are very likely to be representative of the population of Kentucky employers. In other words, the findings of our survey cannot be dismissed with the argument that our sample is not representative of establishments in the Kentucky economy.

Of course there may be reasons that we should interpret our finding that employers in the state appear to need more workers than are available at both ends of the education spectrum and need less than are available in the middle of the spectrum with caution. One way of interpreting this result is that the community colleges and technical schools have done a good job filling the needs of employers for jobs requiring such training, and therefore such jobs are not as difficult to fill and are less likely to be mentioned by employers in the labor demand survey. In addition, our data is for associate or vocational training overall, and not for particular fields. There may very well be serious shortages in particular high demand fields.

Comparisons between our survey data and the Census 2000 data are complicated by a number of other factors. For example, the Census figures refer

to individuals age 25 and over including those over age 65, who are also less likely to be working. Those individuals less than age 25 are likely to have more education than those over 25 on average because of rising education levels over time. Finally, our survey data refer to hard to fill and high demand jobs, not all jobs, while the Census 2000 data refer to all persons age 25 and over, whether they are working or would like to work or not. In other words, the Census 2000 data are only an approximation of the "supply" of education in the economy and measure the education of all persons, not just who would potentially fill high demand jobs. On the other hand, our survey measures "demand" for only high demand or hard to fill jobs, not all jobs in the economy. Nevertheless, the comparison between the Census 2000 data and our survey data is a useful approximation of education imbalances in the economy.

Table 19: Percentages of High Demand or Difficult to Fill Jobs with Various Educational Requirements by Workforce Investment Area

	Educational Requirement					
Workforce Investment Area	**Less Than High School**	**High School**	**Some College**	**Vocational or Associate Degree**	**Bachelor's Degree**	**Graduate or Professional Degree**
1.Purchase / Pennyrile	23%	39%	4%	12%	19%	3%
2. Barren River	16%	50%	4%	16%	11%	2%
3. EKCEP	22%	55%	2%	9%	7%	6%
4. Green River	20%	44%	3%	8%	23%	1%
5.Cumberlands	30%	36%	1%	7%	16%	9%
6. Lincoln Trail	14%	36%	2%	20%	11%	17%
7. TENCO	22%	43%	1%	15%	17%	2%
8. Bluegrass	19%	45%	6%	12%	15%	3%
9. Greater Louisville	20%	45%	9%	13%	8%	5%
10. Northern KY	20%	46%	2%	19%	11%	1%
State Average	*21%*	*44%*	*4%*	*13%*	*13%*	*5%*

Note: Totals do not add to 100 in all cases due to rounding.

Table 20: Percentages of High Demand or Difficult to Fill Jobs with Various Educational Requirements by Industry

Industry	Educational Requirement					
	Less Than High School	High School	Some College	Vocational or Associate Degree	Bachelor's Degree	Graduate or Professional Degree
1. Agri., Forestry, Fishing	38%	49%	8%	1%	1%	2%
2. Mining	50%	46%	2%	2%	0%	0%
3.Construction	36%	41%	1%	20%	1%	0%
4. Man. Durables	28%	48%	3%	16%	5%	0%
5. Manu. Nondurables	40%	47%	1%	7%	4%	0%
6. Trans., Comm., Pub. Utilities	24%	51%	8%	10%	5%	2%
7. Wholesale Trade, Durables	29%	53%	5%	7%	5%	1%
8. Wholesale Tr., Nondurables	15%	73%	4%	4%	4%	0%
9. Retail Trade, Durables	17%	61%	13%	4%	2%	3%
10. Retail Trade, Gen. Merch. and Food	36%	60%	3%	1%	0%	0%
11. Retail Trade, Auto. and Access.	14%	53%	10%	23%	0%	0%
12. Retail Trade, Eating and Drinking Places	66%	29%	5%	0%	0%	0%
13. Finance, Insurance, and Real Est.	0%	80%	9%	3%	6%	2%
14.Entertainment Related Services	36%	57%	3%	1%	2%	1%
15. Bus. Services	34%	47%	9%	6%	3%	1%
16. Professional Services	0%	38%	8%	11%	28%	15%
17. Personal and Health Services	9%	23%	3%	43%	15%	7%
18. Social and Community Org.	3%	42%	4%	1%	36%	14%
19. Pub. Admin.	8%	52%	9%	11%	18%	2%
State Average	*21%*	*44%*	*4%*	*13%*	*13%*	*5%*

Note: Totals do not add to 100 in all cases due to rounding.

Table 21: Industry Breakdown of Sample Respondents and Universe Statewide, by Establishment Size

Industry Name	Less Than 50 Sample	Less Than 50 Universe	Greater Than 50 Sample	Greater Than 50 Universe
Agriculture, Forestry & Fishing	2.06%	2.15%	0.91%	0.71%
Mining	0.74%	0.67%	1.04%	1.54%
Construction	10.18%	10.11%	4.80%	4.58%
Durable Manufacturing	3.64%	2.82%	15.29%	11.33%
Nondurable Manufacturing	1.48%	1.43%	10.82%	8.96%
Transportation, Communications & Public Utilities	6.17%	5.79%	4.93%	6.73%
Wholesale Trade – Durables	4.27%	4.73%	3.18%	2.81%
Wholesale Trade – Non-durables	2.43%	2.67%	1.88%	2.30%
Retail Trade – Durables	7.60%	8.54%	2.20%	2.59%
General Merchandise and Food Retail	3.27%	4.84%	3.43%	8.25%
Automotive and Accessories Retail	2.74%	3.76%	2.46%	2.03%
Eating and Drinking Places	3.80%	5.88%	3.63%	9.52%
Finance, Insurance, Real Estate	8.97%	9.24%	3.18%	3.18%
Entertainment Related Services	2.59%	2.75%	2.27%	2.54%
Business Services	7.70%	8.19%	5.70%	8.03%
Professional Services	6.97%	5.92%	2.27%	1.76%
Personal and Health Services	13.77%	12.48%	11.21%	9.97%
Social and Community Organizations	7.39%	4.31%	13.67%	7.56%
Public Administration	4.22%	3.72%	7.13%	5.65%

Finally, Figures 11-13 show the percentages of high demand or difficult to fill jobs by county group. We show county group data (each county plus all of its surrounding counties) because we only have county-specific data for 25 large counties, but have county group data for all 120 counties (i.e., each county plus its surrounding neighbors). Each figure shows the counties divided up into quantiles based on the percentage of jobs falling into the educational category shown in the figure. In Figure 11, the four groups of counties ranked by percentage of high demand or difficult to fill jobs requiring a high school diploma or less are shown. In Figure 12, quartiles based on the percentage of high demand or difficult to fill jobs requiring some college, vocational or associate degree training are given, and the map in Figure 13 illustrates the percentage of high demand or difficult to fill jobs requiring at least a bachelor's degree.

The data vary considerably from county group to county group. However, some patterns do emerge. Many of the counties in the highest quartile in Figure 11 are in Eastern Kentucky (aside from the Ashland area), suggesting employers there are demanding workers with low levels of skills. In Figure 12, we see that the highest demand for those with some college, associate, or vocational training is along the I-65 corridor, in Northern Kentucky, the Ashland

area, and in counties surrounding Lexington, while the lowest demand is just east of and in the I-75 corridor. Many of those in the highest quartile in Figure 13, county groups having a high demand for college graduates, are suburban and rural counties across Kentucky. Employers in these county groups appear to want more college graduates than are available.

The data presented in this section of the report are only a small part of the entire data available at http://kycwd.org/lmisurvey.htm. We have tried to give some sense of the richness of the data in this section and the possible types of analysis that can be done. We encourage interested users to visit our website to obtain the exact data that is useful to them.

Figure 11: Percentage of Vacancies in High Demand or Difficult to Fill Jobs at the High School Graduate Level or Below by County Group

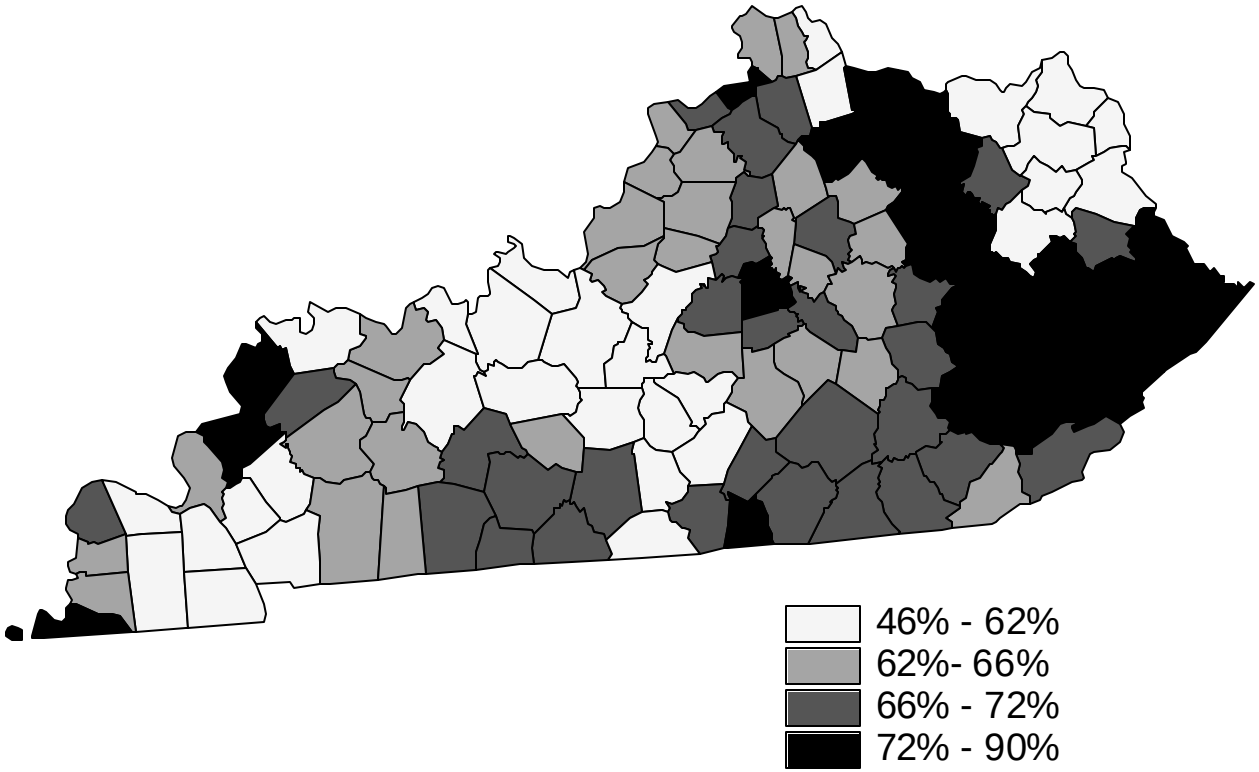


Figure 12: Percentage of Vacancies in High Demand or Difficult to Fill Jobs at the Associate, Vocational Degree, or Some College Level by County Group

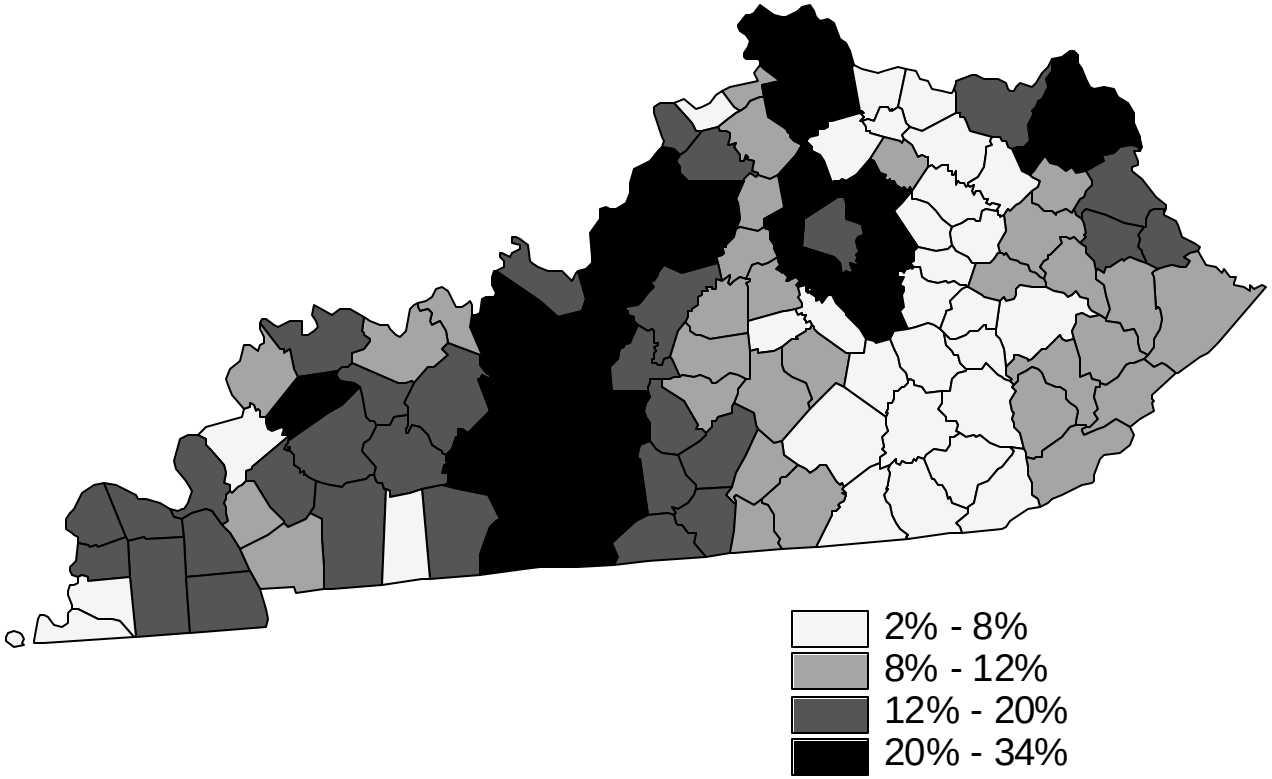
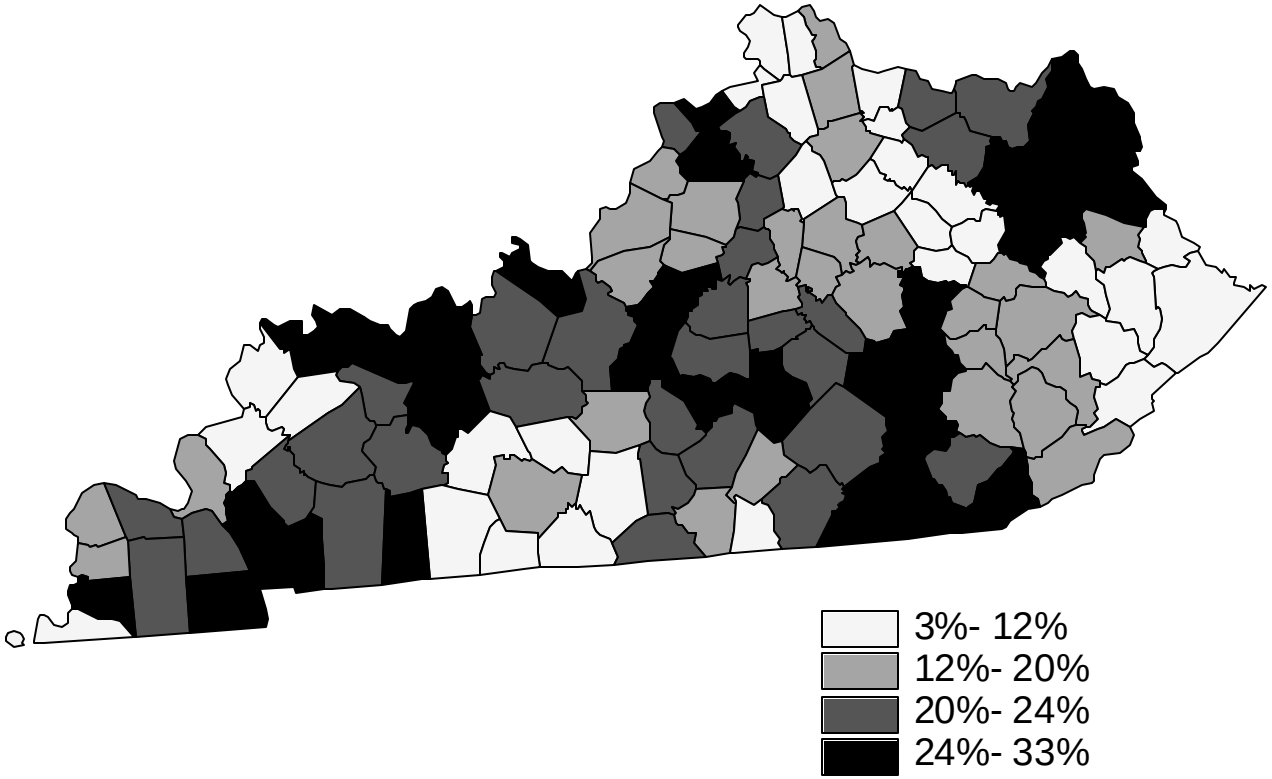


Figure 13: Percentage of Vacancies in High Demand or Difficult to Fill Jobs at the Bachelor's or Postgraduate Level by County Group



Updating and Capacity Building

In this section, we discuss plans for updating the various estimates generated in this study and the capacity building activities that we have undertaken.

Underemployment

The two key inputs into our estimates of underemployment are our statistical model relating underemployment to characteristics of workers and county summary data obtained from the Summary File 3 of the Census 2000. Thus, to update our estimates, one would need either an updated statistical model or an updated county level data, or both. We would recommend that another survey be conducted at some time in the future, perhaps in three or four years, so that a new statistical model can be estimated. The relationship between underemployment and worker characteristics may change over time and if so, using old estimates would result in errors in the predictions about underemployment. On the other hand, a survey is a complicated and costly endeavor. This tradeoff between fresh data and cost will be one that will have to be weighed by the Kentucky Cabinet for Workforce Development in the future.

Updated county level data will be somewhat easier to obtain. Of course, new data will be available at the county level after the 2010 Census . But prior to that time, estimates of county level characteristics will be available from the American Community Survey. Characteristics for counties of all population sizes will be available starting in 2008, with the provision of five-year moving averages for 2003-2007. Information for larger areas will be available sooner. Three-year moving averages will be available for counties with populations of 20,000 or more, presumably in 2006. 53 of Kentucky's 120 counties have populations of 20,000 or more in the Census 2000. Single year estimates will be available for counties with 65,000 populations or more, presumably in 2004. Twelve of Kentucky's 120 counties have populations of 65,000 or more in the Census 2000.

Some of the variables in the model are estimated annually by county and are available from the Kentucky State Data Center at the University of Louisville. These are population counts by age, race, and gender; all characteristics included in our underemployment models. Thus, it would be possible to update these variables for counties not included in the early releases of the American Community Survey while leaving the other variables in the model at their previous levels.

A reasonable schedule for updating the underemployment data over the next 10 years is suggested below:

2002 – Initial estimates published.
2004 – Updated estimates for 12 counties with populations of greater than 65,000 published using new American Community Survey data. Updated estimates for the other 108 counties will use updated population by age, race, and gender from the Kentucky State Data Center and use original values for other variables in the model. Estimates for all 120 counties will use original model estimates.
2006 – New survey taken and updated estimates of all 120 counties published. Estimates for 53 counties with greater than 20,000 population will use new model estimates and updated data from the American Community Survey. Updated estimates for the other 67 counties will use the new model estimates and updated population data by age, race, and gender from the Kentucky State Data Center and use original values for other variables in the model.
2008 – Updated estimates for all 120 counties using 2006 model estimates and county characteristics from the American Community Survey.
2010 – New survey taken and updated estimates for all 120 counties will use new model estimates and county characteristics from the American Community Survey.
2012 – Updated estimates for all 120 counties will use the 2010 model estimates and newly published county characteristics from the 2010 Census .

Fringe Benefits

Similar to the underemployment estimates, the fringe benefit estimates at the county level that come from statistical modeling are generated using estimates of the statistical models explaining the various fringe benefits and the average characteristics of the county. In order to update the estimates of the model, we would need to conduct another survey, which should be done again in the future for the same reasons that the underemployment survey should be redone. For the fringe benefit variables that are not statistically modeled, updates require a new survey to be conducted.

The average characteristics of the county for the fringe benefits models are more easily update. These characteristics come from the ES-202 files, which can be obtained quarterly from the Department of Employment Services in the Kentucky Cabinet for Workforce Development.

A reasonable schedule for updating the fringe benefit data over the next ten years might be the following:

2002 – Initial estimates published.
2003 – Updated estimates of the eight modeled fringe benefit variables for all 120 counties using the original model estimates and updated county characteristics from the ES-202 data.
2005 – New survey undertaken and updated estimates of the eight modeled fringe benefit variables for all 120 counties using new model estimates and updated county characteristics from the ES-202 data. Updated estimates of the other fringe benefit variables using the new survey data.
2007 – Updated estimates of the eight modeled fringe benefit variables for all 120 counties using the 2005 model estimates and updated county characteristics from the ES-202 data.
2009 - New survey undertaken and updated estimates of the eight modeled fringe benefit variables for all 120 counties using new model estimates and updated county characteristics from the ES-202 data. Updated estimates of the other fringe benefit variables using the new survey data.
2111 - Updated estimates of the eight modeled fringe benefit variables for all 120 counties using the 2009 model estimates and updated county characteristics from the ES-202 data.
2113 - New survey undertaken and updated estimates of the eight modeled fringe benefit variables for all 120 counties using new model estimates and updated county characteristics from the ES-202 data. Updated estimates of the other fringe benefit variables using the new survey data.

Job Shortages and Vacancies

The potential options for updating the job shortages/vacancies data are not as straightforward as either the underemployment or fringe benefit data. The data generated in this study can only be updated using the same methodology if a new survey is conducted. Thus, one option is to update these data with a new survey and take this employer survey at the same time as the new fringe benefit surveys. Below is the timetable for this potential option.

Option 1: Generate New Estimates Using New Survey Data

2002 – Initial estimates published.
2005 – New survey undertaken and updated estimates reported for ADDs, WIAs, county groups, and large counties.
2009 - New survey undertaken and updated estimates reported for ADDs, WIAs, county groups, and large counties.

2013 - New survey undertaken and updated estimates reported for ADDs, WIAs, county groups, and large counties.

But the case for a new survey for job shortages and vacancies is less clear than for underemployment and fringe benefits. First of all, estimates are not available for all 120 counties, only for the 120 counties including their surrounding counties. In addition, surveys are expensive to complete, although the additional cost of this survey would be modest since it will be an add-on to the fringe benefit survey. Given the problems and cost of a new survey, we have investigated two other options to generate updated data on job shortages and vacancies.

The Department for Employment Services in the Kentucky Cabinet for Workforce Development periodically releases data on the long-term occupational outlook at the state and ADD level. The most recent statewide Occupational Outlook was published in 1999 and covers the period through 2006, while ADD Occupational Outlooks were published in 1998 and cover the period through 2005. New versions of the Occupational Outlooks are in the process of being completed by the Department for Employment Services now.

At the ADD level, the Occupational Outlooks provide lists of the top 50 occupations by average annual openings and by percentage rate of growth. While the occupations are listed using the National Occupational Employment Statistics (OES) Title and Coding Structure, eventually the O*NET SOC coding scheme will be used, which will enhance the comparability of the Outlooks with other occupational data sets.

These data are useful as indicators of job shortages and vacancies because they are forward looking and it may be difficult to get data distinguishing between short term and long-term vacancies from surveys. For example, in our survey, firms had no trouble reporting to us positions for which they had difficulty finding workers in general, but many say they had no vacancies at the time of the survey. Of course, this may have been due to the fact that our survey was conducted in times of high unemployment rates by recent historical standards, suggesting soft labor demand. But this could be a problem with the timing of future surveys as well. In the end, it may be difficult to obtain data to provide a complete analysis of short-term vacancies. Instead, one option may be to rely on the Occupational Outlook data and release it more frequently than is being done currently.

In order to get some idea of the viability of using the Occupational Outlook data as a proxy for short-term vacancies, we did a comparison of the existing Occupational Outlook data by ADD and the data from our survey by

ADD. We compared the top 50 occupations in our survey by ADD with the top 50 occupations listed in the Occupational Outlook data across 14 ADDs (the Occupational Outlook data combines the Buffalo Trace and Gateway ADDs) using the total openings measure. We found that our lists of top 50 occupations and the Occupational Outlook lists had between 28% and 50% of the occupations in common with an average of 41.6% across all 14 ADDs in the data. The lists of common occupations had a positive Spearman rank correlation coefficient in 13 of the 14 ADDs, with a median of .34.

Thus, the two lists are positively correlated and in general have an overlap of almost half of the occupations. There are two reasons to believe that this may be a lower bound for the overlap between the Occupational Outlook data and data from a survey such as ours. First, the Occupational Outlook data currently available are fairly old and revised data will be published soon. Second, the Occupational Outlook data currently uses OES occupational codes and not O*NET codes. Therefore, we had to use a crosswalk between the two sets of codes. This is likely to induce measurement error that will not be there when the Occupational Outlook data is published using the O*NET occupational codes. It is reasonable to believe that there would be a greater overlap with newer Occupational Outlook data using the O*NET classification system. In any event, it is reasonable to consider the Occupational Outlook data as a substitute or supplement to costly survey data.

A possible schedule generating estimates using the more frequent release of the Occupational Outlooks is given below.

Option 2: Estimates based on more frequent release of Occupational Outlook data by ADD

2002 – Initial estimates published.
2004 – New Occupational Outlooks for ADDs published.
2006 - New Occupational Outlooks for ADDs published.
2008 - New Occupational Outlooks for ADDs published.
2010 - New Occupational Outlooks for ADDs published.
2012 - New Occupational Outlooks for ADDs published.

The advantage of this option is that it takes an existing program in the Kentucky Cabinet for Workforce Development and accelerates the release of its product. Disadvantages are that these data do not specifically deal with short-term shortages and vacancies and they are only available at the ADD level. Further, currently OES occupation codes are currently used. However, once the conversion to the O*NET system is made, it will be possible to link to occupational information at the O*NET website.

The third option takes a somewhat different approach. There are relatively more data available on employment and economic conditions by industry than occupation. For example, using the ES-202 data, it is possible to calculate employment by industry within counties. However, the ES-202 and most other data sets do not have regular, systematic occupation data published at the county level. But the U.S. Bureau of Labor Statistics (BLS) publishes the 2000-2010 National Industry-Occupation Matrix, which relates industry employment to occupation employment. Using this matrix, it is possible to predict which occupations are likely to exist for a given level of employment in a given industry. And armed with predictions of growth or contraction of overall employment in industries by county, one can predict growth and contraction in employment by occupation by county. It would also be possible to generate similar predictions at the county group, ADD, and WIA levels.

Both the University of Kentucky and the University of Louisville do forecasts of industry employment for sub-state regions including counties. In fact, the Center for Business and Economic Research at the University of Kentucky and the Department of Economics at the University of Louisville are working together on a study using this methodology to provide forecasts of occupational growth by county in the Louisville area. The same approach could be pursued on a statewide basis.

The advantage of this approach is that as long as industry forecasts are available, occupation forecasts can be generated, over the short, medium, and long term. Another advantage is that it is already being pursued in the Louisville area and would be relatively easy to expand to a statewide application. In addition, it is much less expensive than conducting another survey. The drawback is that any errors in industry forecasts or any differences between national patterns in the industry-occupation matrix with those that exist in Kentucky will affect the occupational forecasts. However, given the relatively low cost, the benefits of pursuing this application are likely to outweigh the costs.

A possible schedule of generating estimates using industry employment forecasts and the BLS industry-occupation matrix is given below.

Option 3: Generate estimates using industry forecasts and the 2000-2010 National Industry-Occupation Matrix

2002 – Initial estimates published.

2003-2012 (annually) – Produce new estimates of predicted changes in employment by occupation using industry forecasts and the 2000-2010 National Industry-Occupation Matrix. The fastest growing occupations would be reported by county, county group, ADD, and WIA.

In the end, it may be best for the Kentucky Cabinet for Workforce Development to pursue some combination of the three options. For example, it may be a good idea at some point in the future to conduct another survey, perhaps in 2006 in conjunction with the fringe benefit survey, but at the same time speed up the release of the Occupational Outlook data by ADD and to embark on a program that provides estimates of short term occupational employment changes using the BLS industry-occupation matrix, especially during years in which a survey is not conducted.

Educational Requirements

As for the job vacancies and shortages data, if the same methodology is used as in this study, updating will require another survey. So again, we are faced with three options, or some combination of three options: new surveys, reliance on more frequent release of the Occupational Outlook data, or use of estimates from the National Industry-Occupation Matrix combined with industry forecasts of employment by county, county group, ADD, and WIA.

The same advantages and disadvantages of the three options for the job vacancies and shortages data also apply for the educational credentials data. An added wrinkle in the use of the Occupational Outlook data or estimates using the National Industry-Occupation Matrix is that we will obtain data on education credentials for each occupation from the O*NET Database so that it is critical that the occupations be coded using the O*NET SOC system. The current National Industry-Occupation Matrix already uses SOC codes while the Kentucky Occupational Outlook data does not currently use them but will convert to them in the future. If Kentucky Occupational Outlook data are used prior to their conversion from OES to O*NET SOC codes, then it will be necessary to do the conversion prior to the compilation of educational credentials data as we did in our comparison of the Occupational Outlook data with the data generated in our survey.

Possible schedules for the three options for estimating educational credentials data follow those given for the job vacancy and shortage data:

Option 1: Generate New Estimates Using New Survey Data

2002 – Initial estimates published.
2005 – New survey undertaken and updated estimates reported for ADDs, WIAs, county groups, and large counties.
2009 - New survey undertaken and updated estimates reported for ADDs, WIAs, county groups, and large counties.

2113 - New survey taken and updated estimates reported for ADDs, WIAs, county groups, and large counties.

Option 2: Release Occupational Outlook by ADD More Frequently

2002 – Initial estimates published.
2004 – New educational credentials estimates obtained by ADD using new Occupational Outlook data and O*NET data on educational requirements by occupation.
2006 - New educational credentials estimates obtained by ADD using new Occupational Outlook data and O*NET data on educational requirements by occupation.
2008 - New educational credentials estimates obtained by ADD using new Occupational Outlook data and O*NET data on educational requirements by occupation.
2010 - New educational credentials estimates obtained by ADD using new Occupational Outlook data and O*NET data on educational requirements by occupation.
2012 - New educational credentials estimates obtained using new Occupational Outlook data and O*NET data on educational requirements by occupation.

Option 3: Generate estimates of education credentials using industry forecasts, the 2000-2010 National Industry-Occupation Matrix, and the O*NET database.

2002 – Initial estimates published.
2003-2012 (annually) – Produce new estimates of educational credentials needed in fast growing occupations using industry forecasts, the 2000-2010 National Industry-Occupation Matrix, and information in the O*NET database. Education credentials data would be reported by county, county group, ADD, and WIA.

Similar to the job shortage and vacancy data, a combination of the three options may be the best approach. This will insure that estimates of educational credentials are available on a timely fashion in the future, even in years in which a survey is not conducted.

Capacity Building

Capacity building consultation has taken place over the course of the study. We began by studying the existing databases available from the Kentucky Cabinet for Workforce Development. One problem that will eventually have to be addressed is the lack of data and estimates that cross state lines. Aside from the Lexington area, most of Kentucky's population centers are on state borders, meaning that they are parts of bi-state or tri-state economies. But much of the available data do not recognize this reality. One solution will be to develop cooperation in the form of data sharing, joint surveys, and joint modeling across state lines. This would be especially important to develop these efforts with larger states having population centers near the Kentucky border. This would allow estimates to be developed, for example of county groups, that included contiguous counties that were in other states, for example counties across the border from Louisville, Northern Kentucky, Ashland, Owensboro, Paducah, etc. This is a task for future capacity building. For this project, we focused on developing the Kentucky data.

We gave careful consideration of how our new data could be integrated into the existing databases of the Cabinet. We spoke with several groups of staff members within the Cabinet and came up with the best solution given the current status of databases within the Cabinet. The data are available at the Cabinet's website. http://kycwd.org/lmisurvey.htm.

Conclusion

There are over 115,000 businesses and enterprises in Kentucky employing over 1.9 million workers. About 100,000 of these are businesses that have payrolls, benefits, and the other administrative components required where employees are present. In the process of expanding, contracting, or ceasing operations, these businesses absorb workers from the labor pool or release workers to that pool. In addition, new businesses require workers drawn from that same pool.

At the county and at the Workforce Investment Area level in Kentucky, the ability to monitor the needs of employers is essential to maximize employment and individual, public, and commercial benefit. Lead-time needed for the development of training programs as well as infrastructure depend on timely information.

This final report describes our efforts to meet these needs by developing reliable sources of data on underemployment, fringe benefits, labor shortages and vacancies, and educational credentials by county, county group, ADD, and WIAs for interested users in the Commonwealth of Kentucky. These prospective users include potential employers seeking accurate information about the labor market in which they are contemplating locating, state and local officials and policymakers working on economic development, education, or labor market issues, researchers, and the public.

The study began with the design and implementation of a statewide survey of households and a statewide survey of employers. The data from these surveys are combined with Census 2000 data and ES-202 data to generate estimates at the sub-state level. Along the way, the research team has worked closely with officials from the Kentucky Cabinet for Workforce Development to tailor the data to the needs of users and to integrate the new data into the databases of the Cabinet. The final products of the research are this report and a web application that allows users to retrieve data at the county, county group, ADD and WIA levels. The data are available at the Cabinet's website. http://kycwd.org/lmisurvey.htm.

We find that there are almost 355,000 underemployed persons in the state and that underemployment as a percentage of the labor force varies across Area Development Districts from 17.5% to 22.5%. The percentage of persons in the labor force who are either underemployed or unemployed varies from 20.4% to 32.0% across Area Development Districts. Health insurance coverage varies more across regions of the state and by establishment size than across industries. For small establishments with less than 50 employees, coverage rates vary across

Area Development Districts for salary workers from 34.5% to 80.7%. Coverage rates in establishments with over 50 workers typically exceed 90%. Jobs that are in high demand or are difficult to fill vary significantly across regions of the state. The percentage of jobs that are in high demand or are difficult to fill that require at least a bachelor's degree is typically higher than the percentage of Kentuckians with a bachelor's degree. At the same time, the percentage of high demand or difficult to fill jobs that require a high school degree or less is typically also higher than the percentage of Kentuckians with a high school degree or less. These new data will provide useful and timely information to businesses, workers, policymakers, and other interested citizens as they make decisions about the future course of Kentucky's labor market.

Consortium Information

We provide a list of the key personnel at the University of Kentucky and the University of Louisville who conducted the study and descriptions of the four units involved in the consortium.

Key Personnel

Dr. Mark C. Berger, Director, Center for Business and Economic Research and William B. Sturgill Professor of Economics, University of Kentucky, and Fulbright Scholar, Institute for the Study of Social Change at University College Dublin, Principal Investigator.

Dr. Paul A. Coomes, Professor of Economics and National City Bank Research Fellow, University of Louisville, Co-Principal Investigator.

Dr. Ronald E. Langley, Director, Survey Research Center, University of Kentucky, Co-Principal Investigator.

Bruce S. Gale, Executive Director, Survey Research Center, University of Louisville, Co-Principal Investigator.

Dr. Eric Thompson, Associate Director, Center for Business and Economic Research and Associate Research Professor of Economics, University of Kentucky, Investigator.

Dr. Christopher R. Bollinger, Associate Professor of Economics, University of Kentucky, Investigator.

Roy Sigafus, Information Systems Technical Specialist, Center for Business and Economic Research, University of Kentucky.

Jonathan M. Roenker, Economic Analyst, Center for Business and Economic Research, University of Kentucky.

Barry Kornstein, Senior Research Associate, University of Louisville.

John Perry, Graduate Research Associate, Center for Business and Economic Research, University of Kentucky.

Participating Academic Units

The Center for Business and Economic Research, University of Kentucky

The Center for Business and Economic Research (CBER) has a long history of conducting applied economic studies and is the leading source of information on the Kentucky economy. CBER performs contract research for a variety of public and private sector clients, including conducting projects for many Kentucky state government agencies. Besides conducting contract research, CBER also serves as the main depository of economic information in the Commonwealth. CBER maintains the Kentucky Economic Information Service (KEIS), produces the *Kentucky Annual Economic Report*, and provides economic and public policy information to interested persons, businesses, and media across the commonwealth.

The Center for Business and Economic Research is housed within the Gatton College of Business and Economics at the University of Kentucky. In addition to CBER researchers, they frequently consult other faculty members in the Department of Economics and throughout the college to assist with various research projects. In addition, CBER has in place an excellent infrastructure for completing research projects. All of these resources enable them to produce quality research for many different clients. Some recent clients include: U.S. Appalachian Regional Commission, Kentucky Department of Parks, Kentucky Tourism Development Cabinet, Kentucky Governor's Office of the State Budget Director, Kentucky Finance and Administration Cabinet, Kentucky Cabinet for Workforce Development, Kentucky Cabinet for Health Services, Kentucky Utilities, Inc., Blue Grass Airport, National Science Foundation, U.S. Agency for Health Policy Research, U.S. Department of Health & Human Services, W.E. Upjohn Institute for Employment Research, U.S. Small Business Administration, and Toyota Motor Manufacturing, USA, Inc.

The Survey Research Center, University of Kentucky

The University of Kentucky Survey Research Center conducts socially significant research with public policy implications as well as research of theoretical or academic interest. UK-SRC has conducted more than 400 studies since it was established in 1979. UK-SRC's client base includes local and state government agencies, private and non-profit groups, and university researchers. The survey center provides the expertise, resources, facilities, and staff for research using telephone surveys, face-to-face interviews, and mailed questionnaires.

There are six full-time professionals at UK-SRC providing expertise in survey and questionnaire design, sampling, computer technology, and advanced statistical methods. Clients benefit from the multidisciplinary experience of the center's professionals. In addition to the professional staff, UK-SRC employs more than 60 highly trained, experienced project managers, telephone interviewers, field interviewers, and data-entry specialists. Interviewers are given extensive background training on each survey project. UK-SRC uses the WinQuery Computer-Assisted Telephone Interviewing (CATI) system, a 22-line telephone bank, and 22 computer workstation network. The full-featured CATI system enables the interviewer to enter responses to each question directly into the computer. UK-SRC provides individual attention to clients during each stage of the research project, from need assessment to survey design to interpretation of results. Well-tested and highly developed quality-assurance procedures and controls are also in place throughout the project.

Some recent UK-SRC clients include: American Cancer Society, Georgetown Community Hospital, Kentucky Bar Association, Kentucky Commission on Women, Kentucky Department of Fish and Wildlife Resources, Kentucky Department of Vocational Rehabilitation, Kentucky Educational Television Network, Kentucky Environmental Education Council, Kentucky Legislative Research Commission, Kentucky Long-Term Policy Research Center, Lexington-Fayette Urban County Government, Presbyterian Church, USA, Shriner's Hospital Special Libraries Association, Information Technology Division, Washington, D.C., Toyota Foundation, and Woodford County Health Department and numerous University of Kentucky faculty members and research centers.

The Survey Research Center at the Urban Studies Institute, University of Louisville

The Urban Studies Institute at the University of Louisville houses two academic programs (Ph.D. in Urban and Public Affairs and Master of Public Administration) and numerous research centers and programs. In addition to Survey Research, these include the Kentucky State Data Center, the Kentucky Population Research Unit, the Center for Environmental Policy and Management, and the Center for Sustainable Urban Neighborhoods. The Survey Research Center at the Urban Studies Institute provides professional staff and services for telephone surveys, mail surveys, face-to-face interviewing, focus groups data analysis, and report writing. University of Louisville faculty and professional staff direct research funded by federal, state, local and private funding sources.

The Survey Research Center at the Urban Studies Institute maintains an 18 station computer assisted telephone interviewing (CATI) system. Experienced interviewers provide staffing for countywide, statewide and nation-wide business and residential surveys. The CATI system provides quick conversion of data for ASCII format, SPSS, spreadsheet, or database files. The Survey Research staff manages large and small surveys, as well as provides follow-up postcards and additional survey mailings to increase response rates using accepted mail survey standards. Our professional data entry staff also enters most of these surveys.

Department of Economics, University of Louisville

The Department of Economics at the University of Louisville consists of 11 faculty members and two staff members and offers a B.A. in Economics through the College of Arts and Sciences and a B.S. in Economics through the College of Business and Public Affairs. The faculty includes Dr. James Ramsey, the Kentucky State Budget Director, and Dr. Paul Coomes, Professor of Economics and National City Research Fellow. The applied research effort of the Department is led by Dr. Coomes, with the assistance of Mr. Barry Kornstein. Dr. Coomes has obtained funding for his research in recent years from the Kentucky Cabinet for Workforce Development, Kentuckiana Works, the Kentucky Chamber of Commerce, the Kentucky Cabinet for Economic Development, the Transit Authority of River City, the Health Enterprises Network, the Kentucky State Fair Board, Louisville Gas and Electric Company, Louisville Water Company, Kentucky Hospital Association, the Speed Art Museum, the Greater Louisville Corporation, the Kentucky Commission on Military Affairs, Churchill Downs, and the Kentucky Hospital Association.