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At-Home Workers and Home-Based Business Owners in the Pioneer Valley of Western Massachusetts: A Demographic and Economic Analysis

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AT-HOME WORKERS AND HOME-BASED BUSINESS OWNERS IN THE
PIONEER VALLEY OF WESTERN MASSACHUSETTS:
A DEMOGRAPHIC AND ECONOMIC ANALYSIS

A Master's Project presented by

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CHAPTER ONE: INTRODUCTION

I. Introduction

During the past several years, economists and other researchers have speculated about the rise in alternative work situations and the expansion of home-based work. Data from the 2000 U.S. Census indicate that more than 12 million Americans (10 percent of the workforce) reported earning some form of self-employment income (as opposed to traditional wage and salary income), totaling more than \$350 billion.¹ In 2001, the Bureau of Labor Statistics reported that approximately nine million Americans had a formal arrangement with their employers to be compensated for work done from home or considered themselves self-employed.² Not insignificantly, here in the Pioneer Valley of Western Massachusetts, 9.9 percent of the region's workers reported in 2000 that they were self employed.

In recent years, many Pioneer Valley communities, and rural municipalities in particular, have identified home-based businesses and cottage industries as economic development tools, and have begun to respond with appropriate planning mechanisms, like updates to zoning bylaws. As part of a larger regional sustainable development idea, where growth is channeled to the Pioneer Valley's urban core or designated growth areas, and the character of rural communities is preserved, support for home-based businesses and cottage industries seems logical. However, the decision to devote professional planning time to support for these alternative work environments should be informed by quantitative and qualitative research on this segment of the workforce.

II. Statement of Problem

Sustainable development has recently become more prominent in state-level and regional planning programs and policies, namely the adoption of Massachusetts' Commonwealth Capital evaluation program. Fostering a sustainable development model in Western Massachusetts – including land conservation, urban investment, spatial balance between housing and jobs, diversified transportation options – will require a commitment to progressive and innovative economic models and development policies.

Alternative employment options (e.g., home-based businesses or working from home) can be part of this sustainable development conversation, and may help to strike a balance between local economies and the Pioneer Valley's regional economy. Because the region is geographically varied, with a small number of urban core cities, many suburban communities, and a number of rural municipalities, the regional economy is diverse, and sensitive to changes in a range of sectors (from agriculture and manufacturing to biotech and education). Anticipating and understanding trends and shifts in employment patterns, namely from traditional offices and employment centers to home-based workplaces, is a critical first step if planners are to respond appropriately to these long-term changes.

III. Purpose of the Study

The purpose of this project is two-fold. First, performing a demographic and economic analysis of both at-home workers and home-based business owners in the Pioneer Valley of Western Massachusetts will yield useful information about lifestyle choices, financial security, and industrial sector activity. By examining data from both 1990 and 2000 it is possible to observe trends or change over time, and to make more

informed predictions about possible future change. Exploring the data at both the broad regional level – that is, the three Western Massachusetts counties of Franklin, Hampden, and Hampshire – as well as at sub-regional geographies, namely urban, suburban, and rural, expectations of planners about this segment of the workforce can be better managed and informed.

Next, a closer look at a few selected Pioneer Valley communities – including the methods they use to collect data about home-based businesses, strategies put forth in planning documents, zoning regulations pertaining to home occupations, and common types of home-based businesses in communities can further help individual municipalities know what to expect and how to plan for this segment of the workforce. What comes out of this exercise is a useful and interesting analysis of regional and sub-regional trends, and suggestions about methods municipalities can use to track more fine-grained data about this workforce.

IV. Background

Tracking Alternative Workers

In 1960, the U.S. Census added a question about individuals' modes of travel to work, which included a response for at-home workers. The question recorded how many Americans used public transit (e.g., trains, buses, etc.), drove to work alone, carpoled, or did not travel to work because they worked at or from home. These data, along with information about commute times and distances, were used for transportation planning, but also provided an early means of profiling at-home workers (Pratt, 2000).

A variety of economic shifts during the 1970s and 1980s – including a relative shift from industrial to service-based economies as well as from a predominantly resource-based local/regional economy to an increasingly information-based global economy resulted in an upsurge of alternative work patterns (Rowe, 1999; Hill, et. al., 2003). Understanding the labor force characteristics and economic impacts of self-employed and at-home workers emerged as a unique area of research during the 1990s as evidenced by an increase in studies – supported by corporations as well as independent researchers – about telecommuting, freelance or contractual work, and independent consulting.

My previous research, conducted during the summer of 2004, isolated two segments of the Hampden and Hampshire county workforces who 1) indicated through the U.S. Census ‘journey to work’ question that they work from home; and 2) either identified themselves as ‘self-employed’ *or* reported some amount (positive or negative) of self-employment income. For the purposes of that research study, this was a logical rationale, but it must be noted that there was some overlap between the work-at-home and self-employed segments of the workforce. About 14 percent of Hampden and Hampshire Counties’ self-employed workers also work at home, and about half of those who work at home report some form of self-employment income. Nevertheless, it was important to study these two groups independently in order to gain a better sense of their different demographic and economic characteristics, and to facilitate detection of a possible ‘hidden’ economy.

There remain a variety of subsets of alternative workers who would comprise interesting and valuable study groups. Many studies identify and interview their own

sample populations in order to generate data. This project will analyze appropriate samples of existing datasets.

Issues with at-home Work

Recent media accounts uncovered a small epidemic of employers misclassifying hundreds of thousands of Massachusetts workers as self-employed, when their jobs are essentially wage and salary positions. Gringeri (1996) asserts that misclassification allows for the exploitation of low-skill and low-wage workers because employers working with independent contractors no longer have to comply with fair-labor standards. Misclassification not only allows employers to avoid paying payroll taxes, it blurs researchers' abilities to assess the accuracy or validity of non-self-reported data about income and employment class. Thus, literature is reviewed that centers on studies of workers based on their place of employment (the home) rather than the type of income they earn.

The issue of exploitation will continue to be relevant for that segment of the home-based workforce engaged in non-union jobs. Anecdotally, there is a sense that home-based work in the Pioneer Valley is not primarily in manufacturing industries or in unionized service industries, but in information sectors, and the professional or personal service sectors. A detailed analysis by industrial sector and industry will help inform Pioneer Valley planners to be more sensitive to a shift from unionized work to non-unionized home-based work.

This research project is instructive for Pioneer Valley municipal planners, as well as the regional planning agencies working in Western Massachusetts (e.g., the Franklin

Regional Council of Governments and the Pioneer Valley Regional Planning Commission) -- many of whom are actively engaged in broader long-term regional economic development planning efforts and growth management initiatives. Planners have and will continue to respond to changes in work patterns through a selection of mechanisms, from zoning for home-based businesses or at-home work to providing economic and tax incentives to encourage this lifestyle choice (or to discourage or redirect it through regulations and permitting requirements). The companion review of the methods used to track the at-home workforce in selected municipalities offers suggestions for modifying the tracking process, and for evaluating the viability of supporting home-based businesses through planning tools and techniques. Thus, planners are better able to anticipate and proactively plan for alternative employment patterns through this research.

1 U.S. Census Bureau, 2000 Census. Summary File 3, Table P69 "Aggregate self-employment income in 1999 (dollars) for households."

2 U.S. Department of Labor, Bureau of Labor Statistics, 2002. "Work at Home 2001." Available at <http://www.bls.gov/news.release/homey.nr0.htm>.

CHAPTER TWO: REVIEW OF THE LITERATURE

I. Introduction

As outlined in Chapter One, the purpose of this project is twofold – that is, to analyze demographic and labor force characteristics of at-home workers and home-based business owners in the Pioneer Valley, and to understand the methods used by individual municipalities so that researchers and planners can better track and understand trends at local levels. Thus, the literature reviewed for this project spans several topics, including general economic shifts and trends in research about home-based work, the changing relationship between work and family life, the impact of technology on work patterns, the relationship between geography (that is, spatial characteristics of a worker’s settlement area) and at-home work, and distinctions between methods used to track non-traditional segments of the workforce. Additionally, and even more importantly this review will discuss research concerning the use of home-based work as a rural economic development strategy, and more locally, the expansion of economic opportunity to rural or less-competitive areas as part of a larger suite of sustainable development strategies.

II. General economic shifts and trends in home-work research

Prior to the 1980s, many economists associated ‘at-home’ or ‘home-based’ work primarily with unpaid ‘women’s work’ (Rowe, 1999). Many researchers generally assumed that home-based workers were concentrated in a few small sectors (such as craft manufacturing and day care), which warranted little further study and had only a marginal impact on local and regional economies (Heck, 1987). During the 1980s,

however, there was a renewed interest in the role of home-based work vis-à-vis family life. Indeed, the Reagan-era sparked the removal of a number of regulatory obstacles to working from the home. Some researchers and employers touted the benefits of working at home or ‘telecommuting’ and cited the growing ability for parents (mainly mothers) to combine work and family life by moving the workplace into the home (Christiansen, 1988).

During the mid- to late-1990s, the rise of new technology-based businesses and services and the expansion of telecommunications infrastructure had deep impacts on local and regional economies – rural ones in particular. Areas that had previously been bound to manufacturing or agricultural sectors by the presence of a few large employers began to take advantage of the opportunity to diversify their regional economic bases with smaller-scale businesses, self-employment and home-based work (Kale, 1989; Hill, 2003). For instance, in 2001 the Craft Organization Development Association (CODA) released a landmark study estimating that the direct impact of craft sales reached nearly \$14 billion, and that about 80 percent of those craftspersons work in or from studios located on their residential properties. Planners in the Appalachian region and cities like Asheville, North Carolina see value in supporting these types of home-based business initiatives in order to help make rural areas more competitive with their urban or metropolitan area counterparts.

Today, some economic researchers suggest that alternative work patterns are becoming more popular because of expanded support for entrepreneurship, economic diversity, and increased productivity through technology (Hill, 2003; Pratt, 2000). While the use of technology in traditional large-scale manufacturers or industrial firms has, in

some cases, resulted in job loss (because fewer employees are needed to produce the same level of output), some researchers suggest that technology – namely communications and internet technologies -- provides an occasion for smaller home-based businesses to offer products and services that may be competitive with those found in major business centers and metropolitan regions (Zuckerman & Levin, 2003).

These economic shifts sparked a keen interest in tracking and profiling emerging workforces. Those individuals who work from home, whether in a wage and salary position or in their own incorporated or unincorporated business, share a different set of demographic characteristics, are located in a more disparate array of geographic areas, and make a unique contribution to the regional economy. At the same time, working from home begins to blur the lines between what we consider ‘residential’ and ‘commercial,’ and requires attention be paid to new infrastructure requirements, transportation needs, and land use regulations. Traditional economic models – such as location models, behavior models, and product cycle models may help researchers understand the impact of alternative work patterns on regional economies by predicting or explaining geographic concentrations of workers in particular sectors or clustering of workers with certain skill sets. Thus, planners may be able to use economic analysis tools within the context of land-use planning to encourage of apply new ‘smart growth’ principles or meet regional land-use, conservation or transportation objectives.

III. Assessments of Methods for Tracking Alternative Work Patterns

Although rudimentary data on home workers are available through U.S. Census datasets from as far back as 1960, the Bureau of Labor Statistics began actively tracking

self-employed individuals in a more rigorous way in 1985. A series of investigations mainly based at public universities, but also supported by some major national and multinational corporations, focused on different subsets of the “alternative workforce” (sometimes referred to as a “hidden economy”) (Heck, et.al. 1995; Stafford, 1992; Rowe, 1999). Early studies looked at two kinds of individuals: those who work at or from home, and those who are considered self-employed. While these efforts provided a basis for richer dialogue, the data were national in scope, and were less meaningful for municipal planners engaged in very local conversations.

In some cases, at-home work included farm and other work that may be seasonal. Different criteria for determining inclusion in economic surveys included the number of hours per week one worked at home (eight hours per week was a common threshold), or the number of hours per year one spent working at home (more than 300 per year as a threshold). One important criterion has not changed in most studies undertaken since the 1980’s – at-home workers must be paid for work done at home. This starting point eliminates from economic analysis the impact of volunteers or informal workers, and domestic work.

Because many factors influence an individual’s decision to work from home, or become self-employed in a home-based business, some studies have sought to control for factors like balancing work and education (e.g., workers finishing up higher degrees) by isolating individuals in their prime working years, ages 25 to 55 (Edwards and Field-Hendry, 1996).

Studies of the economic vitality of this segment of the labor force follow standards used by the Bureau of Labor Statistics, which includes earnings (wage and

salary income plus self-employment income). In order to understand differences in earnings, a U.S. Census study looked at both hourly and annual wage and salary and self-employment income for both men and women across each class of worker, rather than annual earnings (Edwards & Field-Hendrey, 1996).

Tracking telecommuters has proven more difficult, as the definitional criteria can vary widely. Methods used to forecast or isolate telecommuters previously used a combination of three criteria: employment in the information sector (i.e., data entry, programmers, and word processors), full-time telecommuting, and those who worked from their place of residence (Handy & Mokhtarian, 1996). This definition of telecommuting proved problematic because there are other behaviors and lifestyle patterns that may distinguish a worker from a traditional, on-site, commuting worker earning wage and salary income (such as telecommuting on a part-time basis, or from a satellite office or neighborhood telework center, as opposed to the individual's home).

More sophisticated national surveys conducted in the 1990s and after attempted to capture the frequency of telecommuting, the extent and character of telecommunications technology used for at-home work, as well as the primary reasons for working at home (Bureau of Labor Statistics, 2001). Smaller, qualitative research studies based on interviews with telecommuting employees of various companies (such as one 1990s study of IBM workers cited in Hill, 2003) tried to compile similar information. The geographic level of detail continues to be problematic, as national trends may not mirror or track to local or regional trends in the Pioneer Valley, and small group interviews with a narrow set of employees will not produce results that can be extrapolated to larger populations.

IV. Profiles of at-home workers

Research studies that set out to track demographic characteristics of home-based business owners and telecommuters examine several key factors, including education levels and income, family life patterns, age, and types of sectors and occupations (Heck, 1987; Owen, 1995; Edwards & Field-Hendrey, 1996). Recent findings indicate that home-based workers tend to be older than on-site workers, are more often female, and are self-employed in greater numbers (Edwards & Field-Hendrey, 1996). The fact that self-employment is becoming more prevalent among home-based workers undermines arguments that homebased work can be simply correlated to the exploitation of workers. Exploitation – through poor or hazardous working conditions, lack of benefits, and limited opportunity for advancement – may occur in industrial homework settings, where wage and salary workers are engaged in piecework or assembly of goods. However, self-reported self-employment income indicates that workers are making this choice because of perceived lifestyle benefits, such as flexible scheduling and integration of work and family life.

V. At-home work and geographical location

In addition, many researchers note the geographic location of workers through simple ‘urban’ and ‘rural’ designations. These designations are borne out of several criteria; the Internal Revenue Service, for instance, places workers in a “non-metropolitan” category if they live in areas with populations less than 50,000 persons (Rosage, 1993). Other models use a 25,000-population limit, and still other researchers

analyze data at county or state levels (Stafford, et. al., 1992; Rowe, 1999). Finally, U.S. Census Public Use Microdata Areas are also based first on population levels, rather than the geographic character of aggregated communities.

The literature is more limited in terms of methodology use to tracking spatial distribution and associated broader economic impacts of at-home workers. For local and regional economic development professionals, a more detailed analysis of the type of settlement or place where at-home workers are found will be important for thoughtful long-term regional planning. No studies have been located to date that have attempted to correlate neighborhood design or urban/community form with the prevalence and character of home-based work.

VI. Rural Economic Development

In the course of learning more about at-home workers, several researchers (Hill, 2003; Levin, 1998; Christensen, 1988) discuss the impact of alternative work patterns on rural economies. It is suggested that these work patterns afford planners and policy-makers an opportunity to help stabilize a community by fostering growth of the at-home workforce (Loker, 1995). In addition, research suggests that this type of work may have a measurable impact on rural economies by adding to total income generation, increasing total sales, and expanding the number of employed individuals (Rowe, 1999; Stafford, 1992).

Matthews (2004) makes the connection between rural development and entrepreneurship, noting that state and federal support for micro-credit loans, small business assistance, and availability of investment and risk capital has typically been

found in major metropolitan areas, and specifically only in a few states (e.g., California, New York, and Massachusetts). Within the past several years though, agencies like the U.S. Small Business Administration and the Treasury Department's Community Development Financial Institution (CDFI) have begun to channel more funds into areas considered "rural." Reports by financial magazines and entities such as the Kellogg Foundation point out that many of the fastest growing firms in the U.S. (in terms of total revenue generated) start as home-based businesses. This new focus on entrepreneurship in rural economic development is important, and represents a departure from 1970s and 1980s approaches to rural change, when there was a trend throughout rural areas of the Midwest for rural economic development strategies focused on homebased labor that relied on low-skill, low-wage positions, and that largely "install[ed] women in deskilled non-unionized jobs and depended ... on historical local inequalities based on gender and class" (Parr, 1999). From the 1990s to the present, researchers have suggested that there are some useful rural economic development models that can elevate women's status and success in the workforce, including loan circles, revolving funds, cooperatives and equity share companies (Wagner & Broughton, 1996). Home-based businesses can participate in and benefit from all of these models, though common obstacles and limitations include a lack of personnel to perform administrative and management responsibilities, up-front or start-up costs, and the lengthy process of raising public awareness about the value of such development models.

While discussions about individual rural economic development strategies are useful, the literature also notes a trend over the last decade, towards a more holistic approach to economic development, where rural needs and efforts are juxtaposed against

larger regional models instead of being compartmentalized and separated from research in metropolitan areas or ever-growing suburban and exurban areas.

Major changes in the way we understand local and regional economies include the previous decade's shift to 'globalization' where geopolitical boundaries no longer constrain location choice or relationship opportunities between producers and consumers, and a change towards technology- and innovation-based competition. These changes mean that location decisions are broadened to include "not only natural resource endowments and wage differentials, but also political, social, cultural, and economic resources" (Cooper, 1993). In this way, there is both an economic and a place-based motivation for supporting or encouraging this wide-range of employment choices.

This dual motivation sparks questions about the perceived impacts of alternative work environments on the character of places. Futurists and social commentators argued as early as the mid-1960s that the development of communications technology could result in the dissolution of urban cores (see McLuhan and Berry from Gillespie & Richardson, 2000). This "end of geography" argument purports that technology can and will break the ties that bind us to particular places.

Three decades later, transportation planners and planning theorists counter that we have not witnessed the demise of cities, precisely because "individual workplaces and the agglomeration of such workplaces into cities are highly functional and effective forms of human organization" (Gillespie & Richardson, 2000: 228); thus, cities and urban cores have proven more resilient and persistent than early futurists might have thought.

Moss (1987) and Gillespie (1994) both point out that patterns of metropolitan "hot spots" can be observed where telecommunications services are concentrated, and that

these concentrations foster an urban form of spatial development, rather than a loose dispersal of employment centers or development patterns. Levin (1998) continued to explore the impact of telecommunications technology on urban development, noting that the technology provides “added impetus to a decades-long trend in the growth of the self-employed” (Levin, 1998: xvii). He notes that between 5.2 percent and 9.4 percent of the workforce works from home in those locales with the highest concentrations of at-home workers. Reviewing surveys from the mid-1990s, his work further suggests that there is a trend for city-dwellers – not only suburbanites -- to work from home, as some economists previously suspected.

It is unclear, however, what the expansion of telecommunications services to outlying or rural areas may mean for regional urban centers. More importantly, it is increasingly important to develop an appropriate methodology for tracking and evaluating the economic impact of alternative or off-site employment patterns across different geographies.

VII. Other impacts of non-traditional work environments

A European study of teleworkers attempted to measure the participatory capital of telework, namely, to what degree does working in an alternative work environment affect an individual’s level of community involvement. Notably, that study opted to include only those who work from home at least one quarter of the time and use telecommunications devices for their work. This type of study would not include those who did not use some kind of information technology (IT) device for their work, even if they operated a home-based business or worked from home on a full time basis.

Previous studies (Forester, 1987) suggested that there were an array of measurable positive impacts of alternative work environments, including reduced traffic congestion and improved environmental quality, increased worker productivity associated with added flexibility in work schedules and locations, and decentralized labor markets. Accepting these assumptions, Kamerade and Burchell (2004) found that, controlling for demographics and other work-related characteristics, teleworkers were 1.52 times more likely to participate in volunteer or charitable activities than their non-teleworking counterparts. Their work informs an inquiry into the relationship between alternative work environments and sustainable development, namely, if the regional and local economic benefit is not necessarily significant or substantial, can researchers evaluate other traditionally non-quantifiable benefits of home-based business ownership or telework (such as the generation of social capital)?

In order to further study the social impact of alternative work patterns on municipalities and regions, Woolgar (2002, quoted in Kamerade and Burchell, 2004) suggests a “social constructivist” approach, where investigators look at how the relationship between telework and social participation is shaped by social context like industry, occupation, and location. This will be particularly important in this researcher’s study area – the Western Massachusetts Pioneer Valley (Hampden, Hampshire, Franklin, and portions of Berkshire counties) where there are profound and discernable variations in spatial form and land use patterns.

Two competing theories appear to still be at work, one which suggests that working from home increases social capital because individuals motivated by isolation at home are more apt to be involved in civic affairs, and another which suggests that

‘technological determinism’ creates a community-unfriendly form of work that results in increased isolation. As early as 1985, Renfo countered futurist and utopian arguments that working from home could be a panacea for traffic congestion and reduce excessive mobility by proposing the possibility of an “autistic society” that results from a loss of face-to-face contact. Still, Kamerade and Burchell (2004) note in their work that working from home or telecommuting may be chosen as a lifestyle by those with existing wide or strong social networks, so while some studies may actually show an increased participation rate on the part of at-home workers, this may be only correlative, and not indicate a causal relationship between an alternative employment pattern and social participation rates.

CHAPTER THREE: METHODS

I. Introduction

The purpose of this project is to evaluate the economic impact of home-based businesses throughout the three-county region comprising the Pioneer Valley in Western Massachusetts. This research relies on data from a variety of sources and at different geographic levels. A quantitative analysis of Census and municipal data attempts to establish a baseline assessing the economic reality of alternative work environments by industry/sector, while a qualitative review of zoning bylaws and other relevant municipal documents further informs the project's findings and conclusions.

This chapter offers a comprehensive discussion of each data source, including descriptions of each dataset, geographic extent and levels of detail, limitations and caveats associated with each data source, and uses of data in this project. An explanation of the descriptive statistics and statistical tests employed, as well as of the matrices compiled and analyzed is included below.

II. Sources of Data

In order to produce thoughtful conclusions and practicable recommendations, this project is informed by U.S. Census and municipal data, but also by conversations with planning professionals and a review of existing planning documents. Sources of data include:

1. 1990 and 2000 U.S. Decennial Census Public Use Microdata Sample (PUMS)
2. 1999 through 2005 municipal Business Certificate data

3. EO 418 Plans, also known as “Community Development Plans” or “CD Plans”
4. Municipal zoning bylaws, municipal economic development plans and other planning documents

1. U.S. Decennial Census Public Use Microdata Sample (PUMS)

Description of Dataset

Each decade, the U.S. Decennial Census yields a rich base of data that can be tabulated in a variety of ways for use by researchers, journalists, and the public. Two vehicles collect the Census’ primary data – short and long form questionnaires (Appendix A includes major differences between long form questionnaires in both 1990 and 2000). While every resident is encouraged to complete a Census form, about one in six U.S. households receive the long form version of the questionnaire by postal mail, which includes the same standard questions that appear on the short form, as well as more than twenty additional questions about housing characteristics (e.g. mortgage amounts, rents, land value, building size, etc.), and economic and demographic characteristics (e.g. types of income, number of hours worked each week, and periods of military service). The data collected from the long-form allow for a richer, more detailed level of analysis.

PUMS data was provided by two sources: 2000 data files were obtained from the Pioneer Valley Planning Commission, and included database files of person records with affiliated PUMA codes. Data files for 1990 were obtained from the Massachusetts State Data Center housed within the Donahue Institute at the University of Massachusetts Amherst. The file, issued in February 1995, included both “person records,” on which

this analysis is based, and “housing records” which include geographic identifiers and other variables (e.g. mortgage and rent rates, building types, fuel and heating sources, etc.). Because unique serial numbers are assigned to each household and its corresponding “persons,” those relevant person records were extracted from the full file and used to create a new database of person records. Examples of data points contained in the person records include total income, total earnings, class of worker, race, age, gender, industry, and occupation. While variable names changed slightly from 1990 to 2000, nearly all of the same pieces of information are contained in the two datasets. It should be noted that 1990 housing data was discarded for two reasons. First, this project did not intend to evaluate or analyze any housing characteristics as an objective or goal. Second, housing record data, while likely available from the Massachusetts State Data Center, was not included in the year 2000 files provided to the researcher.

Most data manipulation, including special queries and tabulations based on record type, PUMA, employment status, class or worker, and travel means, was performed using a combination of a flat text file editor and MSAccess. Data analysis was performed in SPSS – the Statistical Package for the Social Sciences – which was sufficient for performing the types of statistical tests necessary to meet the goals of this project.

Geographic Extent and Level of Detail

Because the long form questionnaires yield very large amounts of data, results are not available at the smallest geographic levels, like Census blocks. In addition, because the U.S. Bureau of the Census safeguards the privacy of individuals who complete questionnaires, it was necessary to develop a method of distributing detailed personal

information without compromising respondents' identities. The Public Use Microdata Sample (PUMS) was developed to allow researchers to create special tabulations using long form data for special geographic districts. PUMS data are available for each state in 1-percent and 5-percent samples. These data are organized around Public Use Microdata Areas, or PUMAs. In order to maintain privacy, responses in the 5-percent PUMS sample are separated by PUMAs that contain 100,000 residents. In some cases, PUMA boundaries follow the political boundaries of an existing city or county, while in other cases, a single PUMA may describe several municipalities or towns and cities found within two or more counties.

Between 1990 and 2000, the statewide population in Massachusetts grew by 5.53 percent, while population in the Pioneer Valley remained relatively stable, growing by only 1.04 percent.³ It should be noted that even this modest growth is not characteristic of each individual county; in fact, Hampden County's total population was practically stagnant, dropping by less than one hundred individuals. At the municipal level (or "county subdivision" as cities and towns are termed by the U.S. Census), these slight increases and decreases become even more apparent. In determining the boundaries of PUMAs, U.S. Census officials require that each PUMA contain a minimum population threshold of 100,000 individuals; from that group of responses, a 5-percent sample is extracted and made available to researchers for analysis.

To provide the most fine-grained level of data, a 1-percent sample is also available for download and on CD-ROM, but only at the "Super-PUMA" level. Again, in order to

³ U.S. Census Summary File 1 (100 Percent data) Tables P1: Total Population (Census2000) and P001: Persons (Census 1990). Accessed from American Factfinder at <http://www.Census.gov>.

maintain the privacy of respondents, Super-PUMAs are geographic areas that must contain at least 400,000 individuals, and may cover several discrete counties, as well as a wide variety of places from the very urbanized or metropolitan to the very rural. The level of data available in the 5-percent PUMS file is quite detailed, and provides an opportunity for more sophisticated analysis than town- or city-level data generally available through American Factfinder, the U.S. Census' Web-based data extraction tool. As a result, this analysis relies on 5-percent PUMS data files.

Data Limitations

While researchers generally agree that PUMS level data are useful for more fine-grained tabulations and analysis than those basic tables available in the Decennial Census Summary Files 1 and 3, there are two drawbacks to using this type of data for this project.

First, while maintaining the privacy and confidentiality of respondents is crucial, the data is not made available at the municipal, or "County Subdivision" level. Because this particular research project aims to draw conclusions that are meaningful for individual municipalities, it was important to find a way to categorize or logically group the PUMAs that comprised the three-county study area, in addition to completing an analysis of all PUMAs that contain or are contained by Pioneer Valley counties. A discussion of the method developed to create discrete and logical geographic study areas (of one or more PUMAs) appears below.

The second consideration in using the 5-percent Public Use Microdata centers on sample size. This project, in aiming to understand baseline demographic and economic

characteristics of home-based business owners and the overall at-home workforce, interprets a range of descriptive statistics (for instance, frequencies and means comparisons). For this type of analysis, the sample sizes are large enough to draw meaningful conclusions (that is, sample sizes are larger than thirty cases). In some cases, however, different workforce and travel means criteria are combined to produce smaller subsets of records (for instance, the group of home-based business owners in PUMAs containing rural municipalities in 2000). In such situations, it becomes more challenging to use some samples for more sophisticated statistical analysis, such as regressions. While relevant conclusions could still be drawn from those types of tests, it would be unwise and impractical to use an extremely small sample set to attempt to generate statistically significant results using those methods.

Application of Data to this Project

In order to determine changes or trends in the rate of home-based business ownership, as well as the economic characteristics of individuals engaged in such work, this project first undertook an historical analysis using decennial census data from both 1990 and 2000. The Bureau of Labor Statistics reports that the number of individuals who did some work from home (either in their own business or as telecommuters) during the past two decades grew by more than two million workers.

It is important to note that this project is concerned not only with the demographic characteristics and economic impact of home-based business owners in general, but also with their spatial distribution and trends that can be observed within different settlement patterns (e.g. urban, suburban/exurban, and rural). PUMA boundaries are delineated

based primarily on population counts in a given region. A detailed examination of the PUMA boundaries associated with the 5-percent PUMS data reveals a number of interesting trends.

First, on a large scale, the 1990 Census created five separate PUMAs to encompass all of the sixty-nine towns and cities in Franklin, Hampden, and Hampshire counties. This makes further categorization a bit simpler as that 1990 dataset deals only with Pioneer Valley residents. However, because of fluctuations in population (not only change in birth and death rates, but more importantly in migration within and between counties), PUMA boundaries in 2000 include some communities in Berkshire and Worcester Counties. Maps 3.1 and 3.2 display both the town boundaries and Public Use Microdata Area boundaries for 1990 and 2000. Each county is uniquely shaded, and each municipality is labeled by name. As the maps indicate, 1990 boundaries contained only Pioneer Valley municipalities, while in 2000, of the PUMAs relevant to this study, the boundaries of one microdata area extend into both Berkshire and Worcester Counties. Table 3.1 indicates the total population contained in each county, with a Pioneer Valley subtotal, for the microdata area in question – PUMA 00200.

Table 3.1: Population in PUMA 00200 by County and Region (Census2000)

	Total 2000 Population	Percent of PUMA
Berkshire County (part)	15,552	13.07
Franklin County (part)	67,758	56.96
Hampden County (part)	8372	7.04
Hampshire County (part)	4469	3.76
Worcester County (part)	22,812	19.18
Pioneer Valley	80,599	67.75
TOTAL	118,963	100.00

Rather than re-sample the existing 5-percent sample for 2000, which would have further diluted the dataset, I determined the share of population residing in Pioneer Valley towns within the entire PUMA area.⁴ More than two-thirds (67.8 percent) of that PUMA's population resides in the Pioneer Valley; the character of the communities in both Berkshire and Worcester counties that are included in this group is similar to those Pioneer Valley communities contained in the microdata area, based on a few key indicators.

Median population size in the communities found in the Pioneer Valley portion of the PUMA is 1,434 (with some striking outliers like the city of Greenfield, population 18,168 and the town of Monroe, population 93). Median population in those Census2000 PUMA #00200 Worcester communities is 1,621 (ranging from the town of Athol with a population of 11,299 to the town of New Braintree with a population of 927). Median community size in Berkshire County's portion of PUMA 00200 is 40 percent lower than Pioneer Valley communities, with 835 residents. Most of these communities have fewer than 1,000 residents, though there are some more populous towns (e.g. Sheffield, with more than 3,000 residents).

Examining the prevalence of at-home workers (both self-employed and telecommuters) in each community reveals that the median percentage of at-home workers in those Pioneer Valley towns found in Census2000 PUMA #00200 is 5.23 percent, compared to 5.00 percent in Worcester towns and 6.45 percent in Berkshire towns. While communities in Berkshire and Worcester are different in some respects to

⁴ In performing an historical comparison using this data, I consulted with a graduate student statistician about how the difference in geographic extent of the datasets would impact my analysis.

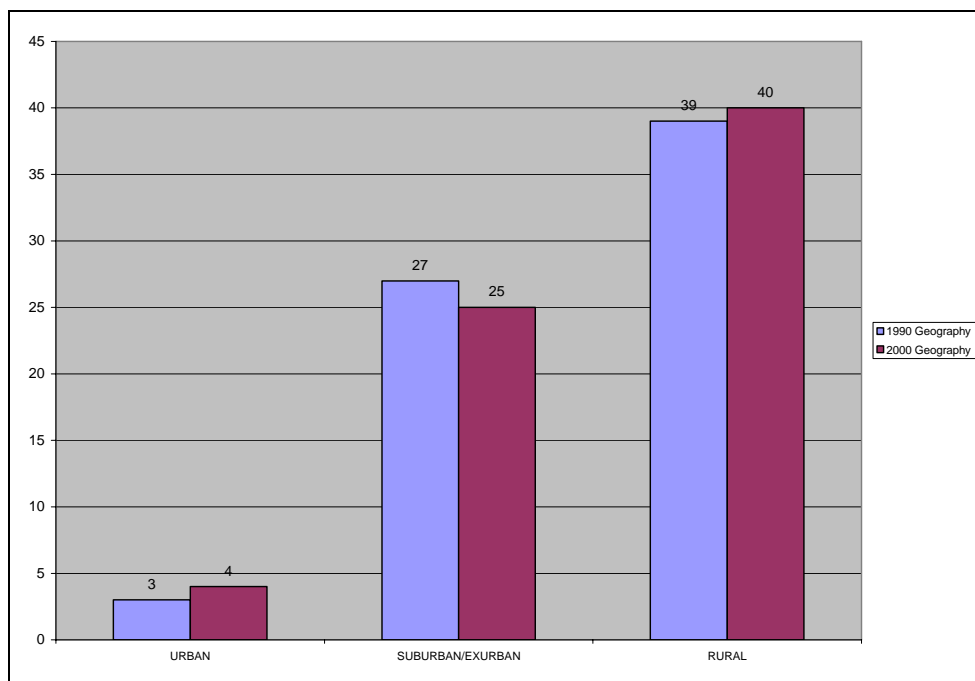
those found in the Pioneer Valley, they share similar demographic and settlement patterns. Thus, it is appropriate to use both the 1990 and 2000 Census PUMS data sets to uncover a series of trends and draw conclusions about changes in alternative employment patterns between the two time periods, and suggest predicted changes in the characteristics of the at-home workforce.

Having addressed issues associated with Census2000's change in the PUMA 00200 boundary, it should be noted that all other PUMA boundaries used in 1990 and 2000 are useful for differentiating between communities in the Pioneer Valley. To perform an analysis on a PUMA-by-PUMA basis would not have yielded meaningful results or conclusions for individual Pioneer Valley communities. Rather, this project examines the links between sustainable economic development, the alternative work force of home-based business owners, and land use. It is crucial to recognize that planning tools and development strategies will be conceived and implemented in different ways across Pioneer Valley communities. The decision was made to group those PUMAs together that contained communities that fell into one of the following three categories: rural, suburban/exurban, and urban core.

To reasonably aggregate PUMAs in both 1990 and 2000 according to geography, a review of factors such as population, population density, and number of households was performed. The result was an agglomeration of communities that shared similar settlement patterns and characteristics. Figure 3.1 indicates that between 1990 and 2000, virtually the same number of communities fell into each of the three categories. This is notable, as discussions with regional land use planners serving Hampshire and Hampden

counties likewise indicate that the Pioneer Valley has been partially successful at limiting widespread and intense change in land use or the rapid urbanization of rural or farmlands. While the threats associated with low-density single-use residential development are real, a large number of Pioneer Valley towns have diligently worked with their respective regional planning agencies (the Pioneer Valley Planning Commission and the Franklin Regional Council of Governments) as well as at the municipal level to put into place land-use regulations and mechanisms that protect and preserve community character.

Figure 3.1: Number of Communities by Geographic Category, 1990 & 2000



Density is a strong factor in classifying the communities by geography. If a PUMA was included in a particular category, but appeared to be inconsistent with other communities in that group based on the average or median density of its communities, it was placed in a more appropriate group. For reference, Table 3.2 below reviews the

average number of persons per acre in both 1990 and 2000 by classification. Total population for 1990 is taken from the U.S. Census American Factfinder Summary File 3 Detailed Tables “P001. Persons.” Total population for 2000 is taken from the U.S. Census American Factfinder Summary File 3 Detailed Tables “P1. Total Population.” The number of total acres in each community was provided by MassGIS, the Commonwealth’s web-based clearinghouse for GIS data layers. The 1999 Land Use data layer includes total acres and number of acres by land use type.

Table 3.2: Average Population Density by PUMA Category, 1990 & 2000

PUMA Category	1990 Average Persons per Acre	2000 Average Persons per Acre
RURAL	.19	.14
SUBURBAN/EXURBAN	.75	.87
URBAN	7.03	5.94

For most communities, their categorization was the same for both 1990 and 2000. For instance, Springfield and Holyoke were as urban in 1900 as they were in 2000. Rural towns like Heath, Hawley, and Colrain also have the same categorization. Appendix B includes the complete list of towns in Franklin, Hampshire, and Hampden counties, with their PUMA categorization for both 1990 and 2000. Each town’s population density and percent of at-home workers (self-employed and telecommuting) are also included.

In several cases though, either through natural shifts in population, density, and other geographic factors, or simply due to Census staff members’ need to describe PUMAs that meet the population requirement, some communities shifted categories. For instance, towns such as Southampton and Ware shifted from a rural PUMA in 1990 to a

suburban/exurban PUMA in 2000. The most striking change was the City of Easthampton's move from a rural PUMA in 1990 to part of the urban core in 2000. Map 3.3 shows, in graduated colors, the aggregation of communities in each PUMA by broader geographic category. Map 3.4 shows which communities did not experience a shift in geography, and which did.

Having categorized communities into suitable PUMAs, an analysis was performed to compare economic and demographic characteristics across two subsets of the sample. The next chapter includes a full discussion of findings tied to an analysis of all workers who indicate that they work from home (this includes both home-based business owners and telecommuters), and the subset of home-based business owners. This is done for several reasons.

First, municipal (or in Census terms "County Subdivision") level data only indicate that a person does or does not work from home, and is not cross-tabulated with that individual's worker class (e.g. a business owner, employee of a private company, municipal employee, etc.). As discussed in Chapter Four, those data are used to better understand the spatial distribution of workers in alternative employment settings, in this case the home, for any reason – whether those workers own their own businesses or telecommute. Those data are also used, along with other data points, to isolate the pilot communities where additional municipal data was collected. The process of identifying communities for further study is discussed in greater depth later in this chapter.

Next, this study further isolates the group of home-based business owners for two primary reasons. For municipal and regional planners who are concerned with expanding employment opportunities in less-competitive or uncompetitive areas, fostering the use of

the home for commercial purposes can provide added secondary or primary income for households and families and reduce the need for travel to employment centers located in other cities and towns. A review of community development plans, to be discussed later, reveals that some Pioneer Valley municipalities are committed to increasing workforce participation by rezoning for home-based businesses and implementing strategies that encourage home-based entrepreneurship (e.g. West Springfield and Plainfield). Because the planning community can and does influence the ways in which towns and cities use residential space for commercial purposes, it is crucial to understand the makeup and economic impact of this growing segment of the workforce. Even more important, once researchers understand what the landscape of home-based business ownership looks like in the Pioneer Valley, *and* how it has changed between 1990 and 2000, planners can begin develop formal and informal models for predicting or forecasting the potential industries that may emerge.

First, an historical comparison (1990 and 2000) examines *all* workers who indicate that they work from home. This subgroup is identified using three criteria: employment status, worker class, and travel means.

For 1990, the variable “RLABOR” is used to describe the “Employment Status Recode” for all person records contained in the file. The Employment Status Recode is indicates an individual’s level of participation in the workforce. This field may be populated by any of the following seven pieces of data:

- Less Than 16 Yrs. Old (Code “0”)
- Civilian Employed, At Work (Code “1”)
- Civilian Employed, With a Job But Not At Work (Code “2”)
- Unemployed (Code “3”)

- Armed Forces, At Work (Code “4”)
- Armed Forces, With a Job But Not At Work (Code “5”)
- Not in Labor Force (Code “6”)

A logical way to isolate the labor force using this type of data is to extract only those individuals coded “1” through “5.” Thus, it becomes possible to examine the demographic characteristics and economic impact of workers only. It must be noted that members of the ‘informal economy’ or those earning income that they do not report on their long-form questionnaire would not be included in this dataset.

Census2000 changed the name of this variable to “ESR” (Employment Status Recode), but maintained the same seven possible codes. The researcher used the same method for the 2000 data as used with 1990 data to separate members of the workforce from residents not participating in the workforce.

The next step was to isolate those individuals who work from home, an extraction based upon an individual’s travel means to work. The 1990 data point “MEANS” affords respondents an opportunity to indicate one of thirteen possible choices:

- Not in the labor force (Code “00”)
- Car, truck, or van (Code “01”)
- Bus or trolley bus (Code “02”)
- Streetcar or trolley car (Code “03”)
- Subway or elevated (Code “04”)
- Railroad (Code “05”)
- Ferryboat (Code “06”)
- Taxicab (Code “07”)
- Motorcycle (Code “08”)
- Bicycle (Code “09”)
- Walked (Code “10”)
- Worked at home (Code “11”)

- Other method (Code “12”)

The only records retained for the purposes of the broader historical analysis of at-home workers were those that indicated they worked at home during the reference period (Code 11). For both 1990 and 2000, the reference period was the previous week. On a sidenote, it becomes difficult to use data culled from this section of the Census to predict or track telecommuting, as workers may telecommute sporadically, or only during particular times of year (if their industry or occupation has extremely busy or slow periods).

Having assembled two samples – one of Census 1990 Pioneer Valley at-home workers and one of Census 2000 Pioneer Valley at-home workers, an analysis was performed to identify trends and characteristics. Important demographic factors include age, gender, marital status, and education level. Other factors for which data were available, but no analysis was performed, include (but are not limited to) military service, presence of children, race, citizenship, and state of birth. Workforce characteristics, such as number of hours worked per week, add to the analysis of at-home workers.

Economic status was tracked using several different measures. First, the distribution of workers by industry establishes an understanding of growth and declining sectors, as well as stable or secure industries. A comparison of median earnings and total income by sectors and occupations allows for a more detailed understanding of the viability of particular sectors or jobs, and to what degree certain sectors may drive the regional economy.

Data for industries and occupations is not identical in the 1990 and 2000 Census files. Census2000 utilized the 1997 North American Industrial Classification System, or

NAICS, instead of the long-used Standard Industrial Code, or SIC. The change came about in part from an effort to better classify new and emerging industries. More importantly, the passage of the North American Free Trade Agreement (NAFTA) in 1997 made it even more important to develop a classification system that was appropriate for industries found not only in the U.S., but in Canada and Mexico as well. The 1997 NAICS, developed in conjunction with economists, public administrators, and researchers throughout North America, replaced the ten original SIC divisions, which had been last updated in 1987, with a broader range of twenty two-digit codes (with several hundred more refined six-digit codes as well). Economists, business owners, and others had criticized the SIC classification system, prompting the Clinton Administration to consider (as early as 1992) the creation of a new system (**NAICS Association, 1998**).

For the purposes of this project, a careful review of the two classification systems was critical for any regional trend analysis to be suggested. A review of initial distributions by top-level code was further informed by a more detailed examination of those particular industries with higher concentrations of at-home workers.

Education levels may vary widely by municipality, county, region, or state. The 1990 variable “YEARSCH” tracks to the Census2000 variable “EDUC,” but some categories found in 1990 were combined, offering fewer choices to 2000 respondents. In addition, the wording of the question itself asks more directly about the *highest* degree or level of school completed. In 1990, this was not evident from the question’s wording, but was simply included as an instruction (**U.S. Census a, 1999**). In addition, Census researchers opted to group nursery school through fourth grade into a single category, but split grades five through eight into two separate categories (5th or 6th and 7th or 8th).

With regard to higher education, which has a great on impact the type industry in which one works, Census2000 split the very general category "some college, but no degree" into two separate responses: "Some college credit, but less than 1 year" and "1 or more years of college, no degree." Finally, reflecting on the decline in the number of individuals receiving occupational, as opposed to academic associate degrees, Census2000 grouped both types of two-year degree into a single category.

Each data file includes numerous economic indicators, including seven different types of incomes as well as total earnings. An individual's total income is determined by combining revenue from an array of sources: traditional wages, self-employment income reported to the IRS, social security income, retirement income from personal retirement accounts (401K, 403B, IRAs, etc.), and interest income earned on investment accounts (money market, savings, stocks, and mutual funds among others). 'Total earnings' consist *only* of the sum of wage/salary income and self-employment income, and is the indicator typically used by agencies like the Bureau of Labor Statistics to compare the economic status of workers. The focus of the data released by the Bureau of Labor Statistics (BLS), an arm of the U.S. Department of Labor, is generally on compensation derived from employment; thus, 'earnings' is the statistic used to measure payment for services. While 'earnings' is the primary financial measurement used in this analysis, total income will also be used to compare the overall economic well-being of the Pioneer Valley's at home workforce.

Following this top-level historical comparison of at-home workers in the Pioneer Valley will be a more detailed analysis of the subsets of home-based business owners in urban, suburban/exurban, and rural PUMAs. An analysis based on geographic

characteristics helps draw out those trends and patterns distinctive to certain areas of the region, and helps individual municipalities better understand baseline or benchmark data about their reference area or reference geography.

In order to isolate home-based business owners only, the variables “CLASS” (1990 Census) and “CLWKR” (Census2000) were used to extract only those respondents who indicated that they work in their own incorporated or unincorporated business, professional practice, or farm. As mentioned in the previous chapter, it can be reasonably asserted that those individuals claiming to work from home but also indicating that they are employees of a private corporation, non-profit organization, or local, state or federal government agency are likely telecommuters. Those persons were removed from my sample. Finally, persons indicating that they work from home without pay in a family business or farm were also removed from my sample. In each file, only a very small handful (sometimes three or four, in other cases, eight or ten) of persons attached this category to their employment situation.

As with the broader comparison of all at-home workers, SPSS was used to produced frequencies and distributions, means and median comparisons, and cross-tabulations of industries and occupations. Because the home-based business owner sample is smaller than all at-home workers (recall that on average, about one-quarter to one-third of at-home workers appear to be telecommuters), it is inappropriate in some instances to draw firm conclusions about the characteristics of home-based business owners (for instance, there might be only two or three person records in Census 2000 urban manufacturing sector sample with extremely high total incomes, but it would be

careless to assert that the same earnings trend would hold true for a large number of manufacturing sector urban home-based business owners).

A complete discussion of findings is contained in Chapter Four. A discussion of additional sources follows below.

2. 1999 through 2005 Municipal Business Certificates

Description of Dataset

Massachusetts General Laws Title XV include guidance on the regulation of trade, and more specifically through Chapter 110, provisions for the treatment of labels, trademarks, names and the registration of businesses. The law states that all individuals conducting business not under their own name must file a certificate with their city or town clerk, complete with the business owner's name and place of residence. Filers must also remit any fees required by the municipality. These "Doing Business As" certificates (DBAs) are kept on file with the town or city clerk, and must be renewed every three to four years, depending on the municipality. In most cases, the certificate requires business owners to describe the nature of their business (e.g., 'landscape design,' 'financial consulting,' 'bookkeeping'). The penalty for not filing a business certificate is the possibility of a \$300 fine for each month that the business does not have a valid certificate.

Municipalities maintain this data in whatever format is most efficient for them. In the communities included in this study, most paper records are kept on file at town hall; in one very small, rural town, a part-time clerk keeps these records in a secure file at her

home. In other cases, a town may enter the business certificate data into a database or spreadsheet program, like Access or Excel.

Geographic Extent and Levels of Detail

In identifying individual communities for further study, a series of indicators were compiled about each of the sixty-nine towns and cities in the Pioneer Valley. Appendix C contains the full compilation of demographic, economic, and land use data for each community. Primary indicators used to identify those communities where further study is beneficial include those with the greatest percentage of at-home workers in the local workforce, and those with the greatest percentage change (growth) in the at-home workforce. Other indicators include the identification in a town's Community Development Plan of strategies designed to support alternative work environments. A review of CD plans is contained in a matrix (Appendix D) and discussed in Chapter Four.

It must be noted that municipal level data is limited to the place of employment, namely at-home work. At the municipal level, existing datasets do not track the split between telecommuters and home-based business owners; rather, this is inferred through the regional analysis of the three types of PUMAs described above. As more attention is focused on the makeup and economic impact of this segment of the workforce, it becomes imperative for planners at both the municipal and regional levels to compile, maintain, and analyze comprehensive demographic and economic data. The ArcView GIS package was used to map the regional distribution of at-home workers, percentage changes or growth in this alternative work pattern between 1990 and 2000, and the

expressed support, through CD Plans, and other planning documents for home-based business ownership. Maps appear in Appendices E through G.

Data Limitations

There are three systemic limitations to the compilation and use of municipal business certificate data that establishes the framework for suggested solutions found in Chapter Five. Limitations discussed below include: framework of the legal requirements for filing, reliance on self-reported information, and lack of electronic maintenance of data.

The law states that individuals doing business under a name other than their own must complete and maintain a valid Business Certificate. For example, an individual operating a home-based business under the name “Jane Doe, Inc.” need not file a DBA certificate, and the municipality where the business is located would be unable to track the economic impact of commercial activity occurring in Jane Doe’s residential property. As a result, after visiting several town halls and compiling DBA data, there is a noticeable discrepancy between the number of records kept on file, and the expected number of records describing at-home workers.

The second limitation is not exclusive to this type of municipal data, but is endemic throughout all such situations where individuals complete forms or questionnaires on their own. Because it is the responsibility of the business owner to file, a municipality may have limited or no knowledge of the presence of a home-based business, the industry or sector the business is found in, the kind of work the individual performs, and the scope of economic gains associated with the business. In addition,

while the bulk of records contained complete data, there were instances where individuals neglected to complete the entire form, and did not describe the nature of the business. In some cases it was possible to discern the broad industry sector from the business name, but in others this was not possible. Such missing data makes it difficult for planners to use this information in the planning process.

Lastly, records are maintained in town halls or with town clerks mainly because Massachusetts General Laws require it.⁵ Planners, town administrators, town clerks, and other municipal employees with whom I had discussions appeared to see little value in the data contained in these records. Most files contained hand-written lists of new permits, and certificates that were missing information were filed away as ‘completed.’

Part of the difficulty in transferring this data into electronic format is the lack of planning or municipal staff in many towns. Unfortunately, it is the smaller towns with few staff members and limited hours that have the highest percentages of at-home workers (Map 3.5 in Appendix E); those are the very towns that could benefit from taking a careful look at the degree to which home-based business ownership impacts the economic status of residents.

Despite these limitations, it was instructive to establish a baseline in different communities where at-home workers and home-based business owners exist.

Application of Data to This Project

Rather than collect business certificate data from each of the sixty-nine communities in the Pioneer Valley, this project focuses on a few selected communities that are representative of different trends and characteristics (including those with high

⁵ See Appendix H for text of the regulation.

percentages of at-home workers or a significant increase between 1990 and 2000 in at-home work). Communities selected for further study include:

- Wendell
- Wilbraham
- Holyoke

The table below tracks raw number of at-home workers in 2000, at-home workers as a percentage of municipalities total workforce, percentage change from 1990 to 2000, 2000 median household income (converted to 2005 dollars), and 2000 PUMA categorization for each of the communities for which business certificate information was reviewed.

Table 3.3: Key Indicators for Selected Municipalities

Municipality	# At-home workers (2000)	% At-home workers (2000)	Percentage change 1990-2000	Median HH Income (1999⁴)	PUMA type (2000)
Wendell	57	9.86	5.01	\$ 49,712	Rural
Wilbraham	228	3.65	1.40	\$ 73,712	Suburb/Exurb
Holyoke	294	2.03	-0.43	\$ 34,514	Urban

Wendell was selected because it experienced one of largest percentage increases in at-home workers during the ten-year period from 1990 to 2000. For communities undergoing similar shifts, it will be particularly important for local and regional planning staff to have a firmer understanding of who these workers are, how their infrastructure needs might differ from other workers, and what kinds of industries their work supports.

Wilbraham was included in order to represent the Suburban/Exurban communities. Within that category, the town not only experienced the highest ten-year percentage increase in at-home workers, but also ranked in the upper quartile of

⁴ As reported in Census2000, median household incomes are for 1999, and have been converted to 2004 dollars.

communities with the largest share of at-home workers among all Pioneer Valley towns and cities. Finally, the City of Holyoke was selected for inclusion for two reasons. First, of the urban core communities that did not change PUMA categories between 1990 and 2000, Holyoke boasts the largest percentage of at-home workers. The number of individuals working at home was relatively stable (a decrease of less than one percent), and median income is among the lowest in the region. Consequently, it is valuable to understand the economic impact of home-based business owners on the urban economy, particularly if the alternative work environment affords urban residents great flexibility or higher earnings potential.

The process by which data was collected centered on visits to town halls and discussions with town clerks. Data was typically made available in paper form, and a database was created, noting the business description and year the business certificate was issued. In nearly all cases, data for 2000 was requested and received. Fees assessed were also included in the database so that communities throughout the Pioneer Valley would have a sense of whether or not fees in one municipality are prohibitive, vis-à-vis other towns in the region.

Next, businesses were assigned an appropriate two-digit NAICS code so that the level of activity in certain sectors could be determined. The frequency of businesses operating in particular sectors was determined, and is discussed in the next chapter.

3. Executive Order 418 Plans (Community Development Plans)

Description of Source

In January 2000 Governor Mitt Romney enacted Executive Order 418 (EO418) which underscored the need for comprehensive planning by providing financial and technical assistance so that communities could craft locally-driven “Community Development Plans” (CDPs). While individual municipalities could take advantage of these funds (up to \$30,000), not every community did so. In the Pioneer Valley, fifteen of sixty-nine communities did not complete CDPs. In many cases, the local regional planning agency – either the Franklin Regional Council of Governments or the Pioneer Valley Planning Commission – spearheaded the process of researching and writing the plans. In other cases, independent consultants (including the University of Massachusetts-Amherst and private agencies) oversaw the creation of the plans.

Because the funds provided through EO418 were made available through a partnership of four state agencies (the Department of Housing and Community Development, The Executive Office of Environmental Affairs, the Executive Office of Transportation and Construction, and the Department of Economic Development), completed plans were required to include chapters on housing, economic development, transportation, and the environment.

Geographic Extent and Level of Detail

The CD plans written thus far consider current conditions in an individual municipality. The plans are not designed to put forth regional or state-level strategies,

only municipal ones. However, findings gleaned from a particular CD plan are, in some instances, relevant for similar communities.

Data Limitations

While an overwhelming majority of towns completed CD plans, fifteen towns did not. One slight limitation to a Community Development Plan review is the inability to review strategies from those towns.

Application of Data to this Project

After holding public forums or town hall-style meetings, municipal or regional planning staff (or consultants) drafted a narrative laying out strategies designed to meet community goals, and a series of maps pinpointing areas for particular types of development. Research for this project included a review of available CD plans to determine which towns and or cities included specific recommendations for home-based businesses or “cottage industries.”

CHAPTER FOUR: DISCUSSION

I. Introduction

This chapter discusses the findings of an analysis of four groups of employed persons in Western Massachusetts' Pioneer Valley. First, this research provides baseline information about all Pioneer Valley individuals who work from home – both those who telecommute for their employers and those who are self-employed in incorporated or unincorporated businesses. Making comparisons to traditional on-site workers (who commute to work in a variety of ways) allows planners to develop an appreciation for variations in demographics, lifestyle choices, and economic characteristics associated with the growing segment of individuals who telecommute or own home-based businesses.

Second, this chapter delves more deeply into the demographic and economic characteristics of home-based business owners in each of the three geographic categories – urban, suburban, and rural. By segmenting the analysis in this way, the data and the analysis become more meaningful for planning professionals and researchers wishing to extrapolate or apply the findings to a particular community. Creating groupings based on geography aids in the detection of patterns and relationships that are not necessarily visible at the broader regional level. This is especially important in a region like the Pioneer Valley where an extremely wide variation in settlement patterns, transportation networks, infrastructure services, density, and land use patterns exists. Greater attention is paid to the rural segment of the Pioneer Valley, where support for cottage industries

and home-based business ownership already exists (as seen in Community Development Plans and other planning documents).

Finally, this chapter attempts to document the methods used by individual communities to track or collect data about home-based businesses, and tries to explore more fully the distribution by industrial sector of home-based business owners in three particular reference communities. In doing so, a municipality's planning professionals or planning consultants can begin to model the characteristics of home-based businesses after regional and sub-regional trends, and manage expectations associated with support for home-based businesses or cottage industries.

II. At-home workers in the Pioneer Valley: 1990 to 2000

Objective of Analysis

There are two primary objectives for this analysis. First, this discussion examines the demographic and employment characteristics of at-home workers compared to traditional on-site workers in the Pioneer Valley. Next, the discussion looks at trends over time between 1990 and 2000. As discussed in Chapter Two, several theories exist about home-based work. In the 1980s and 1990s some authors speculated that at-home work appeals to an “advantaged group of individuals” (Edwards & Field-Hendrey, 1996) who desire greater flexibility in their schedules – including location choice and time management, while other authors argued conversely that at-home workers are exploited, working for low-wages in low-skill jobs and under substandard conditions. A more contemporary view looks at home-based work as an expanded employment opportunity in rural areas, or as one component of a sustainable economic development strategy.

This chapter offers an appraisal of the region's at-home workforce over time so that planners and researchers can begin to determine which theories are most applicable to the Pioneer Valley.

Demographics and Lifestyle Characteristics

A region's labor force characteristics often reflect larger social and demographic changes, or respond to broader economic trends. The decade between 1990 and 2000 witnessed key fluctuations – from the national recession of the early 1990s to the advance of high-technology and an explosion of related jobs and industries. The subsequent puncturing of the “Internet bubble” resulted in concentrated job losses in numerous metropolitan regions around the U.S. However, unlike Eastern Massachusetts (in particular the Route 128/I-95 and I-495 corridors), the Pioneer Valley did not substantially benefit from high-technology job creation activity, and therefore was comparatively insulated from the dip in economic activity that occurred in the late 1990s and early 2000s.

Labor force participation in the Pioneer Valley grew only slightly between 1990 and 2000, and the region's unemployment rate dropped sharply over the course of the decade, from 6.1 percent in calendar year 1990 to 2.9 percent in calendar year 2000. Data made available by the Massachusetts Department of Employment and Training (DETMA) indicate that the labor force in the three counties grew by 1.2 percent from 1990 to 2000; notably, changes in labor force participation varied within the region, from quite significant growth in Hampshire County to a slight decline in the size of the labor

force in Hampden County. Table 4.1 presents an overview of labor force participation in both 1990 and 2000. In both reference years, Pioneer Valley unemployment rates tracked closely to the Massachusetts statewide unemployment rates (6.30 percent in 1990 and 2.70 percent in 2000).

Table 4.1: Pioneer Valley Labor Force Participation in 1990 & 2000

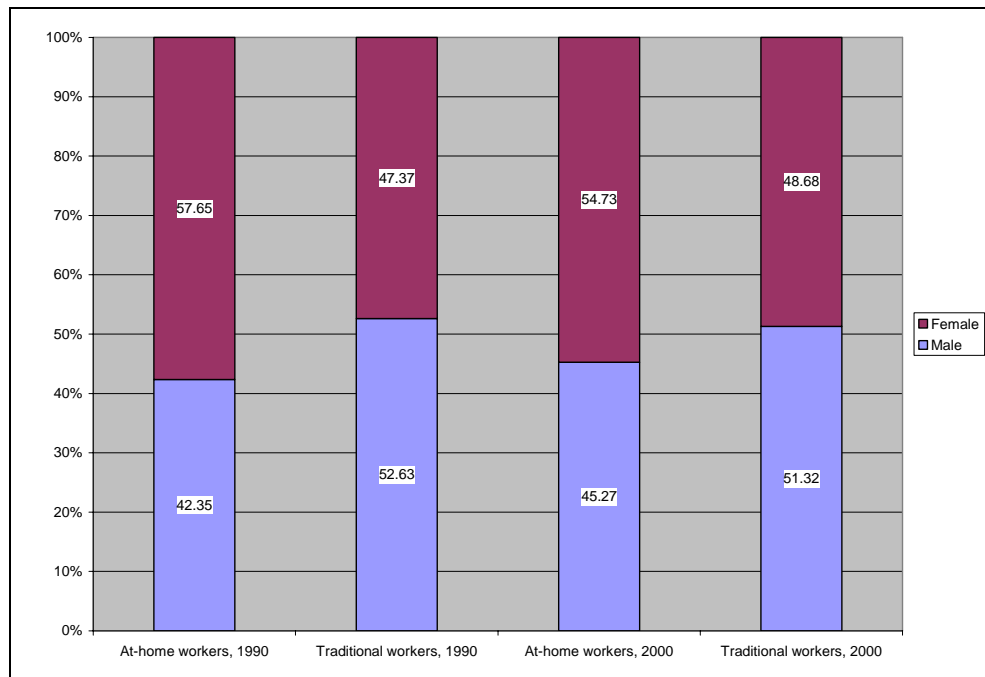
	1990 Total Workers	1990 Unemployment Rate	2000 Total Workers	2000 Unemployment Rate	Percent Change in Total Workers
Franklin County	37,203	5.19	39,067	2.41	5.01
Hampden County	222,872	6.67	218,888	3.25	-1.78
Hampshire County	80,211	5.13	86,560	2.14	7.91
Pioneer Valley	340,286	6.14	344,515	2.87	1.24

Increased labor force participation also tracked a shift in the location of workers in the three counties, with Hampden County losing workers and Franklin and Hampshire Counties workforces growing by almost ten percent. At the same time, although the Pioneer Valley did not see a radical shift in the industrial makeup of jobs and employers, non-traditional employment locations, such as at-home work, increased. Across the Pioneer Valley, the number of workers indicating that they work at home -- either as part of a formal agreement with their employers, in the context of self-employment, or as unpaid family workers -- grew from 3.1 percent to 3.7 percent between 1990 and 2000. While this region-wide shift appears small, there was an extremely wide range at the community level, with some towns experiencing rapid and significant growth in this type of employment pattern (more than 5 percent in Wendell), and others witnessing a sizeable decrease (9.2 percent in Tolland). In addition, the rate of at-home work in the Pioneer Valley is slightly higher than the state average, where 2.6 percent of workers worked at home in 1990, and 3.1 percent worked at home in 2000 -- an increase of more than 22,000

workers. This slight difference between Western Massachusetts and the state as a whole is not unexpected, as Eastern Massachusetts has a larger labor force and many more traditional employment centers and more major metropolitan regions than the western part of the state.

Gender:

Some notable and consistent differences exist between the at-home segment of the workforce and those in traditional (i.e. commuting) jobs. For instance, previous studies both in the U.S. and abroad have shown a tendency for the at-home workforce to be composed of more women than men. Informal work and unpaid family work had typically made up the bulk of employment options for many women, and formal or paid work had centered on industries like crafts production, education, and social services (such as day care provision). While the next section discusses the industrial breakdown among the region's at-home workers, Figure 4.1 shows that women continue to make up more than half of the Pioneer Valley's at-home workforce, and that the gender gap is closing slightly.

Figure 4.1: Gender Split Among Pioneer Valley Workers: 1990 and 2000**Marital Status:**

Early studies of female home-workers often acknowledged the flexibility afforded to families and single parents, as well as the tendency for at-home workers to be composed of more married individuals. This tendency holds true in the Pioneer Valley, where married workers make up more than two-thirds of the at-home workforce in both 1990 and in 2000. The only striking difference in the four samples (1990 at-home workers, 1990 traditional workers, 2000 at-home workers, and 2000 traditional workers) is the rise in divorce rates among traditional, commuting workers between 1990 and 2000 – a 4.3 percent increase. This shift is small, though, and likely did not have a measurable effect on industrial choices, or on the financial status of the traditional workforce.

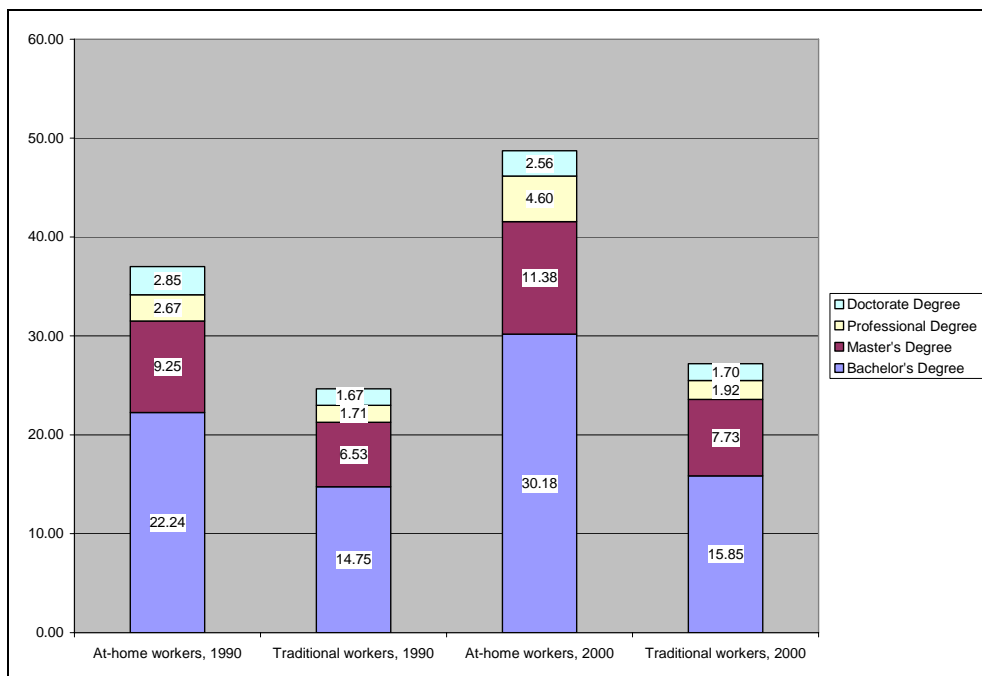
Education Levels:

Educational attainment has been on the rise for several decades, with about one in three Americans under age 55 completing four or more years of college. Linear trends are observed among all age groups and genders responding to the U.S. Census Bureau's Current Population Survey, Annual Social and Economic Supplement to the Current Population Survey, and several Decennial Censuses of Population. It can be expected that additional education affords workers expanded employment opportunities and occupational choices, as well as increased financial security through higher median earnings and diverse income options (such as interest and investment incomes).

In order to best understand the array of industrial and sector choices made by at-home workers (and the resulting economic impact of those decisions), it is valuable to compare their education levels to those of traditional workers. Two key trends are observed over time and between the two samples: at-home workers are more likely to obtain a bachelor's degree or higher than on-site workers, *and* at-home workers in 2000 attained a bachelor's degree or higher in greater numbers than their 1990 counterparts. Figure 4.2 shows the contrast between the at-home workforce and traditional Pioneer Valley workers. While national data obtained from various U.S. Census Bureau surveys apply to all Americans, and not only members of the workforce, the share of Pioneer Valley workers completing four or more years of college slightly surpasses the national average for Americans under age 55 (in 1990, 22.7 percent of Americans under age 55 completed four or more years of college, compared to 24.7 percent of Pioneer Valley workers who completed a Bachelor's degree or higher; in 2000, 26.9 percent of

Americans under age 55 completed four or more years of college, compared to 27.2 percent of Pioneer Valley workers). The small difference may result from the cluster of fourteen high-quality higher education institutions found in the Pioneer Valley.

Figure 4.2: Educational Attainment of At-home and Traditional Pioneer Valley Workers, 1990 & 2000



In the 1980s and earlier, some studies found that home-based workers were clustered in low-skill, low-wage industries and occupations, or were seeking additional (as opposed to primary) income through sales or offering personal or professional services. These trends were typically associated with a workforce that had not attained high or very high education levels. However, the Pioneer Valley's at-home workforce has continued to significantly outpace traditional Pioneer Valley workers in terms of educational attainment during the past fifteen years. Most notably, growth in service industries, including professional consulting services, may track to the almost-doubling

of the attainment of professional degrees among at-home workers. This trend foreshadows a shift in industrial choices between the at-home workers of 1990 and those of 2000, discussed in the next section.

Lifestyle Choices:

Rural economic development and sustainable economic development strategies often acknowledge the need for expanded economic choices and the commitment to removing obstacles to employment in traditional employment centers and central business districts. Such obstacles can include lack of training or education, distance to employment centers and transportation needs, lack of infrastructure or services, and the like. Flexibility in both location and work schedule can minimize barriers to employment in rural or less-competitive communities. Tracking the mean and median number of hours worked per week is a useful way of understanding variations in lifestyle between at-home and traditional workers. The data indicate that 1990's at-home workforce maintained a workweek 20 percent longer than its traditional, commuting counterpart (50 hours per week versus 40 hours per week). This difference is not trivial, and suggests that the presumed flexible or informal nature of at-home work did not necessarily allow the 1990 cohort more time with family or children, or offset time saved by not commuting. In addition, the longer workweek might suggest higher median earnings or total income (discussed later in this chapter). This trend does not hold for the 2000 at-home worker sample, where median and mean number of hours worked per week is 40 hours – the same as for traditional workers. It is possible that activity in a different set of industry clusters allowed at-home workers to maintain a more conventional work

schedule. Another possibility is that workers did not see a measurable increase in median earnings or income levels associated with longer workweeks, and made the choice to reduce maintain a more typical schedule.

Economic and Labor Force Characteristics

There are three key considerations for assessing the viability and value of home-based work as an employment choice for Pioneer Valley workers. First, what is the industrial breakdown among at-home workers as compared to traditional workers, and are there trends over time? Second, what is the economic status of at-home workers in different sectors and industries as compared to traditional workers, and are there discernable trends over time? Finally, to what degree does the at-home workforce contribute to total economic activity in particular sectors or industries? This last question allows planners and researchers to estimate the economic impact of particular home-based business or types of home-based work that could support a local, sub-regional, or regional economy. If indeed there are certain industrial sectors in which the at-home workforce generates a substantial share of total earnings, planners could tailor or target economic development strategies, infrastructure improvement projects, or other investments to support such industries.

The 1990 PUMS file includes Census industry codes based on the Bureau of Labor Statistics 1987 Standard Industrial Codes. Fourteen broad divisions (plus categories for the unemployed and active military) are used to describe the industries respondents note on their Census questionnaires. Census2000 relied on the 1997 North

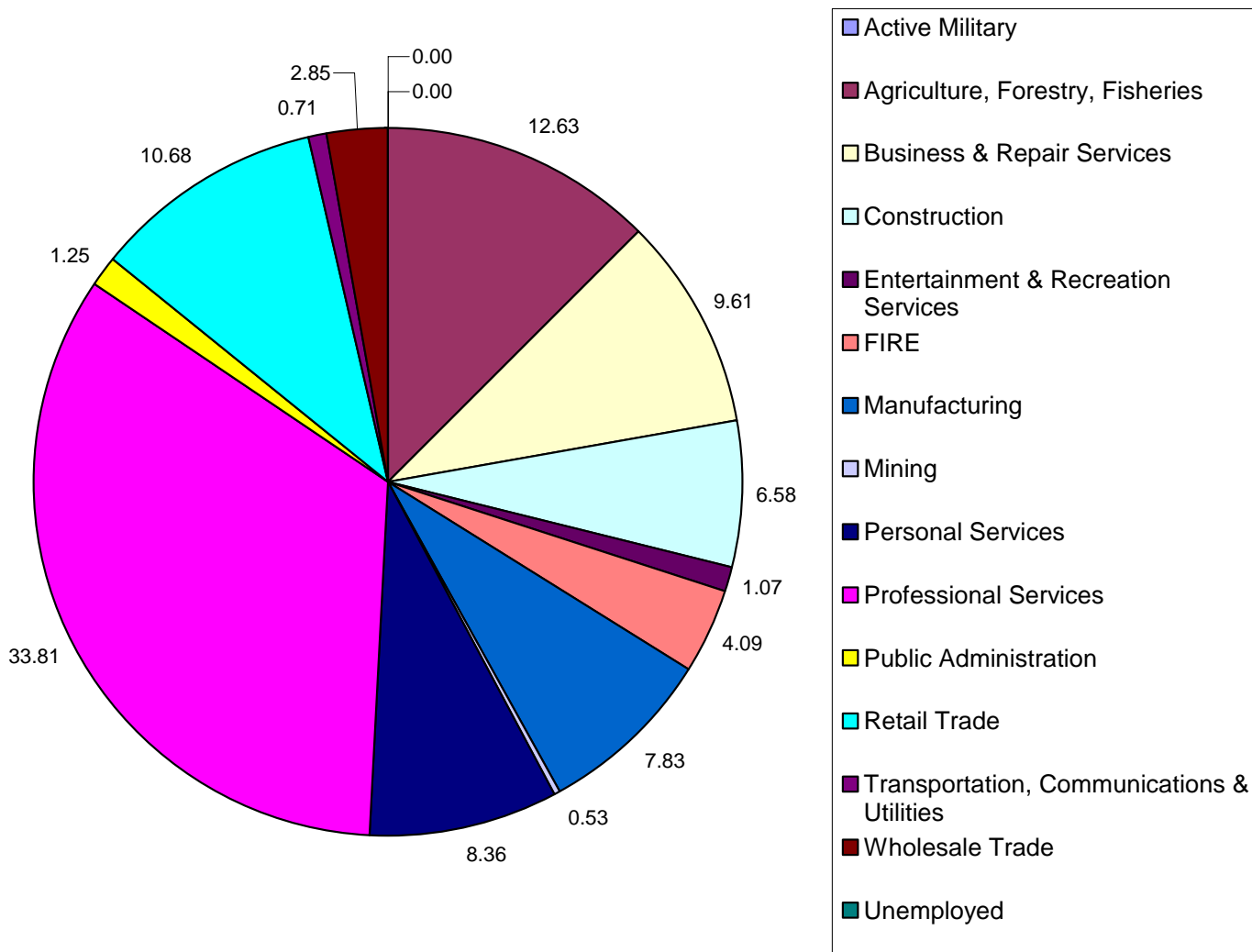
American Industrial Classification System (NAICS) and used twenty broad categories (and a category for the unemployed) to catalog the industries supplied by respondents on their Census questionnaires. Appendix I presents a comparison between the sectors described in 1990 and those described in 2000. As noted in Chapter Three, one major difference between the two classification systems is the acknowledgement by the 1997 codes of new and emerging sectors and industries (such as “Information”), as well as significant growth and diversification of existing sectors (such as the splitting of “Finance, Insurance and Real Estate” into two separate industrial sectors).

Figures 4.3 and 4.4 compare the distribution of the at-home and traditional workforces by industrial sector in 1990. Note that some classifications, such as “active military” and “unemployed” account for zero percent of the workforce. These are included so as to maintain consistency between the at-home and traditional workforce graphs.

To identify notable trends among the at-home workforce, three factors are considered: first, those industries or sectors with the highest shares of at-home workers relative to the entire at-home workforce; second, those industries or sectors where the share of the at-home workforce outpaces that of the traditional workforce; and third, those industries or sectors where the concentration of at-home workers appeared to grow between 1990 and 2000. With regard to this last factor, in some sectors it is possible to compare 1990 and 2000 data, for instance in construction, retail trade, or agriculture. However, in other cases it is not possible to compare growth in a certain sector over time because of changes in industry classifications (e.g., the addition of educational services, health care and social assistance, and information).

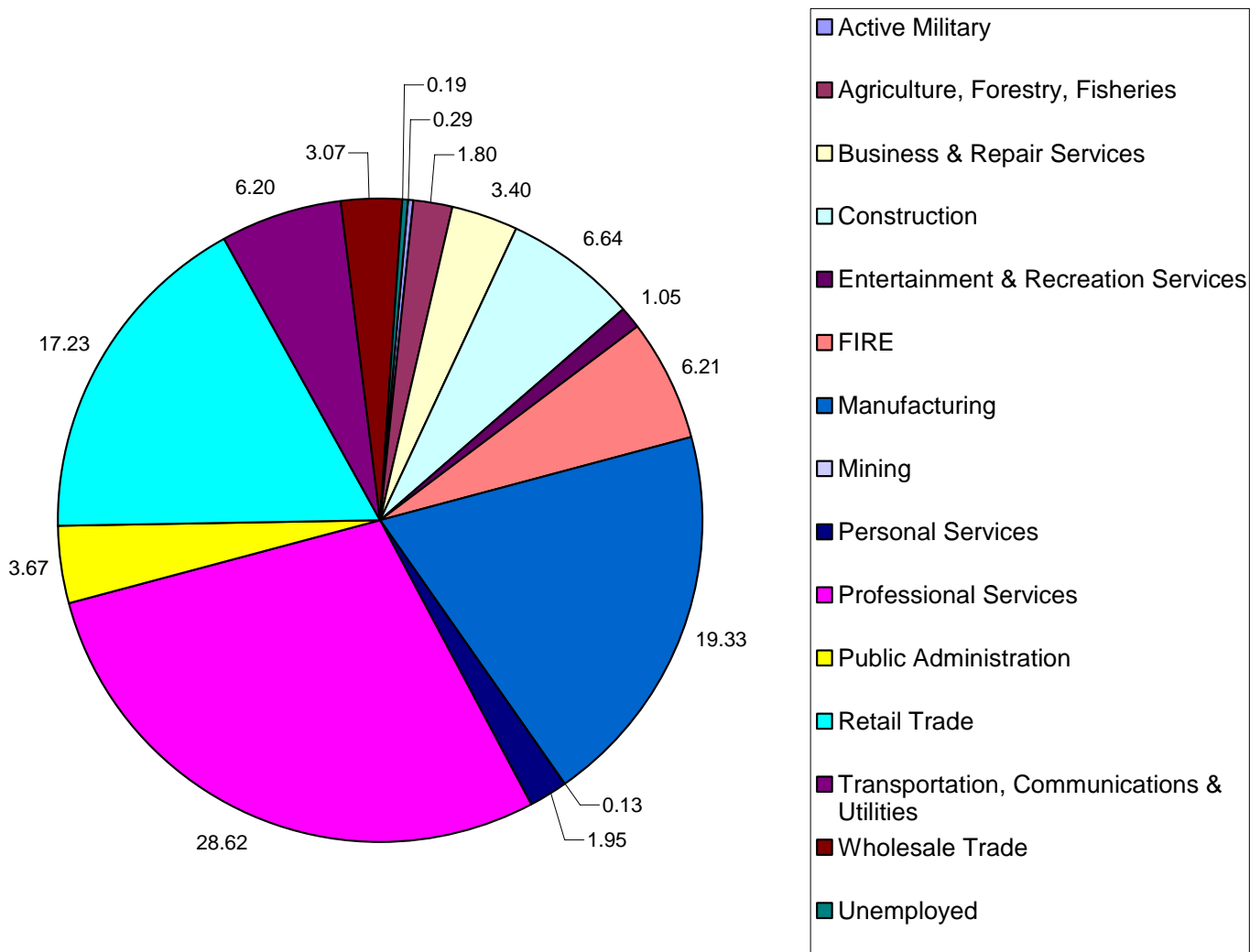
Pioneer Valley at-home workers are clustered in three main sectors: Professional Services (with more than one-third of all at-home workers found in this sector), Agriculture, Forestry & Fisheries, and Retail Trade. These three sectors account for 57.1 percent of the at-home workforce. The Business & Repair Services and Personal Services sectors together account for about one-fifth (18.0 percent) of the total at-home workforce. This distribution differs only slightly from the traditional commuting workforce, where the highest level of activity is seen in the Professional Services, Manufacturing, and Retail Trade sectors (which when combined account for 65.2 percent of the traditional workforce).

Figure 4.3: At-home Workers by Industry, 1990



INDUSTRIAL SECTOR	NUMBER OF CASES	PERCENT OF SAMPLE
Active Military	0	0.00
Agriculture, Forestry, Fisheries	71	12.63
Business & Repair Services	54	9.61
Construction	37	6.58
Entertainment and Recreation Services	6	1.07
FIRE	23	4.09
Manufacturing	44	7.83
Mining	3	0.53
Personal Services	47	8.36
Professional Services	190	33.81
Public Administration	7	1.25
Retail Trade	60	10.68
Transport., Comm., & Utilities	4	0.71
Wholesale Trade	16	2.85
Unemployed	0	0.00
TOTAL	562	100.00

Figure 4.4: Traditional Workers by Industry, 1990



INDUSTRIAL SECTOR	NUMBER OF CASES	PERCENT OF SAMPLE
Active Military	51	0.29
Agriculture, Forestry, Fisheries	384	1.80
Business & Repair Services	645	3.40
Construction	1193	6.64
Entertainment and Recreation Services	188	1.05
FIRE	1104	6.21
Manufacturing	3409	19.33
Mining	25	0.13
Personal Services	387	1.95
Professional Services	5171	28.62
Public Administration	645	3.67
Retail Trade	3059	17.23
Transport., Comm., & Utilities	1083	6.20
Wholesale Trade	551	3.07
Unemployed	33	0.19
Not Classified	38	0.21
TOTAL	17966	100.00

Recall that the 1990 Census industry codes are classified according to fourteen broad sectors, but there are many other subsidiary codes which provide a more detailed description of each major industrial sector. While it is informative to cross-tabulate these more specific industry codes with their broader classifications, sample sizes in the at-home workforce data become very small at the most refined levels, and a 100% study of at-home workers might reveal slightly different trends. While interesting patterns are visible, researchers must be careful not to extrapolate these findings across the entire population without performing a companion survey or assessment of a larger sample of the at-home workforce.

A cross-tabulation of the broad sector codes with detailed secondary codes reveals that within the professional services sector, the strongest clusters of activity are found among family child care homes (20.0 percent) and colleges and universities (16.3 percent). “Family child care homes” differs from the “child daycare services” category in that the former must include only licensed facilities. Nearly 7 percent of at-home workers indicate that they work in the more informal “child daycare services” industry, meaning that nearly one-third of professional service-sector workers are engaged in some form of childcare. As suggested in previous research on home-based workers, child care service businesses have provided added economic opportunity to a significant number of women and families.

A limitation associated with the classification of industries by Census codes is the inevitable use of “miscellaneous” categories. In the case of at-home professional service workers, close to one-fifth (16.3 percent) are classified as working in a “miscellaneous professional and related services” industry. This limitation becomes less apparent in

2000, when more sophisticated 6-digit NAICS codes are assigned to respondents' industries.

With regard to the Agriculture, Forestry & Fisheries sector, it is not surprising that an overwhelming share (80.3 percent) of Pioneer Valley at-home workers in this sector are engaged in the production of crops or the raising of livestock (as opposed to horticultural services, forestry, fishing, hunting or trapping, for instance). The Pioneer Valley in general, and Franklin County in particular, has a rich history of agricultural activity, and is associated with the production of several key items (asparagus, blueberries, and tobacco to name but a few). It should be noted that the between 1990 and 2000, total labor force participation in the agricultural sector dropped from 2.1 percent to 1.1 percent. While the percentage of the total Pioneer Valley workforce engaged in agriculture is small, the decline should be acknowledged. Possible factors include falling earnings among agricultural workers and the loss between 1985 and 1999 of 25,507 acres of undeveloped and agricultural lands to commercial, residential and other types of development throughout the Pioneer Valley.⁵

Finally, 1990 at-home workers in the Retail Trade sector are distributed among a variety of industries, from grocery and home-furnishings stores to direct sales establishments. More than one-fifth (23.4 percent) of at-home workers in the retail sector operates motor vehicle dealerships from their homes.

The Business & Repair Services and Personal Services sectors stand out because many more at-home workers are found in these industries as compared to traditional workers. While 3.4 percent of traditional workers engage in Business & Repair Services

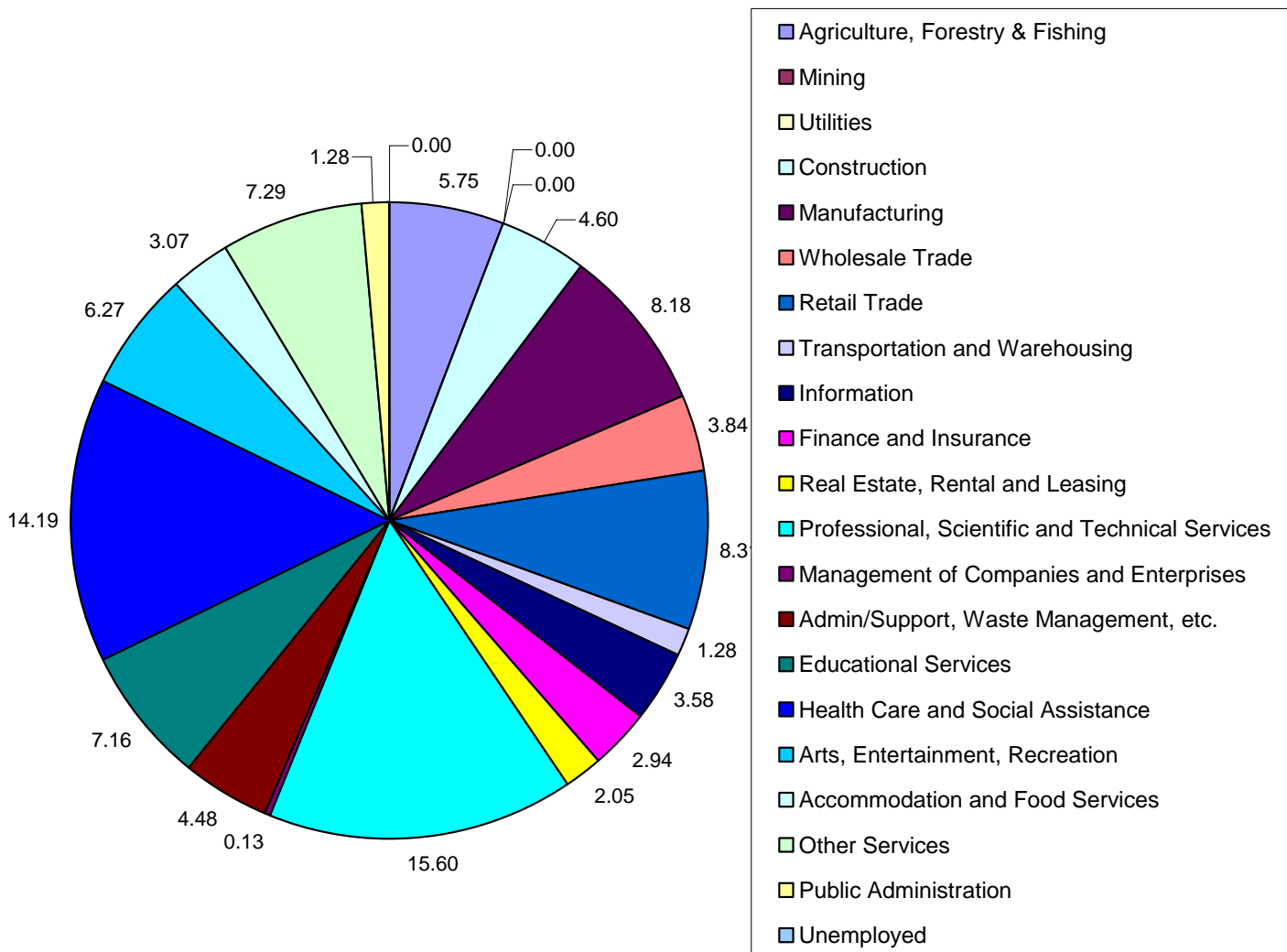
⁵ MassGIS Land Use Statistics 1985 to 1999. Classifications of "developed" and "undeveloped" land are based on aggregations of MacConnell Land Use Codes. Developed Land = MacConnell codes 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, and 19. Undeveloped Land = MacConnell codes 1, 2, 3, 4, 5, 6, 14, 20, and 21.

(specifically in automotive repair and general business services), nearly three times as many – 9.6 percent – of at-home workers choose to work in this sector (also in the automotive repair and general business services sectors).

A similar trend is found in the Personal Services sector, where only 1.9 percent of traditional workers are found (mainly in beauty shops, hotels and motels), compared to 8.4 percent of at-home workers (also clustered in beauty shops).

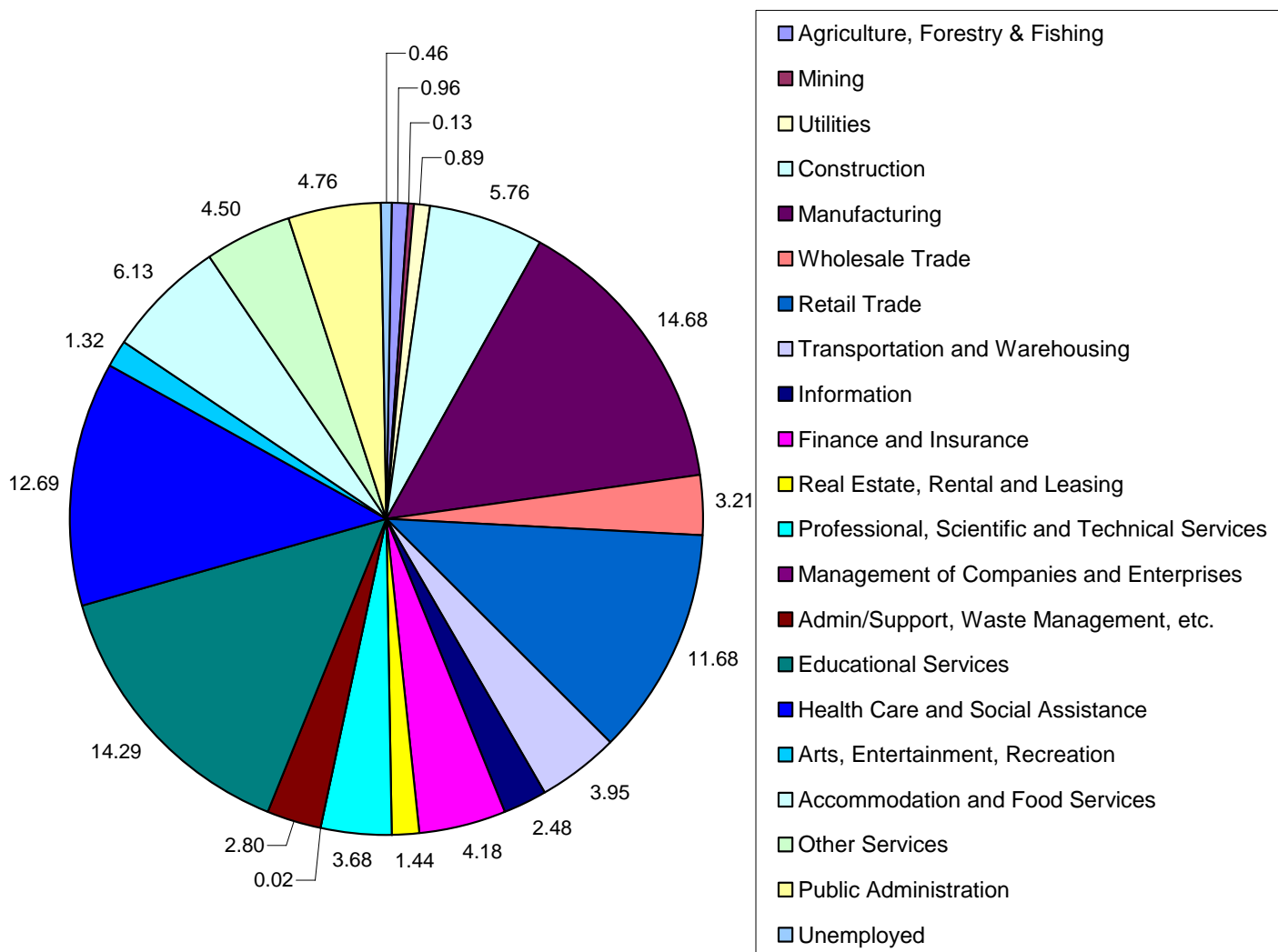
Figures 4.5 and 4.6 compare the distribution of workers by industry in 2000. With twenty broad sector codes and thousands of detailed codes, it is not quite as easy to identify very larger clusters or groupings of workers with the 2000 data. However, Professional, Scientific & Technical Services, Healthcare and Social Assistance, and Retail Trade emerge as the most popular industries for at-home workers. These three sectors account for 38.1 percent of the at-home workforce.

Figure 4.5: At-home Workers by Industry, 2000



INDUSTRIAL SECTOR	NUMBER OF CASES	PERCENT OF SAMPLE
Agriculture, Forestry & Fishing	45	5.75
Mining	0	0.00
Utilities	0	0.00
Construction	36	4.60
Manufacturing	64	8.18
Wholesale Trade	30	3.84
Retail Trade	65	8.31
Transportation and Warehousing	10	1.28
Information	28	3.58
Finance and Insurance	23	2.94
Real Estate, Rental and Leasing	16	2.05
Professional Services	122	15.60
Management of Companies/Enterprises	1	0.13
Admin./Support, Waste Management, etc.	35	4.48
Educational Services	56	7.16
Health Care and Social Assistance	111	14.19
Arts, Entertainment, Recreation	49	6.27
Accommodation and Food Services	24	3.07
Other Services	57	7.29
Public Administration	10	1.28
TOTAL	782	100.00

Figure 4.6: Traditional Workers by Industry, 2000



INDUSTRIAL SECTOR	NUMBER OF CASES	PERCENT OF SAMPLE
Agriculture, Forestry & Fishing	45	0.96
Mining	0	0.13
Utilities	0	0.89
Construction	36	5.76
Manufacturing	64	14.68
Wholesale Trade	30	3.21
Retail Trade	65	11.68
Transportation and Warehousing	10	3.95
Information	28	2.48
Finance and Insurance	23	4.18
Real Estate, Rental and Leasing	16	1.44
Professional Services	122	3.68
Management of Companies/Enterprises	1	0.02
Admin./Support, Waste Management, etc.	35	2.80
Educational Services	56	14.29
Health Care and Social Assistance	111	12.69
Arts, Entertainment, Recreation	49	1.32
Accommodation and Food Services	24	6.13
Other Services	57	4.50
Public Administration	10	4.76
TOTAL	782	100.00

Looking more closely at these sectors, at-home workers in professional, scientific and technical services mainly focus on management, scientific and technical consulting services (including establishments that provide advice and assistance to businesses and other organizations on management issues, such as “strategic and organizational planning; financial planning and budgeting; marketing objectives and policies; human resource policies, practices, and planning; production scheduling; and control planning”⁶) and specialized design services (excluding architectural, engineering, and computer systems design).

A substantial share of Healthcare and Social Assistance workers (65.8 percent) work in the Child Daycare Service industries. This includes informal babysitting from home, child care centers, infant care centers, nursery schools, and similar establishments. Despite anecdotal evidence that home-based child care work is on the rise, in the Pioneer Valley nearly identical shares of at-home workers engaged in this activity in 1990 as in 2000 (9.1 percent of 1990’s at-home workers and 9.3 percent of 2000’s at-home workforce were found in this sector).

Because sample sizes are small, it is difficult to assert with authority that there have been significant changes in the character of at-home Retail Trade workers. However, while workers in this broad sector are distributed across an array of sub-sectors, there appears to be a small cluster in used merchandise stores (a classification that covers antique and consignment shops, used book stores, record shops, and many other types of retail establishments).

⁶ “2000 NAICS Definitions.” U.S. Census Bureau, available at <http://www.census.gov/epcd/naics02/def/>

While it is important to identify the sectors where at-home workers cluster, it is also crucial to examine the economic impact of these workers on the regional economy, and the economic security (measured by median earnings) these workers experience. Appendix J includes a comprehensive breakdown of median earnings and median total income among Pioneer Valley and at-home and traditional workers in each industry. Additionally, Appendix J also includes the share of total earnings attributable to the at-home segment of the workforce in that industry. Generally, it is expected that the share of employees will track closely to the share of total earnings, for instance, if the at-home workers make up 10 percent of all Pioneer Valley workers in the Construction industry, it is reasonable to assume that those workers generate a roughly comparable share of total earnings in that industry. If planners and economic development professionals are interested in supporting or fostering growth in cottage industries or home-based work, it would be wise to prioritize those industries or sectors where the at-home work force may generate a greater-than-expected share of earnings, or where median earnings among at-home workers outpace their traditional commuting counterparts.

Recall that PUMS data for both 1990 and 2000 report 1989 and 1999 dollars, respectively. *While the appendix includes both the originally reported dollar figures as well as the adjusted figures*, this section makes comparisons in 2004 dollars only. In some cases, ‘earnings’ are the measure used to describe the economic well being of a worker. Earnings, which include wage and salary income, as well as self-employment income, are typically used by agencies like the Bureau of Labor Statistics for economic comparisons and analysis. However, ‘total income’ is also a useful measure for this

study as it includes interest income, retirement income, public assistance, and a variety of other forms of income that home-based business owners might earn.

Since 1990, the Pioneer Valley's at-home workers have had median earnings far below their traditional, commuting counterparts. The earnings gap – 129 percent in 1990 – dropped to 46.6 percent in 2000. Table 4.2 below presents a review of median earnings and median incomes for all industries for both at-home and traditional workers.

Table 4.2: Median Earnings for At-home and Traditional Pioneer Valley Workers

Type of Worker	Median Earnings (1989\$)	Median Earnings (2004\$)	Median Income (1989\$)	Median Income (2004\$)
1990 At-Home	\$8,000	\$12,195	\$11,376	\$17,341
1990 Traditional	\$18,372	\$28,006	\$19,945	\$30,404
2000 At-Home	\$17,050	\$19,331	\$22,985	\$26,060
2000 Traditional	\$25,000	\$28,345	\$26,000	\$29,478

Notably, at-home workers median earnings rose by 58.5 percent in the decade between 1990 and 2000 – a considerable increase. At the same time, median total incomes for at-home workers also rose by 50.1 percent. These earnings and income figures stand in stark contrast to those of traditional, commuting Pioneer Valley workers, whose median earnings were nearly stable between 1990 and 2000 (though almost \$10,000 higher than the at-home cohort); traditional workers also experienced a slight drop in median total income, likely due to changes in interest or retirement incomes.

If at-home workers experienced this sharp increase in earnings and total income, is this due to an overall increase across all industries, or are there particular sectors where home-based work activity was more productive or lucrative between 1990 and 2000? A review of those industries which were classified in both reference years indicates that the increase in median earnings was distributed across a range of sectors. In some cases,

such as Public Administration, there were almost identical shares of at-home workers in that industry, but median incomes were nearly three times higher in 2000 as in 1990. As mentioned earlier, small sample sizes make it difficult to assert that this trend would appear if a larger sample of Public Administration workers were analyzed.

The data suggest that the rise in at-home workers median incomes may be due to natural trends in some sectors, for instance the 50 percent increase in median earnings for at-home workers in the Construction industry could be tied to a swelling in new home construction during the 1990s. Even more interesting, in the Manufacturing sector, there was nearly a doubling in median earnings and almost a doubling in the share of manufacturing workers who work at home. Looking more closely at the sector, activity is distributed in a range of smaller businesses, from furniture making and candy production to pottery and paper-making. Increased local and regional support local craft making and cottage industries from economic development professionals and consumers may have sparked this trend.

A final note about the overall increase in median earnings and incomes: emerging sectors strongly contribute to this economic shift, particularly in the case of the Information sector. More than 5 percent (5.26 percent) of all information workers are based in the home, in profitable sub-sectors such as publishing, video production, and film-making.

Overall, the at-home segment of the workforce is not generating a larger-than-expected share of regional earnings or regional total income. Table 4.3 and Table 4.4 list each industry's share of at-home workers and at-home workers' share of total earnings generated in each industry. Notably, earnings generated by the at-home workforce were

below the expected share in 1990, but the increase in median earnings across several different sectors resulted in a nearly equal distribution of earnings and labor force participation rates in 2000.

In 1990, the FIRE (Finance, Insurance, and Real Estate) and Personal Services sectors display a positive difference between earnings and labor force participation, indicating that economic activity within these industries was particularly profitable or lucrative. This becomes more apparent when looking at the 2000 data, where FIRE is split into two unique sectors, and where the home-based worker segments are each responsible for a larger share of total regional earnings than one would expect.

Another important trend that emerges in 2000 is the profitability found in the Retail and Wholesale Trade sectors. A closer look at the industries represented by these two sectors reveals productive activity among non-store retailers and mail-order/Internet retailing, used merchandise stores, and durable goods wholesalers.

Table 4.3: At-home Workers' Contribution to the Regional Economy (1990)

Industry	Median Earnings (2004\$)	At-home Workers' Share of Industry	At-home Workers' Share of Earnings
Agriculture, Forestry & Fishing	\$12,195	18.49	16.23
Mining	\$6,463	12.00	9.63
Construction	\$22,866	3.10	2.95
Manufacturing	\$12,157	1.29	0.82
Wholesale Trade	\$6,174	2.90	0.84
Retail Trade	\$9,756	1.96	1.36
Transportation, Communications and Other Public Utilities	\$69,817	0.37	0.77
FIRE	\$38,110	2.08	2.52
Business and Repair Services	\$15,152	8.37	7.15
Professional and Related Services	\$10,671	3.67	2.58
Entertainment and Recreation Services	\$7,855	3.19	1.51
Personal Services	\$10,671	12.14	12.58
Public Administration	\$1,924	1.09	0.11
TOTAL	\$12,195	3.13	2.26

Table 4.4: At-home Workers' Contribution to the Regional Economy (2000)

Industry	Median Earnings (2004\$)	At-home Workers' Share of Industry	At-home Workers' Share of Earnings
Agriculture, Forestry & Fishing	\$7,143	18.75	11.60
Construction	\$32,313	2.99	2.83
Manufacturing	\$24,036	2.10	2.04
Wholesale Trade	\$24,943	4.39	7.57
Retail Trade	\$17,007	2.67	3.73
Transportation and Warehousing	\$23,186	1.23	2.12
Information	\$40,930	5.26	5.94
Finance and Insurance	\$43,084	2.63	4.02
Real Estate, Rental and Leasing	\$33,787	5.19	6.92
Professional, Scientific and Technical Services	\$29,138	14.04	13.28
Management of Companies and Enterprises	\$58,730	16.67	28.15
Administrative and Support Waste Management and Remediation Services	\$22,676	5.79	9.41
Educational Services	\$7,143	1.89	1.02
Health Care and Social Assistance	\$16,553	4.13	2.75
Arts, Entertainment, Recreation	\$14,399	15.46	23.90
Accommodation and Food Services	\$19,501	1.89	4.00
Other Services	\$17,007	5.86	5.19
Public Administration	\$6,349	1.02	0.40
TOTAL	\$19,331	3.71	3.77

Conclusions

While at-home workers represent a small fraction of the entire regional workforce, the segment continues to grow and to become a stronger economic force, particularly within certain industries and sectors. The choice to work from home appears to offer greater flexibility in scheduling and duration of workweek, and appeals to a portion of the labor force that has attained higher education levels than the overall Pioneer Valley labor force. The discussion that follows next looks more closely at trends

among home-based business owners, especially those in the Pioneer Valley's rural communities.

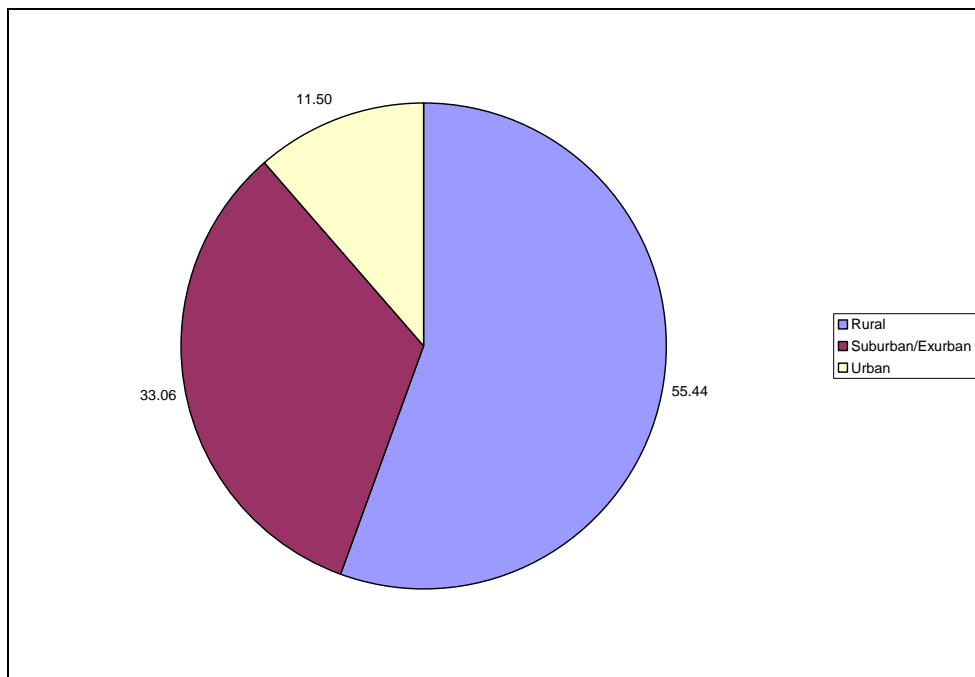
III. Home-based Businesses in the Pioneer Valley's Rural, Suburban, and Urban Communities

Objective of Analysis

This next section takes a closer look at a subset of the at-home workforce: home-based business owners. The rationale for this further sampling of the at-home workforce is threefold. First, in both reference years 1990 and 2000, nearly two-thirds (62 percent) of at-home workers were employed in their own incorporated or unincorporated business, rather than telecommuting on behalf of a public or private employer. Telecommuters or teleworkers may have a very broad range of relationships to their employers, from formal one- or two-day-per-week telecommuting schedules, to an occasional or seasonal pattern of working from home. (Recall that given this self-reported data, there is a greater likelihood that telecommuters in this sample do so for a majority of their work week, but their schedules may still be flexible). Second, from a planning perspective, it is easier to support or encourage – through zoning reform, economic development planning and other means – the ownership of home-based businesses than it is to support a systemic shift towards telecommuting. Thus, home-based business ownership becomes an innovative method of diversifying employment options in rural and other areas in the Pioneer Valley. In terms of local planning, several Pioneer Valley communities have already shown an interest in growing cottage industries or home-businesses. Third, data about the economic impact or demographic characteristics of this segment have been

absent from many local and regional planning dialogues, therefore it is advisable to provide ground truth for the existing assumptions and anecdotal evidence.

A majority (55.4 percent) of the region's home-based business owners are located in those communities found in "rural" public-use microdata areas (discussed in Chapter Three). About one-third (33.1 percent) are found in suburban or exurban area, and the smallest fraction – only 11.5 percent – are located in the region's urban core communities of Springfield, Chicopee, Holyoke, or Easthampton. Compared to the 1990 rural home-based business owner sample, the 2000 sample shows an increase of 69.8 percent – greater than the change observed in the urban or suburban samples. Because planning professionals in several rural Pioneer Valley communities are investing time and effort in supporting home-based business entrepreneurship and ownership, the economic and labor force characteristics discussion is limited to the rural sample. (Additionally, a very small urban sample size makes those observations less replicable across a larger population, and thus, somewhat less meaningful for planners).

Figure 4.7: Geographic Distribution of Home-based Business Owners (2000)

Demographics and Lifestyle Characteristics

Previous research suggested that home-based business ownership presented a practical option for women who were either just entering the workforce, or were looking for creative ways of combining work and family responsibilities. This was particularly true in rural areas, where cottage industries, craft businesses, and agricultural- and natural-resource based business were considered more viable than in urban or suburban areas. The trend seen in both 1990 and 2000 for women to comprise a majority of at-home workers in the Pioneer Valley persists when we isolate home-based business owners and categorize by geography in 2000. The data show that the split is most noticeable in the Pioneer Valley's urban core, where 62.5 percent of home-based business owners are women; at the same time, 52.5 percent of both rural and suburban home-based

business owners are women. Note that the smaller urban year 2000 sample might make the gender differential appear larger than it is; compiling a larger sample of data in the urban core would refute or confirm these findings.

What is more interesting is the difference in the gender differential among rural communities between 1990 and 2000 – in the earlier reference year, the split was reversed such that 52.8 percent of home-based business owners were male. Several factors may be correlated to this shift, such as educational attainment. First, there is a nearly fifteen percentage-point increase in the share of home-based business owners attaining bachelor's degrees or higher – an boost that pushed the number of degree-holders to more than half (56.6 percent) of the total. While more rural home-based business owners were earning degrees, even more were entering college or earning associate's degrees. While in 1990 only 16.5 percent of this segment had associate's degrees (either professional or occupational) or started college, a full 20 percent did so in 2000.

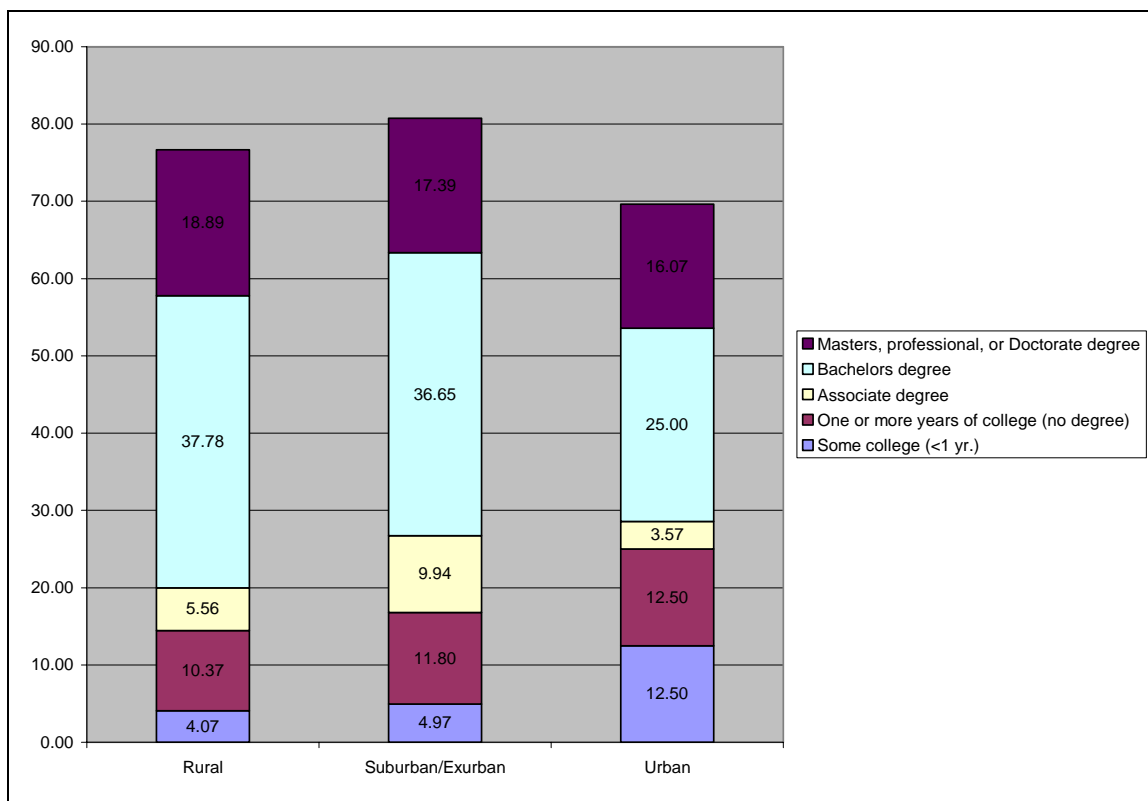
Correlated to this rise in educational attainment is a drop in activity in industrial sectors like manufacturing and retail trade, and in increase in sectors like arts, entertainment, & recreation, and wholesale trade. A detailed study of business-owners in those particular sectors could determine if there in a causal relationship between the increase in education levels and industrial shift, or if the desire to work in certain industries or sectors compelled workers to invest in higher education.

Observing this dramatic increase in educational attainment raises the question of migration. Are more rural home-based business owners choosing to attain degrees or take advantage of the region's educational assets, or, was there a noticeable influx of

educated new arrivals into the Pioneer Valley's rural communities? Both the migration state and migration PUMA are captured in the PUMS data; a look at those variables reveals that three-quarters (73 .4 percent) of rural home-based business owners *did not* relocate during the previous five years. Of those who did relocate, 68 percent moved within the Pioneer Valley, Berkshire or Worcester Counties, or other parts of Massachusetts. Only a very small handful migrated from other parts of New England (Connecticut, Rhode Island, New Hampshire), or elsewhere in the U.S. (California, New York, New Jersey, Pennsylvania, or North Carolina). This is a positive discovery insofar as it confirms that the increase in educational attainment is attributed to a heightened valuation of higher education by the region's rural home-based business owners, rather than in an influx from other locations of educated or highly educated workers.

The rural segment of home-based business owners continues to stand out among its suburban and urban counterparts in 2000, displaying a propensity to attain advanced degrees. Figure 4.8 compares educational attainment by PUMA classification among home-based business owners in 2000. It should be noted that those communities located in Suburban/Exurban PUMAs show a greater likelihood of obtaining Associate degrees, but also of starting and not finishing college. Easier suburban accessibility to two of the region's two-year colleges – Holyoke Community College and Springfield Technical Community College – may explain this difference. Together, those colleges enrolled more than 12,000 students in 2004.⁷

⁷ From U.S. College Search, available at <http://www.uscollegesearch.com>

Figure 4.8: Educational Attainment among Home-based Business Owners (2000)

Does the level of educational attainment, particularly in rural communities, track to trends in industrial sector activity among home-based business owners in 2000? A discussion of economic and labor force characteristics offers some interesting findings.

Economic and Labor Force Characteristics

Before beginning this discussion, it is wise to recall, first, the differences in sample sizes (mainly the very small sample of urban home-based business owners), and the impact the small urban sample could have on transferability of findings. As support for home-based business ownership has been found among the region's rural communities, and throughout rural economic development literature, that segment is the focus of this portion of the chapter. Topline findings show a more even distribution

across industrial sectors than is seen in either the suburban/exurban or urban communities in the Pioneer Valley (Figures 4.9, 4.10, and 4.11 on the pages that follow). While agriculture continues to account for a solid share of home-based business ownership (13.0 percent), sectors new to the 1997 codes, such as professional, scientific and technical services account for nearly one-fifth (17.8 percent) of all rural home-based businesses. The rural cohort is markedly different from urban home-businesses, which are solidly centered on health care and social assistance (where 100 percent of activity is in child day care services); the rural cohort also differs from suburban home-based businesses where activity is centered around professional services (namely management, technical & scientific consulting and specialized design services) and health care and social assistance (where again, most activity is found in child day care services).

Figure 4.9: Rural Home-based Businesses by Industry (2000)

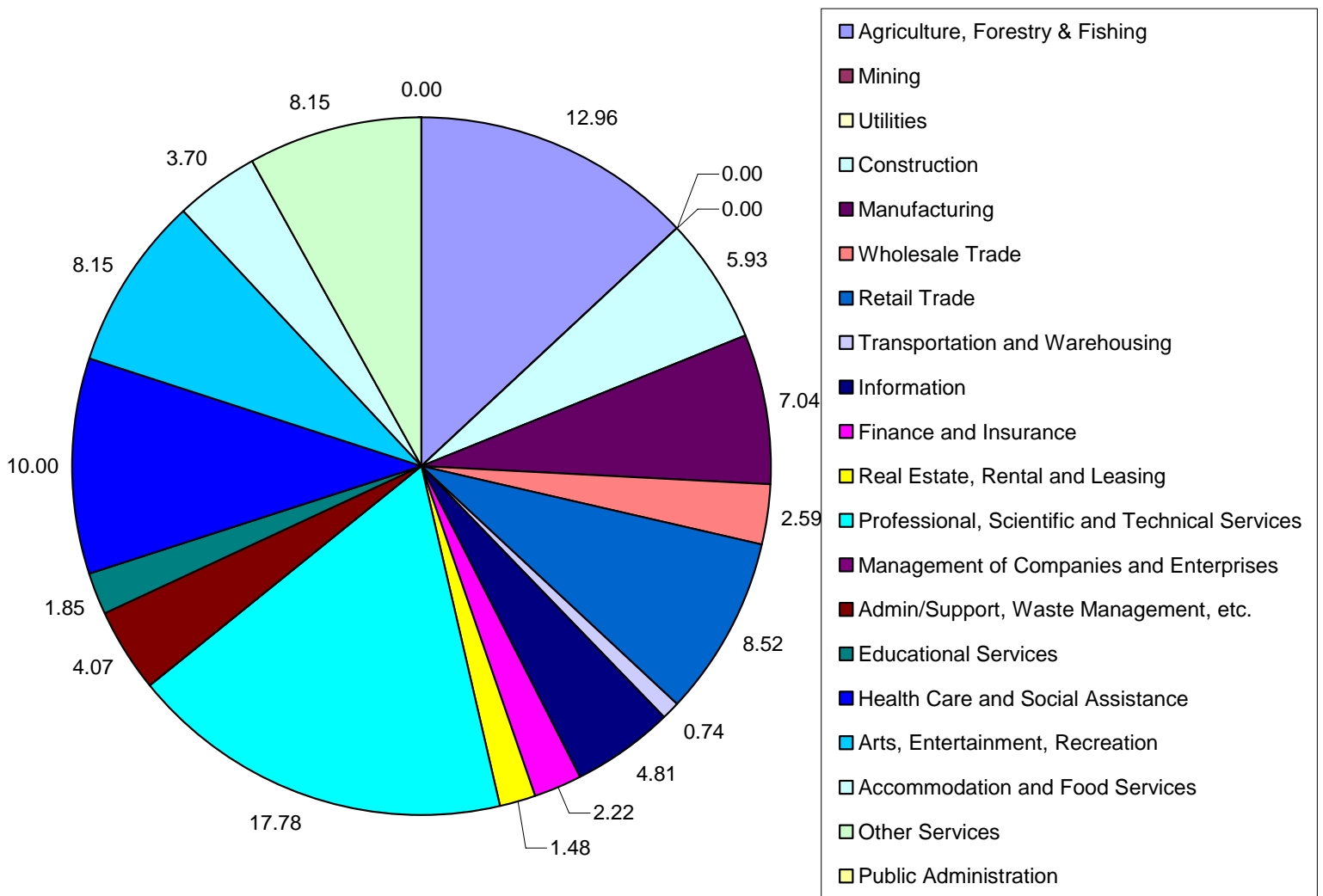


Figure 4.10: Suburban/Exurban Home-based Businesses by Industry (2000)

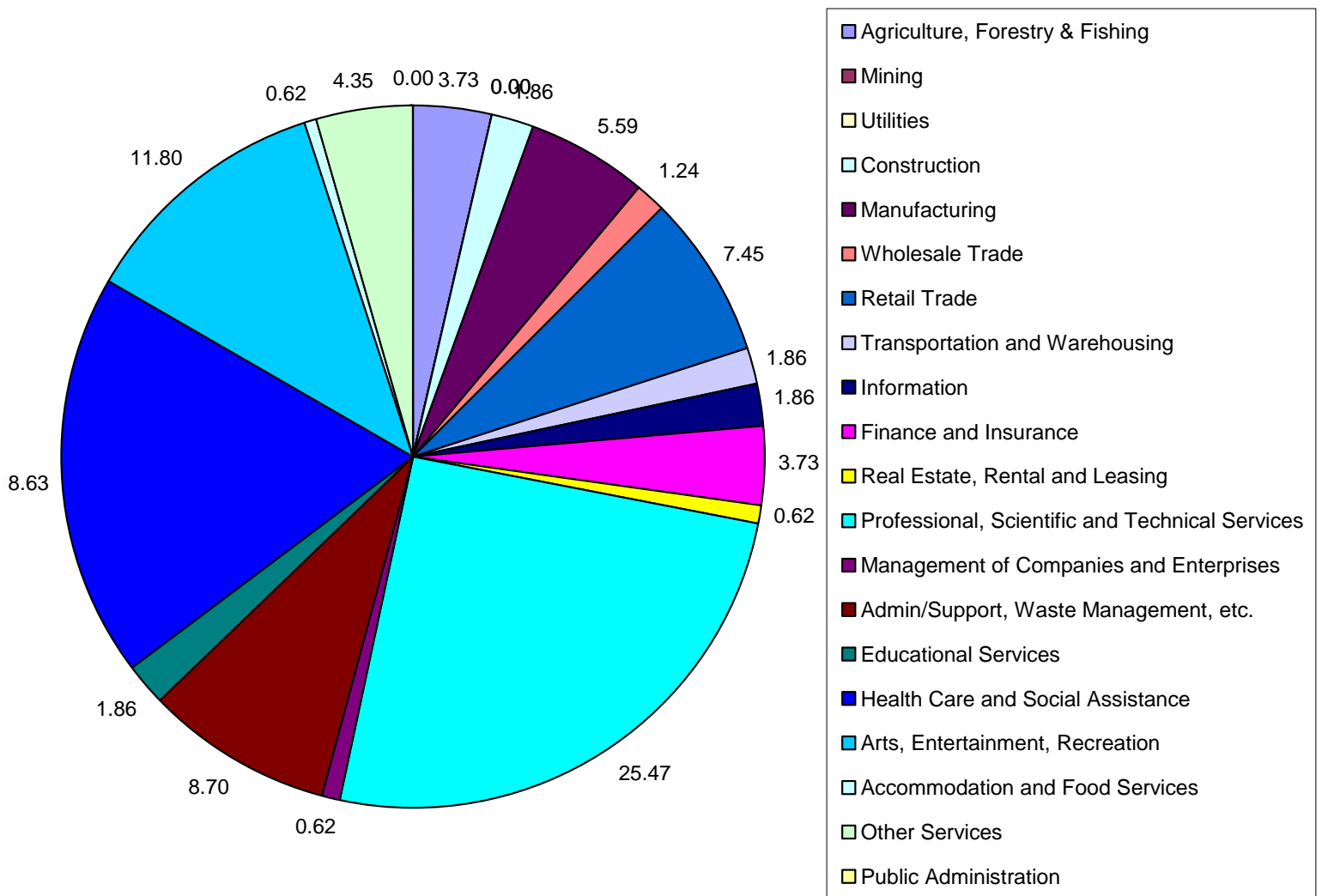
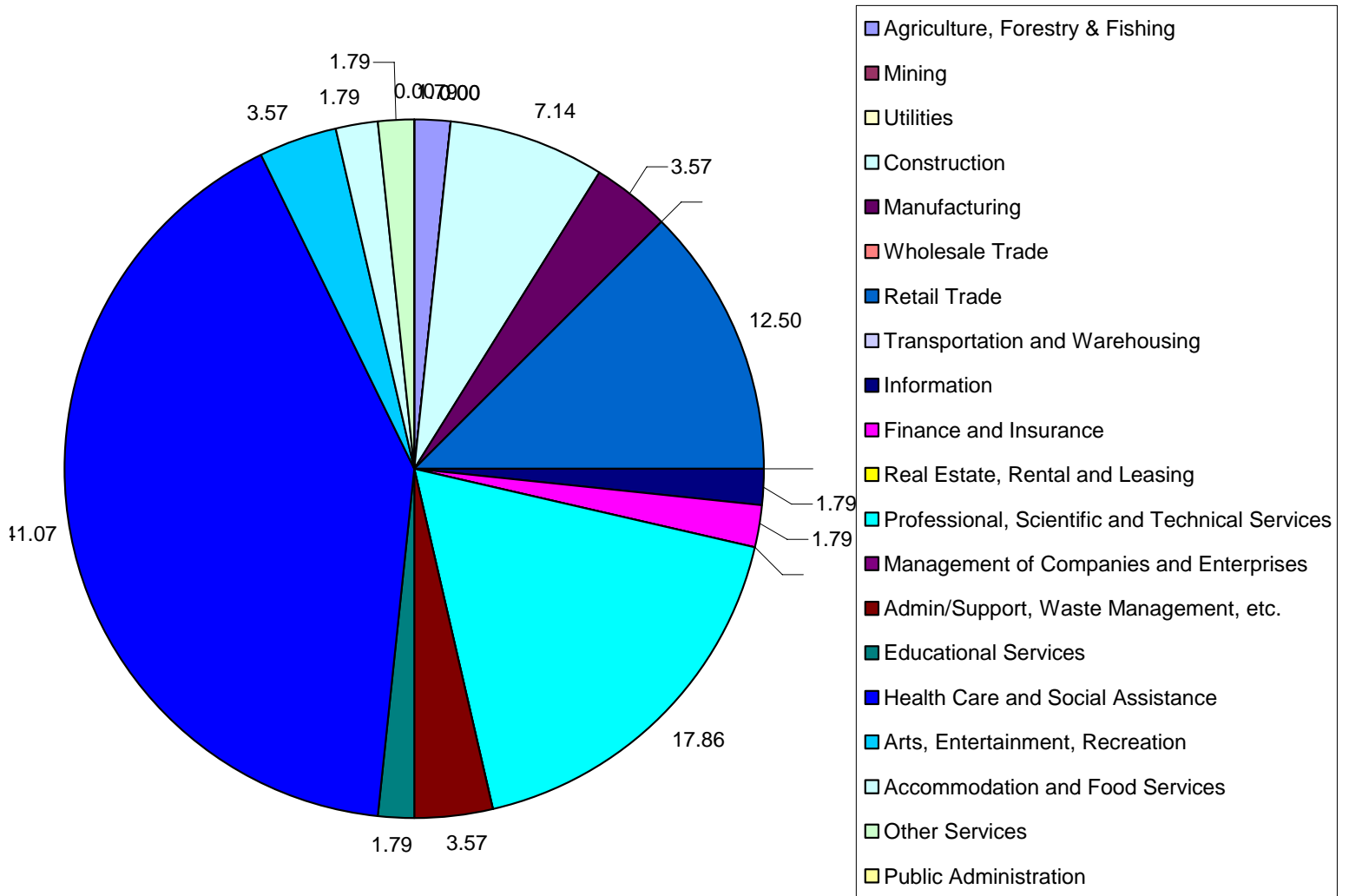


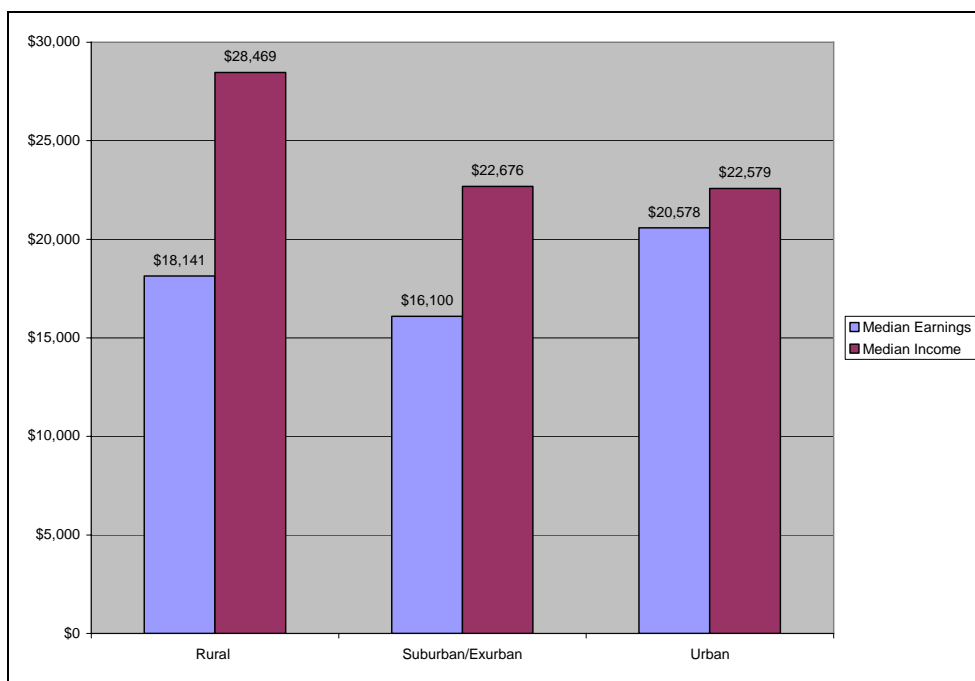
Figure 4.11: Urban Home-based Businesses by Industry (2000)



This presents an interesting challenge for rural and regional planners because zoning bylaws, partnerships with higher education or trade institutions, and a myriad of other economic development strategies must appeal to a wide range of industries and sectors. For instance, economic development professionals and planners in the urban core communities might support the expansion of home-based businesses in one or two key sectors by providing, supporting, or funding extremely targeted job-training, technical assistance programs, home occupation bylaw allowances or other services. Rural planners, however, must decide if key sectors demand particular support, or if strategies to encourage home-based business ownership are applicable to many different sectors, from manufacturing and agriculture to professional services and health care & social assistance.

Understanding the level of economic support associated with each industrial sector could help planners and others begin to channel their energies and efforts, or appraise the economic vitality of home-based business ownership in different areas of the region. Overall, the data indicate that while rural home-based business owners' median total earnings outpace those in suburban communities (see Figure 4.12), they fall short of median earnings of urban home-based business owners. The shortfall is made up in total income – which it should be recalled includes alternatives like interest and retirement income, public assistance, Social Security, and other types of incomes. Note that for the purposes of this discussion, all dollar amounts have been converted from 1999 to 2004 dollars using the same conversion factors previously applied to the sample of region-wide at-home and on-site workers.

Figure 4.12: Median Earnings and Median Total Income among Home-based Business Owners (2000)



A closer look at the rural segment reveals a great deal of interest and retirement income, generating a sum far higher than what is found among urban or suburban home-based business owners. What must be addressed is the fact that with regard to both interest income and retirement income, a relatively small fraction of persons included in the sample report either positive or negative incomes, with several outliers and a very wide range of incomes reported. The challenge, then, is to try to understand whether or not support or encouragement of home-based business ownership can produce greater economic security or positive economic benefit for a large number of residents, or if the landscape of home-based businesses is marked by a handful of very profitable individuals or businesses. Bear in mind that compared to traditional on-site workers in the 2000 sample, median earnings topped \$28,000 and median incomes were close to \$29,500 –

both generally higher than the incomes and earnings experienced by home-based business owners throughout the region.

Given those circumstances, it is wise to evaluate the economic status of home-based business owners using earnings figures, which are comprised of both wage and salary and reported self-employment income. In all three samples (urban, suburban, and rural), most reported compensation is in the form of self-employment, as opposed to wage and salary income.

An examination of median earnings in those industrial sectors and industries that are heavily represented in each geographic category uncovers several significant findings. Among rural home-based businesses, there is a huge disparity between the median earnings and incomes of agricultural businesses. Median income in the sector -- \$28,571 – is more than five times greater than median earnings for the same sample (\$5,669). This suggests that municipal or regional support for agricultural businesses (including niche and specialty products) must assist new business owners in identifying alternative income streams that could compliment or augment the earnings their expected earnings.

Next, Professional, Scientific & Technical Services (namely specialized design services and management consulting) generate relatively high median earnings (\$23,810), but again, interest income and wage and salary income yield an elevated median total income within the sector of more than \$32,000. Because median earnings for rural home-based business owners in this sector outpace median earnings in many other sectors, support for growth in this sector should address the needs of businesses in the sector, such as infrastructure services like high-speed broadband internet and transportation networks that can accommodate delivery services. A needs assessment can inform

changes in local and regional economic development strategies designed to expand economic opportunities in rural areas.

Finally, there has been more interest in recent years in the role that arts-based businesses (including fine/performing artists, arts instruction, materials supply, and technology-based creative endeavors) play in local and regional economies . Industrial classifications responded by adding a range of arts-related businesses to the 1997 NAICS code used for “Arts, Entertainment & Recreation” (the 1987 SIC code tracked only “Entertainment & Recreation” industries). It is unclear where fine artists would be tracked according to the 1987 codes or the 1990 Census industry codes, but by 2000, all rural and suburban/exurban home-based businesses were found in “Performing Arts, Spectator Sports, and Related Industries” segment of the sector. As with agriculturally-based businesses, the rural cohort generously supports earnings with other forms of income, as median earnings fall far short of total median earnings in that geographic segment (\$10,147 compared to \$18,141). The suburban/exurban cohort does not display this wide differential between median earnings and incomes, as median earnings are higher than in the suburban segment overall (\$17,007 versus \$16,100). (Data concerning urban arts-related businesses were not included in this discussion because of the extremely small sample size.) These differences suggest that while arts-based home-businesses are relatively profitable in the suburban/exurban PUMAs, planning efforts in rural communities should acknowledge that arts-based businesses do not appear to be incredibly lucrative. While arts-based home businesses might appeal to individuals seeking additional flexibility in scheduling and work environment, financial security would likely require an individual to have alternative forms of income. Without interest,

retirement, or wage and salary income, these individuals may not experience positive economic benefit. A coordinated effort to generate consumer or wholesale demand for arts-based services and products (and similarly, specialty agricultural products) could help increase median earnings in this sector.

Conclusions

The greatest concentration of home-based business owners is found in rural Pioneer Valley communities, as opposed to the urban core or suburban/exurban communities. However, activity is spread across a range of industrial sectors that generate a wide degree of economic benefit. While some industries are very profitable for business owners, others are less so, and require business owners to supplement their business earnings with other forms of income. Thus, it is crucial to acknowledge that not all home-based businesses will benefit community members in the same way.

IV. Taking Closer Look at Home-based Businesses in Selected Pioneer Valley Communities: Existing Data and Methods

Objective of Analysis

In order to uncover trends related to home-based business ownership in specific Pioneer Valley communities that diverge or differ from sub-regional geographic trends, it is instructive to review municipal data about home-based businesses. Simultaneously, much can be learned from documenting the attempted data collection process, and the information that is actually available in each town. In doing so, we can begin to think about recommendations for systemic research opportunities that can supply a steady stream of data about this interesting segment of the workforce.

Communities were included in the selected group because they met the criteria described in Chapter Three (for instance, a large increase or significant population on at-home workers). However, in some cases, visits to Town Halls did not yield any useful data, or town clerks indicated that business certificates are not routinely collected, or are incomplete. Additionally, as mentioned in Chapter Three, business certificates are required only for those businesses that operate under a different name (i.e. they are “doing business as” another entity). That means that businesses operated out of a person’s residence and bearing the name of the owner (e.g. “Jane Doe Associates”) are missing from this data. With that said, it is infeasible to rely on data extracted from municipal business certificates to determine the *economic impact* of home-based business owners in a particular community. This exercise was extremely valuable though, insofar as it becomes feasible to offer practical suggestions for collecting relevant information, and managing and analyzing that data.

Wilbraham

The Town of Wilbraham, population 13, 473 (according to Census 2000), abuts the City of Springfield, but has a very different settlement pattern and neighborhood form. Zoned primarily agricultural, a swath of land along Boston Rd. (Rt. 20) is zoned for industrial and commercial uses, with a few parcels in the center of town zoned for “neighborhood business.” About half of Wilbraham’s twenty-two square miles are protected because of steep slopes and hills; density in town is quite low – only 612 persons per square mile. With civic and commercial buildings clustered in only a few

parts of town, and large-lot single family homes, Wilbraham's rural character seems out of place only a few miles east of Springfield.

While median household incomes in Wilbraham are among the highest in the Pioneer Valley, growth pressures make planning for economic development an important concern for municipal leaders and planning professionals. It must be noted that Wilbraham chose not to draft an EO418 Community Development Plan, and has not expressed a stated interest in removing obstacles to home occupation. The town's zoning by law, which was revised in 1990, accommodates three kinds of at-home workers: those working out of a private home office or studio (allowed by right), those working in a home professional office (such as "physicians, surgeons, dentists, artists, musicians, accountants, lawyers, engineers, architects, teachers, insurance brokers, builders, real estate brokers, and other like persons" (Wilbraham Zoning Bylaw, 1990)), and those with a home occupation (including crafts, beautician services, dressmaking, photography, repair, and similar functions). Home professional offices and home occupations are allowed only by special permit granted by the Zoning Board of Appeals. Regulations limit the number of employees, parking, storage, and related considerations.

Table 4.5 displays the results of a review of year 2000 business certificates. While the certificate requests a description of the business, owners neglected to define the nature of work performed. Thus, in a few cases, one is unable to classify, by industrial sector, the type of business that is operated. Each entry represents a single instance of a business/type of business. If more than one business of a particular type was found (for instance, 'consulting,' the number of businesses is noted in parentheses). It is not

difficult to attach a general NAICS sector description to some businesses; for others, a search by business type revealed the appropriate sector.

Table 4.5: Business Certificates for Home-businesses in Wilbraham, 2000

Type of Business	Industrial Sector (based on NAICS)
Landscaping (2)	Administrative and Support and Waste Management and Remediation Services
Transcription service	Administrative and Support and Waste Management and Remediation Services
Remodeling/renovation	Construction
Contract labor – entertainment	Construction
Electrician	Construction
Soap making	Manufacturing
Repair	Other Services (except Public Administration)
Corporate travel consultant	Professional, Scientific and Technical Services
Residential checks*	Professional, Scientific and Technical Services
Advertising	Professional, Scientific and Technical Services
Web developer	Professional, Scientific and Technical Services
Medical billing	Professional, Scientific and Technical Services
Furniture design/manufacture	Professional, Scientific and Technical Services
Personal coaching	Professional, Scientific and Technical Services
Crafts/home decorating	Professional, Scientific and Technical Services
Consulting (3)	Professional, Scientific and Technical Services
Computer software**	Professional, Scientific and Technical Services
Mail order and Internet retail sales	Retail Trade
Candy vending machines	Retail Trade
Ticket resales	Retail Trade
Courier	Transportation and Warehousing

* This business visits residents' homes while they are on vacation, like a modified form of house-sitting.

** It is unclear from the name of this business if the individual is engaged in software programming or wholesale/retail distribution.

Trends

It must be reiterated that the purpose of compiling information from business certificates was not to suggest statistically significant results, but to see if patterns and trends in individual communities mirrored those of the sub-regional categories.

Alternatively, are there surprises at the municipal level that are particularly unique or went undetected in the regional or sub-regional analyses?

In the case of Wilbraham, there is generally consistency with the suburban/exurban trends in terms of industrial sector breakdown, with a noticeable share

of those businesses filing certificates in 2000 being in the Professional, Scientific, or Technical services sector. Still, some interesting outliers – such as the manufacturing of soap – should underscore the broad range of possible businesses with varied impacts.

Tracking Methods

Town officials who provided access to the business certificates were not overly concerned that there were many home-based businesses in noncompliance. Because each town sets the fee for certificates, and Wilbraham's \$20 fee is relatively low, filing a certificate does not appear to be a major obstacle for home-based business owners.

There are some issues with missing data that could be collected on the certificates, including a description of the industry or sector into which the business would fall. In some cases, this information was left off of the form, but a weak or no attempt was made to get the filer to supply the information. A regional or municipal uniform data collection process should ensure that all relevant pieces of data are collected from filers.

Holyoke

As a representative urban community, the city of Holyoke has been considered part of the Pioneer Valley's urban core since its inception in 1847. With a population of nearly 45,000 distributed throughout its twenty-two square miles, Holyoke has a population density of 2.053 persons per square mile. Median household income, while not the lowest in the region, lags far behind many of the region's suburban and rural communities. In terms of urban form or spatial layout, the city has a very dense urbanized area with commercial, industrial, and single- and multi-family residential

buildings. However, a large section of the city is relatively rural, owing to topography, distance from the Interstate and other factors. For this reason, it was believed that Holyoke might display some notable tendencies among home-based business owners.

The City of Holyoke's zoning ordinance, similar to that of Wilbraham, allows general home occupation by right, but requires a special permit for other types of uses, such as beauty salons, manufacturing businesses, and other uses that could have negative environmental, visual, or traffic impacts.

Table 4.6 displays the results of a review of year 2000 business certificates. In a binder nearly five inches thick, only six business certificates for home-based businesses were filed. While this is far fewer than expected, it is generally consistent with findings about the extent of home-based business activity (or lack thereof) in urban areas. The 2000 records were supplemented by a printout, provided by the Town Clerk's office, of other current home-occupation permits and by-right home-based businesses.

Table 4.5: Business Certificates for Home-businesses in Holyoke, 2000

Type of Business	Industrial Sector (based on NAICS)
Plumbing contractor	Construction
Printing	Manufacturing
Embroidery kit supply	Manufacturing
Automotive repair	Other Services (except Public Administration)
Nail salon	Other Services (except Public Administration)
Vending	Retail Trade

Trends:

A review of these reveals an unexpected finding – none of the home-based businesses for which permits are on file are in the Health Care and Social Assistance

sector. This diverges from what urban core planners might expect given the observed sub-regional trends. It is possible that the subset of the home-based business owner sample is heavily weighted with Springfield residents (remember that the City of Springfield is its own public-use microdata area in the urban sample), who may display a greater propensity for health care related fields (including day care and similar industries).

The City of Holyoke did complete an EO418 Community Development plan, but did not expressly note support for home-based businesses or cottage industries. In addition to regulations and special permit requirements, a key obstacle for home-businesses operating under another name (and thus requiring a 'dba' certificate) is cost: Holyoke's filing fee is \$100.

Wendell

The Town of Wendell, a very rural community of nearly 1,000 residents spread over 32 square miles sits north of Leverett and Shutesbury in Franklin County. The town is not wealthy, with a median income of more than \$43,000 per year (in 2000). While this is higher than the Pioneer Valley median (of about \$41,000), it lags behind many other communities.

With an historical Town Green around which a small group of civic and municipal buildings are clustered, the town is not in close proximity to any of the major employment centers in the region. The town is zoned entirely Rural Residential Agricultural. Wendell's Zoning Bylaws allow home businesses, cottage industries, and many agricultural uses by right. The bylaws also allow retail stores, professional offices,

restaurants, garages, inns, and industrial uses by special permit. However, there is no specific geographic area designated for new business development, such as a commercial or neighborhood business district. Thus, safeguarding the economic security of residents requires thinking creatively about alternative work environments.

The town completed a Community Development plan in 2004, in which it supplied information about its home-based businesses, listed in Table 4.6 below.

Table 4.6: Home-businesses in Wendell, 2002

Type of Business	Industrial Sector (based on NAICS)
Landscape	Administrative and Support and Waste Management and Remediation Services
Music recording	Arts, Entertainment and Recreation
Remodeling/renovation	Construction
Electrical contractor	Construction
Heating contractor	Construction
Educational services	Educational Services
Massage therapy	Health Care and Social Assistance
Midwife services	Health Care and Social Assistance
Computer support and Web design	Information
Video production	Information
Machine shop	Manufacturing
Hairdresser	Other Services (except Public Administration)
Automotive repair and salvage	Other Services (except Public Administration)
Structural engineering	Professional, Scientific and Technical Services
Software services	Professional, Scientific and Technical Services
Management consulting	Professional, Scientific and Technical Services
Accounting	Professional, Scientific and Technical Services
Web developer	Professional, Scientific and Technical Services
Apparel	Retail Trade

(Source: Wendell Open Space and Recreation Plan, 2002)

Trends:

While professional services appear to emerge as popular industries among Wendell's home-based business community, construction, health care, and 'other services' are also present. The presence of fine artists is notable, as there seems to be an emerging concentration of fine artists and creative workers in Franklin County, but also throughout other parts of the Pioneer Valley. Further, it is interesting to note the raw materials needed by the array of businesses identified in Wendell (including high-tech or digital equipment, art supplies, textiles, and manufacturing tools and supplies).

CHAPTER FIVE: CONCLUSIONS

This project began with two main objectives: to ground-truth assumptions and anecdotal evidence about the at-home workforce, specifically home-based business owners, and to assess how support for alternative work environments could contribute to rural economic development goals or sustainable economic development goals. Through the course of the research, however, another key objective emerged, which was to better understand the methods used here in the Pioneer Valley to track the growing segment of home-based business owners or telecommuters. Take together, the research results in meaningful conclusions, suggestions for planning practitioners, as well as suggestions for future research.

I. Lessons from the Data

When analyzing any data set, the discovery of patterns or findings is tied to the sample set, or the criteria used to isolate a particular segment of records (whether they contain information about people, housing units, businesses, or ecosystems). In this case, preliminary work with the PUMS data set, as well as with a series of municipal indicators about land use, economy, and demographics, lead the researcher to compare the region's at-home workers to traditional, on-site workers in both 1990 and 2000. Painting, first, with these broad brushstrokes helped to discern areas that were viable for further study, and those that were not. What emerges is a picture of a Pioneer Valley at-home worker with higher education levels, but lower median earnings; a worker more likely to be married, but spending more hours per week working. Some of these trends seem at odds

with one another, and set the Pioneer Valley's workforce apart from the rural home-based workforce described in the literature by a variety of researchers.

This picture comes into greater focus when a sub-regional analysis is performed. At that level, wage, gender, and education disparities become even more apparent, and clusters of activity in industrial sectors become visible in some geographies (e.g. urban), but not others. The concentration of activity in Health Care and Social Assistance home-based businesses appears to be unique to urban areas. What is even more interesting from an economic development perspective is the dilution of business activity in rural areas across many different sectors. This suggests that a combination of demographic factors (education levels, migration, age, marital status), offer rural home-based business owners a wide range of possibilities, from home-based manufacturing or retail to technology consulting. For planners, the lesson centers on understanding how home-based business ownership may impact the economic reality or quality of life of residents making this choice.

In its first iteration, this project referred to the "economic impact" of home-based businesses in the Pioneer Valley. Based on the data available and the findings of the analysis, it becomes more accurate to say that this research has been conducted largely from the perspective of a home-based business owner, and the level of his or her economic security. The motivation behind this is the realization that while a community might believe that positive municipal economic development benefits may occur by removing obstacles to home-based business ownership, the impact on workers may not be universally positive. For instance, there still exists a gender gap in earnings, and overall earnings appear to be supplemented in large part by other forms of income. That

many workers may not be professionally stable or mature enough to reap the benefits of interest or retirement income, to have risk capital to reinvest in a business, to have the freedom from family responsibility that allows for longer work weeks must be acknowledged by planners *before* publishing economic development plans, making zoning changes or modifying regulations. From this perspective, the value of this research is in assisting municipal officials in managing expectations of the home-based business workforce, and beginning to model community behavior after sub-regional trends.

II. Conclusions from the Process

The exercise of visiting Town Clerks and attempting to link different pieces of information together in order to complete the puzzle about home-based businesses was instructive. As noted in Chapter Three, municipal data was limited to a sub-set of all home-based businesses (those operating under name other than that of the business owner). Within that subgroup, municipalities rely on business owners to file certificates. This is not always the case, and enforcement is not a high priority. A representative in one rural community that the researcher had hoped to visit counseled against traveling to the town as they ‘don’t really collect that information’ and ‘don’t really care’ if it is on file. That same town claimed that the only certificates on file were for automotive and other repair shops.

An argument against collecting rich and detailed data about home-based businesses (or telecommuters, as well) centers on privacy. While the U.S. Census PUMS data is a rich source, the sample is designed to be large enough to offset concerns about linking fine-grained data with particular individuals or small neighborhoods. Research

designers and data collectors must always wrestle with this issue, and attempt to balance to positive benefits of the study with the negative impacts of being intrusive or revealing results that could have negative unintended consequences.

Based on the experience of this project, the researcher would recommend a that the appropriate regional planning agencies monitor trends among home-based business owners that are currently available, but also consider developing an annual or bi-annual anonymous survey instrument designed to capture information about both home-based business owners as well as telecommuters. This will be particularly important during the next several years, as a number of Pioneer Valley communities are turning to cottage industries and home-based businesses as an innovative sustainable or rural economic development strategy.

III. Suggestions for Further Research

There are two key areas for further research that stem from this project. First, the question of economic impact remains unanswered by available literature or data. Receipts from non-employer establishments provide County-level data, but nothing more fine grained. The median incomes of business owners does not necessarily correlate directly with spending within a community (for instance, a profitable home-based business owner living in Charlemont may spend the bulk of his or her disposable income in Greenfield). Further, most communities and planning professionals have already acknowledged that home-based businesses will not add to the tax base, unless a creative interim 'home occupation' rate can be conceived. That idea is complex, and unlikely to be viable in municipalities with a single tax rate, or where entrepreneurship is a priority. Moving forward, economists might wish to isolate the series of costs and benefits

associated with home-based businesses in order to assess the economic impact on a municipality.

Second, early conversations about this topic centered on urban form or spatial patterns, and their relationship to at-home work (both home-based business ownership and telecommuting). Answering this question may require less quantitative data, and more a more qualitative research framework where a series of reference communities are selected, their density and neighborhood form is documented, and interviews with at-home workers are designed to track to motivation behind working from home, the number of trips these workers make (and used to make as on-site workers), and the way they interact with their community. This facet of the research would contribute more to ‘smart-growth’ and sustainable development conversations at smaller scales.

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