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Estimating the potential available labor supply for mid-sized Iowa communities

Randal Robert Pilkington
University of Northern Iowa

ESTIMATING THE POTENTIAL AVAILABLE LABOR SUPPLY FOR MID-SIZED IOWA COMMUNITIES

An Abstract of a Thesis

Submitted

In Partial Fulfillment

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Master of Arts

Randal Robert Pilkington

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ABSTRACT

This thesis presents a case study approach to estimate the potential supply of available workers within a laborshed or sub-labor market area. Current labor data are not adequate to estimate the supply of labor and its characteristics in mid-sized Iowa communities. In addition, low unemployment rates are not reflective of the willingness of workers to change jobs. Estimates of underemployment are also missing from any current labor data.

The methodology for this study consisted of conducting a random survey of the potential available labor force for a mid-sized Iowa community's laborshed, defined as the nodal region from which a community draws its commuting workers. Three categories of potential workers are estimated and their characteristics are compiled in this study. The first category is current workers willing to change employment or employers under certain conditions. The second category examined is persons not currently working. This is different from unemployed persons since the category includes persons not in the labor force, including discouraged workers and homemakers. The third category of potential workers is underemployed persons. Types of underemployment estimated include persons working fewer hours than they desire, persons working full time but at insufficient wages, and persons with a mismatch of skills between their current job and their education level and training. Estimates were calculated for each of these potential labor force categories and aggregated to depict an accurate estimate of the potential available labor force and its characteristics.

The results of this study indicated that potential labor availability was considerably higher than might be reflected by the low unemployment statistics in Iowa. The labor

force potentially available consists primarily of current workers eager to shift jobs and non-workers willing to enter the labor force under the right conditions. This study details the characteristics of this potential available labor force for the study area.

This research sets forth an approach that can be adapted to other mid-sized Iowa laborsheds and recommends public policy implications for pursuing additional laborshed employment studies. Labor force data are provided at a level considered most important by local development officials, and this promotes a more regional approach toward economic development.

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has been approved as meeting the thesis requirement for the

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Date

Dr. C. Murray Austin, Chair, Thesis Committee

Nov 6, 1998
Date

Dr. Janet Rives, Thesis Committee Member

6 Nov 98
Date

Dr. Thomas Fogarty, Thesis Committee Member

12/7/98
Date

Dr. John W. Somervill, Dean, Graduate College

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CHAPTER 1.

INTRODUCTION

Background of the Research Problem

Economic development officials throughout Iowa have struggled over the past few years to obtain timely and accurate information to help define their available labor force and its characteristics. Due to the currently low rates of unemployment in Iowa, community leaders (and employers) have assumed that economic growth cannot occur in the state because there are not enough available workers and their communities have reached full employment. However, during this same period, many companies expanding and relocating in the state have received between 5 to 10 applicants for each position available. This discrepancy between assumptions and reality may indicate that problems exist in the way unemployment is defined, measured, and reported. In particular, unemployment measures may not truly reflect the potential available labor force of an area, especially in rural areas.

When unemployment statistics are used as the sole method of determining labor availability, they can lead to erroneous conclusions about the potential available labor supply within a laborshed (defined by Fisher, 1995, as a nodal region from which a city draws its commuting workers) or sub-labor market area (sub-LMA). Similar problems exist in major LMAs (urban areas), as defined by the Bureau of Labor Statistics (BLS), albeit to a lesser extent, since more accurate data are obtained through the Current Population Survey conducted by the BLS. These limitations have significant

implications for local economic development officials as they endeavor to create additional jobs and enhance wealth within their region.

The Research Question

This research project attempts to answer the prevailing question facing local economic development officials: Is there a better way of estimating the potential supply of available workers within a laborshed or sub-LMA? Current labor data are provided at the county level by the BLS and state reporting agencies. However, actual laborshed boundaries are delineated by zip codes which are smaller than counties. Labor data collected at the county level cannot be partitioned into non-county areas. In addition, current methods of estimating unemployment are imprecise as an indicator of labor availability.

Problems are also evident at the community level related to the capacity of local economic development officials' understanding of labor market concepts. Determining the potential available labor supply requires an understanding of the community's laborshed. Most economic development officials cannot accurately define the geographic boundaries of their local laborshed or the level (order or size class) of their node in the central place hierarchy. Frequently, these officials are not fully aware of commuting patterns into and out of their region, nor do they understand how the size of the laborshed is dynamic and dependent on the strength of the local economy. Since neither the Bureau of Economic Analysis (BEA) nor the U.S. Department of Agriculture (USDA) maintain economic statistics below the LMA level (50,000 in population), and the BLS utilizes counties or groups of counties for delineating labor data, existing data cannot be readily

obtained to predict the size and basic characteristics of a specific laborshed or sub-LMA. Therefore, this research project proposes an alternative methodology for defining the laborshed of a typical mid-sized Iowa community that lies outside of or on the fringe of an urban center (LMA). The research also estimates the potential available labor supply and its characteristics within a laborshed.

Why Answering the Research Question is Important

Although economic growth in Iowa has been steady over the past 5 years, it has lagged behind the rest of the Midwest region. More importantly, Iowa still ranks near the bottom of other Midwest states in per capita income, only above the Dakotas (U.S. Department of Commerce, Bureau of Economic Analysis, Regional Account Data, 1998). Iowa also experienced the second slowest population growth of all Midwestern states during this decade (U.S. Census Bureau, Population Estimates Program, 1998). Moreover, Iowa has the second oldest median age and second highest population of super seniors (85 years of age and older) in the Midwest (U.S. Census Bureau, Population Estimates Program). These indicators suggest that Iowa has not experienced the economic and population growth of its neighbors, even though Iowa and its communities have been aggressive in pursuing job creation and expansion during the past decade.

The availability of a well-trained and educated labor force is considered the most important locational factor for businesses considering expansions or relocations (Ibold, 1996). Because of Iowa's very low unemployment, businesses and local officials have assumed there is inadequate labor available to support aggressive growth policies. However, as was emphasized earlier, applicant/opening numbers suggest that recent

industrial expansions and relocations have experienced from 5 to 10 applicants per job opening. The apparent discrepancy between assumptions and reality hinges on the way unemployment is defined and interpreted. Harvey Siegelman, Iowa's State Economist, suggests that Iowa's low unemployment rate masks those willing to accept new employment opportunities (Leys, 1997). For example, there is no accounting for those not in the labor force (discouraged workers and homemakers), part-time employees who desire full-time employment, and workers seeking new employment opportunities. This research hypothesizes that a better method can be developed to estimate the availability of workers and the characteristics of these workers within a specific region or laborshed.

CHAPTER II.

LITERATURE REVIEW

Introduction

Attempting to measure labor availability within a specific laborshed is a geographic research problem as well as an economic one. It builds on a broad literature of methods for delineating the appropriate geographic boundaries for the proposed study area. The literature reviewed includes examples of various areal delineations of regional economic activity in order to validate the laborshed as an appropriate and functional area or region of study. Since the laborshed boundaries do not follow given Census or county boundaries, a number of areal delineations were studied to assess their applicability to the laborshed concept. Most relevant are the studies of labor market areas and functional economic areas. Applying the concept of central place hierarchy provides added definition to delineations of regional economic activity. A review of spatial associations among regions further validates the laborshed concept as an appropriate and functional region for this research. Grouping sub-regions into a formal region for study requires an assessment of the methods for measuring interdependence of these sub-regions.

Because this research problem also involves employment issues, discussion of the literature includes a review of current methods for estimating employment, unemployment, and underemployment. The dilemma of low unemployment rates and strong applicant/opening ratios indicates problems with the way unemployment rates are estimated and utilized. In order to assess the depth of this problem for Iowa, some of the latest industrial location decisions in the state are examined. Further, no Iowa agency

currently measures underemployment, but community leaders are anxious to obtain estimates for their area. The literature reviewed indicates the need to develop an alternative method for estimating labor availability and validates the use of laborsheds as the study area.

Defining the Region of Study

Most regional studies begin with a delineation of the "functional" area of study or the unit of analysis and the interrelations of activities in that area. One of the first challenges in this research project was determination of the appropriate functional economic area for the study. Examples of delineating regional economic activity include: the Census Bureau's Standard Metropolitan Statistical Areas (SMSAs, now referred to as MSAs), Functional Economic Areas (FEAs) and Labor Market Areas (LMAs; Fox & Kumar, 1965), the Bureau of Economic Analysis' (BEA) Economic Areas (Berry, 1968, 1973), Travel-to-Work Areas and Local Labor Market Areas in Britain (Coombes, Green, & Openshaw, 1985; Coombes & Openshaw, 1982), USDA Commuting Zones (Tolbert & Killian, 1987; Tolbert & Sizer, 1996), Rural Municipalities (RMs; Stabler, Olfert, & Greul, 1996), and the BLS' Major and Small Labor Market Areas (U.S. Department of Labor, BLS Handbook of Methods, 1997). Unfortunately, most of these regional delineations focus on a central place of significant size and provide limited applicability for rural areas, especially at the sub-county or laborshed level.

Some of the earliest attempts to define areas by economic activity utilized the delineation of MSAs (Knox, 1994). The Census Bureau began using this statistical area of measure in 1960, but the concept actually dates back to 1910 with the designation of

metropolitan districts (Chudacoff, 1981). However, MSA statistical units were, and still are, based on a central city and county with a census population of at least 50,000. Surrounding counties that are metropolitan in nature are sometimes included in an MSA's delineation. Fox and Kumar (1965) had earlier criticized the Census Bureau's MSAs as useful means of statistical reporting. While MSAs have been helpful in examining large cities, rural areas are not covered. Even after the expansion of MSAs to include multiple counties in the 1980 Census, only 10 of Iowa's 99 counties and slightly less than 46% of its population are included in the 1990 Census MSAs. Utilizing MSAs is of limited value for delineating laborsheds of communities in the hinterlands of MSAs. Even when the area of influence for the MSAs is extended into contiguous counties, many of Iowa's mid-sized communities are inappropriately grouped into distant MSAs.

Tolbert and Killian (1987) also criticized the use of MSA data to represent labor markets in research on non-metro employment patterns. They believed these data were insufficient, because rural areas are generally omitted by definition from the research. Census publications later supplemented MSAs by adding county group designations, which were determined independently by officials in each of the 50 states. Since this scheme restricted groupings within state boundaries, county groupings served as less than satisfactory measures for specific labor market areas (Tolbert & Sizer, 1996).

Fox, one of the early pioneers in defining regional economic activity, suggested FEAs as an alternative to the MSA (Fox & Kumar, 1965). The FEA is a "city spatially extended to accommodate a low-density pattern of land use and residential location over the bulk of its areas" (Fox, 1974, p. 138). He suggested that FEAs should be delineated

by the distance of commuting patterns of daily home-to-work trips and these trips would be about the same in each direction. However, Fox's FEAs remained focused around the strength of a central city and its commuting zones, ignoring the option of designating non-metro FEAs (Bao, Henry, & Barkley, 1995). In their initial proposal of FEAs for Iowa, Fox and Kumar used 50-mile radii around urban centers in the top three levels of central place hierarchy. This was based on the assumption that workers are willing to spend a maximum travel time between residence and place of work of one hour in each direction. Fox also noted that most other locations of daily importance to people are closer to home than the workplace and are typically contained in areas smaller than LMAs. "Shopping goods" stores, however, will typically have similar sized trade areas to the labor market area. In more populous areas, the trade areas will be somewhat smaller.

In order to complete a set of initial FEAs for Iowa, Fox and Kumar (1965) added areas with 50-mile radii around two cities of 25,000 or more to the MSAs. They suggested that most economic activity in Iowa relies on these nine areas, with persons in surrounding hinterland (rural) counties commuting to these cities for economic activity. Hinterland counties were added by Fox and Kumar to the FEA with the strongest commuting linkages, however some hinterland counties were not strongly linked to any one FEA. This suggests that FEAs may be an inadequate basis for regional studies of some rural areas in Iowa. Page and Taylor counties (which served as the pre-pilot test area for this research) were specifically identified as not having strong ties to the specified LMAs.

The LMA is the most commonly used delineation of functional economic regions or FEAs. Fox and Kumar (1965) suggested that these terms are interchangeable and defined an LMA as "relatively closed or bounded with respect to the income-producing activities of its residents" (p. 57). It is also relatively closed or bounded with respect to cluster-oriented activities. They state that: "almost all the labor resident in the area is sold within it, and almost all the goods consumed in the area are bought within it" (p. 59).

Berry (1968) proposed a method of measuring economic activity and LMAs, later known as the BEA economic areas. Berry grouped all U.S. counties into 183 economic areas, based on central place theory, to a central node determined by commuting patterns. He concluded that centers must have a threshold population of at least 40,000 to 50,000 before any significant influence occurs.

Tolbert and Killian (1987) proposed an improvement in the BEA concept by incorporating journey-to-work data for counties. Using journey-to-work data, they delineated 382 LMAs for the U.S. and constructed matrices to indicate the relative strength of commuting ties between counties. From these matrices, they identified groups of counties with strong commuting ties to delineate LMAs for the U.S. Unlike the BEA, they did not require their group of counties (LMAs) to have an urban center, removing the bias toward urban areas. In their 1990 update of LMAs, Tolbert and Sizer (1996) identified 764 individual commuting zones; these were later aggregated into the LMAs. Of these commuting zones, 500 were identified as non-metropolitan areas. The authors developed commuter flow matrices to measure the proportional flow between two counties by adding the commuters from one county to the other and then dividing by the

labor force of the smaller county. County groupings resulted in new LMA boundaries with each containing at least 100,000 people (p. 8). Construction of these LMAs served as an improved basis for measuring economic activity compared to the use of county or state level data, however, the method still did not fully consider the strength of commuter ties between counties (Bao et al., 1995). Tolbert and Killian defended their utilization of counties in determining labor market geography on the basis of the breadth of available county-level economic and population data. However, in their update of 1990 Census commuting zones and LMAs, Tolbert and Sizer acknowledged the importance of considering sub-county spatial units for regional studies.

Johnson (1995) defined BEA economic areas based on commuting patterns and economic area data (earnings and employment by industry, income, and population) from the 1990 Census. Johnson assigned some counties into small economic units referred to as component economic areas (CEAs). Each CEA consists of a single economic node and surrounding counties that are economically related to the node (p. 75). Of the 3,141 counties in the U.S., Johnson classified 2,267 counties as non-nodal and grouped these into 348 CEAs. Based primarily on commuting patterns (place of work and residence), CEAs and MSAs were combined into 172 BEAs, a reduction from the original 183. Tolbert and Sizer (1996) emphasized that the BEA county groups remained focused around an urban center and surrounding counties based on central place theory. They did not conceive these economic areas as local labor markets and suggested there were particular problems using these to delineate non-metro labor markets. The authors

concluded that large-scale urban trends are likely to obscure important trends in less populated areas and create an obstacle for studying non-metro labor force participation.

Stabler et al. (1996) expanded on Fox and Kumar's 1965 definition of LMAs, describing them as "an area large enough to contain the workplaces of most of the people who reside within it and the residences of most of the people who work within it" (p. 209). They noted that usually LMAs are delineated based on commuting-to-work data. Boundaries for the LMA are defined as points where the strength of the flow of commuters falls below some predetermined level to keep commuting across boundaries to a minimum.

Utilizing counties as the basis for data gathering and comparison of regional economic activity has been debated for more than 30 years. Fox and Kumar (1965) proposed that counties are not sufficient for the delineation of FEAs. They refer to counties as political artifacts, which may have been well adapted to the technology and socio-economic conditions of the mid-nineteenth century, but which are not adapted to today's needs. In rural states such as Iowa, counties were originally designed to serve an agrarian society. Fox and Kumar point out that the existing county lines in Iowa were established in 1857 when more than 90% of the people were living on farms or in villages. According to 1998 Census Bureau population estimates, populations of Iowa counties range from 5,420 to over 427,000, and less than 46% of Iowa's population lives in Iowa's eight MSAs. In addition to the wide variation in population among counties, Iowa's population has become significantly more urbanized.

Leven, Legler, and Shapiro (1970) had also argued that counties should remain the unit of analysis in order to control computational costs; however, they still supported the FEA concept for determining regional boundaries. Barkley, Henry, Bao, and Brooks (1995) emphasized that in addition to FEAs corresponding to trade areas of the central place, where the size and number of establishments are a function of population and transportation costs, counties are representative of regional labor markets' commuting patterns, and are a primary determinant of regional boundaries. Although Barkley et al. used counties as the basis for data gathering and comparisons, they stated that "the delineation of areas for study will vary according to the research problem, rather than utilizing previously defined FEAs" (p. 299).

Tolbert and Sizer (1996) asserted that "if we are to understand the diversity of non-metro America, we need a geographic standard capturing variations in local economic and labor force activities" (p. 1). They defined a labor market area as "a specific locale in which interactions between buyers and sellers of labor take place" (p. 2). Tolbert and Sizer expanded their designation of LMAs beyond state boundaries to represent a more accurate view of interstate economic activity within LMAs. However, the typical LMA that resulted from their study averaged 300,000 inhabitants and encompassed seven counties, much larger than the proposed study area for this research problem. In addition, counties remained the defined unit of commuting data in their research.

Tolbert and Sizer (1996) concluded that "it is a mistake to assume homogeneity in work environments throughout non-metro America" (p. 4). While Tolbert and Sizer's method of redefining LMAs based on commuting patterns for journey-to-work was an

improvement over the BEA economic areas, its application to Iowa did not change the original FEAs suggested by Fox and Kumar (1965). In addition, each of Tolbert and Sizer's proposed Iowa LMAs still included the influence of an urban community, and all but two included an MSA.

Stabler et al. (1996) refined the LMA approach in their study of spatial labor markets in Canada. They argued that "alternatives to urban-based employment are required in remote rural areas and existing commuting patterns do not support including these remote areas in LMAs" (p. 207). Canadian data are available at the micro-level which allowed Stabler et al. a precise delineation of labor market areas using RMs as the unit of analysis. Using each of Saskatchewan's 299 RMs as building blocks for the definition of LMAs, they performed a cluster analysis of changing commuting patterns over time. The result of this analysis was a grouping of rural clusters with little or no association with previously defined LMAs that were formed into separate rural LMAs. Since Canadian-based RMs are of similar geographic size, they are better sub-units of LMAs compared to counties in the U.S. Counties tend to vary significantly in size among the states, especially in western states (Stabler et al.). Unfortunately, comparable mico-level data is not readily available in the U.S.

While the area and size of LMAs vary somewhat in the literature, there appears to be a general consensus that the LMA must have a minimum population of 100,000 to serve as a functional economic region for the purposes of regional comparisons and to meet Census Bureau confidentiality standards. The only delineation that significantly varies from those found in the literature is the one suggested by the BLS. The BLS

provided further delineation of LMAs by offering two additional definitions of LMAs, "major and small" (U.S. Department of Labor, BLS Handbook of Methods, 1997, p. 238). Major LMAs are considered coterminous with MSAs, and small LMAs include counties or groups of counties with a central community of at least 5,000 in population.

BLS-defined small LMAs appear to be consistent with sub-LMA definitions presented in the BLS Handbook of Methods (1997); however, the single counties do not meet the LMA definitions offered by Barkley et al. (1995), Fox and Kumar (1965), Stabler et al. (1996), Tolbert and Sizer (1996), and others. All these authors define an LMA as an area where the majority of the labor is resident. Since many jobs within a county are held by residents outside the county, this unit does not appear to meet the generally accepted definition for an LMA. However, the only published data available for studies of sub-LMA areas are county level statistics. Clearly, more accurate information on sub-county spatial units is needed to better describe functional economic activity for those mid-sized Iowa communities on the fringe of LMAs. Such sub-county studies require the collection of primary data.

Labor Market Areas and Central Place Hierarchy

Delineating FEAs and/or LMAs according to the central place hierarchy enhances their value. Philbrick (1957) classified central places according to their hierarchical status in areal functional organization. In accordance with central place theory, Philbrick stated that "the areal structure of occupance is composed of a number of nested orders of areal functional organization" (p. 308). Philbrick's goal was to demonstrate society as a multiple series of bi-polar interconnections. In this areal structure, each central place,

even the smallest village, serves a nodality function for a larger hinterland. Fox and Kumar (1965) adapted this areal structure in their FEA delineations by emphasizing the necessity of utilizing at least third-order central places as defined by Philbrick (50,000-300,000 in population). However, the nodality of second-order central places, notably the county seat towns of 5,000 to 15,000 in population (as defined by Philbrick), serve an important function in regional economic activity (Fox & Kumar). The acknowledgement that these second-order central places serve a function of nodality at least partially validates studying these small sub-LMAs as proposed in this research project. It is the contiguous clustering of these second-order central places, in combination with third-order central places, that form the FEAs and LMAs discussed by Philbrick, and Fox and Kumar.

The laborshed concept proposed in this thesis reflects the nodality of mid-sized Iowa communities that Fox and Kumar (1965) and Philbrick (1957) identified. Fisher (1995) defined laborsheds as "the nodal region from which a city draws its commuting workers" (p. 5). This is similar to the definition of an LMA proposed by Tolbert and Sizer (1996) as "a specific locale in which interactions between buyers and sellers of labor take place" (p. 1). As Philbrick concluded, these second-order central places serve an important function of nodality and, thus, can serve as the node for defining the laborshed of smaller and less populated regions. Therefore, the most appropriate definition of the proposed study area is the laborshed at the sub-LMA level.

Spatial Association in Regions

Identifying the economic interdependence of counties within an FEA provides another means for validating groupings. Barkley et al. (1995) employed spatial auto-correlation to measure the degree that activities (population growth and income change) are similar among counties in a region. Barkley et al. also used spatial clustering to estimate the function of distance on the attributes measured. The results of this method were groups of counties with high or low attribute areas near the centroid county. Each of these statistical procedures was performed at the county level; however, Barkley et al. suggested that sub-county areas would be more preferable for examining intra-regional dependencies. He suggested two reasons for these limitations: first, attributes varied significantly within a county; and second, only a few county-level observations were available for the smaller FEAs.

In earlier work, regional interconnectedness was measured by Tolbert and Killian (1987) using a proportional flow matrix. This measure includes the total number of commuters between two counties divided by the total county labor force. They suggested that commuters from smaller counties represented only a small portion of the larger counties' labor force, but these commuters tended to represent a very substantial proportion of the smaller counties' resident labor force. Strong commuting links between the county and the central place in the LMA led Tolbert and Killian to group counties into LMAs for the U.S. However, Bao et al. (1995) suggested groupings based on commuting flows between individual counties and all other counties in the LMA. This process resulted in identifying inappropriate LMA county groupings when compared to

actual linkages of county pairs. Of specific concern in this grouping are those counties on the border of LMAs where commuting patterns can represent as little as 10% of commuters from that county into the LMAs. Bao et al. concluded that these small percentages of commuting patterns might provide further evidence that fringe counties are not appropriately a functional part of the LMA; a smaller unit of study may be appropriate for these areas.

While some recent literature has indicated that there are circumstances when economic analysis is preferable at the sub-county level, the literature provided no analysis that would be appropriate for this study. Even the BLS requires labor force estimates for some Federal allocation programs (U.S. Department of Labor, BLS Handbook of Methods, 1997). However, the data required to compute independent Handbook estimates are generally not available. The only utilization of sub-LMA data (in U.S.-based studies) was the effort of the BLS to estimate unemployment using unemployment insurance claims by census tract or city level as a ratio of the population of the LMA. Even with this disaggregation of data, BLS-defined sub-LMAs are not grouped by economic activity or by labor force characteristics.

As Stabler et al. (1996) suggested, "defining the spatial framework that constitutes the labor market area is a necessary first step to a systematic and coherent analysis of alternatives facing the rural labor force" (p. 227). Instead, the importance of intra-regional linkages have encouraged researchers and policy makers to view regions as economic systems as opposed to loose associations of economic entities (Barkley et al., 1995).

Pursuing the laborshed concept for a second-order central place as defined by Philbrick (1957) and acknowledged by Fox and Kumar (1965) is a daunting task. While LMAs/FEAs may well be appropriate for larger regional and national economic analysis, methods do not exist that adequately estimate labor market areas of rural communities with significant nodality. Though numerous authors cited in this study noted the desirability of defining sub-LMAs, they did not propose an effective methodology. The literature validates the importance of examining labor markets of non-metro areas, especially counties in the hinterland of LMAs without strong commuting links to any specific LMA. Only Stabler et al. (1996), in their addition of Canadian rural municipalities was able to go beyond county-level data, thanks to the availability of micro-level data in the Canadian Census.

Labor Force Delineations and Measures - Underemployment

A number of researchers have focused on unemployment and underemployment over the past two decades. As unemployment declined, more emphasis has been directed toward understanding and measuring underemployment. The economic shift of the past two decades has made underemployment more critical for labor studies. Clogg (1979) suggested that unemployment statistics no longer serve as an adequate indicator of labor market conditions. DeAnda (1994) criticized using the unemployment rate as an indicator of labor force performance. Instead, DeAnda suggested that we must determine whether a person is adequately used in the labor force.

While there is no consistent definition of underemployment, Clogg (1979) suggested that "underemployment exists when a person's employment is inadequate in

relation to specific norms of his or her occupational skill (training and work experience," p. 3). Five classifications of underemployment represent the latent class of unemployed or those who have the potential for more significant employment participation. Clogg suggested that underemployment can be both visible and invisible and can be measured in the following five ways: (a) sub-employment (discouraged workers), (b) involuntary part-time employment, (c) unemployment, (d) not in the labor force (inactivity), and (e) underemployment by low income. Individuals can be simultaneously underemployed within two or more categories of underemployment, especially during a time of economic fluctuation in the economy.

These five classes of underemployment constitute what Clogg (1979) termed the Labor Utilization Framework (LUF). The central concept underlying the LUF is the adequacy of labor use. DeAnda (1994) defines a person as adequately employed if he or she works a standard work week at a wage above the poverty level and is in an occupation suitable to his or her education level" (p. 165). Whenever the worker's capacity to find adequate employment is circumvented by the labor market, this worker is considered underemployed.

Khan and Morrow (1991) had earlier proposed a simpler measure of underemployment as either objective or subjective. The authors defined objective underemployment as "the circumstance occurring when employees possess education or skills which exceed normal job requirements" and subjective employment as "the circumstance occurring when employees feel that their abilities are not fully utilized" (p. 211). In their study of university staff positions, they found that underemployment

emanates more from subjective factors than objective factors, caused by a negative relationship with job satisfaction. This concept is generally supported by Rifkin (1995), who suggested that "employment is more than a measure of income; for many it represents a measure of self worth" (p. 195).

Underemployment among rural women has been substantially higher than either urban women or rural men (Lichter, 1989). Utilizing data from the current population survey, Lichter applied Clogg's LUF to claim that roughly one of every three rural female workers are underemployed. He suggested that sex- and residence-based differences in underemployment are experienced broadly across labor force groups. Therefore, Lichter concluded that "place-oriented policies" that increase the quantity, quality, and diversity of employment opportunities in rural labor market areas will do more to solve employment equity problems than "people-oriented" programs that target particular distressed labor force groups (p. 206). Soltero (1995) also concluded that the likelihood of underemployment varies across geographic regions, caused primarily by structural transformations in the economy.

Tigges and Tootle (1990) examined the geographical structure of underemployment in rural and urban areas. They suggested that both employers and employees have choices and constraints in the employment relationship. Underemployment therefore has a direct relationship with jobs that are available locally. The authors suggested that employment adequacy is determined by industrial structure and that the stock of human capital in the area is a critical factor. Due to both of these factors, they concluded that underemployment was typically more concentrated in rural areas.

The impact of technology on underemployment has recently been discussed in the literature (Feldman, 1996; Kasandra, 1995; King, 1998; Reich, as quoted in "Generation X-onomics," 1994; Rifkin, 1995; Snyder, 1996). Snyder pointed out that, as we get better at using information and technology, fewer workers will be needed, resulting in mass underemployment and unemployment. His concern was not that there will be fewer jobs, but that there will be fewer and fewer good jobs.

Very few states or cities have tried to determine the extent of their underemployment. Kansas is one state that has effectively measured underemployment in a statewide random telephone survey to determine the effective labor force in its state. The Kansas study used four measures of underemployment: (a) discouraged workers, (b) part-time workers who want full-time jobs, (c) temporary workers who want permanent jobs, and (d) workers whose skills are underutilized in their current jobs (Glass, Krider, & Nelson, 1996). The Kansas survey instrument added specific questions to the BLS' Current Population Survey (CPS) to garner responses in each of these four categories. This study shows underemployment is higher in rural areas and among women. However, more mismatched workers were located in metropolitan areas. This study provided additional support for attempting to measure underemployment as part of a labor study of a specific sub-LMA or laborshed and also provided a more realistic set of measures.

The BLS has not adopted any widely accepted definitions of underemployment, even though a number of authors have emphasized its importance in labor studies. Unfortunately, the BLS decided to stop using one of its most helpful statistics, the U-7

rate. This rate did include some estimate of underemployment in monthly CPS surveys, primarily related to an accounting of discouraged workers. As Sanders (1994) pointed out, "without a better understanding and measurement of underemployment, we cannot gain a true perspective of our economy" (p. 1). Breslow and Howard (1995) also emphasized the need to measure underemployment to better evaluate the performance of the economy. Reflecting on recent literature surrounding this topic, estimating underemployment within a specific laborshed study appears doable and important. Estimating underemployment for the pilot laborshed will provide a more meaningful and accurate assessment of the available labor force and its characteristics.

Recent Industrial Locations in Iowa

Applicant/opening ratios (supply/demand ratios) are important indicators of the availability of certain types of workers for different types of jobs. The Iowa Department of Workforce Development (1997) uses this ratio to measure the number of applicants per job opening for each of its regional workforce development offices and also maintains ratios for the entire state. With Iowa reaching record low levels of unemployment, 2.4% (Siegelman, 1998), one might assume that the applicant/opening ratios would also be at record lows. However, a review of recent news stories regarding industrial facility locations and expansions in Iowa shows that this is not necessarily the case. For instance, 4,909 persons applied for 500 jobs at a Waterloo foundry (Kinney, 1997); 500 persons applied for 100 jobs at an Ames plastic container company (Kovac, 1997); 2,700 workers applied for 200 jobs at a new glass plant in DeWitt (Leys, 1997); 450 persons applied for 100 jobs for a cabinet manufacturer in Oelwein (O'Donoghue, 1997); 650 workers

applied for 60 jobs for a new pudding plant in Waterloo (Kinney, 1997b); and 2,000 persons applied for jobs for the new prison being built in Fort Dodge ("Plan for Prison," 1997). Unemployment rates in these communities varied from 2.1% to 4%. There are numerous other examples of businesses experiencing between 5 and 10 applicants per opening. With Iowa's low unemployment level, one has to ask where these applicants are coming from.

Harvey Siegelman, State Economist for Iowa, concluded that Iowa's low unemployment rate camouflages the reality that many people are willing to accept jobs below their qualifications (Leys, 1997). Citing the DeWitt glass manufacturer, Leys suggested that Iowa's record low unemployment rates do not mean that existing workers will not seek better jobs. Kinney (1997) also suggested that a vast majority of applicants for the Waterloo foundry jobs were already working. In each specific case mentioned, the large number of applicants could not be only those who were unemployed. These examples challenge the validity of utilizing the unemployment rate as an indicator of potential employees for new or expanded operations.

Part of the problem stems from the way the unemployment rate is calculated. The unemployed are defined as persons who do not have a job but have actively looked for work in the prior four weeks. The actual percentage of unemployment is determined through the CPS as described in the BLS summary of employment measures attached in Appendix A. However, this method does not account for discouraged workers, that is those workers who are no longer looking for work due to difficulty finding jobs. In addition, there is no accounting for the five types of underemployment defined by Clogg

(1979). Each of these factors may lead to a grossly understated potential available workforce when unemployment is the sole source of measurement. Breslow and Howard (1995) estimated that the "real" unemployment rate would be closer to 12% if we included the categories of underemployment. Even this percentage does not include current workers desiring new employment opportunities and those working more than one job for economic reasons. Thus, as indicated by the literature, a better method is needed to estimate the number and characteristics of the available labor force of the nation, its states, LMAs, and sub-LMAs.

Summary

This thesis proposes a better way of estimating the potential supply of workers within a laborshed. The literature reinforces the importance of sub-county level data for regional studies (Tolbert & Sizer, 1996). Regional economic studies have traditionally been conducted at the county level due to availability and breadth of published data. County-level statistics may be adequate for studying MSAs, but these data do not represent the specific laborshed of a region, especially in more rural areas. As Tolbert and Sizer emphasized, in order to understand the economic and labor force activities of non-metro areas, a new geographic standard is needed to capture these variations.

The laborshed concept addresses the micro-level data gaps discussed in the literature and the need for a revised spatial framework that constitutes sub-county labor market areas. Mid-sized Iowa communities serve a function of nodality in the intraregional economies. These cities were referred to by Philbrick (1957) as second-

order central places and can serve as the node for defining the laborshed boundaries of small regions.

Labor availability and unemployment measures are frequently fundamental to regional economic studies. Literature reviewed above indicates the importance of considering labor force measures, including underemployment, to assess the level of underutilization in the labor force. Since underemployment is typically more concentrated in rural areas (Tigges & Tootle, 1990), laborshed employment studies provide a methodology for estimating the labor force potential and its characteristics for mid-sized Iowa communities.

CHAPTER III.

RESEARCH METHODS AND DATA

Framework for the Research

Determining the appropriate approach for pursuing the laborshed study requires an understanding of current employment measures and methodologies. The BLS of the U.S. Department of Labor calculates employment statistics for the nation, while all state agencies compute their respective employment statistics individually. The methodology used by the BLS is such that employment data cannot be directly translated and applied at the state or sub-state levels. An abbreviated summary of the BLS estimating methodologies is included in Appendix A.[1] Both the BLS and states begin with the civilian population that is non-institutionalized and is 16 years of age or older. Data are gathered on the employed and unemployed, with an emphasis on identifying who is willing to work. The BLS does not provide measures for underemployment. Since national- and state-level labor data cannot be partitioned to the smaller geographic boundaries of a laborshed, a new methodology is necessary.

Figure 1 describes and defines the purpose and scope of this research project. This schematic diagram reflects the theoretical framework used in this research. It shows the factors that influence the potential available labor supply of a laborshed and the relationships among these factors. The first step in determining the potential available labor supply for the laborshed of a mid-sized Iowa community is to identify the

[1]Additional information can be obtained from the U.S. Department of Labor, BLS Handbook of Methods, 1997.

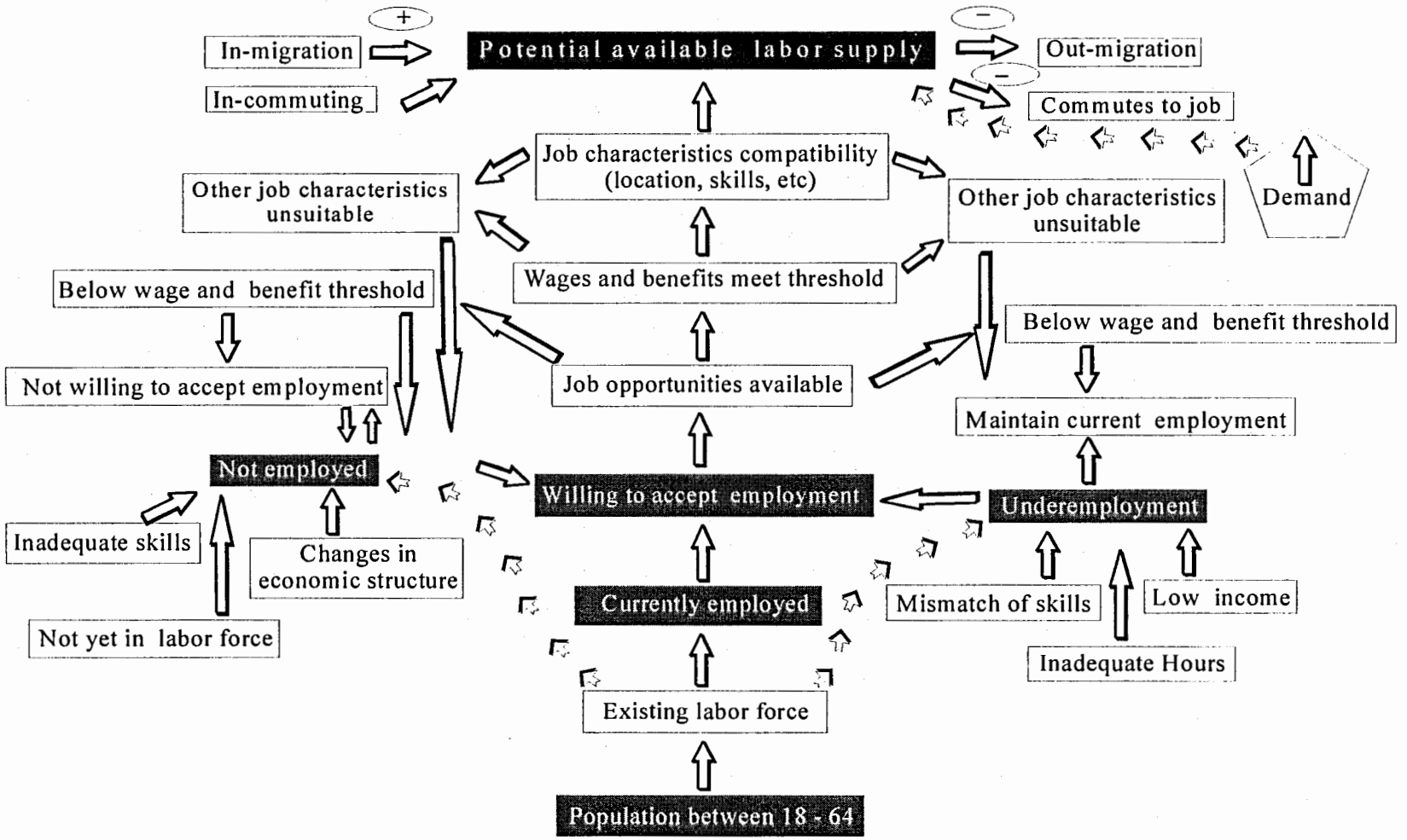

Figure 1. Schematic Diagram of the Comprehensive Factors that Influence the Potential Available Labor Supply of a Laborshed

population between the ages of 18 and 64. These age cohorts represent those with the greatest potential for being in the labor force and are the most frequent group sought by employers. The existing labor force is estimated from this population base. This research considers three categories of potential workers, including persons classified as (a) employed, (b) not employed, and (c) underemployed.

Workers or potential workers in each of the three employment categories make a sequence of decisions for either accepting or changing employment. Assuming that new jobs are available in the laborshed, decisions for accepting employment are based on the characteristics of the jobs (i.e., wages and benefits) at each level in the schematic. The primary purpose of this research is to estimate the number of potential workers interested in entering the labor force or changing employment. The research will endeavor to determine the characteristics of jobs that would be accepted and describe workers who would accept these jobs.

Similar diagrams illustrate the decision-making process for each of the three employment categories and are provided as Figures 2, 3, and 4 in Appendix B. For example, persons in the "not employed" category may choose not to be in the labor force because either economic conditions do not provide job opportunities or by personal choice. If persons not employed are willing to work, one must understand details of the potential job characteristics, including wages and benefits. In addition, the jobs will need to be within the desired commuting distance. While some of the underemployed will face employment decisions, this segment of the labor force is already employed at some level. These workers have the option of accepting new jobs that meet their wage and benefit

requirements. If new jobs do not meet wage and benefit expectations, underemployed persons can maintain their current employment.

Research Approach

This research uses a case study approach. A mid-sized Iowa community laborshed (nodal region or sub-nodal region) outside an urban center (LMA) was selected to serve as the pilot for this research project. In Iowa, there are several communities that range in population from 5,000 to 15,000 and lie outside the primary influence of an urban center. Some examples include Clarinda, Creston, Osceola, Knoxville, Pella, Fort Madison, Decorah, Spencer, Storm Lake, Denison, and Carroll. These communities are classified as second-order central places and function as the node for drawing a significant labor pool from a specific region, thus creating a laborshed. However, detailed labor force data are not readily available according to the boundaries of a specific laborshed. Counties are used almost exclusively as the basis for collecting demographic and labor force information. The challenge of this research is to develop a methodology to convert existing data into the laborshed boundaries or to obtain primary data based on the defined boundaries.

Knoxville and Pella were jointly selected as the primary pilot communities for this research project. These communities meet the size criteria (Knoxville with a population of 8,490 and Pella with a population of 9,712; Goudy & Burke, 1997), and they lie just outside the Des Moines MSA. Both communities were selected for designating a single laborshed due to their close proximity and similar size. Since Knoxville and Pella lie on the fringe of the Des Moines MSA (50 miles), Census Bureau and BLS data do not

provide a methodology for extracting labor data specific to them. Other sources of labor data, such as labor surveys from Iowa Workforce Development, maintain information at the county level. However, Knoxville-Pella has its own laborshed that overlaps the Des Moines LMA and also overlaps the sub-LMAs of Ottumwa and Newton as shown in Figure 5. Therefore, existing data sources do not provide an accurate description of the laborshed of Knoxville-Pella, nor do these sources provide a means of partitioning data to the sub-county level. The inadequacy of published data sources created the need to develop a new methodology for obtaining tailored labor data.

This selection was also heavily influenced by the lack of labor force data the local development groups have access to. Both local development groups agreed to serve as the catalyst for this pilot project and to provide funding for the random labor survey portion of this study which was conducted by the Center for Social and Behavioral Research (CSBR) at the University of Northern Iowa (UNI). It was anticipated that this study would generate an approach that would be transferable to other communities in Iowa that share similar size and locational characteristics.

A complete demographic and economic profile of Knoxville and Pella has been prepared as an integral part of this project (Community Assessment and Target Industry Analysis, Institute for Decision Making, 1996). The profile provided a basis for comparing Knoxville-Pella and its nodal region to other areas that may be studied in the future. Such a profile is helpful in understanding the relationship between the economic base of the area and its potential available labor force. Elements of the local economy

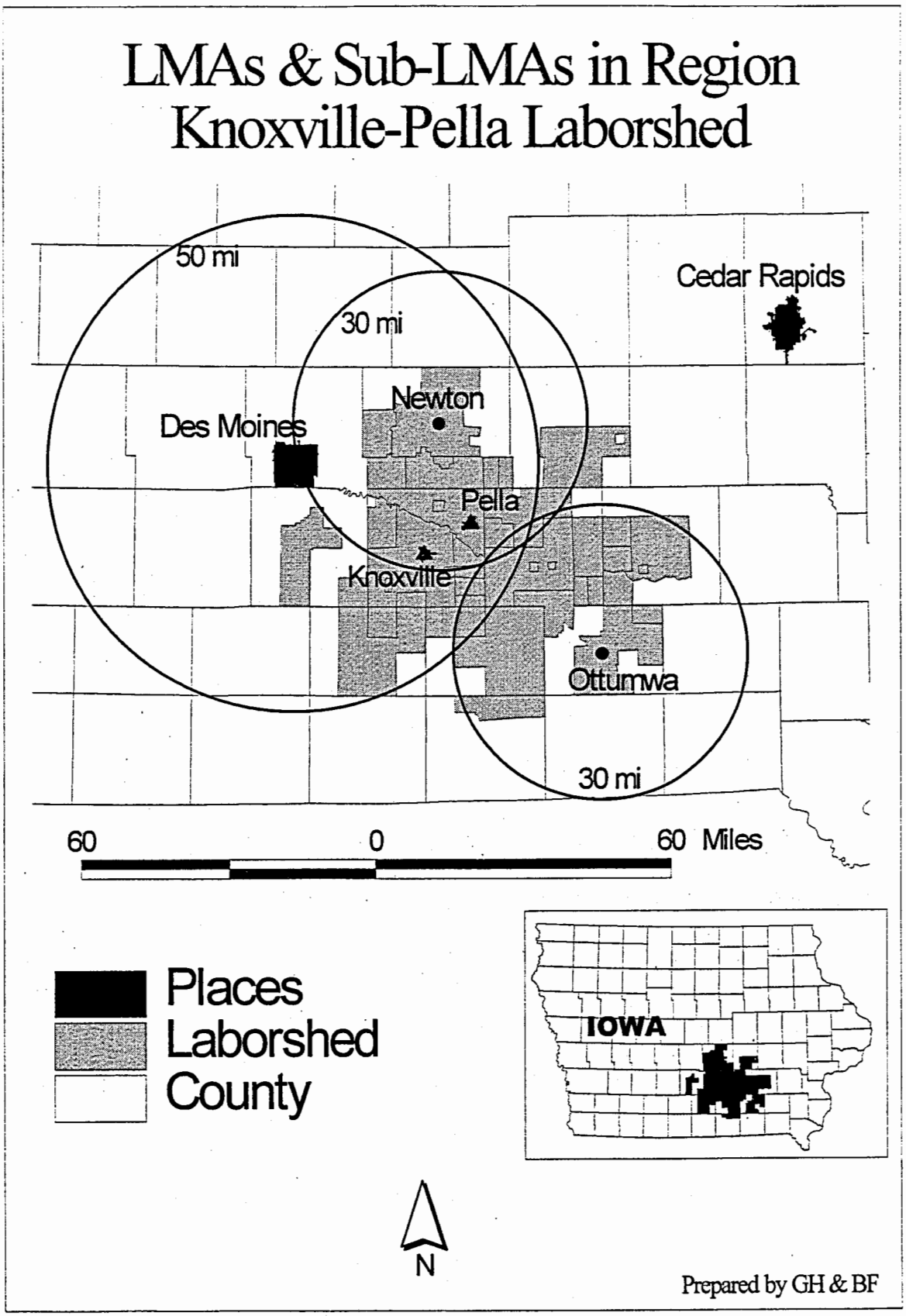

Figure 5: LMAs & Sub-LMAs in Region, Knoxville-Pella Laborshed

that were considered include characteristics of the population, age distribution by cohort groupings, the economic base of the laborshed and surrounding counties, and reported characteristics of the labor force such as wage or salary level, skill sets, occupational mix, educational level, and hours worked. Most of these data are at the county level due to limited availability of published data for smaller geographic units.

Survey Methodology and Data

In order to obtain current and accurate labor force information for the Knoxville-Pella laborshed, a random telephone survey was conducted. The survey was designed during the fall of 1997 with assistance from the Center for Social and Behavioral Research (CSBR), Dr. Janet Rives in the Department of Economics at UNI, and IDM staff. The survey format received Human Subjects Approval; a copy of this approval is included in Appendix C. The actual Knoxville-Pella survey instrument is included in Appendix D.

The first step in determining the potential available labor supply requires an understanding of the laborshed of the region. As explained earlier, a laborshed is defined as the area or nodal region from which a community (Knoxville and Pella) draws its commuting workers. Understanding the laborshed concept assists local development efforts by delineating geographic boundaries from which Knoxville and Pella are able to attract workers. This becomes the area over which the survey is carried out.

In order to determine the boundaries of the laborshed for Knoxville and Pella, the Knoxville Chamber of Commerce and the Pella Area Development Corporation provided a direct linkage to area employers for obtaining employee information. Specifically, all

Knoxville-Pella employers with more than 10 employees supplied local development officials with an actual number of all their employees by zip code. Employees were then aggregated into zip code categories and placed into a geographic display for analysis utilizing the mapping function of ArcView Geographic Information System (GIS) software. This GIS has been utilized to overlay the zip code data set, the county data set, and transportation routes. A map displaying employee frequency of the Knoxville-Pella laborshed is included as Figure 6.

The number of surveys conducted in each zip code was proportional, with equal numbers of surveys conducted in three separate zones as shown in Figure 7. Zone boundaries were delineated to maintain a relatively even population total among the zones. The three zones were delineated as (a) Knoxville-Pella and Marion County, (b) zip codes adjacent to Knoxville-Pella and Marion County with a frequency of between 176 and 1,056 employees commuting to jobs in Knoxville and Pella, and (c) the hinterland zip codes with a frequency of employees commuting to Knoxville and Pella ranging from 4 to 175. This proportional distribution of interviews among the zones ensured that responses were not clustered in Knoxville and Pella or in the surrounding rural areas. This survey distribution method also provided a basis for comparing the different zones.

Methodology for Estimating the Total Labor Force Potential

The sample target goal of the survey was to interview a total of 400 respondents who were between the ages of 18 and 64 and who were either employed or unemployed,

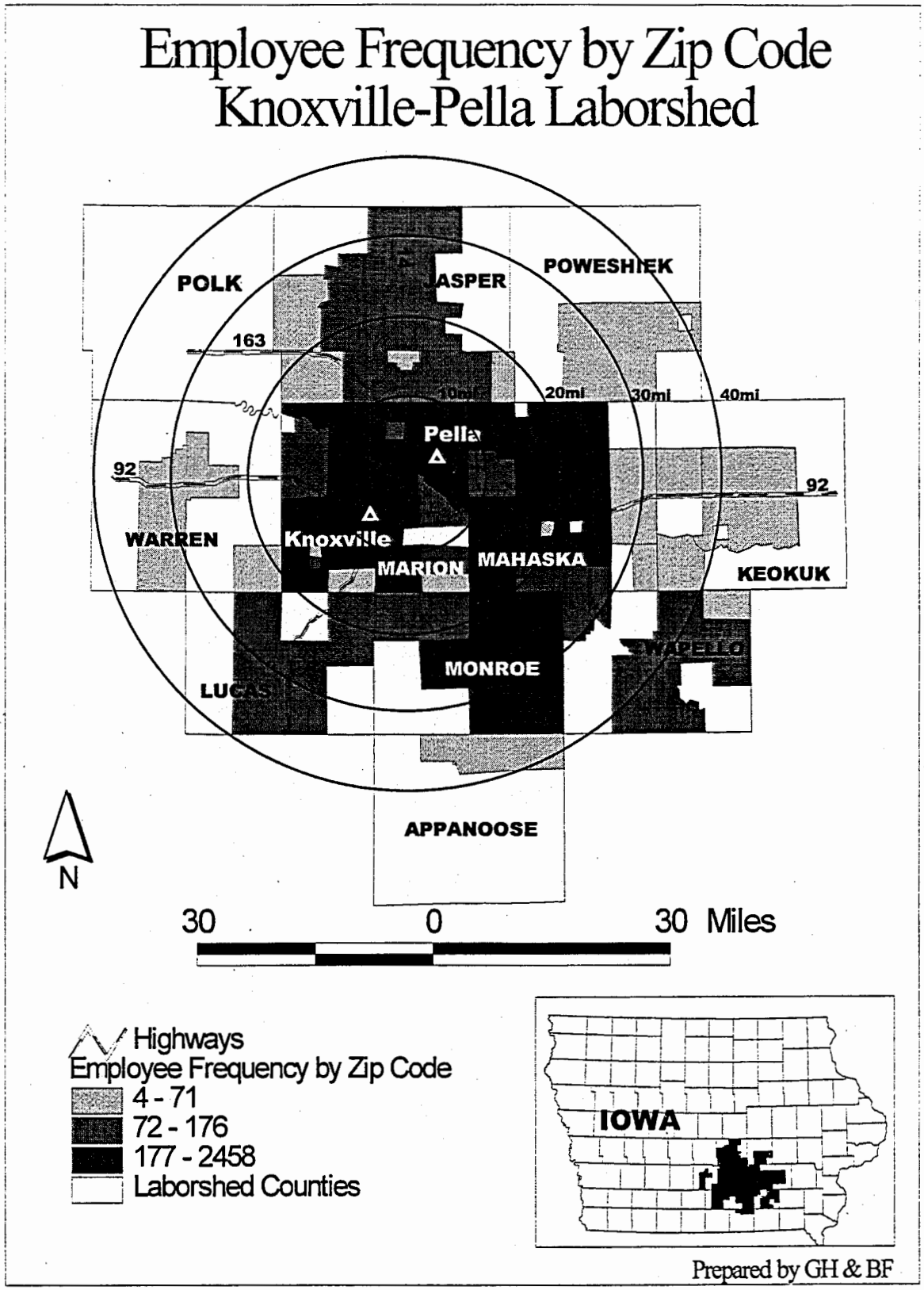

Figure 6: Employee Frequency by Zip Code, Knoxville-Pella Laborshed

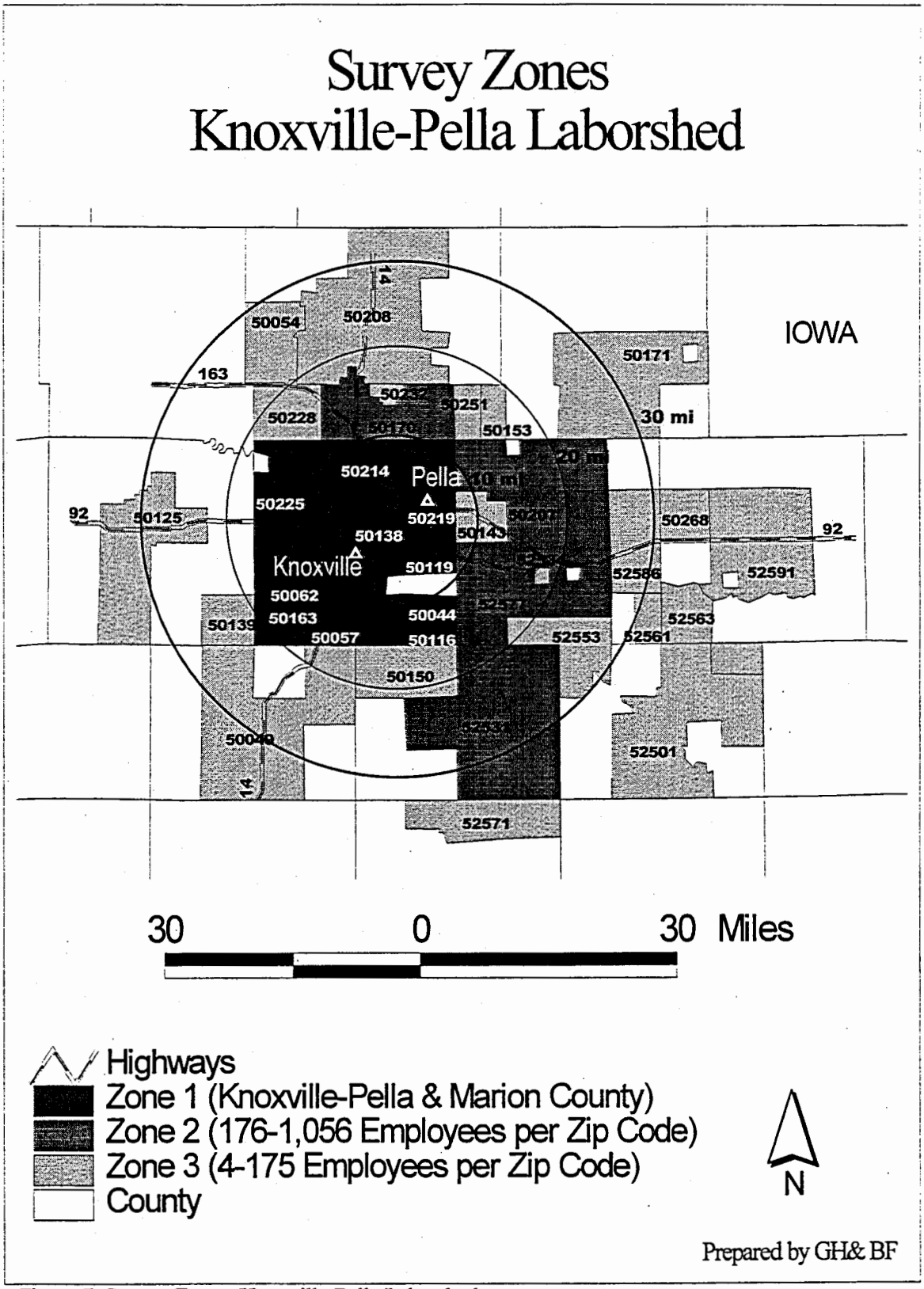

Figure 7: Survey Zones, Knoxville-Pella Laborshed

thus ensuring the results are statistically valid at a confidence level of plus or minus 5% as determined by the population size of the study area. A potential list of interviewees was obtained for each of the telephone prefix codes for all the zip codes in the laborshed. Telephone numbers were tested by a private company and inactive and business telephone numbers were excluded. This step reduced the actual number of calls that were necessary to achieve the desired number of surveys. Nearly 1,350 telephone calls were made to achieve 406 valid responses. These responses were proportional among the three zones. Randomness of the survey was met by selecting the person in the household with the most recent birthday as the interviewee. Information about one additional person within the household who fit the screening criteria was also obtained. This was accomplished by asking the interviewee to provide information about the person with the next most recent birthday. Data on an additional 282 persons was gathered through this method.

Telephone interviews were conducted from 9:30 a.m. to 8:30 p.m. Monday through Thursday, from 9:30 a.m. to 4:30 p.m. on Friday and from 2:00 p.m. to 8:30 p.m. on Sundays. The average interview length was from 10 to 15 minutes. Special training was provided to each of the interviewers prior to conducting the survey. Computer assisted telephone interview (CATI) software was used by the callers. Responses to the survey questions were recorded directly into the CATI program and later converted into a statistical package called the Statistical Package for the Social Sciences (SPSS) for analysis.

The survey instrument was designed to determine the respondent's current employment status as well as gender, age, education level, location of residence, location of employer, occupation, employer type, years of experience for current type of work, whether hourly, salaried, or self-employed, current salary or wage, any additional qualifications they possessed, how many different employers they had in the past 3 years, and if they worked part-time or full-time (see Appendix D). Respondents were also asked if they were willing to change employers or employment, how far they would be willing to travel to change employment, and what characteristics of this new employment were important. A change in employment could occur without changing employers and thus, both measures are important to consider in a laborshed study.

In order to estimate the impact of underemployment, interviewers asked part-time workers if they desired more work hours. Responses were also gathered for other skills the respondent possessed, their previous jobs, and the types of skills used in those jobs, in order to assess the level of underemployment due to a mismatch of skills. Those not employed were asked a series of questions to determine what job characteristics and benefits were most important for them in considering employment and how far they would be willing to travel to accept employment. The survey questions were developed based on the work of Clogg (1979), DeAnda (1994), Glass et al. (1996), and Hirschl (1996).

Results of the survey were analyzed to determine the relationships among variables within each zone and for the entire survey sample. Analytical methods utilized for this research relied primarily on crosstabulations among the set's variables using SPSS.

Crosstabs allowed for easy review of responses for each question contingent upon geography, gender, and other variables. Medians and means were also computed from the frequency tables for comparison and analysis. Since the number of actual surveys conducted in each zone was carefully monitored, geographic comparisons within the laborshed were also possible and provided new insights into the labor force. Such analysis is not possible utilizing published sources of employment and underemployment statistics. The next chapter of this report summarizes the actual findings of the laborshed survey.

CHAPTER IV.

RESEARCH RESULTS AND ANALYSIS

Estimating the Total Labor Force Potential

Prior to using survey results for the Knoxville-Pella laborshed, it was necessary to estimate the size of the potential labor force between the ages of 18 and 64 by survey zone and zip code. These steps are outlined in Figure 8. Numerous accessible U.S. Census Bureau, BLS, and Iowa Workforce Development publications and data sets were used to estimate the size and demographic details of the potential labor force of the Knoxville-Pella laborshed. Economic development groups rely on county-based labor data from the 1990 Census, the 1996 Census update, and Iowa Workforce Development's material. Because they are county-based, these data sets do not provide for the conversion of labor data into the actual laborshed of a community (or communities) delineated by zip codes.

In order to effectively estimate the size of the total potential labor force of the Knoxville-Pella laborshed, a data set was obtained from BLR Data, a private data vendor. This data set includes population, income, and other demographic data for the entire U.S. that is sortable by age cohorts and zip codes. Using BLR Data, population age cohorts for each zip code were compiled into a complete summary of the potential labor force between the ages of 18 and 64. This age range includes most of the active portion of the labor force that would be considered by employers. The cohort distributions identified by zip code are reproduced in Table 1.

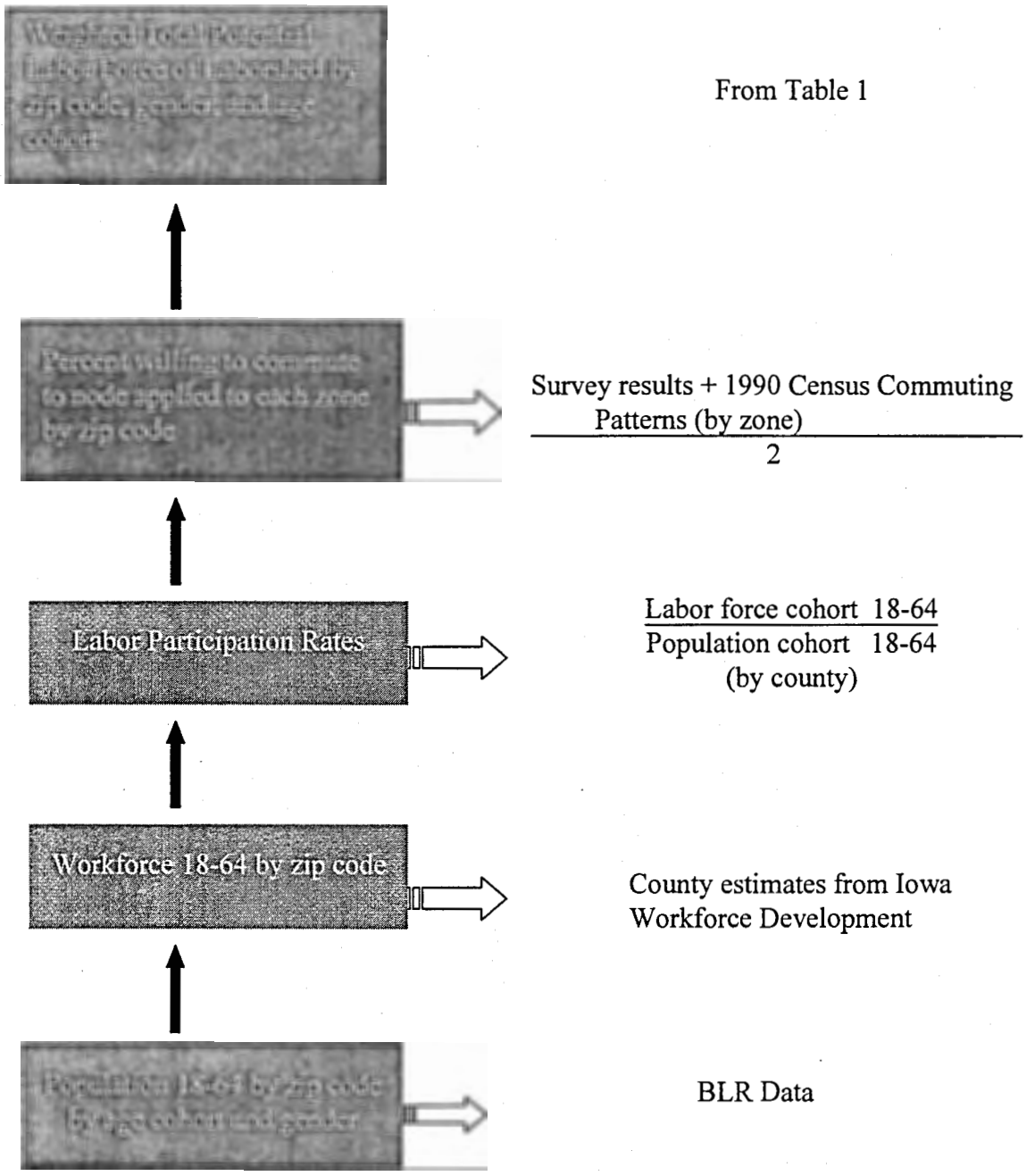

Figure 8. Steps for Estimating the Total Potential Labor Force of a Laborshed.

Table 1

Estimated Total Labor Force - Knoxville-Pella Laborshed

		Age 18-24			Age 25-34			Age 35-44			Age 45-54			Age 55-64			Total 18-64				Adj. LF	Wght LF	Adj. LF	Wght TLF	Adj. LF	Wght TLF
County	ZIP Code	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	LFC/PC	Total	Total	Male	Male	Female	Female
Zone 1																										
Marion County	50062	49	25	24	115	58	57	138	70	68	109	55	54	98	49	49	509	257	252	0.9321	474	371	239	188	235	184
Marion County	50116	6	3	3	13	6	7	16	8	8	20	10	10	12	6	6	67	33	34	0.9321	62	49	31	24	31	25
Marion County	50057	6	3	3	10	5	5	21	10	11	10	5	5	9	4	5	56	28	28	0.9321	52	41	26	20	26	20
Marion County	50138	630	327	303	1,446	751	695	1,847	960	887	1,544	802	742	1,192	619	573	6,659	3,461	3,198	0.9321	6,207	4,860	3,226	2,526	2,981	2,334
Marion County	50219	2,366	1,136	1,230	1,442	692	750	1,662	798	864	1,326	637	689	841	404	437	7,637	3,667	3,970	0.9321	7,118	5,574	3,418	2,677	3,700	2,897
Marion County	50119	38	19	19	74	37	37	108	54	54	103	51	52	63	31	32	386	192	194	0.9321	360	282	179	140	181	142
Marion County	50163	49	25	24	109	55	54	140	71	69	108	55	53	88	45	43	494	250	244	0.9321	460	361	233	182	227	178
Marion County	50214	25	13	12	98	53	45	113	61	52	103	55	48	71	38	33	410	220	190	0.9321	382	299	205	161	177	139
Marion County	50044	13	6	7	28	14	14	34	17	17	43	21	22	27	13	14	145	72	73	0.9321	135	106	67	53	68	53
Marion County	50225	170	84	86	334	165	169	451	223	228	458	226	232	225	111	114	1,638	810	828	0.9321	1,527	1,195	755	591	772	604
Total Zone 1		3,352	1,642	1,710	3,669	1,837	1,832	4,530	2,271	2,259	3,824	1,918	1,906	2,626	1,322	1,304	18,001	8,990	9,011		16,779	13,138	8,380	6,561	8,399	6,576
Zone 2																										
Jasper County	50170	181	92	89	352	179	173	474	241	233	369	188	181	265	135	130	1,641	834	807	0.8685	1,425	604	725	307	701	297
Monroe County	52531	421	198	223	779	367	412	974	459	515	726	342	384	637	300	337	3,537	1,666	1,871	0.8956	3,168	1,343	1,492	632	1,676	711
Mahaska County	50207	153	74	79	294	143	151	365	178	187	275	134	141	214	104	110	1,301	633	668	0.8452	1,100	466	535	227	565	239
Mahaska County	52577	1,420	686	734	1,826	883	943	2,210	1,068	1,142	1,582	765	817	1,179	570	609	8,217	3,972	4,245	0.8452	6,945	2,945	3,357	1,423	3,588	1,521
Total Zone 2		2,175	1,051	1,124	3,251	1,572	1,679	4,023	1,946	2,077	2,952	1,428	1,524	2,295	1,109	1,186	14,696	7,105	7,591		12,638	5,358	6,108	2,590	6,529	2,768
Zone 3																										
Lucas County	50049	464	218	246	808	379	429	913	429	484	867	407	460	723	339	384	3,775	1,772	2,003	0.7677	2,898	701	1,360	329	1,538	372
Jasper County	50054	289	144	145	599	299	300	635	317	318	494	247	247	365	182	183	2,382	1,191	1,191	0.8685	2,069	501	1,034	250	1,035	250
Warren County	50125	2,065	986	1,079	1,651	789	862	2,428	1,160	1,268	2,179	1,041	1,138	1,320	630	690	9,643	4,605	5,038	0.9013	8,691	2,103	4,151	1,005	4,540	1,099
Warren County	50139	37	18	19	85	42	43	92	45	47	125	61	64	54	26	28	393	192	201	0.9013	354	86	173	42	181	44
Mahaska County	50143	47	25	22	79	42	37	98	52	46	90	48	42	49	26	23	363	194	169	0.8452	307	74	164	40	143	34
Monroe County	50150	70	35	35	155	78	77	124	62	62	154	77	77	101	51	50	604	303	301	0.8956	541	131	271	66	269	65
Jasper County	50153	47	24	23	73	38	35	87	45	42	75	39	36	62	32	30	344	177	167	0.8685	299	72	154	37	145	35
Poweshiek County	50171	229	113	116	407	201	206	596	294	302	541	267	274	430	212	218	2,203	1,088	1,115	0.861	1,897	459	937	227	960	232
Jasper County	50208	1,395	673	722	2,648	1,277	1,371	3,159	1,524	1,635	2,533	1,222	1,311	2,207	1,065	1,142	11,942	5,761	6,181	0.8685	10,372	2,510	5,003	1,211	5,368	1,299
Jasper County	50228	62	30	32	157	76	81	192	93	99	137	67	70	107	52	55	655	318	337	0.8685	569	138	277	67	292	71
Jasper County	50232	22	12	10	37	20	17	46	25	21	46	25	21	34	18	16	185	99	86	0.8685	161	39	86	21	75	18
Jasper County	50251	67	33	34	154	75	79	147	72	75	140	68	72	120	59	61	628	307	321	0.8685	545	132	267	65	279	67
Keokuk County	50268	76	38	38	145	72	73	184	91	93	141	70	71	129	64	65	675	334	341	0.8077	545	132	269	65	276	67
Wapello County	52501	2,521	1,193	1,328	3,459	1,636	1,823	4,597	2,175	2,422	3,279	1,551	1,728	2,936	1,389	1,547	16,792	7,944	8,848	0.8546	14,350	3,473	6,789	1,643	7,561	1,830
Mahaska County	52534	118	58	60	227	112	115	292	144	148	259	127	132	158	78	80	1,054	518	536	0.8452	891	216	438	106	453	110
Mahaska County	52553	105	53	52	213	107	106	288	145	143	201	101	100	142	71	71	949	477	472	0.8452	802	194	403	98	399	97
Mahaska County	52561	52	26	26	140	69	71	188	93	95	102	51	51	93	46	47	575	285	290	0.8452	486	118	241	58	245	59
Keokuk County	52563	120	59	61	236	116	120	238	117	121	202	100	102	168	83	85	964	475	489	0.8077	779	188	384	93	395	96
Appanoose County	52571	81	40	41	132	65	67	188	92	96	170	84	86	125	61	64	696	319	354	0.8784	611	148	281	68	311	75
Mahaska County	52586	32	17	15	107	57	50	104	55	49	73	39	34	59	31	28	375	198	177	0.8452	317	77	168	41	149	36
Keokuk County	52591	170	80	90	425	200	225	431	203	228	380	179	201	313	148	165	1,719	810	909	0.8077	1,388	336	655	158	734	178
Total Zone 3		8,069	3,875	4,194	11,937	5,751	6,186	15,027	7,233	7,794	12,188	5,869	6,319	9,695	4,664	5,031	56,916	27,369	29,524		48,872	11,827	23,504	5,688	25,348	6,134
Totals		13,596	6,568	7,028	18,857	9,159	9,698	23,580	11,450	12,130	18,964	9,216	9,748	14,616	7,095	7,521	89,613	43,464	46,126		78,288	30,323	37,993	14,839	40,276	15,479

A number of adjustments are necessary to more accurately estimate the potential total labor force for the Knoxville-Pella laborshed. The first adjustment is to account for differences in the labor participation rates within each of the zones. This rate is achieved by dividing the labor force cohort between the ages of 18 and 64 by the population cohort between the ages of 18 and 64 (LFC/PC). The labor force cohort includes both the employed and the not employed who are looking for work. This is similar to the BLS labor force participation rate (LFPR), except that the LFPR includes the total civilian non-institutionalized population 16 and above. Since most employers are more concerned with the population between the ages of 18 and 64, cohort groups above age 64 were removed. It was necessary to estimate the size of the 16 to 17 year old cohort group participating in the labor force because county data are not available for ages of 18 to 64. Instead, labor force participation information at the county level is only recorded for the entire population above age 16. However, it was possible to subtract the labor force above 64 years of age by accessing 1990 Census Bureau information on labor participation by county. An estimate of these two population groups in the labor force is subtracted from the total labor force for each county. The LFC/PC is then calculated for each county and applied to each zip code within that county to adjust the potential total labor force size (indicated as Adj. LF in Table 1).

Harvey Siegelman (1998), Iowa's State Economist, estimates the statewide labor participation rate of those between the ages of 18 and 69 to be 87%. The ratios determined through the LFC/PC calculations are consistent with this estimate (ranging from 77% to 93%). As stated earlier, the LFC/PC varies from the traditional BLS

measure - the LFPR. The LFPR is the total labor force divided by the total population 16 years of age and above. Obviously, the LFPR is significantly lower (68% for Iowa) than the LFC/PC ratios utilized for this study. However, the LFC/PC provides a more accurate estimation of the potential total labor force for the laborshed.

The laborshed survey queried employed respondents about their willingness to accept new employment, asking if respondents were either very likely or somewhat likely to accept new employment opportunities and under what conditions. A similar question was posed to the currently not employed respondents about their willingness to accept employment and what the conditions would need to be for them to do so. The total population willing to accept new jobs was the combination of these two groups. This total was disaggregated by the three zones and zip codes.

Further adjustments are accomplished in Table 1 by calculating the centroid distances for each zip code in zones 2 and 3 to the centroid of the Knoxville-Pella employers using ArcView mapping software as previously shown in Figure 7. Since each of the respondents was asked to indicate the distance he or she would be willing to travel one-way for employment, the percentage of respondents meeting the distance specification was calculated for each zip code. Because the actual survey results obtained in some zip codes were small, the percentage of workers willing to commute to jobs was calculated for entire survey zones 2 and 3 rather than by individual zip codes. Based on this, 32% of the workers in zone 3 were found to be willing to travel the necessary distance for employment opportunities in Knoxville-Pella for jobs that met their wage and benefit requirements. For zone 2, the figure was 67%.

The size of the groups willing to travel the necessary distance is high when compared to the actual commuting patterns reported in the 1990 Census. There are four likely reasons why the survey data showed an increased willingness to commute. First, counties include a larger geographic area and thus greater commuting distances to the Knoxville-Pella centroid compared to zip codes used in the survey. Second, Census Bureau commuting patterns include only current jobs in the county and do not account for any potential level of interest in changing jobs. Third, 1990 Census Bureau commuting information is 8 years old, and significant job growth in Knoxville-Pella and Marion County is not accounted for. Finally, Census Bureau commuting data ignores those not employed who are willing to enter the labor force. Commuting patterns reported by survey respondents were also considerably lower than the percentage of those willing to commute, but higher than the 1990 Census commuting figures. However, discrepancies as large as 40% among county-to-county commuting patterns indicated the need to consider some form of discount to reduce these differences.

The actual commuting percentage of residents reported in the 1990 Census in zone 2 into the Knoxville-Pella area for employment was only 17.8%. Nearly 67% of survey respondents indicated they were willing to travel the necessary distance to accept jobs in Knoxville-Pella. Splitting the difference between the 17.8% and 67% resulted in a discounted estimate of commuting from zone 2 to be 42.4%. The results of this discounting methodology also reduced the potential commuting pull from zone 3 to 24.3%. These steps build a more realistic estimate of the workers and persons not employed willing to commute to Knoxville-Pella for new opportunities.

A slightly different process was used to estimate the percentage of commuting workers in zone 1. Census Bureau commuting numbers in 1990 for Marion County indicated that 83.5% of the labor force living in the county also worked in the county. Nearly 90% of the survey respondents indicated a willingness to travel the necessary distance to remain in zone 1 for employment. However, survey results indicated that employed persons residing in Knoxville-Pella and zone 1 had an actual commuting rate of only 66% (within the zone). Averaging the three percentages resulted in an estimated 79.8% of the potential labor force in zone 1 that would remain in this zone for employment. This additional averaging step was performed to account for the lower percentage of survey respondents actually remaining in zone 1 for employment and to avoid overestimating the potential labor force.

Percentages of workers from zones 1, 2, and 3 willing to accept jobs in zone 1 were then applied to Table 1 to further adjust the total potential labor force size (indicated as Wght. TLF in Table 1). It should be noted that the adjustment method utilized in this approach is arbitrary, but is expected to provide a more realistic estimate of commuting workers than otherwise would be available.

In review, the population of each zip code within the laborshed was adjusted according to the percentage of potential workers willing to travel to Knoxville and Pella and by the LFC/PC to estimate a weighted total labor force potential for each zip code. Zip code estimates were aggregated by survey zone within the laborshed and then summed to estimate a total potential labor force for the communities. Once again, the total potential labor force is detailed by zip code and zone in Table 1.

Gender also affects membership in the labor force. Gender distributions are enumerated in each zip code by age cohorts using 1997 population estimates from BLR Data. Each cohort grouping is factored by the LFC/PC and by the estimated percentage of the total potential labor force likely to become active in each laborshed employment study.

Combining these steps results in an estimated total labor force for the Knoxville-Pella laborshed with the random survey results applied to the following categories: (a) currently not employed who are willing to accept employment, (b) currently employed who are willing to change employment or employers (part-time and full-time employees), and (c) underemployed based on a mismatch of skills, low income, or inadequate hours worked.

Potential for Employing Those Currently Not Employed

The definition of not employed utilized in this study varies from the standard BLS definition of unemployed summarized in Appendix A. The not employed category includes all persons not currently employed whether or not they were seeking employment opportunities or not. Persons actually seeking employment but not currently working are categorized as unemployed in this study.

This study first tallied all persons currently not employed, whether or not they were currently seeking employment opportunities. Telephone surveys included further questions to determine what percentage of these respondents were willing to accept employment opportunities. Survey results showed that 34 of the 406 (9.1%) respondents indicated they were currently not working and were classified as not employed. Of the

nonemployed persons, 21 (62%), indicated that they were either "very likely" or "somewhat likely" to accept employment. Viewing those 21 persons as a percentage of the 406 survey respondents results in a more traditional unemployment rate of 5.2%.

Applying the adjusted 5.2% unemployment rate to the potential labor force indicates an estimated 1,577 persons not employed in the laborshed who would consider employment opportunities as summarized in Table 2. Of these respondents, 42.9% said they would be very likely and 57.1% said they would be somewhat likely to accept jobs, resulting in 676 persons very likely to enter the labor force. Slightly more than one-half of the persons not employed (52.4%) desired full-time jobs, while the other 47.6% preferred part-time opportunities.

Table 2.

Unemployment in the Knoxville-Pella Laborshed

	Total Not Employed	Accept Employment	% Total Labor Force	Estimated Accept Employment	Very Likely	Somewhat Likely
Zone 1	16	11	2.7	819	351	468
Zone 2	6	4	1.0	303	130	173
Zone 3	12	6	1.5	455	195	260
Total	34	21	5.2	1577	676	901
% Total	9.1	5.2				

Wage levels and employee benefits are important issues in determining the willingness of persons not employed to accept employment and were the variables most frequently identified in the survey. From the survey, 65% of those willing to change employment or employers indicated a willingness to accept employment at a range of

$6.99 per hour and below. At $8.99 per hour, the willingness to accept employment increases to 82.3%. Due to the clustering of the respondents to this question, a threshold wage of approximately $8.00 per hour can be projected to attract a majority of these potential workers into the labor force. Questions were also asked regarding the employee benefits that were important for accepting employment. The benefit considered the most important was health care insurance for respondents and their families. More than 80% of respondents stated that family health care benefits would be necessary for them to accept employment. Fewer than 33% of the respondents indicated that other benefits (dental, vision, life insurance, pension-retirement, paid vacation, and other) were as important for accepting employment.

One of the more interesting survey results of the not employed category was the high percentage of those willing to accept employment who were female (79.4%) while only 50% of the labor force is female. This large proportion of females currently earn below the average wage of $11.79 for Marion County (Iowa Department of Economic Development, 1998), and many of the potential workers (a group that itself constitutes a large proportion of women) would also accept employment below the average wage. When the number of willing to accept employment is adjusted by gender and extrapolated into the estimated total potential labor force, its nature changes significantly. The types of jobs that would attract this segment into the workforce should receive special consideration, and efforts should be made to expand the service sector.

The education and skill levels of the those not employed add further dimensions to understanding this segment of the labor force. Approximately 71% of the unemployed

reported at least a high school education. More importantly, one third of those not employed indicated some education beyond high school. However, this is a somewhat lower educational level than the laborshed average and may explain the higher unemployment percentages. In addition, the skill level of the not employed sector indicates a clustering in the technical, sales, and administrative support occupations. These occupations tend to have lower pay than Marion County's average wage.

In order to cross-check unemployment data from the survey sample, the interviewee was asked to provide information about a secondary person in the household. As with the primary respondent, the "second" person selected for the interview was the person with the next most recent birthday. Information on an additional 282 secondary persons was gathered with 24, or 8.5%, indicating they were not employed. From this group, 16, or 66.7%, indicated that they would be willing to accept employment opportunities. This adjustment reduces the estimated effective unemployment rate down to 5.7%, which is similar to the 5.2% in the sample of 406 primary respondents as displayed in Table 3.

Table 3.

Secondary Persons Not Employed

Survey Total	Number Not Employed	Percent Not Employed	Male	Female	Willing to Accept Employment	Percent of "Secondary" Total
282	24	8.5	33%	67%	66.7%	5.7%

Secondary persons not employed within the laborshed were spread evenly among all three zones. The gender of the secondary not employed segment is predominantly

female, but at a lower percent (67% compared to 79.4%) than in the primary sample. Another similarity of this "secondary" group is that the majority of people are between the ages of 25 and 49 and had previous experience in the technical, sales, and administrative support occupations, similar to the primary survey sample of 406 respondents.

Gathering information on a secondary person in the household was a useful technique to cross-check potential survey bias concerns. However, data collected on secondary persons did not change any research results. Thus, it was not necessary to include additional information on this segment in other sections of this study.

Overall, the not employed segment suggests a group with potential for entering the labor force if jobs were created in the $8.00 per hour range, with family health insurance benefits included. These jobs should obviously be targeted toward semi-skilled, technical, and service sector positions with an emphasis on types of companies typically employing a high percentage of women. In addition, a majority of the not employed segment prefer part-time job opportunities if available.

Willingness of the Currently Employed to Change Employment

Typically, a portion of the labor force within any region is considered flexible, dynamic, and willing to change employment under certain conditions. When considering this portion of the labor force, many factors must be taken into account, such as the type and characteristics of the job alternatives available, skills of those currently employed, wages and benefits of any new jobs, and distance willing to travel. Current literature does not suggest any standards applicable to Knoxville-Pella for estimating how many

workers are willing to change employment; but for this pilot project, the assumption is made that Knoxville-Pella may be typical of numerous other mid-sized Iowa communities. The results of this portion of the survey should be of interest to existing employers in the Knoxville-Pella laborshed and represent the greatest potential for identifying available workers for existing and new employers.

Within the Knoxville-Pella laborshed, 38.7% of those surveyed indicated they were either very likely or somewhat likely to change employers or employment. Of these respondents, 81.5% are full-time employees and 18.5% are part-time employees (currently working fewer than 35 hours per week). Those currently employed who would change employment are relatively evenly distributed among the zones, ranging from a high of 40.7% of respondents in each of zones 2 and 3, to 34.6% in zone 1. Table 4 presents these results and applies them to the weighted total labor force in each zone.

Table 4.

Currently Employed – Willing to Change Employment - Totals by Zone

	Willingness to change employment	Percent of zone willing to change	Weighted labor force by zone	Estimated total by zone	Very Likely	Somewhat Likely
Zone 1	47	34.6	13,138	4,546	1,227	3,319
Zone 2	55	40.7	5,358	2,181	589	1,592
Zone 3	55	40.7	11,827	4,814	1,300	3,514
Total	157		30,323	11,541	3,116	8,425

Respondents were asked if they were very likely or just somewhat likely to change employment. Table 4 shows that nearly three times as many employed respondents indicated that they were somewhat likely to change employment as those that

indicated that they were very likely to change (8,425 somewhat likely and 3,116 very likely). In other words, approximately 27% of the respondents who indicated a willingness to change employment reported being very likely to change whereas 73% were somewhat likely to change.

Nearly 57% of those very likely to change employment were females, encompassing an estimated 1,776 persons within the labor force; males totaled 1,340. Within the laborshed, females accounted for 50% of the labor force. The majority of those willing to change employment were between 35 and 49 years of age (38.9%). In addition, over 27% of those in the 25 to 34 age category indicated they were willing to change employment. In all, approximately 66% of those employed and likely to change employers were between the ages of 25 and 49, which represents the age cohorts most frequently requested by prospective and existing employers. Table 5 provides the details of each age category.

The education and skill levels of those willing to change employment are impressive. Nearly 95% of those willing to change employers or employment have at least a high school diploma and nearly 50% indicated they possess post high school education, technical training, or college degrees. These percentages are slightly higher than those represented by the total labor force in the Knoxville-Pella laborshed and estimates reported in the Marion County labor survey conducted by Iowa Department of Workforce Development (1997), indicating a relatively well-educated and well-trained

Table 5.

Currently Employed – Willing to Change Employment - By Age Cohort

Age	Percent and Percentage	Yes, very likely	Yes, somewhat likely	Total
18-24	Count	9	18	27
	%	20.9	15.8	17.2
25-34	Count	11	32	43
	%	25.6	28.1	27.4
35-49	Count	15	46	61
	%	34.9	40.4	38.9
50-64	Count	8	18	26
	%	18.6	15.8	16.6
Total	Count	43	114	157
	%	100.0	100.0	100.0

potential source of available workers. Further, 99% of those willing to change employment said they would be willing to learn new skills.

The survey indicates that 70.1% of the employed respondents were wage employees, compared to 24.2% salaried and 5.7% self-employed. These percentages are consistent with the economic base of the Knoxville-Pella area. Table 6 shows this distribution of wage and salaried workers.

In order to gain a more realistic picture of employed persons who were willing to change employment or employers, distributions of these employees by occupation and skill sets were analyzed. The majority of those willing to change employers or employment were wage employees. The distribution of occupations of the respondents is spread among the occupational categories, but the highest concentrations occurred in the managerial and professional specialty occupations category; the technical, sales, and administrative support occupations category; and the operators, fabricators, and laborers

Table 6.

Currently Employed – Willing to Change Employment - Percent Hourly/Salaried/Self Employed

Employment Type	Count and Percentage	Yes, very likely	Yes, somewhat likely	Total
Hourly	Count	32	78	110
	%	74.4%	68.4%	70.1%
Salaried	Count	8	30	38
	%	18.6%	26.3%	24.2%
Self	Count	3	6	9
	%	7.0%	5.3%	5.7%
Total	Count	43	114	157
	%	100.0%	100.0%	100.0%

category (76.4% of respondents). Applying the survey percentages to the potential number of persons in the laborshed resulted in nearly 3,000 available employees in these three occupational categories. These results are detailed in Table 7.

In addition to identifying those willing to change employment by current occupation, the survey results provided data regarding the "other qualifications" detailed by survey respondents. Keep in mind that most of the respondents to this question were hourly employees (70.1%). The skill sets most frequently mentioned by those willing to change employers or employment are outlined in Table 8.

Skill sets or other qualifications of those willing to accept employment indicate some clustering in a few occupations. Results presented in Table 8 show that there may be some mismatch of skills within the existing labor force. Of the 111 respondents who claimed they had other qualifications, 67 indicated their skills were in the managerial and

Table 7.

Currently Employed – Willing to Change Employment - By Occupation

Occupation	Count and Percentage	Yes, Very Likely	Yes, Somewhat Likely	Total Survey Results	Potential Total in Laborshed
Managerial & Professional Specialty Occupations	Count %	11 25.6%	28 24.6%	39 24.8%	2,862
Technical, Sales, & Administrative Support Occupations	Count %	12 27.9%	30 26.3%	42 26.8%	3,093
Service Occupations	Count %	4 9.3%	12 10.5%	16 10.2%	1,177
Precision Production, Craft, & Repair Occupations	Count %	5 11.6%	16 14.0%	21 13.4%	1,547
Operators, Fabricators, & Laborers	Count %	11 25.6%	28 24.6%	39 24.8%	2,862
Total	Count %	43 100.0%	114 100.0%	157 100.0%	11,541

Table 8.

Currently Employed – Willing to Change Employment - "Other Qualifications"*

	Primary Other Qualifications	Percent	Secondary Other Qualifications	Percent
Managerial & Professional Specialty Occupations	31	19.8	10	6.4
Technical, Sales, and Administrative Support Occupations	36	22.9	12	7.6
Service Occupations	15	9.6	5	3.2
Farming, Forestry, and Fishing Occupations	6	3.8	0	0
Precision Production, Craft, and Repair Occupations	12	7.6	4	2.5
Operators, Fabricators, and Laborers	11	7.0	5	3.2
Sub-total	111	70.7	36	22.9
No Response	46	29.3	121	77.1
Total	157	100.0	157	100.0

Note. *Other qualifications are additional skills that the person has but is not using in his/her current job.

professional specialty occupations, and the technical, sales, and administrative support occupations and that these skills were not being used. The potential mismatch of skills will be examined in the underemployment section of this report. Table 8 suggests that those willing to change employers or employment have a variety of skills, and there were potentially available workers with skills in all of the occupational classifications. Almost 70% of the persons in this group were in the 25 to 49 age group.

Respondents were also asked about the employment factors most important to them in considering a change in employment or employers. As in the case with those not employed, the most important factors of the potential new jobs were wage or salary and family health insurance benefits. Also somewhat important was paid vacation time. Table 9 shows the minimum hourly wage needed for hourly workers to accept new employment as well as the minimum annual salary needed for salaried employees to accept new employment.

Table 9.

Currently Employed - Minimum Wage or Salary Needed to Change Employment

Minimum Hourly Wage	Number of Responses		Minimum Annual Salary	Number of Responses
4.75-5.99	14		15,000-20,000	8
6.00-6.99	15		20,001-25,000	10
7.00-7.99	13		25,001-30,000	11
8.00-8.99	16		30,001-35,000	5
9.00-9.99	9		35,001-40,000	2
10.00-11.99	21		40,001 or more	4
12.00-14.99	12			
15.00 or more	10			
Total	110		Total	40

Hourly employees who were willing to change employment currently earned an average wage of $9.14 per hour. Fifty-eight persons, or 52.7% of the hourly employees, would accept a wage below $9 per hour, and 80% would accept jobs below $12 per hour. Slightly more than 9% (10 out of 110) responded that they would need $15 per hour or more to change employment. Determining an exact threshold of where the majority of workers will accept employment is difficult. Therefore, it is more accurate to segment this group according to the percentages outlined above.

The salaried employees who were willing to change employment reported an annual average salary of nearly $27,000. The majority of these people (72.5%) responded that they would accept new employment at $30,000 or less per year. Seven people (17.5%) would require an annual salary of $30,000-40,000, and the remaining 10% would need over $40,000 to change employment. These results suggest that higher salaries were not a major factor for the majority of salaried employees who would consider a change in employers or employment.

The survey results of those willing to change employment indicated a strong likelihood that new employers in the area would have success in finding adequate workers if they offered jobs paying at least $12 per hour for wage earners and $25,000-30,000 per year for salary workers, and if family health insurance benefits and options for paid vacation were included.

Estimating Underemployment

Although underemployment has only recently become a topic addressed in popular press, it has been a concern of economists for a much longer time. While there is not one

widely accepted definition of underemployment, four types of underemployment seem generally recognized (Clogg, 1979; DeAnda, 1994; Glass et al., 1996; Hirschl, 1996). The first type of underemployment is defined as individuals working less than 35 hours a week, but who want to work longer. This group is considered underemployed by inadequate hours worked. A second type is caused by a mismatch of skills. Workers are denoted as "mismatched" if their completed years of education are above the number needed for their current occupational group or if they have significant technical skills beyond those currently being utilized. A third type of underemployment is defined as individuals working full-time but at insufficient wages (usually defined as below the poverty level).

Some economists identify a fourth type of underemployment consisting of discouraged workers. These persons are out of work but refuse to seek work because of their discouragement in job seeking. This segment is also classified as not working. Including discouraged workers as underemployed and not working results in double counting of some respondents. This category has therefore been dismissed from this study.

Inadequate Hours Worked

In order to assess the impact of underemployment in the Knoxville-Pella laborshed, numbers of employed persons working 35 hours or less were tabulated. The Bureau of Labor Statistics (BLS) considers these persons part-time employees. From the survey responses, 59 persons indicated that they worked 35 hours or less. This represents 14.5% of the laborshed. Of the 59 persons working part-time, 19 desired more hours or full-time

employment. Applying these responses to the overall laborshed indicated that 4.7% of persons in the laborshed considered their employment to be inadequate in hours worked, as shown in Table 10. Nearly 80% of this group resides in zones 2 and 3.

Table 10.

Underemployment by Inadequate Hours Worked

Total Sample	Part-time Workers	Percentage of Total	Desire More Hours	Percent of Part-time	Percent Underemployed Low Hours
406	59	14.5%	19	32.2%	4.7%

It is important to review the characteristics of underemployed workers. Within the Knoxville-Pella laborshed, most of the underemployed by inadequate hours worked were in the occupational category of technical, sales, and administrative support, were female, and were between the ages of 18 and 49. This group had an overall education level below the county average. Overall this group of part-time workers indicated only limited interest in changing employers (25%), suggesting that they simply desire more hours with their current employer.

Skills Mismatch

In order to estimate underemployment due to a mismatch of skills, the survey asked respondents to identify additional skills or training that were not being utilized in their current jobs. The occupational categories with the most frequent responses were technical, sales, and administrative support (22.9%), and managerial and professional specialty (19.8%). Traditional manufacturing occupational classifications of precision production and operators, fabricators, and laborers were a combined 14.6% of the other

skills identified by the respondents. Overall, 27.3% of survey respondents indicated they possessed skills not utilized in their current job.

Combining each of the other qualifications recorded in the survey into an overall estimate of mismatched skills is difficult. The literature on mismatched skills indicates that most workers consider themselves underemployed to some degree. However, the total number of respondents who indicated additional skills did not detail what level of underemployment by mismatch of skills was occurring. In order to validate underemployment by mismatch of skills, the education level of the part-time workers was considered. Since 93.6% of the sample had at least a high school degree and 17.7% had college degrees, the educational level of this laborshed was above average compared to similar sized communities.

Combining the responses to the other qualifications and educational level questions indicated that the highest percentage of underemployment by mismatch of skills was occurring in the managerial and professional specialty, and technical, sales, and administrative support occupations. Survey respondents falling into the second of these occupational categories were primarily female and between the ages of 18 and 49. The total percentage of underemployment by mismatch of skills was difficult to estimate without a case by case examination. However, based on previous studies and drawing on the results of cross tabulating individual responses, especially the additional skills listed by the employed compared to their current employment, it was estimated that the underemployment rate by mismatch of skills was approximately 5%.

Low Income

Measuring underemployment by low income was accomplished by determining how many households fall below the poverty level. Within the literature, the poverty level was generally accepted as the threshold level for measuring underemployment by low income. Since the survey did not ascertain the number of persons per household for multiple response queries, only the 83 single households can be used to estimate underemployment by low income. Only one of the persons interviewed was below the poverty level in the survey sample. Overall, the average wages and salaries were at or above other counties in the laborshed. Therefore, underemployment due to low income appeared to be negligible (.1%).

Estimated Total Underemployment

Combining all four measures of underemployment would result in an estimated underemployment rate of 9.8% in the laborshed as indicated in Table 11. However, some of these persons may be counted in multiple categories, thus underemployment can only be considered within each subcategory classifying and estimating worker availability. Underemployment estimates and the categories of potential underemployment within the labor force are not as easily identified as the other sectors. In each case, estimates have relied on the survey responses to each of the survey questions and accuracy is tied directly to these responses. Available demographic data has been utilized to validate these responses and maintain accuracy in the results.

Table 11.

Total Estimated Underemployment

Percent Underemployed by Low Hours	Percent Underemployed by Mismatched Skills	Percent Underemployed by Low Income	Total Underemployment
4.7%	5.0%	.1%	9.8%

Summary

The survey results of the Knoxville-Pella laborshed indicated that the potential labor availability was considerably higher than might be assumed with the low unemployment statistics suggested by the national and state data. The labor force potentially available consisted primarily of current workers eager to shift jobs and nonworkers willing to enter the labor force under the "right" conditions. Whether or not this potential labor force would actually move to new employment opportunities or enter the labor force would depend upon the characteristics of the jobs offered. Through the laborshed survey, estimates were derived regarding what the threshold of these characteristics would need to be regarding wages, benefits, and travel distance in multiple categories. This study provided descriptions of these characteristics that can be given to existing employers and potential new employers to support their expansion plans. However, the actual quality of potential employees was unknown.

This study provided an analysis of three separate pools of potential employees that companies can consider. The most significant pool of employees consisted of those already employed but willing to change employment or employers. Some concerns have been expressed that identifying this sector would lead to "job hopping" to seek better

wages. Admittedly, during times of low unemployment more workers would seek better conditions and the company losing the worker would have an immediate economic cost created by the need to replace the worker. However, there would be an immediate economic gain for the community since this person's income would go up. Over the longer run, there would probably be an economic gain to all parties since a new person would enter the job market to fill the vacant position as the overall labor force grows. However, this analysis cannot prove the exact number of potential workers that might apply for specific employment opportunities.

Briefly reviewing each of the three employment categories provided a snapshot of the laborshed characteristics. Within the category of those currently employed but willing to accept new employment, 37.8% indicated they were likely to change employers or employment. Approximately 27% of those willing to change employment indicated they were very likely to change, whereas the remaining 73% were somewhat likely to change. Applying the survey results to the Knoxville-Pella laborshed resulted in an estimated 3,116 persons very likely to change employment, and 8,425 persons somewhat likely to change. Almost 95% of those willing to change employment had at least a high school diploma and nearly 50% possessed post high school education, technical training, or college degrees. Employers should have success in attracting these workers if they offer jobs in the $12 per hour range with family health insurance benefits and options for paid vacation.

Within the not employed category the results were significantly different. While the survey results estimate that 1,577 persons were currently not working, only 676

persons (42.9%) were very likely to accept employment. More than 79% of this group were females. Most of this classification (80%) had previous employment experience, but their education and training skill levels were below the county average. If additional jobs were created in the $8.00 per hour range with family health insurance benefits, and these jobs were tailored for female employees, prospective employers would have a potential pool of 500 applicants, depending on the other characteristics of the job.

The underemployed sector of the potential available labor force was difficult to estimate. It was also difficult to determine their future impact on prospective employers. Two of the most reliable methods for estimating this impact were to consider part-time workers who desire full-time employment and current workers who had a mismatch of skills in their current employment. Discouraged workers probably do not represent a potential for entering the labor force since they indicated in the survey that they were unlikely to accept employment. This group has therefore been categorized as not employed and not included in the aggregated underemployment estimate. Even when the most conservative estimates of the three categories were considered, approximately 9.8% of the laborshed can be classified as underemployed. Once again, some of these persons may be included in two or more underemployment categories, but the aggregated estimate provided a snapshot of the underemployment occurring in the laborshed.

Overall, the study estimated that nearly 3,800 potential employees within the Knoxville-Pella laborshed were available for and very interested in new employment opportunities. These estimates provided local development groups with significant

documentation that workers will be available for the types of jobs characterized in this study.

CHAPTER V.

EVALUATION OF THE SURVEY APPROACH AND INSTRUMENT

Survey Approach

Conducting a labor survey according to the boundaries of a laborshed provided an appropriate scale for this project. The laborshed concept offered a realistic estimate of the potential available labor force and identified some of its important characteristics for Knoxville and Pella. Population and demographic data sets, such as BLR Data and CACI, provided 1997 Census Bureau population estimates at the zip code level supporting the laborshed approach. In order to pursue economic development at the local level, it is critical to have labor force information that is accurate, up-to-date, and tailored to specific communities or groups of communities. The laborshed approach appears to have enormous potential for conducting further labor studies for communities in Iowa and beyond. One of the most important benefits of this approach is the ability to designate the actual geographic area from which the community draws its labor as the area of study. In some cases a laborshed will cross one or more state's boundaries. With each state reporting its labor information in different formats with distinct geographic delineations, using existing data sets is difficult, if not impossible.

One significant limitation of the laborshed approach is the difficulty of applying county labor data to laborsheds. Since the laborshed concept does not follow county boundaries, it is necessary to gather primary labor data on each laborshed. While primary data is preferred over secondary data, resource limitations of labor force service providers

and community economic development groups constrain the number of communities that can pursue the laborshed concept.

Conducting a random telephone survey within the geographic boundaries of the laborshed and using the survey results to estimate the total labor force potential of the laborshed is an appropriate way to obtain the needed data. A significant benefit of conducting the surveys proportionally within the three zones is the potential to make detailed comparisons between the zones. Future laborshed studies should use similar zones; however, care must be taken when creating the zones. Zone 1 in this research project included nearly all of Marion County; a more appropriate delineation may have been to designate zone 1 as just the cities of Knoxville and Pella. Zones should also be designed to have roughly equal population size. For example, zones 2 and 3 include significantly more area than zone 1, but population totals are significantly higher in zone 3 due to the presence of one larger community. Maintaining population consistency among zones may be difficult if the geographic area of the laborshed is expansive and includes other second-order central places. Another option is to statistically adjust the survey results according to the population of each zone.

When a survey is limited by a given aggregate size and partitioned into smaller units (zones), accuracy is reduced. While the overall survey produced 406 valid responses, only 135 or 136 responses were available for each survey zone. This limited number of surveys will not meet the tests for validity at the plus or minus 5% level and will actually be closer to plus or minus 10% reliability. Even with the somewhat reduced reliability of using smaller numbers of responses by zone, the advantage of having

detailed data at zone and zip code levels produces extensive benefits for labor force analysis at the laborshed level.

For the laborshed pilot study, the random telephone survey was conducted by UNI's Center for Social and Behavioral Research (CSBR). The expertise and oversight of the CSBR was critical for this initial pilot study. However, due to its current workload and staffing limitations, the CSBR cannot pursue multiple surveys within the desired timeline. An alternative would be to consider contracting with a professional telemarketing organization equipped with computer assisted telephone interview (CATI) capabilities. Contracting for these services would produce some risk in quality control, but would significantly enhance the volume of surveys that can be conducted in a timely manner. Cost factors are likely to be comparable according to some preliminary investigations with telemarketing companies.

Another alternative is to consider conducting a mail survey. Mail surveys are typically less expensive, but there are significant trade-offs to consider. For example, controlling the number of surveys returned by zones will be difficult because there is no way of knowing who will actually complete and return the survey. Randomness was maintained in the telephone survey by asking for the person in the household with the most recent birthday. In a mail survey, there is a greater risk of gender, age, and geographic bias. Purchasing lists with balanced demographics and even geographic distributions can mitigate some of these concerns. Sending a proportional number of surveys into each zip code according to actual commuting patterns in the laborshed would also enhance survey distribution. Offering incentives for respondents to complete the

survey could increase the percentage of returns. Even with these concerns, the mail survey option is an alternative worthy of consideration in any subsequent laborshed studies.

Recent technological advances by survey companies offer another option to consider. Several companies now provide touch-tone telephone responses to mail surveys. The initial stages of this approach are similar to mail surveys (e.g., purchasing pre-qualified lists, mailings, and providing incentives for completing the instrument). Respondents are provided a long-distance calling card with additional free minutes that are activated when the caller answers the survey questions using a touch-tone telephone. The advantage of this approach is that the data entry process is automated. As the respondents reply, data entry occurs directly from the telephone into a computer database and can be easily exported into statistical programs such as SPSS. This approach also allows the survey data entry process to be closed when the desired number of surveys has been completed. Costs for this approach are less than a random telephone survey but greater than a mail survey.

Survey Instrument

Analysis of the survey responses indicates the need to revise some survey questions, add questions, and remove unnecessary questions. The most significant revisions need to occur in the area of estimating underemployment. Two specific components of underemployment were especially difficult to estimate and indicate the need for further queries in the survey. These categories are underemployment by mismatch of skills and underemployment by low income.

Estimating underemployment related to mismatched skills was difficult based on the survey results. Question 5D, which queried respondents regarding their additional skills, appears to have been too general. The survey instrument asked respondents if they had additional professional or technical skills, based on previous experience, education, or training, in addition to the skills they were currently using in their job. Respondents were allowed to identify both primary and secondary skills. Responses were tabulated to show an overall percentage of respondents who felt they had additional skills not being utilized; filtering the responses indicated specific characteristics of the respondents who had indicated they possessed additional skills. While this question did serve as an indicator of additional skills possessed by the labor force, it did not provide a suitable methodology for estimating underemployment by mismatch of skills. The only accurate method of estimating underemployment via these responses is to review each response individually and compare the respondents' other skills to their current occupation.

An alternative approach would be to change the nature of this question and measures for this category of underemployment. First, the respondent should be asked if they think they are qualified for a better paying job. If the response is yes, the following five options would be provided for them to explain why they are qualified for a better job.

1. The respondent held a previous job that required more skill and/or education.
2. The respondent had additional job training and/or education.
3. The respondent's current job does not require current training and/or education.
4. The respondent had a previous job earning higher wages or salary.
5. Other (please explain).

More accurate estimates of underemployment by mismatch of skills could then be provided through these responses. For example, a respondent may indicate that he or she is qualified for a better or different job, but a previous job was similar in nature to the present job. This respondent would not be classified as underemployed by a mismatch of skills. The purpose for this type of analysis is to confirm that the respondent is actually underemployed. Glass et al. (1996) effectively utilized this approach in their report, The Effective Labor Force in Kansas.

Underemployment by low income was difficult to estimate in this pilot study since family income data were not gathered. The only indication of underemployment by low income that could be measured by the survey was for single person household responses. These respondents represent the household; thus their income is the household income. Since only one single person respondent was below the poverty level, this type of underemployment was reported as negligible. The only income data that were gathered during the survey were specifically related to the respondent, not the family. Questions related to family income were not asked in the pilot survey. Any subsequent surveys should ask for family income early in the survey. Underemployment by low income could then be measured by the percentage of families and individuals who are below the poverty level or at some other predetermined income level.

Inadequate hours worked is another category of underemployment that needs some adjustment. The pilot survey asked respondents who indicated they worked part-time (fewer than 35 hours) if they desired more hours. A better way of making this query is to

determine if the respondent desired more hours, but wanted to remain part-time, or if they desired full-time employment. This clarification would provide further information about this underemployment category.

In addition to including refined questions to better estimate underemployment, some survey questions need revision. In some cases, respondents were confused when asked to identify their employer type. Specifically, questions 5B and 5C should be reversed. Respondents had no difficulty describing their primary occupation (5C), but they had to be given examples of types of employers (5B) before they could effectively respond. Some of the interviewers had to return to question 5B to make corrections after the respondents described their occupation. Changing the sequence of these questions could result in better responses.

Another change in the sequence of questions is needed for the question concerning the respondent's town of residence. This question should be asked earlier in the survey, just after questions about their employer. This order change will provide a better sequence for determining actual commuting patterns of the respondents.

Other problems related to occupational classifications became apparent in the analysis of the survey data. Occupational categories used in this pilot project were obtained from the U.S. Department of Labor, BLS Occupational Employment Statistics (OES, 1997). The OES provides a classification for all employed persons according to job tasks and groups of occupations within nine primary categories. These categories are included in Appendix E. Some of the occupational groupings, as readjusted by the CSBR for the computer-assisted survey data entry, may be inappropriate and should be revised

for further labor surveys. For example, managerial and professional specialty occupations do not appear to be appropriate for grouping occupations. Professional specialty occupations are actually technical occupations such as engineering technicians, legal assistants, computer programmers, and other job titles outlined in Appendix E. This category does not seem to fit with managerial occupations. Administrative and executive categories actually fit better with managerial as one category. The categories provided in the OES are aggregated at the appropriate level and additional aggregation of these categories results in awkward combinations. This has the potential of skewing findings.

Several questions can be deleted from the survey. One (5R) asked what would influence the respondent to move to a new community. The information generated by this question was of limited benefit in evaluating the laborshed. If urban laborshed studies are conducted, this question may be valid. However, the laborsheds related to second-order central places, communities of 5,000 to 15,000 in population, are too small in area to justify this question. This question did not seem to fit in the study, but was added at the request of the pilot communities.

The second question that could be removed relates to queries of those not employed but willing to be trained in new skills. Almost all respondents indicated a willingness to be trained for new employment opportunities. An alternative could be asking respondents specifically which skill areas they would like to be trained in. Questions related to existing skill sets are appropriate and should be maintained.

The survey instrument also provided for data to be gathered on a second person in the household. While the results of the data resulting from other persons appear very

consistent with the randomly selected persons, questions arise about the randomness of the responses. This may affect the ability to evaluate its statistical significance. More importantly, these data and their analysis did not contribute to the estimated potential available labor force in the pilot study. However, some limited questions should still be asked of the other person(s) in the household. For example, some general questions regarding commuting distance, age, and gender could help build the laborshed profile at the zone and zip code level. Other questions related to another person in the household could be removed without diminishing survey results and would actually lower overall survey costs.

CHAPTER VI.

CONCLUSIONS AND IMPLICATIONS FOR PUBLIC POLICY AND ECONOMIC DEVELOPMENT

Appropriate Use of Labor Data

Many local government leaders and economic development professionals have become accustomed to using low unemployment rates to tout the success of local development efforts. This study demonstrates that unemployment rates are simply one economic indicator and do not necessarily reflect the potential available labor force. The potential available labor supply is actually represented by combining the employed persons willing to change employment and underemployed persons with the not employed persons willing to enter the labor force. Furthermore, labor force statistics are not currently available for a community's actual laborshed. Local leaders must recognize the potential misrepresentation of the local economy if too much emphasis is placed on unemployment rates as a measure of economic performance and labor availability.

Results of this pilot laborshed study indicate that most persons wanting a job can find one. At the same time, more than 38.7% of survey respondents would consider changing employers or employment. These indicators explain the high ratio of applicants to openings described in the literature review. It appears that workers are willing to test the waters because of strong employer demand for workers (i.e., it is a seller's market). These workers may also feel more capable of finding more challenging and better paying jobs due to their perceptions of a strong economy. In order to be hired for such jobs, the workers will likely need additional skill development. Respondents

indicated a strong willingness (more than 99%) to train for new jobs. Local development leaders must foster more direct cooperation for advanced skill training and continuing education among employers, educators, and economic development groups to develop these skills. New public and private resources will most likely be needed to facilitate the additional skill training and education gaps that exist.

Economic development groups have the opportunity to change or add focus to their operations. One suggestion is to create a clearinghouse for labor force assistance. Responsibilities could include organizing industry roundtables to determine current and future training and education needs. Another service would be delineating the laborshed and exploring the potential of expanding geographic areas from which commuting workers are attracted. For example, the polygon boundaries of the laborshed may indicate some geographic areas with limited workers commuting to the laborshed node. These areas may represent potential for additional targeted geographical worker recruitment by local employers. The local development group could investigate the demographic characteristics of the targeted zip codes and develop a targeted employee recruitment program.

The initial concerns of employers that this laborshed study would encourage companies to steal employees from each other quickly waned as the survey results were presented. Companies viewed the survey results as actual labor force information that included characteristics of potential employees who would be available for work in the laborshed. Local development groups can become the purveyors of this information for local companies considering potential expansions.

Regional Approaches to Economic Development

Regionalism has become one of the primary topics of discussion among the economic development profession during the 1990s. Barnes and Ledebur (1998), The National League of Cities (1993), and Ohmae (1995), predicted that the future world economy and its cities will depend on developing regional economies. Accurate labor force data is a critical element for regionalization. Without labor force data at the sub-LMA level, it is difficult to precisely estimate where regional and sub-regional economies are forming. Enhanced demand for labor force data may expedite public policy decisions regarding labor force data collection and analysis.

Providing laborshed studies for communities on the state's borders will also have implications for public policy. Some communities in Iowa will have laborsheds that draw workers from three contiguous states. Local elected officials will be faced with labor force issues that affect the entire laborshed area and not just their specific community or state. The laborshed concept may necessitate organizing economic development efforts to enhance opportunities within the laborshed, even if these efforts primarily support the node of the laborshed, which may actually be in another state.

Delivery of Labor Survey Services

The state department currently conducting labor surveys, Iowa Workforce Development (IWD), may also want to review its approach and explore its validity in light of the laborshed study results. This study indicates that the scope and purpose of IWD may be too limited, if not antiquated. If IWD chooses not to change its survey approach, an alternative is to have either this agency or its sister organization, the Iowa

Department of Economic Development (IDED), fund a portion of the community's expense associated with conducting a laborshed study. The IDED has reviewed the initial laborshed study results and advocates broadening this approach to other communities in the state. The IDED has actually used the results of the pilot study to represent the potential labor force in the pilot community to a company considering a Midwest expansion site location. In addition, one local employer in the pilot community has utilized the study results to plan an expansion project.

Communities throughout Iowa have also learned about the pilot study and are requesting similar studies in their areas. In view of the apparent initial success of the pilot study and subsequent demand for additional research, laborshed studies should be continued. As the process becomes refined, the state (IDED, IWD, and the Iowa General Assembly) will be faced with the task of how to most efficiently conduct labor force studies. This public policy decision at the state level could become quite political. Both the communities of Iowa and the IDED are seeking a better method of providing labor force surveys and data analysis. The IWD is aware of these concerns and has chosen not to pursue a more thorough methodology but instead will focus its energies on providing more county-level surveys with limited analysis. In order to more appropriately meet this critical demand and need, the decision of how to deliver labor force surveys will most likely be an issue for the Iowa General Assembly during the next session. The pilot laborshed study, conducted at a Regents' institution with an economic development outreach group, offers an alternative solution. Recent history suggests a strong desire by the General Assembly to centralize economic development services in Iowa, regardless of

effectiveness or efficiency. Centralization has not proven to be more efficient with other economic development endeavors during the past decade. Expertise and techniques developed for conducting laborshed studies cannot be easily transferred to a different economic development service provider. In this case, it appears that UNI should be recognized for developing this concept and provided an opportunity to expand this service in a manageable manner.

Future Work

This study does seem to have developed a better methodology for estimating the potential available labor force of a specific laborshed. However, results of this research have indicated that additional analysis could be performed to augment laborshed employment studies to more thoroughly support economic development efforts and public policy decisions. Some of the most frequent issues that were raised during the analysis of the survey results included the need to further analyze commuting patterns, to explain the significance of the job characteristics considered most important to job seekers, to consider the impact of multiple job holders among the potential available labor force, and to develop profiles of respondents who will or will not accept employment opportunities.

Commuting patterns were ascertained in this study by asking the survey respondent questions regarding place of residence and place of employment (by zip code). Responses provided an estimate of how many potential workers would commute to or stay in the centroid community (node) of the laborshed for employment opportunities. Further analysis could be conducted to determine why these workers commute to jobs in

other communities. An assessment of each respondent's current job characteristics and a review of the types of jobs in the community to which they are commuting may offer some potential answers to this question. Employers and economic developers in the laborshed area would have a better grasp of the types of jobs commuters are leaving the area for.

Technical analyses could also be conducted to measure the relationships among job characteristics and the impact of commuting distance for accepting employment opportunities. Commuting patterns of respondents could be disaggragated by zip code for this analysis. Distance to work could serve as the dependent variable in a regression model to measure the significance of these relationships. Other variables, such as income or wage rate, hours worked, benefits, age and gender of the respondent, population of the zip code in which the respondent is employed, and number of business establishments, could serve as the independent variables. In addition to assessing the covariance of the residuals in this analysis, other steps could be taken to determine the spatial correlation of the data. Statistical modeling tailored for a neighbor analysis could be utilized to view the similarities among neighboring zip codes and to determine where clusters of commuters are occurring. Reasons for the clustering could range from access to transportation routes, wages offered to attract workers into certain zip codes, economic base and jobs provided in the zip code, and prevailing wage rates.

Analysis of the factors that determine the wage rate of employed persons required to change employers would also be valuable information for existing companies and future business prospects. For example, a cross-sectional regression model could be

applied with the dependent variable of wages and independent variables represented by the other job characteristics such as benefits, miles traveled, current wages, age, gender, etc. Developing a correlation matrix with these variables may indicate where multicollinearity exists among combined variables. Significance values among the variables can also be determined by an ordinary least squares statement and t tests.

Possibly a more inclusive model for evaluating job characteristics in the laborshed is the logit model. Using this method, a profile could be created of both the employed (and possibly the not employed) who will and will not accept employment opportunities in a community. The model's dependent variable might be defined as "will the respondent accept a position in the laborshed centroid community?" Independent variables could range from responses relating to current wage, desired wage, place of residence and place of work (by zip code), age, gender, distance traveled, distance willing to travel, occupation, household size, and household income. If the respondent is willing to accept a position in the centroid community (or node) of the laborshed, the response will be given a value of one and a no response will be zero. The logit methodology will estimate coefficients for the variables that will allow calculations of the probability of persons accepting employment based on a set of values for the independent variables. For example, distance may be less significant than the number of years they have worked for their current employer or the wage they desire.

This description of possible technical analysis represents but a few ideas for future research regarding laborshed employment studies. Local developers have suggested other adaptations to meet their specific labor identification needs. As long as interest in this

concept remains robust across the state and beyond, additional research opportunities should abound.

REFERENCES

Bao, S., Henry, M. S., & Barkley, D. L. (1995, March). Defining labor market areas and functional economic areas: An alternative approach. USDA Research Initiative, grant # 92-37401-8251. Clemson, SC: Clemson University.

Barkley, D. L., Henry, M. S., Bao, S., & Brooks, K. R. (1995). How functional are economic areas: Tests for intra-regional spatial association using spatial data analysis? Journal of the RSAI, 74, 297-316.

Barnes, W. R., & Ledebur, L. C. (1998). The new regional economies. Thousand Oaks, CA: Sage Publishing Company.

Berry, B. J. L. (1968). Metropolitan area definition: A re-evaluation of concept and statistical practice. Working Paper Number 28. United States Census Bureau. Washington, D.C.

Berry, B. J. L. (1973). Growth centers in the American urban system (Vol. 1). Community development and regional growth in the sixties and seventies. Cambridge: Ballinger Publishing Company.

Breslow, M., & Howard, M. (1995, May/June). The real unemployment rate. Monthly Labor Review, 35.

Chudacoff, H. P. (1981). The evolution of American urban society. Englewood Cliffs, NJ: Prentice Hall, Inc.

Clogg, C. (1979). Measuring underemployment. New York: Academic Press.

Coombes, M. G., Green, A. E., & Openshaw, S. (1985, January). Britain's changing local labour markets: Evidence from the review of TTWAs'. Employment Gazette, 6-8.

Coombes, M. G., & Openshaw, S. (1982). The use and definition of travel-to-work areas in Great Britain: Some comments. Regional Studies, 2 (16), 141-149.

DeAnda, R. (1994). Unemployment and underemployment among Mexican-origin workers. Hispanic Journal of Behavioral Sciences, 2 (16), 163-175.

Feldman, D. C. (1996). The nature, antecedents and consequences of underemployment. The Journal of Management, 22, 385-407.

Fisher, J. S. (Ed.). (1995). Geography and development, 5th ed. Englewood Cliffs, NJ: Prentice-Hall.

Fox, K. A., & Kumar, T. K. (1965). The functional economic area: Delineation and implications for economic analysis and policy. Papers of the Regional Science Association Meeting. 15, 57-85.

Fox, K. A. (1974). Social indicators and social theory: Elements of an operational system. New York: John Wiley & Sons.

Reich, R. (1994, March 19). Generation-x-onomics. The Economist, 27-28.

Glass, R. J., Krider, C. E., & Nelson, K. (1996, January). The effective labor force in Kansas: Employment, unemployment and underemployment. Research paper. Lawrence, KS: The University of Kansas Institute of Public Policy and Business Research, School of Business, Department of Economics.

Goudy, W., & Burke, S. C. (1997, October). Population (1850-1990) and population estimates (1996) for incorporated places in Iowa. Ames: Iowa State University.

Hirschl, T. A. (1996, March). Underemployment in New York State. Cornell University, Department of Rural Sociology. [On-line]. http://www.mannlib.edu.

Ibold, K. (1996, December). Bizsites monitor joins readers' choice awards in defining hot spots. Plants, Sites and Parks, 23, (7), 80-82.

Institute for Decision Making. (1996). Community assessment and target industry analysis. Cedar Falls: University of Northern Iowa.

Iowa Department of Economic Development. (1998, June). Community economic betterment account county wages. [Pamphlet]. Des Moines: Author.

Iowa Department of Workforce Development. (1997, September). Method for obtaining local area unemployment estimates. Iowa Department of Workforce Development Handbook. [Pamphlet]. Des Moines: Author.

Johnson, K. P. (1995, February). Redefinition of the BEA economic areas. Survey of current business, 75-81.

Kasandra, J. D. (1995). Industrial restructuring and the changing location of jobs. In R. Farley (Ed.), State of the Union: America in the 1990s (pp. 215-267). New York: Sage Publishing.

Khan, L. J., & Morrow, P. C. (1991). Objective and subjective underemployment relationships to job satisfaction. Journal of Business Research, 22, 211-218.

King, B. (Ed.). (1998, January/February). Underemployment can hide a skilled work force. Expansion Management, 122.

Kinney, P. (1997a, May 20). 4909 apply for 500 Deere foundry jobs. Waterloo Courier, p. 1.

Kinney, P. (1997b, August 12). Pudding plant job opportunities draw 650 to HCC session. Waterloo Courier, p. 1.

Knox, P. L. (1994). Urbanization: An introduction to urban geography. Englewood Cliffs, NJ: Prentice Hall, Inc., 6.

Kovac, M. (1997, May 22). Ball Plastic Container begins Ames hirings. Ames Daily Tribune, p. 8.

Leven, C. L., Legler, J. B., & Shapiro, P. (1970). An analytical framework for regional development policy. Cambridge: MIT Press.

Leys, T. (1997, July 28). A lot of job-seekers are already working. The Des Moines Register, 1.

Lichter, D. T. (1989). The underemployment of American rural women: Prevalence, trends and spatial inequality. Journal of Rural Studies, 5 (2), 199-208.

National League of Cities. (1993). Global dollars, local sense: Cities and towns in the international economy, the 1993 futures report. Washington, DC: Advisory Council Futures Process.

O'Donoghue, K. (1997, July 17). Bertch adds 100 jobs at Oelwein. Waterloo Courier, p. 1.

Ohmae, K. (1995). The end of the national state: The rise of regional economics. New York: Free Press.

Philbrick, A. K. (1957, October). Principles of areal functional organization in regional human geography. Economic Geography, 33, 299-336.

Plan for prison spurs interest in job prospects. (1997, March 16). The Des Moines Register, p. 3.

Rifkin, J. (1995). The end of work. New York: Putnam Publishers.

Sanders, B. (1994, September 26). Number's game: Internet information access company, 1.

Siegelman, H. (1998, April). Iowa economic trends [On-line]. Available: http://www.state.ia.us/trends/index.html.

Snyder, D. P. (1996, March/April). The revolution in the workplace: What's happening to our jobs? The Futurist, 8-13.

Soltero, J. (1995). The regional distribution of Mexican, Black and White underemployment. Latino Studies Journal, 6 (2), 56-72.

Stabler, J. C., Olfert, M. R., & Greul, J. B. (1996, Spring). Spatial labor markets and the rural labor force. Journal of the RSAI, (27), 206-230.

Tigges, L. M., & Tootle, D. M. (1990). Labor supply, labor demand, and men's underemployment in rural and urban labor markets. Rural Sociology, (55), 328-356.

Tolbert, C. M., & Killian, M. S. (1987, August). Labor market areas for the United States. (Staff Report No. AGES870721). Washington, DC: Agriculture and Rural Economy Division Research Service, U. S. Department of Agriculture.

Tolbert, C. M., & Sizer, M. (1996, September). U. S. commuting zones and labor market areas, A 1990 update (Staff Paper No. AGES-9614). Washington, DC: Rural Economy Division, Economic Research Service, U. S. Department of Agriculture.

United States Census Bureau, Population Division. (1998). Population estimates program [On-line]. Available: http://www.census.gov/.

United States Department of Commerce, Bureau of Economic Analysis. (1998). Regional Account Data [On-line]. http://www.bea.doc.gov/.

United States Department of Labor, Bureau of Labor Statistics. (1996, Fall). Occupational employment statistics. OES Structure [On-line]. http://www.stats.bls.gov/oeshome.html.

United States Department of Labor, Bureau of Labor Statistics. (1997, April). BLS Handbook of Methods (Bulletin 2490).

APPENDIX A

Bureau of Labor Statistics Methods for Estimating Employment and Unemployment

Bureau of Labor Statistics Methods for Estimating Employment and Unemployment

Introduction

Understanding what Iowa employment and unemployment figures represent requires a familiarity with how estimates are calculated and how data differs at the national, state, and sub-state levels. The Bureau of Labor Statistics (BLS) of the U.S. Department of Labor calculates employment statistics for the nation, while state agencies compute their respective figures individually. Unfortunately, the methodology used by the BLS is such that the unemployment data cannot be directly translated into comparable state generated measures. The purpose of this appendix is to summarize the estimating approach outlined in the BLS Handbook of Methods (1997), in order to provide an understanding of how estimating methods in this study differ from those of the BLS.

Estimating Employment and Unemployment

In the United States and the state of Iowa, the estimated labor force is defined as the portion of the civilian population that is non-institutionalized,16 years of age or older, and currently employed or not employed. The BLS defines persons as employed in the following two ways. First, persons are employed if they did any work as a paid employee, for their own business, profession, on their own farm, or worked 15 hours or more as unpaid workers in a family-operated enterprise. Second, persons are employed if they did not work but had jobs or businesses from which they were temporarily absent due to illness, bad weather, vacation, child-care problems, labor dispute, maternity or paternity leave, or other family or personal obligations.

Unemployed persons are defined as those who were not employed during a reference week but were available for work (except for temporary illness) and had made an effort to find employment within four weeks of being questioned. Persons waiting to be recalled to jobs from which they were laid off are also not employed. The reference week refers to the week of the month that includes the 12th day. All labor activity statistics are based on this period of time. The BLS groups those not employed into four primary categories. First are job losers, those laid off- both temporarily and permanently. Second, are persons who quit or were terminated and are looking for work. Third are persons who had been employed at one time and are now beginning a new job search. Fourth are new entrants who have never worked but are beginning their first job search.

Those individuals who are not classified as either employed or not employed are not considered to be part of the labor force. The non-working designation may be due to a variety of reasons; however, the underlying factor is that the individuals have not sought employment within the past four weeks.

The BLS uses the number of employed and not employed persons to calculate the civilian labor force, the unemployment rate, and the labor force participation rate (LFPR). The total labor force is calculated by adding all employed and not employed persons. Those not considered employed or unemployed are not included in this calculation. The unemployment rate is the number of persons not employed divided by the total labor force. Labor force participation rates are determined by dividing the total labor force by the population of non-institutionalized citizens 16 years of age and above. Unemployment rates and LFPRs are also calculated for specific demographic groups.

A proper interpretation of the unemployment rate requires an understanding of the processes used to generate the data on which the calculation is based. According to the BLS Handbook of Methods (1997), the BLS uses the monthly Current Population Survey (CPS) to collect data from a sample of 59,000 households, taken from 754 sample areas located throughout the country. The purpose of the survey is to collect information on earnings, employment, hours of work, occupation, demographics, industry, and socio-economic status. These data are obtained through personal and telephone interviews. Of the 59,000 households in the sample, only about 50,000 are generally available for testing due to absence and illness. The 50,000 households generate information on 94,000 individuals. Each household is interviewed for two four-month periods with an eight month break between the periods. The pool of respondents is divided into eight panels, with a new panel being rotated each month.

The 754 sample areas represent 3,141 counties and cities. Population samples are divided into a combination of counties, urban and rural areas, or entire metropolitan area. These are referred to as population sample units (PSU's). PSUs are categorized by state into sample groups of similar population, households, average wages, and industry. The 754 sample areas consist of 428 PSU's that are large and diverse enough to be considered an independent PSU, and 326 groupings of smaller PSU's.

The BLS subdivides sample areas into enumeration districts of about 300 households, which are then divided into smaller clusters of about four dwelling units each for interviewing. Each month, one-fourth of the households in the sample is changed so that no household is interviewed more than four consecutive months. This rotating

procedure results in approximately 75% of the sample remaining the same from month to month and 50% from year to year.

Iowa and Sub-state Unemployment Rates

The CPS produces reliable national unemployment estimates; however, these do not translate into estimates for all state and sub-state areas. Only eleven of the most populous states and the LMA's of Los Angeles and New York City are large enough to have unemployment rates calculated by the CPS. The unemployment estimates for the 39 other states, 5,600 geographic areas, LMA's, counties, and cities are calculated using BLS guidelines established by each state's employment agency. For example, in the state of Iowa, Iowa Workforce Development (IWD) considers almost every county as a separate and small LMA. Exceptions to this designation are the paired counties of Wapello/Davis, Story/Boone, Jefferson/Van Buren, and Mahaska/Keokuk. In contrast, the MSAs of Cedar Rapids, Davenport, Des Moines, Dubuque, Iowa City, Council Bluffs, Sioux City, and Waterloo-Cedar Falls are considered large LMAs.

The BLS and IWD utilize a time series model to estimate state labor force statistics and the BLS Handbook Method is used for sub-state projections. The state unemployment estimates are based on a time series to reduce the high variability found in the CPU estimates caused by small sample size. The time series combines historical relationships in the monthly CPS estimates along with Unemployment Insurance (UI) claims and Current Employment Statistics (CES) survey.

The CES is a monthly survey of employers conducted by the BLS and state employment agencies. The BLS obtains employment, hours/overtime, and earning

information for 400,000 workers are obtained from employer payroll records. Annually, BLS benchmarks monthly unemployment estimates to the CPS estimate so that the annual average of the final benchmarked series equals the annual average, and to preserve the pattern of the model series. IWD also uses CES data to determine average wage levels in each occupational employment category described in Appendix E.

IWD calculates sub-state unemployment estimates by using the BLS Handbook Method. This method accounts for the previous status of the unemployed worker and divides the workers into two categories: those who were last employed in industries covered by UI laws and workers who either entered the labor force for the first time or reentered after a period of separation.

Individuals considered covered by UI are those currently collecting UI benefits and those who have exhausted their benefits. Data for insured persons are collected from State UI, Federal, and railroad programs. The estimate for those who have exhausted their funds is based on the number who stopped receiving benefits at that time and an estimate of the individuals who remain unemployed.

New entrants and reentrants into the labor force are estimated based on the national historical ratio of entrants compared to the experienced unemployed and the experienced labor force. The BLS indicates that the Handbook Method estimate of entrants into the labor force is a function of the month of the year, the level of the experienced unemployed, the level of the experienced labor force, and the proportion of the working age population. The total entrants are estimated by the formula:

$$ENT = A(X+E)+BX$$

where:
ENT = total entrant unemployment
E = total employment
X = total experienced unemployment
A, B = synthetic factors incorporating both seasonal variations and the assumed relationship between the proportion of youth in the working-age population and the historical relationship of entrants, either the experienced unemployed or the experienced labor force (BLS Handbook of Methods, 1997, p. 39).

Total employment (E) estimates represent the total number of paid employees in non-farm industries. The BLS calculates entrants based on various sources, including the CES survey and state designed surveys of establishments. These figures are combined with a weighted factor accounting for historic employment relationships found in the Census. In order to compute the total Handbook entrant employment, the BLS combines the entrant estimate with standard estimates for agricultural workers, non-farm self-employed and unpaid family workers.

In order to obtain unemployment estimates for the sub-state/LMA the BLS computes a Handbook share for that area. This is defined as the ration of the area's given Handbook estimate to the sum of the Handbook estimates for all LMAs in the state. This same type of adjustment is performed to calculate employment. The formula utilized by the BLS to determine unemployment is:

$$Ua(t) = Us(t) * UHBa(t)$$

where:
U = total unemployment
UHB = Handbook unemployment
a = area
s = State
t = time

As with the state data, the BLS benchmarks sub-state/LMA estimates annually so that they sum to the revised state estimates of employment and unemployment.

IWD uses either the population-claims method or the Census-share method to calculate unemployment estimates for portions of the LMAs. The population-claims method is the preferred method according to the BLS. Where available, resident based UI claims data for the sub-LMA area are used to determine the ratio of these claims to the total number of UI claims within the LMA. The number of unemployed entrants is based on the Census distribution of adult and teenage population groups. IWD utilizes the current population distributions prepared by the Census Bureau and weighted by each area's Census relative share of employment to population to derive total unemployment estimates. The Census-share method is used if UI claims data for the sub-LMA area are unavailable. In this method, decennial Census data from the county in which the area is located are divided into a portion consistent with the size of the area. The Census-share method is considered less accurate than the population-claims method.

Limitations

Since the State, LMA, and sub-LMA data are not directly obtained from a survey, the employment and unemployment estimates calculated are subject to a level of error. These errors can occur due to improper estimations and insufficient data. Unfortunately, a universal level of error cannot be easily computed because of the wide variety of sources and methods used. The CPS information used to calculate the national estimates and to benchmark the state figures is subject to sampling and non-sampling error. Non-sampling errors in the CPS, such as those due to respondent bias and question

interpretation, are minimized through re-interviewing respondents and rotating the panels of respondents. Sampling errors in the CPS over time indicated that 68% of the intervals are within one standard deviation, 90% are within 1.6 standard deviations, and 95% of the intervals are within two standard deviations of the mean.

APPENDIX B

SCHEMATIC DIAGRAMS OF THE COMPREHENSIVE FACTORS THAT INFLUENCE THE POTENTIAL LABOR SUPPLY OF A LABORSHED

- Not employed
- Employed
- Underemployed

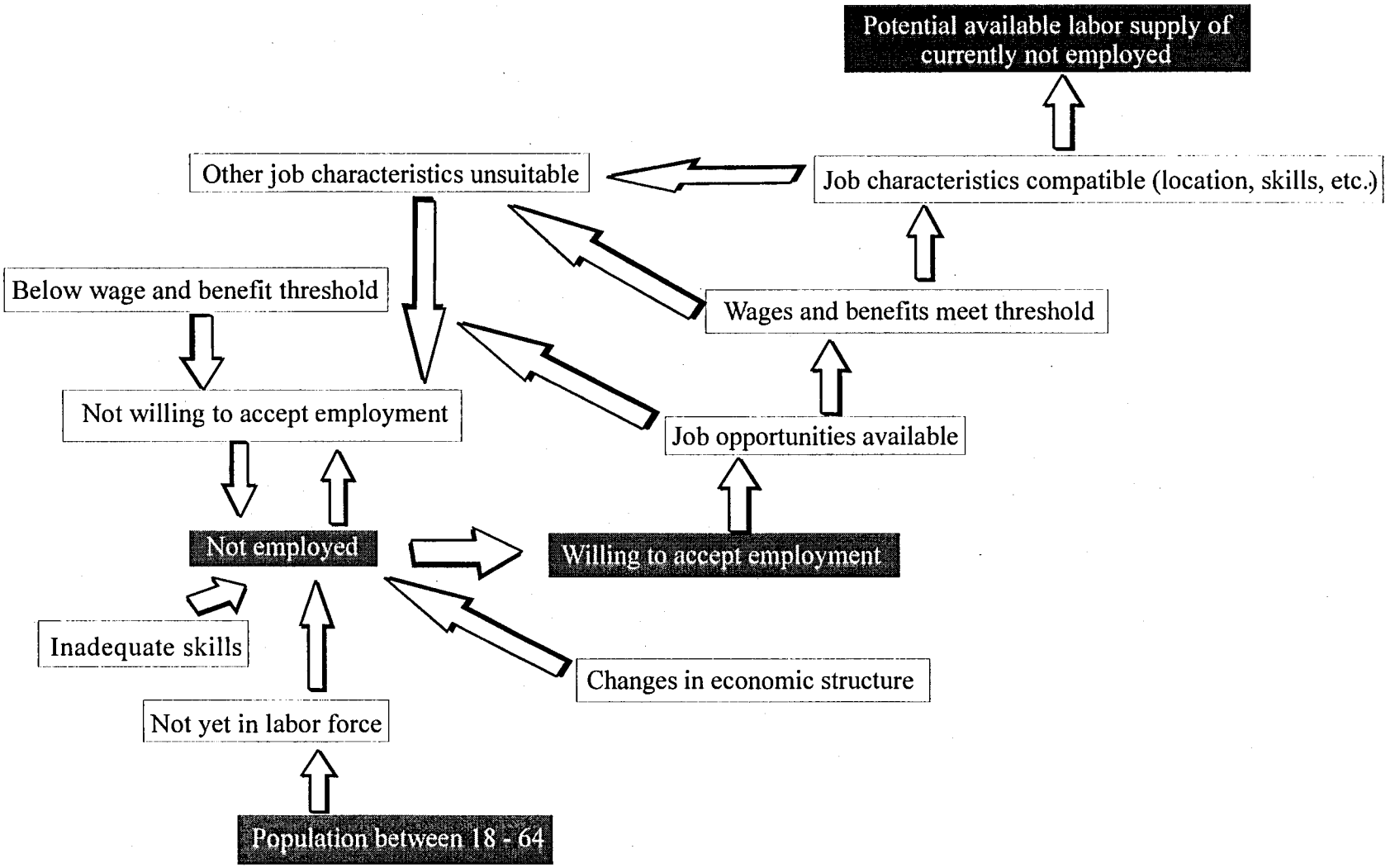

Figure 2. Schematic Diagram of the Factors that Influenc the Potential Available Labor Supply of a Laborshed Incorporating Those Not Employed

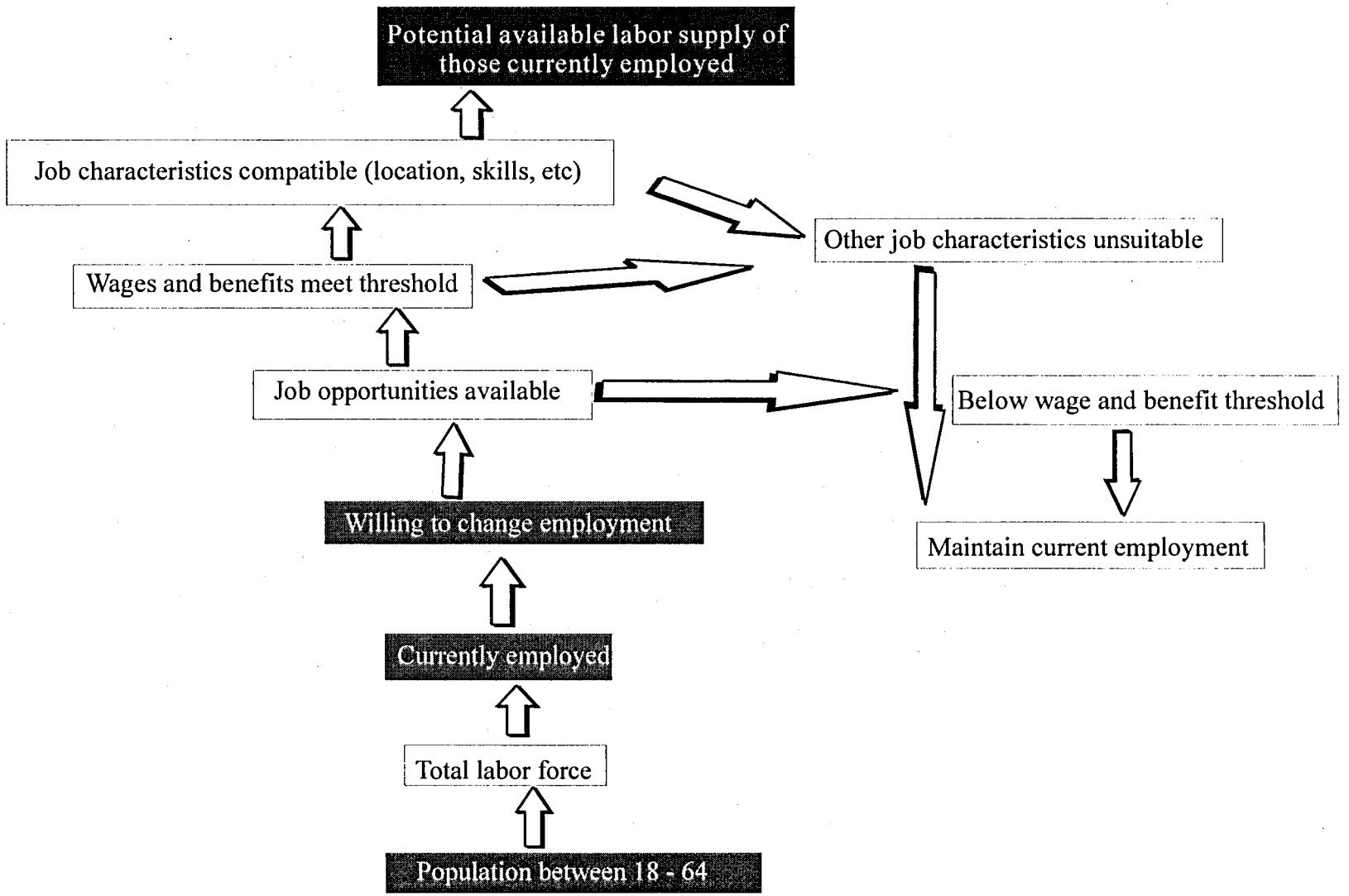

Figure 3. Schematic Diagram of the Factors that Influence the Potential Available Labor Supply of a Laborshed Incorporating the Existing Labor Force

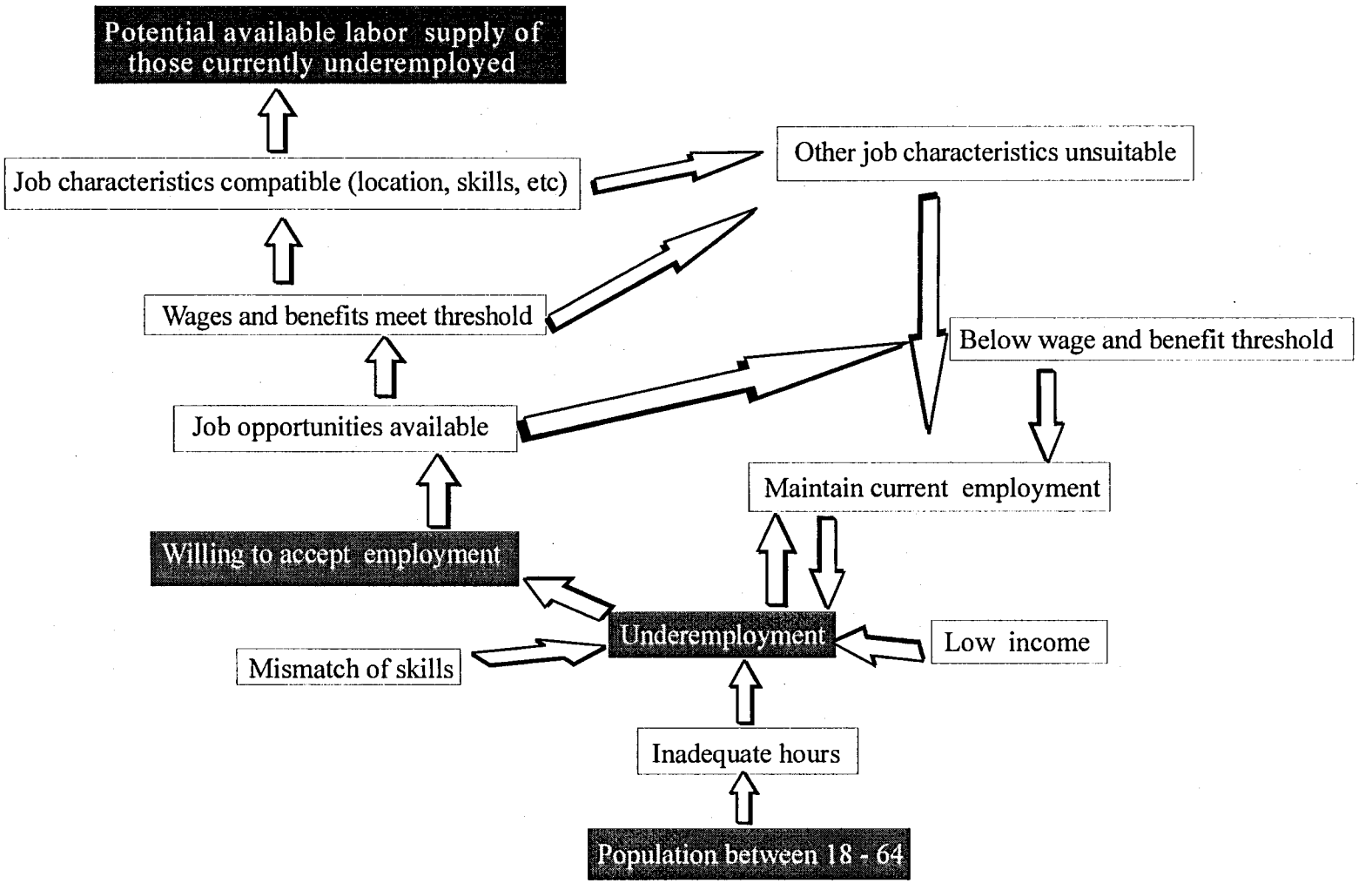

Figure 4. Schematic Diagram of the Factors that Influence the Potential Available Labor Supply of a Laborshed Incorporating the Underemployed

APPENDIX C

HUMAN SUBJECTS APPROVAL

The University of Northern Iowa

October 21, 1997

Dr. Robert E. Kramer
Center for Social & Behavioral Research
0402

Dear Dr. Kramer:

Your project, Knoxville/Pella, Iowa, Labor Shed Survey, which you submitted for human subjects review on 10/20/97 has been determined to be exempt from further review under the guidelines stated in the UNI Human Subjects Handbook. You may commence participation of human research subjects in your project.

Your project need not be submitted for continuing review unless you alter it in a way that increases the risk to the participants. If you make any such changes in your project, you should notify the Graduate College Office.

If you decide to seek federal funds for this project, it would be wise not to claim exemption from human subjects review on your application. Should the agency to which you submit the application decide that your project is not exempt from review, you might not be able to submit the project for review by the UNI Institutional Review Board within the federal agency's time limit (30 days after application). As a precaution against applicants' being caught in such a time bind, the Board will review any projects for which federal funds are sought. If you do seek federal funds for this project, please submit the project for human subjects review no later than the time you submit your funding application.

If you have any further questions about the Human Subjects Review System, please contact me. Best wishes for your project.

Sincerely,

Norris M. Durham, Ph.D.
Chair, Institutional Review Board

cc: Dr. David A. Walker, Associate Dean

Graduate College 1 Seerley Cedar Falls, Iowa 50614-0702 (319) 273-2748 FAX: (319) 273-2243

APPENDIX D

KNOXVILLE – PELLA LABORSHED STUDY SURVEY INSTRUMENT

Center for Social and Behavioral Research
University of Northern Iowa
Knoxville-Pella, Iowa, Laborshed Survey

Hello, this is [_____] and I am calling from the University of Northern Iowa's Center for Social and Behavioral Research. We are conducting a survey concerning people's employment for the Knoxville and Pella Chambers of Commerce.

Is this [TELEPHONE NUMBER] ?

1=YES
2=NO ⇨ ***I'm sorry, I must have misdialed.*** [HANG UP.]

Is this a residential telephone number?

1=YES
2=NO⇨[PROBE TO DETERMINE IF A BUSINESS, GROUP QUARTERS, TEEN LINE, ETC.
IF NOT A RESIDENCE, SAY:]

We are only trying to reach people at their place of residence. Since this isn't a residential telephone number, I don't need any further information. Thanks for your help.

Your household has been chosen randomly to be included in this study. In order to determine whether your household is eligible for inclusion in our study, I need to know your zip code.

Q1A. ***What is your zip code?*** 9 = REFUSED [SKIP TO CLOSE 4]

Q1B. ***In order to randomly select a person to interview, I need to know how many people live in your household who are between 18 to 64?***

NUMBER:

[IF Q1B GE 2, SKIP TO Q2]
[IF 0, SKIP TO CLOSE 2]
[IF Q1B=1, ASK]

Q1C. ***Are you currently employed, unemployed, that is, previously had a job but are not currently working, retired, or a homemaker?***

1=EMPLOYED
2=UNEMPLOYED
3=RETIRED, HOMEMAKER, OTHER
9=REFUSED

[IF Q1C=1, SKIP TO **INTRO Q5A2]**
IF Q1C=2, SKIP TO **INTRO Q5UA**]
[IF Q1C GE 3, SKIP TO CLOSE 3]

Q2. ***Among the people who live in your household who are 18 to 64, how many are . . .***

1. ***Employed?***

2. ***And, how many are unemployed, that is, previously had a job but are not currently working and are not retired?***

[IF Q2A=0 AND Q2B=0, SKIP TO CLOSE 3]
[IF Q2A=1 AND Q2B=0, ASK Q3D1]
[IF Q2A=0 AND Q2B=1, SKIP TO Q3D2]
[IF Q2A GE 1 AND/OR Q2B GE 1, SKIP TO Q4B]

Q3D1. ***I need to speak to the employed person, would that be you?***

1 YES
2 NO

[IF Q3D1=1, SKIP TO **INTRO Q5A2**]
[IF Q3D1=2, SKIP TO Q4A]

Q3D2. ***I need to speak to the unemployed person, would that be you?***

1 YES
2 NO

[IF Q3D2=1, SKIP TO **INTRO Q5UA**]
[IF Q3D2=2, ASK Q4A]

Q4A. ***May I speak to that person?***

[WHEN SELECTED RESPONDENT COMES TO PHONE, SKIP TO **INTRO Q5A1**]

[IF SELECTED RESPONDENT IS NOT AVAILABLE, ARRANGE FOR CALLBACK.]

[CLOSE WITH:] ***We will call (him/her) back (at/on/at)*** _____. ***Thank you. Good bye.***

[ON CALLBACK, BEGIN WITH **INTRO Q5A1**]

Q4B. ***Among the (employed*** [AND/OR] ***unemployed) persons in your household, which one had the most recent birthday?***

[IF PERSON ON PHONE HAD MOST RECENT BIRTHDAY, SAY:]

Then you are the person I need to speak to.

[SKIP TO **INTRO Q5A2**]

[IF SELECTED RESPONDENT IS OTHER THAN PERSON ON PHONE, ASK]

Q4C. ***May I speak to that person?***

[WHEN SELECTED RESPONDENT COMES TO PHONE, SKIP TO **INTRO Q5A1**]
[IF SELECTED RESPONDENT IS NOT AVAILABLE, ARRANGE FOR CALLBACK.]

[CLOSE WITH:] ***We will call (him/her) back (at/on/at)*** _____. ***Thank you. Good bye.***

[ON CALLBACK, BEGIN WITH **INTRO Q5A1**]

[Q5 SERIES -- FOR ADDITIONAL SCREENING, AND EMPLOYED RESPONDENT]

⇨ **[INTRO Q5A1]**

Hello, this is [_____] and I am calling from the University of Northern Iowa's Center for Social and Behavioral Research. We are conducting a survey concerning people's employment for the Knoxville and Pella Chambers of Commerce. Your household has been chosen randomly to be included in this study. I would like to ask you a few questions about your employment status. The interview only takes a few minutes and all the information you provide will be kept strictly confidential. Your participation in this study is completely voluntary and you do not need to answer any questions that you do not want to.

Q5A1. ***Are you currently employed or unemployed?***

1=EMPLOYED
2=UNEMPLOYED
9=REFUSED

[IF Q5A1=1, SKIP TO Q5B]
[IF Q5A1=2, SKIP TO Q5UB]
[IF Q5A1=9 SKIP TO CLOSE 4]

⇨ **[INTRO Q5A2]**

I would like to ask you a few questions about your current employment. The interview only takes a few minutes and all the information you provide will be kept strictly confidential. Your participation in this study is completely voluntary and you do not need to answer any questions that you do not want to.

Q5B. ***To begin with, I would like to read you a short list of types of businesses and industries. Please tell me which one of these best describes your employer . . . is it mainly . . .*** [READ LIST. CODE ONLY ONE CATEGORY]

Agriculture / Forestry / Mining
Construction
Manufacturing
Transportation, Communication, Public Utilities
Wholesale Trade
Retail Trade
7. ***Finance, Insurance, Real Estate***
Health Care / Social Services
9. ***Personal Services***
10. ***Enertainment and Recreation***
11. ***Professional Services***
12. ***Public Administration, Government***
13. ***Active Duty Military***
14. ***Or some other business or industry?*** [PROBE

Q5C. ***What kind of work do you do, what is your main occupation called?*** [PROBE. IF MORE THAN ONE OCCUPATION, ASK FOR PRIMARY OCCUPATION.]

[RECORD OCCUPATIONAL TITLE]

[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

Q5D. ***Based on your previous experience, education or training, what other technical or professional skills that you now have, would you like to utilize in addition to the skills you are currently using?*** [PROBE FOR MAXIMUM OF TWO OCCUPATIONAL TITLES]

[FIRST OCCUPATIONAL TITLE]
[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____
[SECOND OCCUPATIONAL TITLE]
[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

Q5E. ***Approximately how many hours do you work a week?*** HOURS _____

[IF Q5E GE 40, SKIP TO Q5G]

Q5F. ***Would you prefer to work more than*** [HOURS IN Q5E] ***week?***

1=YES
2=NO
7=DON'T KNOW
9=REFUSED

Q5G. ***Are you employed on a hourly basis or are you a salaried employee or self–employed?***

1=HOURLY
2=SALARIED
3=SELF
7=DON'T KNOW
9=REFUSED
0=REFUSED

Q5H. ***What is your (hourly wage/annual salary)?*** AMOUNT _____

Q5I. ***For approximately how many years or months have you been doing this kind of work?***

_____ YEARS OR _____ MONTHS 99=REFUSED

Q5J. ***How many different employers have you worked for in the last three years?***

NUMBER _____ 99=REFUSED

Q5K. ***If you had the opportunity to change employment or employers, would you say . .*** [READ LIST]

1=***Yes, you are very likely to do so,***
2=***Yes, somewhat likely to do so,***

3=***No, somewhat not likely to do so, or***
4=***No, very unlikely to do so.***
7=DON'T KNOW
9=REFUSED

[IF Q5K GE 3 AND Q1B=1, SKIP TO Q7]

[IF Q5K GE 3 AND SKIP TO SELECTION PROCEDURE, PAGE 6]

Q5L. ***What would be the lowest wage or salary you would accept in order to change employment or employers?***

AMOUNT _____

Q5M. ***What employment benefits, if any, would you want as part of your change of employment ?***
[PROBE. DO NOT READ LIST. CODE ALL THAT APPLY]

1=PHYSICAL HEALTH
2=DENTAL COVERAGE
3=PRESCRIPTION DRUGS
4=VISION
5=LIFE INSURANCE
6=PENSION / RETIREMENT
7=OTHER [PROBE]
8="NONE"
9=NOT SURE

[IF Q5M NE 1 OR 2 OR 3 OR 4, SKIP TO Q5O]

Q5N. ***How important is it that the health benefits also provide coverage for your immediate family, would you say . . .*** [READ LIST. CODE ONE ANSWER]

1=***Very important,***
2=***Somewhat important, or***
3=***Not important?***

Q5O. ***If new skills were required for the new job, would you be willing to be trained in the new skills?***

1=YES
2=NO
7=NOT SURE
9=REFUSED

[IF ZONE EQ 1, SKIP TO Q5Q]

Q5P. ***Approximately how many miles would you be willing to travel one way, for a new employment opportunity?***

MILES: _____

Q5Q. ***Would you be willing to move to a new community for a new employment opportunity?***

1=YES
2=NO
7=DON'T KNOW
9=REFUSED

[IF Q5Q NE 1 AND Q1B=1, SKIP TO Q7]
[IF Q5Q NE 1, SKIP TO SELECTION PROCEDURE ON NEXT PAGE]

Q5R. ***Beyond employment opportunities, what else would influence you to move to a new community?***
[PROBE. DO NOT READ LIST. CODE ALL THAT APPLY]

0=NOTHING / CANNOT THINK OF ANYTHING
1=HOUSING
2=SCHOOLS
3=RECREATION / ENTERTAINMENT / CULTURAL
4=SAFETY / LOW CRIME RATE
5=AVAILABILITY OF CHILD CARE
6=LOW TAXES
7=RELIGION
8=OTHER [SPECIFY:]

[IF Q1B=1, SKIP TO Q7]
[IF Q2A GE 2 OR Q2B GE 1, USE SELECTION PROCEDURE ON NEXT PAGE]
[SELECTION PROCEDURE FOLLOWING Q5 SERIES -- FOR HOUSEHOLD HAVING TWO OR MORE EMPLOYED AND/OR UNEMPLOYED PERSONS]

[IF Q2A GE 2 AND Q2B=0, SAY]

Earlier (you told me / someone else in your household told me) that there (was one other person / were other people) between 18 and 64 living in your household who (was / were) employed. I would like to ask you a few questions about (that person) / (one of these individuals . . . the one that who had the most recent birthday).

[SKIP TO Q6A1]

[IF Q2A GE 2 AND Q2B GE 1, SAY]

Earlier (you told me / someone else in your household told me) that there (was one other person / were other people) between 18 and 64 living in your household who were either employed or unemployed, that is, previously had a

job but are not currently working. I would like to ask you a few questions about one of these individuals. The one that we will focus on is the one who had the most recent birthday. Is that person employed or unemployed?

[IF EMPLOYED, SKIP TO Q6A1]
[IF UNEMPLOYED, SKIP TO Q5UX1]

[IF Q2A=1 AND Q2B=1, SAY]

Earlier (you told me / someone else in your household told me) that there was a person living in your household between 18 and 64 who was unemployed. I would like to ask you a few questions about that person.

[SKIP TO Q5UX1]

[IF Q2A=1 AND Q2B GE 2, SAY]

Earlier (you told me / someone else in your household told me) that there were people living in your household between 18 and 64 who were unemployed. I would like to ask you a few questions about one of these individuals. The one that we will focus on is the one who had the most recent birthday. Is that person employed or unemployed?

[SKIP TO Q5UX1]

[Q5U SERIES -- FOR UNEMPLOYED RESPONDENT]

⇨ **[INTRO Q5UA]**

I would like to ask you a few questions about your last employment. The interview only takes a few minutes and all the information you provide will be kept strictly confidential. Your participation in this study is completely voluntary and you do not need to answer any questions that you do not want to.

Q5UB. ***To begin with, what kind of work did you do at your last job, what was your main occupation called?***
[PROBE. IF MORE THAN ONE OCCUPATION, ASK FOR PRIMARY OCCUPATION.]

[RECORD OCCUPATIONAL TITLE]

[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

Q5UC. ***I would like to read you a short list of types of businesses and industries. Please tell me which one of these best describes your former employer . . . is it mainly . . .*** [READ LIST. CODE ONLY ONE CATEGORY]

- ***Agriculture / Forestry / Mining***
- ***Construction***
- ***Manufacturing***
- ***Transportation, Communication, Public Utilities***
- ***Wholesale Trade***
- ***Retail Trade***

7. ***Finance, Insurance, Real Estate***
   Health Care / Social Services
9. ***Personal Services***
15. ***Enertainment and Recreation***
16. ***Professional Services***
17. ***Public Administration, Government***
18. ***Active Duty Military***
19. ***Or some other business or industry?*** [PROBE

Q5UD. ***Based on previous experience, education or training, what other technical or professional skills do you have in addition to the skills you used on your last job?*** [PROBE FOR MAXIMUM OF TWO OCCUPATIONAL TITLES]

[FIRST OCCUPATIONAL TITLE]

[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

[SECOND OCCUPATIONAL TITLE]

[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

Q5UE. ***Approximately how many hours did you work a week?*** HOURS _____

[IF Q5UE GE 40, SKIP TO Q5UG]

Q5UF. ***Would you have preferred to work more than*** [HOURS IN Q5UE] ***week?***

1=YES
2=NO
7=DON'T KNOW
9=REFUSED

Q5UG. ***Were you employed on a hourly basis or are you a salaried employee or self–employed?***
1=HOURLY
2=SALARIED
3=SELF
7=DON'T KNOW
9=REFUSED
0=REFUSED

Q5UH. ***What was your (hourly wage/annual salary/annual income)?*** AMOUNT _____

Q5UI. ***For approximately how many years or months had you been doing that kind of work?***

_____ YEARS OR _____ MONTHS 99=REFUSED

Q5UJ. ***How many different employers have you worked for in the last three years?***

NUMBER _____ 99=REFUSED

Q5UK. ***If you had the opportunity to become employed, would you say . . .*** [READ LIST]

1=***Yes, you are very likely to do so,***
2=***Yes, somewhat likely to do so,***
3=***No, somewhat not likely to do so, or***
4=***No, very unlikely to do so.***
7=DON'T KNOW
9=REFUSED

[IF Q5UK GE 3 AND Q1B=1, SKIP TO Q7]
[IF Q5UK GE 3, SKIP TO SELECTION PROCEDURE ON PAGE 10]

Q5UL . ***How many hours per week would you like to work?*** HOURS: _____ _____

Q5UM. ***What would be the lowest wage or salary you would accept for new employment?***

AMOUNT _____

Q5UN. ***What employment benefits, if any, would you want as part of your new job?*** [PROBE. DO NOT READ LIST. CODE ALL THAT APPLY.]

1=PHYSICAL HEALTH
2=DENTAL COVERAGE
3=PRESCRIPTION DRUGS
4=VISION
5=LIFE INSURANCE
6=PENSION / RETIREMENT
7=OTHER [PROBE]
8="NONE"
9=NOT SURE

[IF Q5UN NE 1 OR 2 OR 3 OR 4, SKIP TO Q5UP]

Q5UO. ***How important is it that the health benefits also provide coverage for your immediate family, would you say . . .*** [READ LIST. CODE ONE ANSWER]

1=***Very important,***
2=***Somewhat important, or***
3=***Not important?***

Q5UP. ***If new skills were required for the new job, would you be willing to be trained in the new skills?***

1=YES
2=NO
7=NOT SURE
9=REFUSED

[IF ZONE EQ 1, SKIP TO Q5R]

Q5UQ. ***Approximately how many miles would you be willing to travel one way, for a new employment opportunity?***

MILES: _____

Q5UR. ***Would you be willing to move to a new community for a new employment opportunity?***

1=YES
2=NO
7=DON'T KNOW
9=REFUSED

[IF Q5UR NE 1 AND Q1B=1, SKIP TO Q7]
[IF Q5UR NE 1, SKIP TO SELECTION PROCEDURE ON NEXT PAGE]

Q5US. ***Beyond employment opportunities, what else would influence you to move to a new community?***
[PROBE. DO NOT READ LIST. CODE ALL THAT APPLY]

0=NOTHING / CANNOT THINK OF ANYTHING
1=HOUSING
2=SCHOOLS
3=RECREATION / ENTERTAINMENT / CULTURAL
4=SAFETY / LOW CRIME RATE
5=AVAILABILITY OF CHILD CARE
6=LOW TAXES
7=RELIGION
8=OTHER [SPECIFY:]

[IF Q1B=1, SKIP TO Q7]
[IF Q2A GE2 OR Q2B GE 1, USE SELECTION PROCEDURE ON NEXT PAGE]

[SELECTION PROCEDURE FOLLOWING Q5U SERIES – FOR HOUSEHOLD HAVING TWO OR MORE EMPLOYED AND/OR UNEMPLOYED PERSONS]

[IF Q2A GE 2 AND Q2B=1, SAY]

Earlier (you told me / someone else in your household told me) that there (was one other person / were other people) between 18 and 64 living in your household who (was / were) employed. I would like to ask you a few questions about one of these individuals . . . the one who had the most recent birthday.

[SKIP TO Q6A1]

[IF Q2A GE 2 AND Q2B GT 1, SAY]

Earlier (you told me / someone else in your household told me) that there (was one other person / were other people) between 18 and 64 living in your household who were either employed or unemployed, that is, previously had a job but are not currently working. I would like to ask you a few questions about one of these individuals. The one that we will focus on is the one who had the most recent birthday. Is that person employed or unemployed?

[IF EMPLOYED, SKIP TO Q6A1]

[IF UNEMPLOYED, SKIP TO Q5UX1]
[IF Q2A=0 AND Q2B GT 2, SAY]

Earlier (you told me / someone else in your household told me) that there were other people living in your household between 18 and 64 who were unemployed, that is, previously had a job but are not currently working. I would like to ask you a few questions about one of these individuals. The one that we will focus on is the one who had the most recent birthday. Is that person employed or unemployed?

[SKIP TO Q5UX1]

[IF Q2A=1 AND Q2B EQ 1, SAY]

Earlier (you told me / someone else in your household told me) that there was one other person between 18 and 64 living in your household who is currently employed. I would like to ask you a few questions about that person's job.

[SKIP TO Q6A1]

[Q6 SERIES -- FOR OTHER EMPLOYED HOUSEHOLD MEMBER]

Q6A1 ***Is that person a male or female?***

1=MALE
2=FEMALE
9=REFUSED

Q6A2. ***And what is that person's age?*** _____ 99=REFUSED

Q6B. ***I would like to read you a short list of types of businesses and industries. Please tell me which one of these best describes (his/her) employer . . . is it mainly . . .*** [READ LIST. CODE ONLY ONE CATEGORY]

- ***Agriculture / Forestry / Mining***
- ***Construction***
- ***Manufacturing***
- ***Transportation, Communication, Public Utilities***
- ***Wholesale Trade***
- ***Retail Trade***

7. ***Finance, Insurance, Real Estate***
   Health Care / Social Services
9. ***Personal Services***

20. ***Enertainment and Recreation***
21. ***Professional Services***
22. ***Public Administration, Government***
23. ***Active Duty Military***
24. ***Or some other business or industry?*** [PROBE

Q6C. ***What kind of work does (he/she) do, what is (his/her) main occupation called?*** [PROBE. IF MORE THAN ONE OCCUPATION, ASK FOR PRIMARY OCCUPATION.]

[RECORD OCCUPATIONAL TITLE]
[CODE OCCUPATIONAL TITLE BY SIC CODE.]

Q6D. ***Approximately how many hours does (he/she) work a week?*** HOURS _____

[IF Q6D GE 40, SKIP TO Q6G]

Q6F. ***How many hours per week would (he/she) prefer to work?*** HOURS _____

Q6G. ***Is (he/she) employed on a hourly basis or a salaried employee, or self–employed?***

1=HOURLY
2=SALARIED
3=SELF
7=DON'T KNOW
9=REFUSED

Q6H. ***What is (his/her) (hourly wage/annual salary/annual income)?***
AMOUNT _____ 0=REFUSED

Q6I1. ***For approximately how many years or months has (he/she) been doing this kind of work?***

_____ YEARS OR _____ MONTHS 99=REFUSED

Q6I2. ***In what town does (he/she) work?*** _____

Q6J. ***How many different employers has (he/she) worked for in the last three years?***

NUMBER _____ 99=REFUSED

Q6K. ***If (he/she) had the opportunity to change employment or employers, do you think (he/she) would do so?***

1=YES
2=NO
3=DON'T KNOW
9=REFUSED

Q6L. ***Based on (his/her) previous experience, education or training, what other technical or professional skills that (he/she) now has, would (he/she) like to utilize in addition to the skills that (he/she) is currently using?*** [PROBE FOR OCCUPATIONAL TITLE.]

[RECORD OCCUPATIONAL TITLE]
[CODE OCCUPATIONAL TITLE BY SIC CODE.]

[Q5UX SERIES -- FOR OTHER UNEMPLOYED HOUSEHOLD MEMBER]

Q5UXA1. ***Is that person a male or female?***

1=MALE
2=FEMALE
9=REFUSED

Q5UXA2. ***And what is that person's age?*** _____ 99=REFUSED

Q5UXB. ***What kind of work did (he/she) do, what was (his/her) main occupation called?***
[PROBE. IF MORE THAN ONE OCCUPATION, ASK FOR PRIMARY OCCUPATION.]

[RECORD OCCUPATIONAL TITLE]

[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

Q5UXC. ***I would like to read you a short list of types of businesses and industries. Please tell me which one of these best describes (his/her) former employer . . . is it mainly . . .*** [READ LIST. CODE ONLY ONE CATEGORY]

- ***Agriculture / Forestry / Mining***
- ***Construction***
- ***Manufacturing***

- *Transportation, Communication, Public Utilities*
- *Wholesale Trade*
- *Retail Trade*

7. *Finance, Insurance, Real Estate*
   Health Care / Social Services
9. *Personal Services*
25. *Enertainment and Recreation*
26. *Professional Services*
27. *Public Administration, Government*
28. *Active Duty Military*
29. *Or some other business or industry?* [PROBE

Q5UXD. ***Based on previous experience, education or training, what other technical or professional skills does that person have in addition to the skills they were using on their last job?***
[PROBE FOR MAXIMUM OF TWO OCCUPATIONAL TITLES]

[FIRST OCCUPATIONAL TITLE]

[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

[SECOND OCCUPATIONAL TITLE]

[CODE OCCUPATIONAL TITLE BY SIC CODE.] _____

Q5UXE. ***Approximately how many hours did (he/she) work a week?*** HOURS ____

[IF Q5UXE GE 40, SKIP TO Q5UXG]

Q5UXF. ***Would (he/she) have preferred to work more than*** [HOURS IN Q5UXE] ***week?***

1=YES
2=NO
7=DON'T KNOW
9=REFUSED

Q5UXG. ***Was (he/she) employed on a hourly basis or a salaried employee, or self–employed?***

1=HOURLY
2=SALARIED
3=SELF
7=DON'T KNOW
9=REFUSED

Q5UXH. ***What was (his/her) (hourly wage/annual salary/annual income)?***
AMOUNT _____ 0=REFUSED

Q5UXI. ***For approximately how many years or months had (he/she) been doing that kind of work?***

_____ YEARS OR _____ MONTHS 99=REFUSED

Q5UXJ. ***How many different employers has (he/she) worked for in the last three years?***

NUMBER _____ 99=REFUSED

Q5UXK. ***If (he/she) had the opportunity to become employed, do you think (he/she) would do so?***

1=YES
2=NO
3=DON'T KNOW
9=REFUSED

[DEMOGRAPHIC INFORMATION AND CLOSING]

Q7. ***And now I have just a few background information questions and then we will be done.***
What is your sex? You are . . .

1=***Female***
2=***Male***
9=REFUSED

Q8. ***What was your age on your last birthday?*** AGE: _____ 99=REFUSED

Q9. ***What is the highest grade or year of school you've completed?*** [READ ONLY IF NECESSARY. IF RESPONDENT SAYS "HIGH SCHOOL," PROBE FOR WHETHER RECEIVED DIPLOMA. IF RESPONDENT SAYS "COLLEGE," PROBE FOR WHETHER RECEIVED DEGREE.]

1. LESS THAN 9TH GRADE
2. SOME HIGH SCHOOL, BUT NO DIPLOMA,
3. HIGH SCHOOL (INCLUDING GED)
4. SOME EDUCATION BEYOND HIGH SCHOOL, AN ASSOCIATE DEGREE, SOME COLLEGE, OR TECH/TRAINING SCHOOL

5. UNDERGRADUATE DEGREE (COMPLETION OF BA ,BS, OR EQUIVALENT)
6. SOME POST-COLLEGE OR PROFESSIONAL DEGREE (MA, MS, MFS, MBA, PH D, DOE, MD, ETC)
7. REFUSED

[IF RESPONDENT IS UNEMPLOYED, SKIP TO CLOSE 1]

Q10. ***And finally, in what town do you work?*** _____

[READ CLOSE 1]

.....

[CLOSE 1] ***That's my last question. Your answers have been very helpful and I want to thank you for your time and cooperation. Good bye.***

[CLOSE 2] ***Since our survey focuses on persons who are between the ages of 18 and 64, that is all of the information I need. Thank you for your time. Good bye.***

[CLOSE 3] ***Since our survey focuses on persons who are employed or unemployed, that is all of the information I need. Thank you for your time. Good bye.***

[CLOSE 4] ***That is all of the information I need. Thank you for you time. Good bye.***

APPENDIX E

EXAMPLES OF JOB TITLES IN THE OCCUPATIONAL CATEGORIES FROM THE OCCUPATIONAL EMPLOYMENT STATISTICS (OES) CATEGORIES OF THE BLS

Examples of Job Titles in the Occupational Categories from the Occupational Employment Statistics (OES) Categories of the BLS

Executive, Administrative, and Managerial

- Construction managers
- Education administrators
- Financial managers
- Food service and lodging managers
- Industrial production managers
- Property and real estate managers
- Accountants and auditors
- Claims examiners
- Cost estimators
- Loan officers and counselors
- Personnel specialists
- Purchasing agents

Professional Specialty

- Engineers
- Architects
- Computer systems analysts
- Chemists
- Meteorologists
- Economists
- Urban and regional planners
- Social workers
- Lawyers
- Teachers
- Doctors
- Writers, artists, and entertainers

Technicians and Related Support Occupations

- Dental hygienists
- Licensed practical nurses
- Engineering technicians
- Drafters
- Aircraft pilots
- Computer programmers
- Legal assistants

Marketing and Sales
- Cashiers
- Real estate agents
- Retail salespersons
- Stock clerks
- Travel agents

Administrative Support and Clerical
- Bill and account collectors
- Insurance adjusters
- Telephone operators
- Computer operators
- Hotel desk clerks
- Postal mail carriers
- Meter readers
- Stock clerks
- Library assistants
- Secretaries
- Bank tellers
- Customer service representatives
- Proofreaders
- Teacher aides

Service
- Janitors
- Chefs and cooks
- Bartenders
- Waiters
- Ambulance drivers
- Dental assistants
- Barbers
- Child care workers
- Flight attendants
- Fire fighters
- Police and detectives
- Guards
- Sheriffs

Agricultural, Forestry, and Fishing
- Animal caretakers
- Farm occupations
- Fishers, hunters, and trappers
- Forest and conservation workers
- Gardeners and groundskeepers

Precision Production, Crafts, Trades, and Repair

- Carpenters
- Highway maintenance workers
- Electricians
- Mining
- Mechanics
- Watchmakers
- Assemblers
- Butchers
- Jewelers
- Sheet metal workers
- Bookbinders
- Pattern makers
- Upholsterers
- Dental lab technicians
- Chemical plant and system operators

Machine Operators, Fabricators, and Hand Laborers

- Machine tool cutters and formers
- Metal fabricators
- Welding machine setters
- Furnace operators
- Plastics molding machine operators
- Bindery machine operators
- Printing press operators
- Sewing machine operators
- Boiler operators
- Cannery workers
- Grinders and polishers
- Welders and cutters
- Bus drivers
- Truck drivers
- Rail transportation workers
- Ship captains and pilots
- Material moving equipment operators
- Hand packers and packagers
- Refuse collectors
- Service station attendants