MISAGO AUGUSTIN, Ph.D. Residential Building Permit Activity by U.S. Metropolitan Area: Key Agents of Change. (2008)
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Housing construction is considered a key parameter of the overall health of the U.S economy. Spatially, housing represents the largest single urban land use of most metropolitan areas encompassing about 35 to 45 percent of land in most cities. Based on a statistical analysis of U.S. Census data, and others sources, this dissertation provides answers to questions of why and how residential building permit distribution varies across the nation and what key determinant factors influence the geography of housing supply.

This dissertation hypothesizes that in any given U.S. metropolitan area the amount of new privately owned housing units authorized by building permits per 1000 can be explained by a combination of three major groups of variables that includes: a group of indicators that measure the overall health and mix of the metropolitan economy, the effects of existing housing characteristics on supply and demand, and a mix of socio-demographic variables that trigger housing demand.

The purpose of this dissertation project was twofold. *First*, this dissertation attempted to disentangle the fundamental contemporary growth patterns of housing markets by examining the spatial distribution of residential building permits by metropolitan area. *Second*, based on a statistical analysis of data, the most prominent economic, housing and socio-demographic characteristics that most significantly shape housing demand were to be isolated in an attempt to uncover the key triggers of residential development growth across the nation.

The findings suggested that the most important variables that shaped building permit activity included the percent of the 2005 population attributed to net migration from 2000 to 2005, the percent housing vacancy rate, the percent of housing units built between 1990 and 2004, the percent population employed in health care and social assistance, and the percent elderly. Additionally, two regions of the country dominated residential housing market activity in 2005, and these included the South Atlantic region especially the Florida and Carolinas metropolitan areas, and some relatively isolated Rocky Mountain metroplitan areas. However, the Northeast and the Midwest metropolitan markets experienced below average permitting rates.

RESIDENTIAL BUILDING PERMIT ACTIVITY

BY U.S. METROPOLITAN AREA: KEY

AGENTS OF CHANGE

By

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APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Housing construction is considered a key parameter of the overall health of the

U.S economy and homeownership is a key ingredient in the mythology of the "American

Dream." Housing provides one of the most basic needs for all members of society which

is shelter. In terms of the living expenses facing households and families, housing ranks

second only to food (Bourne, 1981). For homeowners, a house purchase is frequently the

largest single financial decision made in their life-time. Additionally, housing is also of

enormous "psychological importance" since it is an integral part of our definition of what

is a desirable quality of life. Furthermore, it is a major sector of the national economy, a

substantial consumer of investment funds and a large source of employment within the

construction and building industries. Spatially, housing represents the largest single urban

land use encompassing about 35 to 45 percent of land in most cities (Bourne, 1981). In

the United States, investments in housing and transportation have long acted as a key

trigger for general economic activities (Buckley, 1952).

Moreover, housing consumption is related to a set of contextual effects, including

the supply and cost of housing in particular locations (Clark et al., 2000). In the early

literature, housing was differentiated from most other commodities by two main factors:

its durability and its spatial immobility. Consequently, the spatial dimension plays an

important role in the market and it is the explanation of this role that is at the heart of

much intra-urban residential location theory (Ball & Kirwan, 1977). Also, a wealth of literature indicates that housing is a major "swing industry" in the economy because it can affect so many diverse businesses.

However, the modern literature on urban growth and economic geography generally ignores housing supply issues even though some research indicates that better understanding the housing supply can lead to a better understanding of many other aspects of urban dynamics (Glaeser et al., 2006). For example, homeownership helps families build stability and long-term financial security. Additionally, the interplay of housing demand and housing supply greatly influences assessed values, home sale prices, and the vitality and stability of neighborhoods. Many experts view homebuilding as one of the most reliable leading indicators of economic activity. For example, residential real estate markets are among the first sectors to stagnate when the economy approaches recession and it is often the first sector to reemerge when the economy strengthens (Baumohl, 2005).

The purpose of this dissertation project is twofold. *First*, this dissertation will attempt to disentangle the fundamental contemporary growth patterns of housing markets by examining the spatial distribution of residential building permits by metropolitan area. *Second*, based on a statistical analysis of data, the most prominent economic, housing and socio-demographic characteristics that most significantly shape housing demand will be isolated in an attempt to uncover the key triggers of residential development growth across the nation. Thus, this dissertation will provide answers to questions of *why* and *how* residential building permit distribution varies across the nation and *what* key

determinant factors influence the geography of housing supply.

This dissertation hypothesizes that in any given U.S. metropolitan area the amount of new privately owned housing units authorized by building permits per 1000 would be explained by a combination of three major groups of variables that includes:

♦ a group of variables that measure the <u>overall health and mix of the metropolitan economy</u> (e.g. employment type, annual average pay)

♦ the effects of <u>existing housing market characteristics</u> on supply and demand (e.g. vacancy rates, house prices) and

♦ a specific mix of <u>socio-demographic variables</u> that trigger housing demand (e.g. education levels, population change rates, percent elderly).

The interaction of these variables could have both positive and negative impacts on the number of building permits issued by metropolitan area and, therefore, could shape and explain any geographic disparities in housing supply and demand. The dissertation hypothesis builds on the classical theoretical framework long established by Maisel (1963) and Bourne (1981). Both authors suggested that the three major groups of variables identified above are key determinants of residential construction start-ups. Surprisingly, little research has been conducted in this area by geographers since the early 1980s. This dissertation represents an attempt to update the geography literature on housing to establish which elements of these three main groups of variables play the most significant role in the geography of residential building permit activity by metropolitan area.

Understanding the spatial distribution of new residential housing construction and the factors that influence its spatial distribution may be useful for policy makers, planners and developers at local, state and even national levels. Residential development is a substantial slice of urban land use and, therefore, shapes the urban landscape in fundamental ways. Second, substantial appreciation in house prices in combination with robust sales can generate strong tax base revenue for local governments because almost 70 percent of all tax revenues raised by local governments in the United States come from property taxes (Lareah, 2003). In addition, a better understanding of the role that key socio-demographic and economic factors play in shaping housing markets can mobilize broader economic development initiatives because "those interested in urban and regional growth must think about housing markets and in particular the nature of housing supply; firms in a region cannot expand employment without new homes to house workers" (Glaeser et al., 2005 p. 23).

Answers to these sorts of research questions is crucial because according to the National Association of Home Builders (NAHB) "the construction of 1000 single-family homes generates 2,448 full-time jobs in construction and construction related industries with $79.4 million in wages and $42.5 million in combined federal, state and local revenues and fees, whereas about 30 percent of the new home occupant's income is spent on items produced by local businesses" (Lareah, 2003 p.4). Additionally, the value of residential structures nationwide totals over $12 trillion, while the housing sector directly and indirectly accounts for about 15 to percent of our nation's Gross Domestic Product (GDP) every year (Lareah, 2003).

Despite these pressing concerns, much of the literature on residential housing supply and demand has been conducted in economics, urban planning, political science or urban sociology (Doogan, 1996; Blackley, 1999; Leung, 2004; Glaeser and al, 2005; Kim, 2004; Priemus, 2004; Goodman, 2005). Some of the limited research undertaken by geographers has focused mostly on housing consumption and crowding, residential mobility and housing market discrimination (Huang, 2002; Dieleman, et al. 2000; Clark, 2000; Clark & Huang, 2003; Clark &Withers, 1999 and Huang, 2004)

However, although the early literature shows that residential building activity in urban areas had been a big preoccupation in economic geography, building permits were mostly, if not exclusively, used as a tool to estimate, analyze and determine the volume of residential construction in non-farm areas (Cover, 1932; Chawner, 1937; Foster & Wickens, 1937; Buckley, 1952; Pollock, 1973). Little empirical research has been conducted to determine which variables most influence the geography of residential housing market activity as measured by residential building permit activity. Since little of the previous research has utilized the conventional socio-economic variables to empirically evaluate the spatial distribution of residential building permit activity by U.S. metropolitan area, this dissertation will utilize conventional spatial analysis to investigate, assess and determine the key economic factors, housing characteristics and socio-demographic factors that most influence residential construction demand across metropolitan markets.

This dissertation continues with Chapter II, Review of the Literature, by outlining some of previous studies conducted on urban housing markets. First, the chapter provides

an overview of the key determinants of the geography of urban housing markets from the early classical research, then proceeds to review the contemporary research, and finally, presents an overall summary and discussion. Chapter III, Research Design, presents the overall research hypothesis, data definitions, three sub-hypotheses, and the sources of data. Chapter IV, Findings, highlights the research findings, while Chapter V, Conclusions, presents a conclusive summary of thoughts and suggestions for future research questions.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Housing studies have been conducted by scholars from different disciplines, including geography, economics, sociology, planning, political science, urban studies and architecture among others. The purpose of this literature review is to explore the significant amount of research that has been published by scholars from these various disciplines and at diverse geographic scales. This will provide a theoretical context and help to better understand how urban housing markets work.

However, owing to the large volume of literature available on the issue, the literature review will mainly focus on studies conducted in the United States and is organized into two major sections. The first section reviews the key determinants of urban housing markets conducted in the early classical research, while the second section focuses on literature from the contemporary era. Finally, the literature review concludes with a brief summary and a discussion of the major implications.

1. Early Research: Key Determinants of the Geography of Urban Housing Markets

a. Building Permits: A Barometer of Urban Building Activity

Over seventy years ago, Cover (1932) utilized building permit data to measure residential building activity. He argued that "permits are an [instrument] to measuring building activity; [...]. Their significance as barometers depends not only upon a

differentiation among types of building, numbers of permits and permit values, but, in addition, upon the power and efficiency of local permit officers and the collective adjustment in the process of analysis" (Cover 1932, p.126).

His study consisted of determining the effectiveness of evaluating the level of building activity by using building permits and permit valuation data. He noted that in certain communities there were substantial lags that occurred between the issuance of a permit and the undertaking of actual construction; in fact, some projects were abandoned even though permits were issued. Despite these concerns, Cover concluded that building permits and permit value remained one of the best available general indexes of building activity.

In the three decades that followed Cover's study of building activity, Maisel (1963) noticed a high level of volatility in housing production output over time. He argued that changes in output of housing start-ups have a significant impact on household income. He developed a housing market model to help better understand why large fluctuations in housing production output occur. By using the model, he could examine the key elements influencing the number of residential construction start-ups.

According to Maisel, the housing market is composed of five major interconnected market components that include:

-the existing stock of dwelling units (i.e. households and vacancies)

-completions (i.e. housing units completed in the period and their disposition);

-builders;

-inventory under construction; and

-exogenous and demographic variables.

The model explained the types of variables and other influences underlying fluctuations in housing starts. For example, Maisel suggested that in housing markets, outside forces exist that can influence the rate of household formation, affect the number of housing demolitions and lead developers to adjust their approximation of future demand for housing (e.g. credits, income, or relative prices). Ultimately, these forces can influence the rate of housing starts. Also he argued that internally, when vacancy rates change, the relationship among rents, prices, and the cost of ownership can change as well. In the early 1980s, Bourne utilized the same model to study the determinants of new residential construction. This dissertation utilizes both these models in developing the principal research hypothesis, a point to which I shall return to in chapter three.

b. Bourne's Classic Book "The Geography of Housing:" A Definition of Housing Markets

Bourne's (1981) classic book titled The Geography of Housing articulated a comprehensive research agenda for geographers involved in housing-based scholarship. Bourne examined the types of housing markets and their sub-markets, the spatial delimitation of each market and its component parts and how the housing market actually worked.

Bourne argued that the market for housing is primarily an economic market set within a given political framework. He defined housing markets "as a set of institutions and procedures for bringing together housing supply and demand, buyers and sellers, renters and landlords, builders and consumers for purposes of exchanging resources. […] Unlike other markets however, the urban housing market deals as much with the

exchange of rights to property as it does with a consumer good such as housing" (Bourne 1981, p.72). In addition, in terms of consumption, with the exception of mobile or manufactured homes, housing as a consumption good cannot be physically moved; rather, the buyer has to move instead.

Bourne asserted that housing markets are divided into two distinct scales: the macro scale, which is concerned with the housing sector at the national economy level and the interaction of supply and demand at an aggregate (usually national) level; and the micro scale, which focuses on the behavior of individual producers and consumers at a more localized level. By studying the geography of residential building permits by metropolitan area, this dissertation research focuses on the macro-level, because my intention is not to disentangle the composition of housing stock at the neighborhood scale but rather to examine the key factors behind the geographic disparities in the production and consumption of housing at the national scale by metropolitan area.

Bourne also argued that the housing market is essentially defined by the relationship between the rate of investment in the housing supply and the aggregate expenditures by households. According to Bourne, housing markets have two major components which include both the housing stock characteristics (e.g. vacancies generated by out-migration, new construction, physical modifications, etc) and the inventory of household characteristics (e.g. net changes in population, preference changes, changes in household: aging, etc) in a given market area. These two components are, in turn, linked by market transactions which can generate a series of outcomes that includes changes in the locational patterns of vacancies, prices, investments,

overcrowding rates, occupancy rates, and neighborhood turnover (Bourne, 1981). Since

the principal constituent in the housing market is change, the interaction between "the

determinants of these external changes primarily alter the rate of new housing

construction and the size, demographic structure, and income of the population which

give rise to the demand for housing" (Bourne, 1981, p.75).

Although housing markets as a spatial entity are not easily defined, Bourne

argued that housing markets are "a contiguous geographic area, more or less clearly

bounded, within which it is possible for a household to trade or substitute one dwelling

unit for another without also altering its place of work or its pattern of social contacts"

(Bourne, 1981 p.73). Such a definition is now somewhat dated since housing markets are

substantially altered by inter-metropolitan interactions as well as intra-metropolitan

changes. Of course, Bourne indicated that the spatial delimitation of urban housing

markets also varies depending on where one is situated within the housing allocation

process (Bourne, 1981). For example, many housing relocations significantly impact

place of work and social activity because the relocation may involve moving from one

metropolitan area to another metropolitan area. Additionally, the relatively new

phenomenon of wealthy retiree migration can significantly impact some metropolitan

(and non-metropolitan) housing markets in places like Florida and Arizona.

According to Bourne (1981), the geography of housing markets encompasses two

distinct dimensions: one concerns the partitioning of a housing stock into distinct

"segments" in aspatial terms, whereas the second involves the urban area as a

geographical subdivision of spatial sub-markets. Within these sub-markets, supply and

demand interact to generate homogeneous clusters of housing types or household

characteristics in which there is a unique set of prices (or rents) and between which there

is little substitution of one unit for another. Several factors can trigger the formation of

additional sub-markets, including the size and heterogeneity of the housing stock, the

diversity of demands placed on that stock by households, and the barriers or constraints

acting on the supply of housing. Some of these include:

> *supply restrictions*: the limited availability of certain kinds of housing that is in demand, but which cannot be easily reproduced (e.g. 19th century brown–stones or low-cost older units). *Accessibility restrictions*: some houses may have a unique location, which conveys to them an additional benefit (or liability) in terms of accessibility (e.g. single-family housing within walking distance of the center). *Neighborhood restrictions*: for various reasons, [certain sub-markets] can [ ] become especially attractive (or unattractive), for which entry is limited and people will pay a premium (or discount) [e.g. gated community]. *Institutional restrictions*: perhaps the most obvious is the practice of redlining, in which mortgage-lending agencies refuse to lend in certain areas. Other examples include [certain types of] building codes, zoning and planning regulations. *Racial, ethnic, and class discrimination:* [ ] certain [social groups] are limited in their search for and choice of housing because of direct exclusion. *Information restrictions:* some households have differential access to information on housing opportunities, and on how the market works (Bourne, 1981, p.91).

Bourne asserted that the level of housing demand by market depends on

population growth rates, the demographic structure (such as age, household size etc),

disposable income rates, housing preferences and tastes, and taxation and investment

policies. Bourne argued that the demand for housing is intertwined with certain other

factors, such as demand for land, location and services (e.g. schools) which are associated

with the neighborhood. He also distinguishes three sources of demand for housing: *first*, a

direct growth demand: this kind of demand arises when a significant change occurs owing to growth in aggregate population (e.g. in-migration) within a geographic location or through a change in the demographic composition of the population. The *second,* replacement demand is demand for housing to replace the existing dwelling units lost or destroyed due to various causes, including demolition, conversion, fire or other natural causes. *Finally,* the demand for improvements in the existing housing can arise when households desire and have the means to upgrade their existing housing standards (Bourne, 1981). Three years after the publication of Bourne's classic book, John Adams delivered a Presidential Address to the Association of American Geographers in 1984 that focused on the meaning of housing.

c. Adam's Four Key Triggers of Growth and Change in Urban Housing Markets

It has been over two decades since John S. Adams' presidential address at the 1984 annual conference of the Association of American Geographers (AAG) in Washington D.C. about the meaning of housing in America. Adams (1984) argued that "housing landscapes are never stable in America" (p.520) due to four key triggers of cultural growth and change. First, demography: different age groups in the broader population experience different housing needs. Second, wealth shifts: within any given metropolitan area there is a continuing change in wealth levels from declining or stagnant neighborhoods to faster growing areas, usually located in the suburban ring outside the urban core. The new geography of wealth can create new patterns of housing demand because the aspiration to move from one place to another can trigger substantial changes in the existing housing landscape. Third, the massive influx of foreign immigrants to

America has radically altered the housing landscape. Adams argued that a large number of these immigrants have settled in the booming Sunbelt areas of the West and South. Finally, the fourth element that has contributed to changes in the housing landscape includes the shift of capital from stagnant areas to growth regions. Adams argued that as further immigration and investment flows continue to move to these booming regions, they become a key stimulus to push the 'boom' still higher (Adams, 1984).

Adams argued that the housing process begins when new housing units are built and occupied. "Through this process of new construction and residential mobility, housing demand is withdrawn from some [degrading] areas--often in the inner city--and transferred toward other more desirable houses and neighborhood settings" (Adams, 1984, p.519) in suburban areas. One outcome of this housing chain is that the house price in the growing markets can experience rising prices, while areas experiencing significant out-migration can experience decline due to sluggish demand and the lower prices of older housing stock. Adams also noted that the dynamic and competitive quality of many urban housing markets obligates householders to move occasionally so as to maintain their relative social and financial position with respect to other households in their housing submarkets.

In any given location, the demand for housing in comparison to the local housing supply gives housing its market value and determines its contribution to the Gross National Product (GNP) (Adams, 1984). In the conclusion to Adams' address, he argued for more research to better understand the geography of housing markets. He suggested that in the effort to better comprehend the geography of a "de-urbanizing Post-Industrial"

America "the housing landscape tells us much about ourselves and our progress toward national and household goals" (Adams, 1984, p.525)

2. Contemporary Research: Key Determinants of the Geography of Urban Housing Markets

a. Mobility and Lifecycle Influences

The analysis of housing markets from a geographic perspective has been relatively limited since Adams' Presidential Address in 1984. The limited amount of research is curious given the call by Cover (1932) over seventy years ago to utilize building permit data to measure residential building activity. However, more recently the amount of research undertaken by geographers focused on housing has increased, although a significant amount of scholarship has focused largely on residential mobility, housing consumption patterns and residential overcrowding problems.

Those limited studies on the geography of housing markets have tended to focus on the influence of various socio-demographic and economic factors including the effects of demographic shifts (population growth, immigration…), the structure of households (family size, age and income, life-cycle...) and specific housing characteristics (vacancy rate, density of housing units, housing price…). This section of the literature review will focus on these research arenas to help better understand the impact of those variables on urban housing markets.

Some of the most important research conducted on residential mobility has included Dieleman et al. (2000) who analyzed the linkage that exists between the housing relocation process and the overall structure of metropolitan housing markets. They argued that dynamic residential relocation patterns significantly shape the geography of

metropolitan housing markets and that the relocation is motivated by an amalgam of several factors that include changes in household composition, increases in wealth, changes in household size requirement, and significant job changes (Dieleman et al., 2000).

Dieleman et al. (2000) claimed that the substantial differences in turnover rates in certain metropolitan housing markets result from certain particular conditions regarding tenure composition and prices which can constrain or expand the range of opportunities available to households. Dieleman et al. also argued that the age distribution of the population is a significant factor in shaping residential mobility rates. Studies have shown that the population aged between 25 and 35 years old are the most mobile segments of the population because many significant changes occur during this part of the lifecycle. Significant life-cycle triggers include leaving a home to start college, getting married and beginning a family, or starting a new job or acquiring a better-paying job.

Dieleman et al., suggested that previous studies have found that the residential mobility rates of metropolitan housing markets are largely a function of urban population growth rates and employment growth rates because both stimulate the demand for housing and, therefore, boost new housing construction which can trigger additional in-migration. Other important factors include fluctuations in local house prices, the types of housing stock available, construction costs, the development of land and other factor costs which can all significantly interplay in determining the level of housing market activity in terms of the overall scale of house purchases.

In their study, Dieleman et al. (2000) utilized six years of data from the Annual Housing Survey (AHS) to expand their understanding of variations in residential mobility processes across the largest 27 metropolitan areas in the United States. The focal point of their study was residential mobility, which included analyzing the decomposition of total residential turnover rates by housing tenure and age of the household, determining the linkage that exists between in-migration rates and the level of local mobility, uncovering the key determinants of turnover rates, and finally classifying metropolitan areas based on residential turnover patterns.

Dieleman et al., indicated that population growth was the main trigger driving both new construction and residential turnover rates, whereas the age and composition of the housing stock may also play an important role. Dieleman et al. found that the geography of turnover rates for the 27 metropolitan areas were clustered into four distinct regions based on the characteristics of the housing markets. The "hot" housing markets were found to be located in the U.S. Southwest, while the "cold" housing markets were in the Northeast. The economic and demographic shifts that have characterized U.S. cities over the last two decades may help explain the spatial variation of the level of activity by metropolitan housing market (Dieleman et al., 2000).

In various other studies, researchers have also associated the geographic distribution of residential mobility and housing consumption to specific population changes and the income characteristics of households. For example, Clark et al. (2000) suggested that the demographic composition of a household (e.g. family size) and the age cohort of the household members or the presence of children can trigger the need for

additional space and, therefore, act as a catalyst for a move from an existing house to a bigger and often more luxurious house depending on income.

Also, they indicated that increased levels of income inequality in a market can lead to affordability problems and overcrowding issues for low-income households. Metropolitan markets that attract a significant number of low-income immigrants can exacerbate the affordable housing problem which can in turn lead to a significant crowding problem by unit (Clark et al., 2000). For these and other reasons Clark et al., have argued that housing consumption patterns need more research attention because it involves a complex interaction that includes assessing the role of the internal characteristics of each household and the household's ability to afford a new house.

Consequently, Clark et al. examined three questions: the impact of income on housing consumption rates; the relationship between overcrowding and substantial population changes in markets attracting a significant number of international immigrants; and the tendency of low-income households in crowded housing conditions to seek larger housing units. Clark et al. utilized the weighted core sample data from the Panel Study of Income Dynamics (PSID) which was a large panel study initiated in the U.S. in 1968 at the county level to investigate the geographic variation of housing space consumption that relates these trends to space consumption needs and to variations in household incomes and other characteristics.

Most other geographically centered studies focused on residential overcrowding issues which suggested that the higher population density and housing shortages of many U.S. metropolitan areas are invariably the result of a large number of immigrants (Clark

et al., 2000). They pointed out that new non-white immigrants to the United States were two and half times more likely to reside in overcrowded housing conditions than either earlier arrivals or white immigrants. While the competition for housing in cities attracting large numbers of immigrants can increase the cost of housing, some immigrants responded by increasing the number of persons per household.

Clark et al. also found that the amount of space used by households varied by income levels and ethnicity. They noted a particular improvement in the housing consumption patterns of African-American households. In 1968, 20 percent of all African Americans lived in housing that was overcrowded, but this overcrowded rate declined to approximately eight percent by 1992. According to Clark et al the required number of rooms is defined by the formula in the PSID as 2 rooms for each head (including spouse if present) one room for additional couple or single 18 years old or older, one room for every two boys under 18 years of age, and one room for every two girls under 18 years of age (Clark et al., 2000). When those conditions are not met, it is said that there is "room stress" or a "room shortage" meaning residential overcrowding.

Clark et al. also pointed out that the rapid growth of the Hispanic population in metropolitan areas nationwide has increased crowding levels because "these are the households, often with larger families, who are likely to occupy less spacious, older, centrally located housing; [… additionally] these immigrants have higher fertility [rates] and larger size families in general" (Clark et al., 2000 p.53-57). The study indicated that the most affected counties were largely those located in California, plus the border states of Texas, Arizona, and Florida.

Overall, Clark et al. concluded that housing consumption patterns are related not only to changing life cycles, but also to the general processes of change that occur in Western societies. The size and the quality of new dwelling units increase as affluence levels arise. Also, certain demographic factors play a significant role in housing markets, when the birth rate decreases and the cohort of the population age reaches a certain stage level (for example, adulthood), the average household size tends to decrease.

Clark et al. (1984) utilized data from the city of Tilburg, Netherlands to examine housing consumption and residential mobility rates and changes in housing consumption that result from residential relocation. They also examined how space-related changes stimulate residential mobility. Clark et al. focused on the nature of housing consumption by tenure and life-cycle characteristic of households and the space requirements on residential mobility.

They asserted that one measure of the relationship between the demand for housing and the supply of housing is overcrowding, which indirectly measures the adequacy of housing supply relative to the need or demand as established by family size or population growth. Also, they argued that a better understanding of the operation of the housing market requires a better more integrated analysis of demand and supply over time. They documented that previous studies have established that differences in housing demand and supply triggers different types of mobility behavior.

Clark et al. argued that in the United States and Western Europe, decreasing household size and the overall expansion in the household inventory have generated a much lower lever of crowding and rising amounts of housing consumed per capita.

Additionally, in the United States, many first home-buyer households who enter the housing market begin with modest dwelling units, but when their income increases they move to a more impressive and spacious house located in a new development or into a neighborhood of a higher social status. The same process occurs in the Netherlands; however, unlike the U.S., the Dutch tend to enter housing markets as renters in both the private and public sector (Clark et al., 1984).

According to Clark et al., housing choice is largely conditioned by a mix of demographic arrangement as measured by the marital status and ages of household heads, the presence of children in the household, and the age of the youngest child. Also, space and the physical structure of housing units were found to be crucial elements in the selection process for households engaged in a housing search. They also indicated that though changes in household structure may trigger mobility, housing needs also may be dependent on residential history or conditioned by housing markets and institutional changes external to households (Clark et al., 1984).

The existing literature focused on metropolitan housing markets suggests that certain key socio-demographic and economic differences may primarily determine the extent to which a household may be able to acquire and own a new home. Morrow-Jones and Wenning (2005) examined the fluctuations that can occur within the repeat home-buyers market by metropolitan area. The study focused on the housing ladder, life-cycle and life-course concepts. The authors argued that the inability to move upward between housing units or the inability to move up in housing chain as much as other socio-economic groups do can reinforce existing social disparities among populations

(Morrow-Jones and Wenning, 2005). That said, the repeat home-buyer can both affect and be affected by the geographic structure of a metropolitan area. They argued that over time, moving up through the housing ladder implies that a home-owner has left older urban neighborhoods for a new higher-priced unit located in a new development that is in a more suburban or exurban setting.

Morrow-Jones and Wenning suggested that the geographic distribution of new high-priced housing can shape new types of housing landscapes within a metropolitan area. The underlying theme, according to the authors, is that most of the time the decision to move is triggered by a household income increase or a change in the household structure. However, the authors acknowledge that housing consumption paths can vary among home-buyers because limitations still exist for low-income and minority households. For those groups, the income requirements and implicit discrimination can continue to bar access to the higher rungs of the housing ladder (Morrow-Jones and Wenning, 2005).

Morrow-Jones and Wenning also indicated that a key concept in residential mobility research is the housing life-cycle. The life-cycle notion stipulates that when composition and housing characteristics, such as the number of bedrooms or bathrooms, tenure, location etc…, no longer meet the household preference requirements because of certain life-changes e.g. "nuclear family formation such as marriage, expansion (additional children) contraction (maturation of children) and dissolution (death of a spouse)" (Morrow-Jones and Wenning 2005, p. 1741) a relocation may be imminent.

Scholars have also connected the geography of housing to workplace needs and, this linkage is seen as a major component of the theory of urban spatial structure. For example, many economic geography models have utilized the conventional trade-off between commuting costs and housing costs to explain the theories of residential location (Clark and Withers, 1999).

In their study, Clark and Withers (1999) extended this assumption and argued that the simultaneous analysis of job choices and housing location choices can help to better understand urban spatial structure. This linkage between jobs and housing location holds for many reasons. For example, job changes or job losses may require households to adapt to new conditions of living that may include relocating from their regular residence to a new work place or from a bigger house to a small more affordable house.

Additionally, Clark and Withers (1999) argued that the life course changes are a major trigger regarding changes in the residential environment. For example, research has shown that any increase or decrease of family size has a significant impact on the likelihood of moving to a new housing unit in most cases to look for a better paying job. However, Clark and Withers argued that although job changes are an important factor in triggering residential relocation, households that rent are more likely to relocate than owner-occupied households. Similarly, they found that a job change is a more powerful triggering effect for the single renter household than for the married couple household with two jobs. The relationship between job changes and residential relocation choice is very important in any understanding of urban housing markets, since a mover can impact

the market in two ways--increasing the vacancy rate on one side (the leaving place) and creating demand for housing on the other (at the destination).

In the various life-course events which can lead to relocations, Clark et al. (2003) distinguished two types of residential moves. First, short distance moves occur within a specific labor and housing market. This change of location usually does not disrupt the overall lifestyle. The second includes interregional moves that arise through a change in job. Although these types of moves operate at different geographic scales, they both affect the housing market in fundamentally different ways.

Clark, et al. argued that there are several previous research studies that have examined residential mobility in various geographic areas including the United States, Europe, New Zealand, and Australia. However, an examination of the British housing market revealed that British housing markets have a higher proportion of public housing and was found to be more similar to the Dutch experience than that of the United States. They asserted that a higher proportion of the British housing stock is dominated by public housing where the housing authorities control a large part of the housing market. In recent years, however, changes have occurred to encourage more private homeownership in Britain. These changes consisted of selling some public housing units to stimulate homeownership. However, unlike the United States, Britain no longer has a policy of mortgage deduction from ordinary income in income tax assessment.

Some studies of the housing market have indicated that households that experience certain composition changes like divorce often move back down the housing ladder, while households with lower income levels can remain as renters. Nevertheless,

some scholars have showed that many housing moves are created by the investment

climate rather than by demographic changes, while others provide evidence that suggest

that demographic factors are a good explanation for residential change. For example,

change in household composition was found to be closely related to changes in

occupational careers, and these in turn are translated into changes in housing tenure and

housing consumption (Clark et al., 2003).

In the British housing market context, the mobility model incorporating

demographic variables and classic age and space-consumption variation are good

explanations for mobility. In this view, investment decisions may play a crucial role

within the basic demographic process. Clark et al. concluded that life cycle changes in

household composition (age, family size) and family income levels are important

determinants of mobility in British housing markets just as they are in American markets.

Vlist et al. (2001) examined the linkage between residential mobility rates and

local housing market differences. They argued that residential mobility is one of the key

factors in explaining the demographic dynamics of the neighborhood unit and the

functioning of the local housing and labor markets. Residential mobility creates a

mechanism in housing consumption in two ways. It increases the existing housing

vacancy rate in one side and decreases housing vacancy rates on the other.

Since housing supply is relatively inelastic in the short run, changes in

neighborhoods arise mainly from shifts in the household composition. Vlist et al. argued

that prior studies have established that the structure of local housing markets, including

local land use regulations for new construction, various allocation, or geographic factors

affect residential mobility through the amount of housing stock available and the average housing market prices. In addition, housing market choices are set within the local economy which differs from region to region. Also, residential mobility is associated with specific changes in households, changes in housing and changes in the housing markets.

Vlist et al. indicated that residential mobility rates differ widely across local housing markets, substantiating the view that residential relocation is intimately intertwined with conditions at the local level. Local housing market conditions can also have different effects on mobility rates based on tenure type (renter or owner-occupier). They claimed that across housing markets, variation in residential mobility rates also, can be partly explained by the level of urbanization, the tenure structure, the degree of government intervention, and the size of the housing market (Vlist et al., 2001). They also indicated that restrictions on residential mobility may have strong impacts on local housing markets and may also be an important source of job-housing mismatches and other inefficiencies in the labor market. Also, differences between the labor market and the number of local jobs available may also explain differences in residential mobility rates across housing markets.

Overall, Vlist et al. concluded that residential mobility is one of the key factors in explaining the demographic dynamics of a neighborhood and central to a better understanding of the functioning of both the local housing and labor market. They indicated that large differences in residential mobility rates exist between households and across local housing markets. In general, residential mobility is thought to be triggered by

changes in the family life course and related changes in housing demand, or labor market changes. Moreover, a distinctive geography of residential mobility exists in local housing markets, with lower mobility rates in the core regions and higher mobility rates in the periphery, probably because most of the new housing units are built outside of the inner city, where more and relatively less expensive land is located.

In housing studies, demographic factors emerge as a major key agent in influencing the demand for housing and in determining the amount of housing units needed in response to these needs. One key issue is immigration which continues to be a hot topic in the United States due to its impact on the country's population growth rate. For example, Saiz (2006) argued that in the metropolitan areas that are attracting large number of immigrants, both the demand for housing by new immigrants and a continued housing supply market can increase housing rents and prices.

To investigate the impact of immigration inflows on housing rents in U.S. metropolitan areas, Saiz utilized data on legal immigration inflows from the Immigration and Naturalization Service (INS) and decennial census data to track the number of foreign-born, housing rents, and home values by metropolitan area. He found that immigration inflows have an impact on rents and housing prices because they increase the demand for housing. For example, Saiz indicated that in metropolitan areas where immigration inflows are equal to one percent of a metropolitan area's population, the increase in average rent and housing values is about one percent (Saiz, 2006).

The author also asserted that in gateway metropolitan areas like New York, Los Angeles, Miami and San Francisco that attracted a significant number of immigrants

between 1970 and 2000, housing prices and rents increased regardless of the economic cycle. Additionally, Saiz argued that his prior study on immigration and rental prices had shown that rental prices had increased eight percent more in Miami than for the rest of the Florida metropolitan areas he examined.

b. Housing Market Activity: Price and Other Influences

A large number of scholars from various disciplines have conducted research focused on the role of price in residential housing markets. A significant amount of housing research has attempted to link variations in urban housing supply to many factors but especially to variation in house prices. It is not my intention to conduct an exhaustive study of the literature on housing prices; rather, this dissertation reviews research that has focused on housing prices that shape the aggregate housing market at a broad geographic scale. For example, it has been established that variation in housing prices can affect overall urban growth rates (Glaeser et al., 2006).

Dipasquale and Wheaton (1994) examined housing market dynamics and their connection to future housing prices. They reviewed previous housing studies that focused on better understanding housing construction and suggested that the production or flow of new housing units is determined by the level of house prices. They claimed that the average housing unit price increases as the housing stock grows because each new construction diminishes the amount of available usable land. Under this theory, they argued that high price levels would trigger an increase in the number of housing units until the current stock satisfies demand, where, the price of housing would become more stable over time.

The authors acknowledged that demographic changes at the national level have an impact on the demand for housing. Also, they indicated that though housing prices and construction costs have been established as the driving forces that most shape housing supply other influential variables include vacancy rates, mortgage rates, and housing sale rates, as well as general macroeconomic conditions (Dipasquale and Wheaton, 1994).

Dipasquale and Wheaton also indicated that besides house prices, the main determinants of housing demand could include personal consumption rates, household income levels, and changing demographic profile variables such as household formation and population age-group profiles, among other factors. They established that annual movements in house prices are not sufficient to explain the large short run changes in single family housing supply, but instead, yearly variations in new building rates were better explained by fluctuations in interest rates and a mix of price changes with other variables (e.g. demographic, job growth) that better reflect the state of the housing market.

While residential mobility was found to be significantly important in understanding housing markets, Green and Malpezzi (2003) argued that three major elements of these markets are inseparable and these include: *inputs* (i.e. those basic elements necessary in the production of housing such as land, labor, finance, materials, and infrastructure), *the supply-side agents (*e.g*.* landlords and developers)*,* that provide housing services, and *relative prices* which provide valuable information that help to determine whether to supply more or less housing or whether input suppliers should provide larger or fewer inputs.

Green and Malpezzi argued that in housing markets, housing demand is driven by both population and incomes. The authors indicated that prior studies had established that demographic composition can determine the absolute number of households while incomes can determine the size and the quality of those units. Other studies that focused on housing demand moreover, suggested that the type of unit and its location could be influenced by the age of the household head and household composition patterns (Green and Malpezzi, 2003).

Regarding housing supply, the authors argued that despite remarkable increases in real income and household formation, the housing market has remained cyclical (Green and Malpezzi, 2003). However, they also acknowledged that new housing construction is not the only source of supply or the largest. Other important sources of housing supply include a small but growing number of manufactured homes, and changes in the number of vacancies, demolitions and conversions (Green and Malpezzi, 2003).

Jud and Winkler (2002) investigated the determinants of change in real housing prices in 130 metropolitan areas between 1984 and 1998. They documented that previous studies have indicated that population and employment growth affect housing appreciation, but the impact of these variables varied widely. Also, other studies had found that income and construction costs were the important factors in rationalizing changes in housing costs.

In their analysis, Jud and Winkler (2002) employed a fixed-effects model to control for a metropolitan area's specific factors that would influence appreciation rates in any particular location. Their empirical findings indicated that housing appreciation

rates were unevenly distributed across metropolitan areas due to location-specific fixed-effects on housing prices. Jud and Winkler also indicated that a positive correlation existed between the magnitudes of the fixed-effects in particular metropolitan areas and certain restrictive growth management measures that were directly imposed on land scarcity levels. They also found that real housing values at the metropolitan scale are most responsive to population changes. Overall, their model suggested that variation in housing price changes among the metropolitan areas was mostly affected by variables that included real income, population change, real wealth, real construction costs, and real interest rates.

Glaeser et al. (2005) conducted a similar study by investigating the key determinants of housing price increases. They argued that since 1950, housing prices have risen regularly by almost two percent per year. Between 1950 and 1970, this increase reflected rising housing quality and construction costs, whereas since 1970, that increase reflected the increasing difficulty of obtaining regulatory approval for building new homes (Glaeser et al., 2005). According to Glaeser et al., the supply of housing is influenced by various components including the availability of appropriate land and government policy.

In their analysis, Glaeser et al. used both empirical analysis and a comparative method, and the results indicated that new construction has declined sharply in high price locations. Also, they found that restrictive land policies aimed at controlling the amount of new housing supply gradually have a significant impact because they prevent suppliers from responding to higher prices by building additional units. Variations in population

density levels were not sufficient to explain all this change, because a study of the San Francisco metropolitan area has showed that a strong negative relationship exists between population density and new construction in the 1990s.

Glaeser et al. argued that the empirical evidence suggests that housing supply strategies are never a consequence of restrictive government regulations but rather they are a consequence of physical geographic limitations such as mountains. Overall, the authors stressed that over the past 30 years, the provision of new housing units is reasonable in most markets and housing prices have remained relatively low. However, new housing construction activity has decreased and housing prices have escalated in a small but increasing number of locations in the United States, and these changes are largely due to regulatory changes that increasingly make large-scale residential development difficult especially in expensive regions like New York, San Francisco, and Los Angeles (Glaeser et al., 2005).

Gyourko and Saiz (2006) examined the relationship that exists between construction costs and the supply of housing at the metropolitan level. According to Gyourko and Saiz, the urban literature has documented that population density alone can make it difficult and costly to build in dense areas. Also, the physical landscape of an area can increase construction costs by driving up input prices or by making certain construction processes more expensive. They also argued that variables that include wages, unionization rates, and the regulatory environment at the local level can affect construction costs. For example, unions can influence costs via wages or through impacts on productivity via restrictive work rules or others channels (Gyourko and Saiz, 2006).

In their study, Gyourko and Saiz utilized data from various sources to examine the impact of construction costs on housing supply housing structure. These sources included housing construction costs from the R.S. Means Company, which is a data provider and consultant to the home building industry; income and Product Account series data on the cost of building new residential structures; population density data from the Bureau of Economic Analysis (BEA); residential building permits from the U.S. Census Bureau; average wages from the Bureau of Labor Statistics (BLS); physical landscape data from U.S. Department of Agriculture's Economic Research Survey (ERS); unionization rates from the Current Population Survey (CPS). However, measuring accurately the extent of a particular city's regulatory regime is very difficult, since this may range from onerous building codes to complex inspection processes and could increase the cost of housing construction (Gyourko and Saiz, 2006).

Gyourko and Saiz found that a positive correlation exists between local spending per capita on inspection activities and home construction costs, but the coefficient was small and not statistically significant. Population density and per capita income were positively associated with higher local construction costs, while unionization rates in the construction sector, the regulatory environment and topography were found to be major determinants of overall construction costs. Metropolitan areas that are dominated by high hills and mountains are about 10 percent more costly than other topographic forms. Also, local wages were found to have a great impact on construction costs.

Additionally, Gyourko and Saiz established that construction costs are an important component of house prices in all markets. They argued that in metropolitan

areas with relatively lower land values, high construction costs could make new development or redevelopment unfeasible if the market value of a house is lower than local construction costs (Gyourko and Saiz, 2006). Finally, their analysis suggested that a more stringent local regulatory environment also was associated with somewhat higher construction costs.

Several scholars have attempted to better understand the connection that exists between urban growth rates and urban housing market activity. For example, Glaeser et al. (2006) explored empirically the role that the supply of housing plays in mediating urban dynamics. They reviewed the connections that exist between housing stock and population change by examining changes in vacancy rates and household size, and they also examined whether the dynamic changes in housing supply can directly affect urban form.

Glaeser et al. argued that the correlation between housing supply and population change provides a necessary, but not sufficient, explanation of how the supply of housing shapes overall urban growth rates. Instead, urban growth could be explained by other factors, and housing supply could respond to the needs caused by those factors (e.g. job growth, in-migration flow). They also argued that housing supply has become very inelastic in many areas of the country because of restrictive land use regulations. In metropolitan areas where land use regulations are less severe, the population (and new housing supply) response to labor demand needs is much stronger than in metropolitan areas where land use regulations are more restrictive. Regulatory controls that shape housing supply are important not only for understanding changes in overall population

levels within metropolitan areas, but also for understanding overall urban housing market conditions.

In this context, the growth of cities is determined by the elasticity of the supply of housing. In places where limited land use regulations exist and low population densities facilitate the construction of new homes, it is likely that those cities will experience significant population growth rates. By contrast, in places with higher population densities and stringent land use regulations, those cities may experience limited population growth rates even though housing prices and income levels may rise in these places (Glaeser et al., (2006).

Some researchers have also examined the effect of impact fees (defined as a one-time charge imposed on new development by local government to fund a proportional share of the cost of capital facilities required by that development) on urban housing markets. Mathur et al., (2004) argued that impact fees add directly to the costs faced by developers in supplying new housing to the market. The effects on new housing prices and the quantity of new residential construction depend on market conditions, where tighter market conditions lower the price elasticity of demand and increase the price effects of the impact fee, while softer market conditions have the reverse effect. Under tight market conditions, Mathur et al. (2004) would expect the impact fee to be passed on principally to consumers, while developers and landowners would absorb most of the cost of the impact fees in the form of lower profits under soft market conditions.

According to Mathur et al. (2004) the "impact fee increases the prices of the house in both the high-and low-quality housing markets" (p.1304). Consequently, the

consumers' reaction to this price increase may lead to a change in both the demand and supply of housing in these markets. However, the magnitude of this change would depend upon the price elasticity of the demand and supply of housing in these sub-markets

Mathur et al. (2004) found that the effect of impact fees on the price of new housing was quite significant raising new home prices by about 166 percent of the amount of the fee after accounting for macroeconomic conditions and other factors that influence prices. The effect was more pronounced for higher-quality houses where the price increase was more than three and a half times the amount of the fee. In addition, they found that the effect of impact fees in less-quality housing markets was smaller in magnitude and also statistically insignificant.

Ihlanfeldt and Shaughnessy (2004) affirmed that impact fees can affect land and housing markets. By utilizing data from Dade County (FL), Ihlanfeldt and Shaughnessy conducted an empirical study to estimate the effects of impact fees on the prices of new and existing single-family homes and undeveloped residential land.

Ihlanfeldt and Shaughnessy's findings indicated that housing prices rise by about $1.60 for each additional $1 dollar of impact fees. They found that the difference in the effect of an additional dollar of impact fees between new and existing housing is small and statistically insignificant. Developers of the new housing appear to be compensated for the impact fees that they pay because they increase prices on the new homes. However, while the increase in housing prices is found to cover the current level of the fee, developers purchasing land have no assurance that rising housing prices will cover

future fees, especially due to the unpredictable upward trend in total fees over time. This uncertainty leads developers to reduce the amount they are willing to pay for land.

c. Housing Market Activity: Building Permits as a Surrogate Measure

Hoffman (1999) utilized building permit data to examine home building activity in 39 large American urban regions at the peak of the housing cycle of 1986. These data measured the extent and proportion of new housing construction in 39 large cities and their surrounding metropolitan areas. Here, the term "large cities" referred to largest cities and any others with a population of more than 200,000 within a metropolitan area as defined by the Joint Center for Housing Studies of Harvard (Hoffman, 1999).

Hoffman argued that a growing economy can stimulate job growth, which can in turn lead to population change which could result in demand for additional housing. According to the author, in a given metropolitan area demand for more homes can rise as people migrate from other places, or simply seek new, large and usually more expensive houses. Despite this, he recognized that some regions economically do better than others, and therefore, the amount of home construction is unevenly distributed among the cities and suburban parts of the U.S. metropolitan areas.

He found that the construction of new homes has continued since the recession of the early 1990s, because the analysis showed that between 1991 and 1998, the number of new homes in the 39 metropolitan areas examined had grown by nearly 78 percent, and about 80 percent of new housing built had occurred in the suburbs. However, this increase in new housing construction was unevenly distributed during that period, since some cities have experienced a slowing in building activity, especially the more compact

and densely developed cities with lesser amounts of undeveloped land (e.g. Hartford, and Miami), while capacious cities with substantial amounts of undeveloped land (e.g. Phoenix and Dallas) have experienced a booming residential market in building activity.

McDonald and McMillen (2000) developed an empirical model of residential building permit activity in a study of 696 urban counties located in 263 metropolitan areas in the United States for the period 1990-1997. They argued that in markets experiencing significant housing appreciation rates, developers will apply for building permits for additional housing units to satisfy demand. However, they argued that if the current housing price is within the limits of a 'normal' housing price (i.e. neither too low nor too expensive), there will be no pressure to build more housing units. In this case, the vacancy rate will remain stable and maintain equilibrium between the demand for housing and the actual quantity of housing supply. However, if the housing market shows a significant decrease in housing prices, there is no reason to add more units to the existing stock since the suggestion is that a surplus of housing units exists and acts to decrease prices. If such economic conditions persist, the end result can be housing abandonment, demolition, or conversion of some units for other uses (McDonald and McMillen, 2000).

McDonald and McMillen's findings indicate that the vacancy rate is negatively correlated with building permit activity. The higher the vacancy rate, the lower the number of building permits issued. Although McDonald and McMillen found a statistically significant relationship existed between these two variables, the overall

magnitude of the effect was small due to the influence of other more powerful variables including the population growth rate.

McDonald and McMillen's research found other positive correlations existed between both the number of old and new housing units in a market and building permit activity. The findings are interesting but not surprising. Residential developers carefully assess the balance between housing demand and housing supply (number of units on sales) before proceeding with a project. For example, when demand for housing exceeds the current housing supply, housing prices can go up. Similarly, in markets that have a significant number of old dwelling units, residential developers have to replace some of those units due to obsolescence so they pay attention to maintaining the equilibrium between demand and supply.

Moreover, the positive relationship that exists between the number of new houses (homes recently finished) and the number of building permits can be explained. For example, when there is a high demand for housing, home prices appreciate more rapidly than in normal housing market conditions. As a solution to that high demand, developers continue to provide new housing until the demand cools down.

Asabere and Huffman (2001) examined the relationship that exists between public policies governing building permits and their impacts on suburban land prices. They argued that in those municipalities where stringent permit and planning policies imposes tough restrictions that affect urban growth, for example, when a municipality imposes a moratorium on building permits for new development, land prices can fall. By contrast, in municipalities where planning policy encourages and facilitates urban growth, (e.g. by

adopting an easy approval for each building permit requested by the developers) land prices are expected to rise (Asabere and Huffman, 2001).

To examine and identify the impact of building permit policy, defined as a statement of the projections for the number of permits to be allowed by buildout for specific land uses such as single family residential on land prices, Asabere and Huffman analyzed vacant land sale price data that included 354 vacant land sales from 1993 to 1998 in 26 townships of Montgomery County (PA). They argued that public policies that control building permits should influence land prices. Also, they assumed that an inverse relationship existed between the percentage of developable land and land prices.

Their findings revealed that a correlation existed between land prices and residential building permits where land prices go up with increases in residential building permits. For example, they suggested that a one percent increase in permits leads to a 1.14 percent increase in sale price per acre, holding other influential variables constant. They also found that a residential permit policy that facilitates the issuance of building permits can cause land prices to increase, specifically in those municipalities where the supply of developable land is scarce.

Bier and Post (2003) argued that the relationship between housing construction and households is a fundamental and influential factor in the dynamics of urban change. They utilized building permit data to measure changes in housing stock which, according to the authors, is defined as the net number of units constructed, the number of units demolished, and the number of units converted in use to or from housing. The authors analyzed the relationship that exists between new housing construction and household

change in 74 of the largest metropolitan areas in the United States, to determine the extent to which new housing construction kept pace with household growth between 1980 and 2000, but with a particular focus on the 1990s.

Bier and Post claimed that metropolitan areas that consistently produce less housing than the economic growth rate would experience a housing market boom and escalating prices; while those metropolitan areas that consistently produce more housing units than the economic growth rate would face potential real estate abandonment due to an excessive housing surplus. They believed that in metropolitan areas where the amount of new housing built each year exceeds the increase the number of households, a housing surplus would emerge. However, if most of the new housing units are located in suburban areas, and those units are affordable, then lower income households would be more likely to move up to these new housing units. An implication of this type of urban activity would be that some houses would be left vacant in the least preferred neighborhoods, which most likely are located in old central cities. This type model of metropolitan housing market was clearly evidenced in the Midwestern and Northeastern metropolitan areas according to Bier and Post (2003).

Bier and Post indicated that from 1980 to 2000, the number of new building permits exceeded the number of new households by nearly 19 percent, although large differences existed between the decades. However, they also suggested that "Economic growth attracts households; where growth is strong (as it was witnessed in the West and the South during 1990s), expansion of the housing supply is likely to be in pace with growth (accompanied by upward pressure on housing prices). Where economic growth is

not strong, neither is household growth, but demand for new housing still exists" (Bier and Post, 2003, p.10).

3. Summary and Discussion

The purpose of this literature review was to uncover the principal geographically centered research that has been conducted on residential housing markets and specifically, to explore the key determinants of new residential housing supply in the United States. From the early studies to the more contemporary research, various scholars have stressed the large number of interrelated factors that have shaped residential housing markets.

Among the most common factors likely to influence the geography of supply and demand for housing are the following: the socio-demographic structure of the markets (marriage, family size, age-group, family dissolution, immigration, internal migration, population growth etc.), changes in household income, various forms of regulation including land use regulations, environmental regulations, government regulations (taxes, impact fees), planning policy, broader macro-economic forces such as job growth rates, job changes, employment composition, interest rates, inflation rates, and various cost related to housing production including both construction and labor costs and the price of land.

Regarding the effects of the existing housing markets on new housing supply needs, most researchers mentioned the impact of vacancy rates, existing prices and the overall condition of the existing home market (the amount of old housing units, the

number of new units), housing price appreciation rate, housing density, and the size of

the existing housing stock as key differentiating factors.

However, although a significant amount of research exists on residential housing

markets, the contemporary literature in urban and economic geography has tended to

overlook the geography of housing supply and residential market especially at the

metropolitan scale. For example, Glaeser et al. asserted that:

> The modern literature on urban growth and economic geography generally
> ignores housing supply. [ ] The real estate and urban economy increasingly
> have become separate subject areas. Virtually none of the articles on urban
> growth that have appeared in general interest economics journals over the
> past 20 years mention the supply of housing. At the same time, the real
> estate literature has focused on a variety of other issues such as housing
> as a financial asset that tend to be orthogonal to housing's large role in
> economic geography (2006, p.71).

The lack of research by geographers in this area is curious given the magnitude

and role of urban housing markets and the socio-economic significance of residential

housing in urban areas. For example, various studies have suggested that housing

occupies approximately 35 to 45 percent of land in most major cities (Bourne, 1981).

That said, geographers have not completely ignored housing issues since many

geographers have studied intra-urban residential markets and specific metropolitan areas.

For example, several studies have focused on local housing markets by examining

residential mobility, or housing choice within neighborhoods, and housing consumption

and residential crowding (Clark et al., 2000 and 2006).

In addition, studies conducted under the supervision of the U.S. Department of Housing and Urban Development have explored housing markets within particular geographic areas such as metropolitan areas or broader regional markets. Although such studies provide an overview of housing market conditions at a national scale, they lacked explicit spatial theorization and they rarely acknowledged the broader geographic literature on housing.

However, the existing literature on housing markets does provide detailed information on various factors that influence the supply and demand for housing. However, most of these studies have been conducted by economists and they tended to focus on housing as an economic asset, the role of housing in the national economy, housing price fluctuations, various obstacles faced by developers or homebuyers, such as the effects of impact fees and down payments, but few have studied the explicit geographic variation of housing supply by metropolitan area

Despite a significant amount of research on housing markets, it appears that few studies have utilized residential building permit data to statistically investigate housing market activity at a metropolitan scale. Although some research studies have utilized building permit data to assess building activity, they were limited to a smaller geographic scale. This dissertation is a first step at enriching the literature on the geography of housing markets by better understanding how the key determinants of urban residential housing market activity at the metropolitan scale shape housing demand and supply. The following chapter illustrates the research hypothesis and data used in this dissertation research.

CHAPTER III

RESEARCH DESIGN

Introduction

After the last recession in 2001, housing construction was one of the few growth sectors in the national economy, and the extraordinary increase in home value combined with low interest rates, innovative financing, and government incentives contributed to very active housing markets. Additionally, substantial investments by "baby boomers" in second home purchases and retirement planning that included significant real estate acquisitions all stimulated housing markets in urban and especially resort-oriented areas.

It is crucial to better understand what specific socio-economic factors have influenced decision making relative to the construction of these new residential housing units by different metropolitan markets. Better understanding the geography of building permit activity can help us better understand the wider economy. The purpose of this dissertation is to empirically analyze the key economic, existing and current housing characteristic and socio-demographic factors that most influence new residential housing building permits per 1000 persons by U.S. metropolitan area. This study will enrich the current literature in economic geography and also will fill a gap in the geography literature on housing. Most prior studies undertaken by economic and urban geographers have overlooked the importance of studying housing market activity at a national scale preferring to concentrate instead on residential mobility rates, neighborhood dynamics,

overcrowding rates and residential segregation largely at a more local scale of analysis.

1. Overall Research Hypothesis

This dissertation hypothesizes that an amalgam of factors explain the geographic differences in residential building permit activity by metropolitan area and that these factors can be grouped into three major categories: First, residential building permit activity per 1000 is largely conditioned by the composition of the metropolitan economy. The rationalization here is that building permit rates are affected in both positive and negative ways by the type and number of establishments, and by the type and mix of employment available within the metropolitan area. For example, it is hypothesized that metropolitan areas with a disproportionate share of highly skilled labor and high value added industries will generate a significant above average rate of residential building permits per 1000 persons. The logic here is that a highly skilled labor pool that earns above average incomes are more able to afford a home purchase.

Second, it is hypothesized that residential building permit activity is influenced by existing housing characteristics which include both conventional housing stock measures and various exogenous effects related to housing conditions. It is argued that the number of owner-occupied and rental units, the number of vacant housing units, the number of dwelling units ready for demolition due to abandonment or condemnation, and the amount of housing under construction or in renovation or conversion at the time the developer seeks the building authorization can significantly shape the number of building permits issued.

Finally, the number of residential building permits can be influenced by certain <u>key socio-demographic characteristics</u>. There is an underlying assumption that population change, ethnic mix, and age composition can all significantly shape building permit activity in different ways. It has been established that any change in household composition can lead to a need for new housing. For example, if family size increases, and that increase is accompanied by an increase in household income, the family may move to a new, more spacious and usually very expensive house.

Disentangling those variables that most significantly explain the geography of residential building permit activity by metropolitan area with the most parsimonious regression model is the central theme of this dissertation. It is hypothesized that the principal causal agents regarding the geography of residential building activity will include some mix of these three major groups of independent variables.

2. Data Definitions

a. The Dependent Variable: Residential Building Permits per 1000

In this dissertation, the dependent variable is the number of *residential building permits* per 1000 persons by metropolitan area for 2005. Residential building permit data are based on reports submitted by local building permit officials in response to a U. S. Census Bureau mail survey of 20,000 permit-issuing places. They are collected from individual permit offices, most of which are municipalities. However, the data only represent those areas where a permit is required prior to any construction activity (U.S. Census Bureau).

A housing unit, as defined for purposes of the building permit report compiled by the U. S. Census Bureau, is a house, an apartment, a group of rooms or a single room intended for occupancy as separate living quarters. Separate living quarters, however, are those in which the occupants live separately from any other individuals in the building and which have a direct access from the outside of the building or through a common hall. In accordance with this definition, each apartment unit in an apartment building is counted as one housing unit.

Additionally, housing units are defined as conventional "site-built" units, prefabricated, panelized, componentized, sectional, and modular units and exclude group quarters (such as dormitories and rooming houses), transient accommodations (such as transient hotels, motels, and tourist courts), "HUD-code" manufactured (mobile) homes, moved or relocated units, and housing units created in an existing residential or nonresidential structure. Despite these caveats, the residential building permit data provides a general indication of the amount of new housing stock that may have been added to the national housing inventory at any given time.

b. The Independent Variables

The independent variables to be examined are grouped into three major categories: the composition of the metropolitan economy, the existing housing characteristics and the socio-demographic characteristics of the resident population.

Figure1 illustrates a simple model of the theoretical interrelationships that exist within the context of a metropolitan housing market for these three categories that builds on the classical work of Maisel (1963) and Bourne (1981) who both developed

conventional frameworks of the key determinants of new residential construction activity

as measured by building permits.

➢Category I contains those variables that are used to define the composition of

the metropolitan economy (ME).

Category I

| Composition of the Metropolitan Economy (ME) (Jobs, wages, establishments) |

Residential Building Permits Per 1000

Category III

| Socio-Demographic Characteristics (SDC) |

Category II. a.

| Housing Stock |

Category II. b.

| Exogenous Effects Related to the Existing Housing Stock |

Category II

| Existing Housing Characteristics (EHC) |
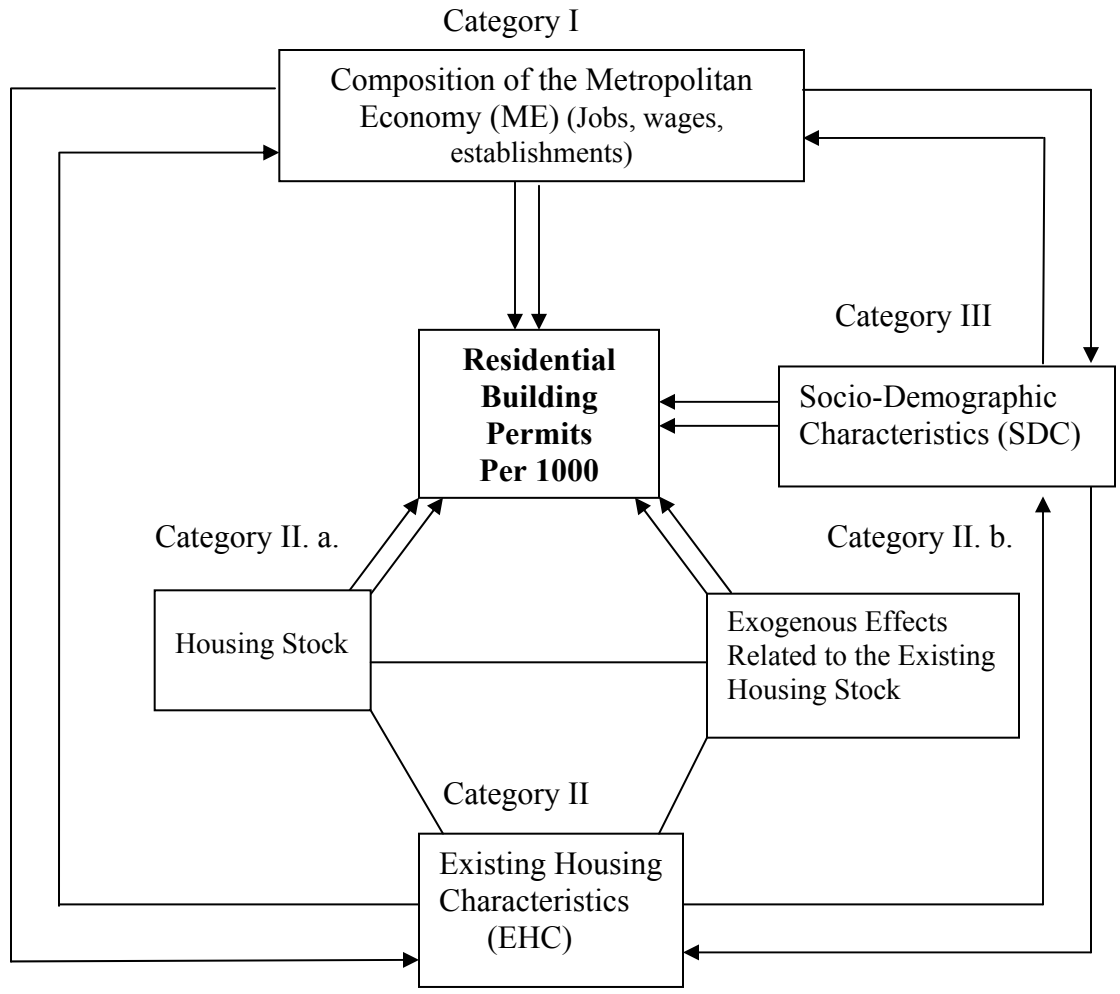
Figures 3.1 Conceptualization of the Key Determinants of Residential Building Permit
         Activity by Metropolitan Area
Source: Derived from Maisel (1963) and Bourne (1981)

Note: While this dissertation provides a small step towards better understanding the geography of new residential housing markets, additional research should include variables that can capture the role of the natural environment (e.g. temperature), the overall quality of public services, cost of living indexes, the role of planning and government regulations, land availability and the impact of public housing since these factors are not fully explored in this dissertation.

The employment composition data to be used in this dissertation consists of the number of establishments, the total employment, and annual average wages from six selected sectors of the national economy as defined in North American Industry Classification System (NAICS).These six sectors of the economy account for 65 percent of all jobs in the United States. They include:

1. *Manufacturing (NAICS 31-33)*: This sector comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products.

2. *Retail Trade (NAICS 44-45)*: This sector comprises establishments engaged in retailing merchandise generally without transformation, and rendering services incidental to the sale of merchandise. The sector comprises two main types of retailers: *store* and *nonstore retailers*. The store retailers operate fixed point-of-sale locations, located and designed to attract a high volume of walk-in customers. They typically sell merchandise to the general public for personal or household consumption, but some also serve business and institutional clients. However, the *nonstore retailers*, like store retailers, are organized to serve the general public, but their retailing methods differ. The establishments of this

subsector reach customers and market merchandise with methods, such as the broadcasting of "infomercials," the broadcasting and publishing of direct-response advertising, the publishing of paper and electronic catalogs, door-to-door solicitation, in-home demonstration, selling from portable stalls (street vendors, except food), and distribution through vending machines.

3. *Professional, Scientific, and Technical Services (PST) (NAICS 54)*: This sector comprises establishments that specialize in performing professional, scientific, and technical activities for others. The activities performed require a high degree of expertise and training and include legal advice and representation; accounting, bookkeeping, and payroll services; architectural, engineering, and specialized design services; computer services; consulting services; research services; advertising services; photographic services; translation and interpretation services; veterinary services; and other professional, scientific, and technical services.

4. *Administrative and Support and Waste Management and Remediation Services (NAICS56):* This sector comprises establishments performing routine support activities for the day-to-day operations of other organizations. The establishments in this sector specialize in one or more of these support activities and provide these services to clients in a variety of industries and, in some cases, to households. Activities performed include office administration, hiring and placing of personnel, document preparation and similar clerical services, solicitation, collection, security and surveillance services, cleaning, and waste disposal services.

5. *Health Care and Social Assistance (NAICS 62)*: The sector includes both health care and social assistance because it is sometimes difficult to distinguish between the boundaries of these two activities. The services provided by establishments in this sector are delivered by trained professionals. All industries in the sector share this commonality of process, namely, labor inputs of health practitioners or social workers with the requisite expertise.

6. *Accommodation and Food Services (NAICS 72)*: This sector comprises establishments providing customers with lodging and/or preparing meals, snacks, and beverages for immediate consumption. The sector includes both accommodation and food services establishments because the two activities are often combined at the same establishment.

For each of these six major sectors of the economy, the following indicators will be included in the subsequent analysis of the independent variables that capture the composition of the metropolitan economy (*ME*):

-average annual pay for each of these industrial sectors (*Aa*)

-total number of establishments per sector (*Te*),

-percent employed for each of these industrial sectors (*Pe*),

-total establishments per 1000 persons (6 NAICS) (*Es*)

-employment levels per 1000 persons (6 NAICS), (*Em*)

-average annual wages by sector (*Ws*),

-average annual wage per job (dollars) 2005 (*Wj*),

-the total annual payroll per capita (*Ap*).

Other measures of economic activity that may correlate with building permit activity that will be included in this analysis include:

-total employment available per 1000 persons (all sectors) (*Ea*),

-the number of bank offices in 2004 (*Nb*),

-the annual deposits (in million of $) in 2004 (*Ad*),

-the median household income, and (*Y*)

-the unemployment rate (*U*) of each metropolitan area.

In statistical terms the general relationship can be expressed as follows:

(1) *ME=f(Aa, Te, Pe, Es, Em, Ea, Ws, Wj, Ap, Nb, Ad, Y, U).*

➢Category II contains those variables that are used to define <u>the existing housing characteristics (EHC) of each metropolitan market</u>. These variables included those used to define the existing housing stock and the exogenous effects that can shape housing stock. *First,* the housing stock (*Hs*) is defined and measured by:

-total of owner occupied housing units (*Oo*),

-total rental occupied housing units (*Ro*),

-total vacant dwelling units (*V*), an

-total housing units waiting for demolition (*Dh*).

-total new dwelling units under construction (*Uc*) i.e. started but not yet completed

The Second subcategory encompasses exogenous effects related to the existing housing conditions (*Ee*) and this includes:

-median housing value ($) for existing housing units (*Hv*),

-percent of old dwelling units (built before 1939) (*Od*),

-median real estate tax (\$) (*Rt*),

-housing affordability ratio (*Ar*) (i.e. median family income divided by median

 home value, where a high ratio indicates a high level of affordability

-average housing value (\$) for new housing units in 2005 (*Nh*),

-percent of owner occupied units with mortgage (*Om*),

-total housing units (*Th*),

-percent of housing units built between 1990 and 2004 (*Nb*),

-percent owner-occupied housing units without a mortgage (*Wm*).

Statistically, we can rewrite this relationship as shown in (2).

(2) $EHC = [f \{Hs = (Oo, Ro, V, Dh, Uc) + f \{ Ee = (Hv, Od, Rt, Ar, Nh\ Om,, Th, Nb, Wm)\}]$

➢Category III includes those variables that measure <u>the key socio-demographic</u> <u>characteristics (SDC)</u> that shape housing activity. Those variables are measured by:

-the level of education (*Ed*) (indicated by the percentage of the population 25years

and older with bachelor degree or higher),

-population density (*Pd*),

-the total population (*Tp*),

-the percent population growth by natural increase, (2000-2005) (*Ni*),

-the percent population change, 2000-2005 (*Pc*),

-the percent population growth by net migration data (*Nm*),

-the percent of the population 65 years and over and the percent of the

 population 25 to 34 years old (*Pa*),

-the percent single family householders (*Sh*).

-percent ethnic population (African American, White alone not Hispanic or

Latino) (*Eg*),

Statistically we can rewrite the relationship as follows (3).

(3) *SDC= f (Ed, Pd, Tp, Ni, Pc, Nm, Pa, Eg, Sh).*

The basic model assumes that the geographic variation in residential building

permit activity cannot be explained by a single category of variables but rather by a

combination of employment mix, housing stock and socio-demographic characteristics.

The implication here is that an effective explanation of any spatial variation of residential

building permit activity may be best understood by analyzing the interplay of these three

major groups of variables. By doing so, the resulting equation would be:

(4) *RBP= f (ME, EHC, SDC)*

Much of the proposed model was first utilized by Maisel (1963) to study

fluctuations in residential construction starts. He argued that in the short run fluctuations

in housing starts are caused by processes deeply imbedded in the construction process

and these forces primarily create fluctuations in vacancies and inventories under

construction (Maisel, 1963). A similar model was proposed by Bourne (1981); he argued

that "the supply of new housing increases positively with the rate of net household

formation, the rate of unit removals from the housing stock, average house price

increases and the rate of housing starts in the immediately preceding period. Similarly,

supply decreases with higher vacancy rates and higher interest rates" (Bourne, 1981

p.101). As applied to this dissertation, both models imply that employment composition;

existing housing characteristics and other metropolitan-based socio-demographic

characteristics can explain the spatial variation of the dependent variable: *new privately-owned housing units authorized by building permits*.

3. Additional Sub-Hypotheses

The first key determinant of residential building permit activity is the overall composition of the metropolitan economy of the metropolitan area. It is hypothesized that residential housing market activity is proportionally linked to ongoing regional economic activity. For example, metropolitan areas with a higher percent of professional, scientific, and technical services (PST) jobs should experience above average new building permit rates. The logic here is that educated, skilled labor markets are capable of attracting new investments and significant population growth rates, which in turn can create housing demand and, therefore, trigger new housing construction in response to that demand. Table 3.1 illustrates some of the additional potential sub-hypothesis and their potential resulting effects on housing consumption.

A second category contains certain existing housing characteristic variables. In a given metropolitan area, housing market activity may be affected by the condition of the existing housing stock. For example, in this dissertation, it is assumed that metropolitan areas with a higher housing vacancy rate would experience a lower number of building permits per 1000 persons. However, it is possible that metropolitan areas with a higher rate of old dwelling units would have a higher number of building permits per 1000 persons due to the need to substitute those in demolition. It is also possible that a high rate of old homes may not stimulate a high rate of new housing supply, if they are located in metropolitan areas experiencing a significant population decrease or are depressed

economically (Table 3.2).

Table 3.1 Metropolitan Economy Variables

The Potential Impact of Metropolitan Economy on Building Permit Activity by MA	
Potential negative effects: (= *indicators associated with a lower number of building permits*)	Potential positive effects: (= *indicators that stimulate a higher number of building permits*)
° High percent of manufacturing industry => *massive job losses* => *unemployment rate increases. E.g. Piedmont Triad* ° Low annual payroll per capita =>*capital flow is low* =>*lower capacity to attract new business and investments* ° High unemployment => *high proportion of population may leave to search for jobs* => *triggering high housing vacancy rate* => *lower demand for new housing* => *limited capital + inability to qualify for a mortgage*	° Higher percent of professional, scientific, & technical services jobs (PST) => *high average wage* => *potentially higher housing consumption rates* ° High annual payroll and receipts per capita => *higher level of business and investment activity* => *higher growth rates* => *higher ability to attract new residents* => *increased demand for housing* ° Low unemployment rates => *if jobs have competitive salaries* => *significant income growth can trigger increased in-migrants* => *demand for housing increases to accommodate this new population*

Finally, the third key determinant comprises certain socio-demographic

characteristics. For example, differential housing market activity rates can be linked to

different rates of population change by metropolitan area. Metropolitan areas with a

higher population growth rate tend to experience higher rates of building permits per

Table 3.2 Housing Characteristic Variables

The Potential Impact of Existing Housing Characteristics on Building Permits	
Potential negative effects (indicators associated with lower number of building permits)	Potential positive effects (indicators associated with higher number of building permits)
° Higher housing vacancy rates =>*number of existing housing units exceeds the number of potential homebuyers => lower demand for new housing supply* ° Higher median real estate taxes *=>this factor can constitute a significant obstacle to both developers and potential homebuyers and can drive them away to metropolitan areas with lower taxes => can decrease the rates of new housing construction* ° High median housing price for both existing and new dwelling units =>*Affordability issue is crucial in housing markets; metropolitan areas with higher housing prices may discourage potential home buying* ° Low percent of housing with a mortgage purchase or similar debit => *this may be a good indicator of a population with a reduced capability of owning a house*	° Low vacancy rate => *housing consumption level is significantly high => new housing supply keeps equilibrium between demand and supply* ° Lower median real estate taxes => *may be more attractive to homebuyers* ° Affordability rates => *metropolitan areas with affordable housing may be a significant destination if associated with some of the other ingredients such as available high quality jobs* °Demolition: *housing destroyed because of fire, natural disaster or old dwelling units are replaced with new housing units and therefore increase the number of building permits* ° High percent of housing with a mortgage, purchase or similar contract => *sign of flowing capital and high housing consumption => more housing is needed.*

Table 3.3 Socio-Demographic Variables

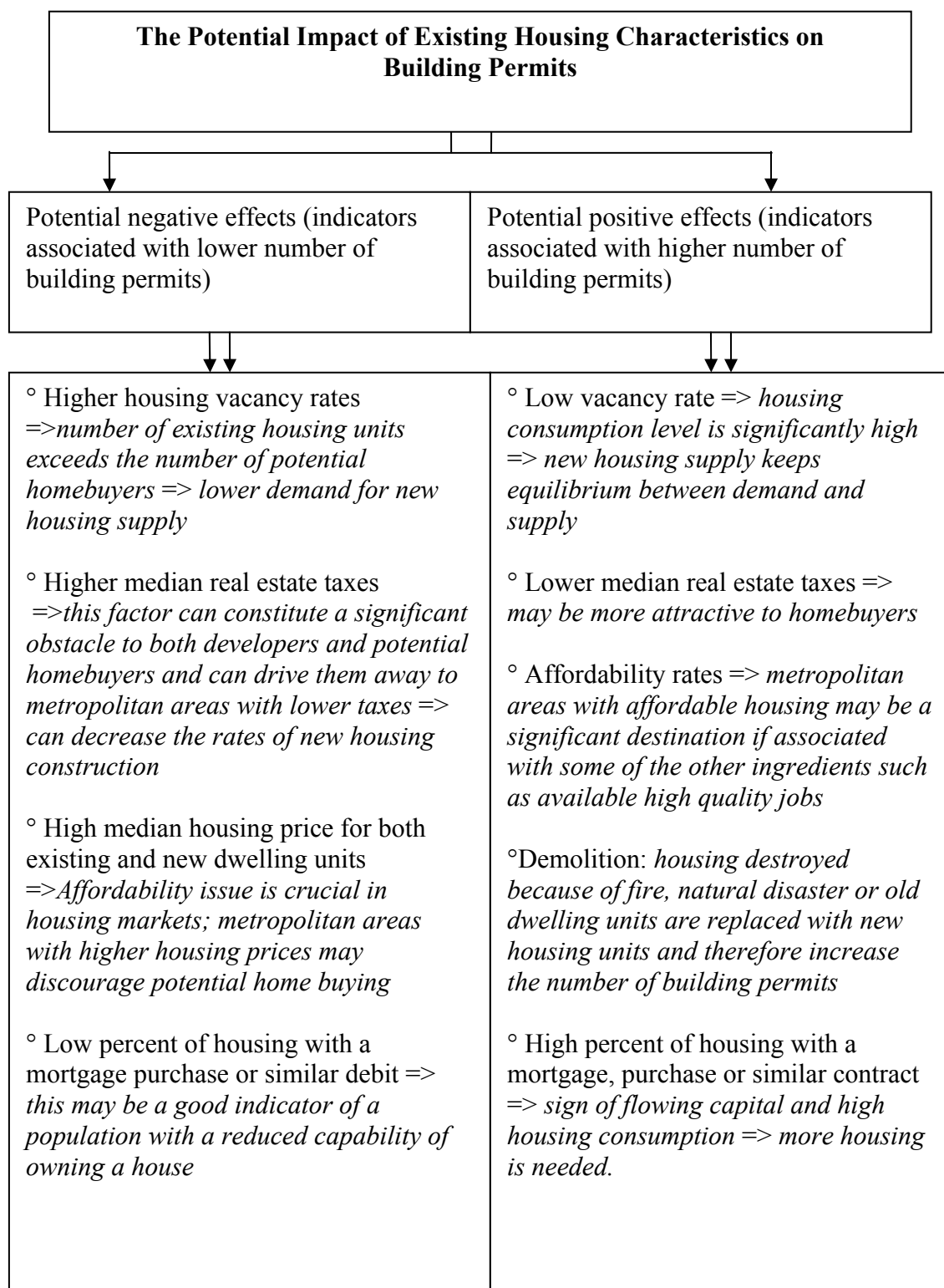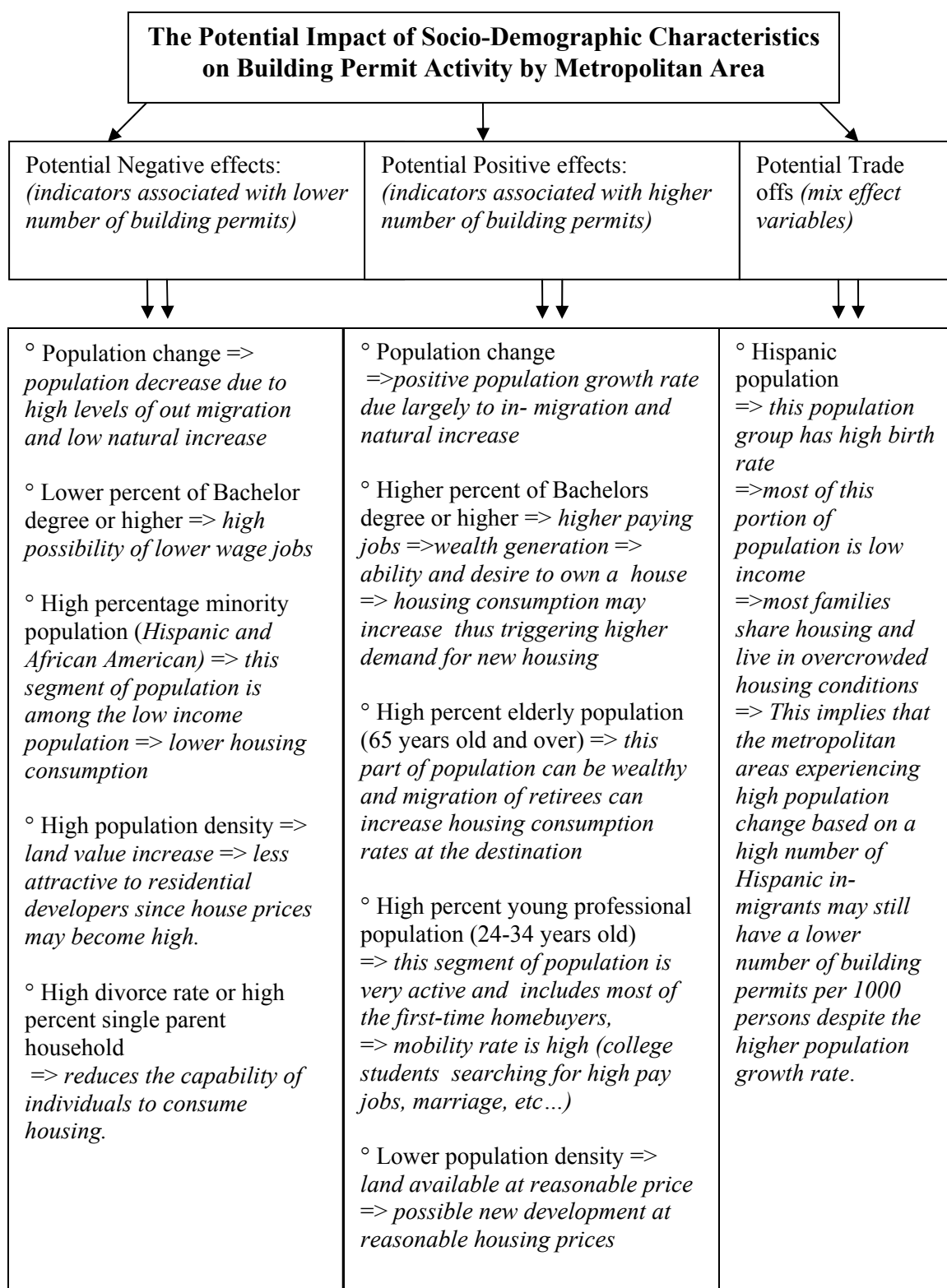| The Potential Impact of Socio-Demographic Characteristics on Building Permit Activity by Metropolitan Area		
Potential Negative effects: *(indicators associated with lower number of building permits)*	Potential Positive effects: *(indicators associated with higher number of building permits)*	Potential Trade offs *(mix effect variables)*
° Population change => *population decrease due to high levels of out migration and low natural increase* ° Lower percent of Bachelor degree or higher => *high possibility of lower wage jobs* ° High percentage minority population (*Hispanic and African American) => this segment of population is among the low income population => lower housing consumption* ° High population density => *land value increase => less attractive to residential developers since house prices may become high.* ° High divorce rate or high percent single parent household => *reduces the capability of individuals to consume housing.*	° Population change =>*positive population growth rate due largely to in- migration and natural increase* ° Higher percent of Bachelors degree or higher => *higher paying jobs =>wealth generation => ability and desire to own a house => housing consumption may increase thus triggering higher demand for new housing* ° High percent elderly population (65 years old and over) => *this part of population can be wealthy and migration of retirees can increase housing consumption rates at the destination* ° High percent young professional population (24-34 years old) => *this segment of population is very active and includes most of the first-time homebuyers, => mobility rate is high (college students searching for high pay jobs, marriage, etc…)* ° Lower population density => *land available at reasonable price => possible new development at reasonable housing prices*	° Hispanic population => *this population group has high birth rate =>most of this portion of population is low income =>most families share housing and live in overcrowded housing conditions => This implies that the metropolitan areas experiencing high population change based on a high number of Hispanic in-migrants may still have a lower number of building permits per 1000 persons despite the higher population growth rate.*

1000, whereas those experiencing population decline or slower growth rates would typically generate a lower number of building permits per 1000. It has been suggested in the literature that in-migration (both domestic and international migration) and natural population increase are key triggers of population growth. A significant population increase can trigger a higher demand for housing because such change may create additional housing needs. By contrast, a population decrease can slow housing market activity since, realistically, housing investors would not construct new housing units in declining regions where the existing housing stock may exceed the number of potential homebuyers (Table 3.3).

4. Data Source

a. Metropolitan Economic Data

Data were collected from the U.S. Bureau of Labor Statistics (BLS). These data were based on the Quaternary Census of Employment and Wages (QCEW). The QCEW program is supervised by the BLS Office of Employment and Unemployment Statistics. The program provides tabulations on the number of establishments, employment, and total wages of employees covered by various unemployment insurance programs. The data result from a federal /state cooperative statistical program and the cooperating state agencies include the States Employment Security Agencies (SESAs). The economic sectors that are used here were defined according to the North American Industry Classification System (NAICS) which is an industry classification system grouping the establishments into industries based on the activities in which they are primarily engaged (U.S. Census Bureau).

b. Socio-Demographic and Housing Characteristic Data

Both housing characteristics and socio-demographic data were from the same source. These data were based on the U.S. Census Bureau population, estimate data for 2005. The U.S. Bureau of the Census Population Estimates Program publishes population estimates for all metropolitan and micropolitan statistical areas. The data include the demographic components of change that include births, deaths and migration, etc… and the reference date for these estimates is July 1st. These estimates were developed with the assistance of the Federal State Cooperative Program for Population Estimates (FSCPE) which was created in 1973 by a group of Census Bureau and state employees charged with developing sub-national population estimates.

These estimates also are used in federal funding allocations, as denominators for vital rates and per capita time series, as survey controls, and in monitoring recent demographic changes. The State FSCPE works in cooperation with the Census Bureau Population Estimates Branch to produce sub-national population estimates through the use of established methods and comprehensive data review, and to improve and advance population estimation techniques and methodologies.

5. Data Limitations

This dissertation has some limitations relative to data gathering. For example, regarding residential building permit data, the proportion of construction measurable from building permit records is inherently limited since such records do not reflect construction activity outside of areas subject to local permit requirements. The U.S. Bureau of the Census reported that, for the nation as a whole, less than five percent of all

privately owned housing units built are constructed in areas that do not require building permits.

The reported statistics are also influenced by other factors. For example, according to the Census Bureau, some building permit jurisdictions close their books a few days before the end of the month/year, so that the time reference for permits is not, in all cases, strictly the calendar month/year. To the extent that most of these limiting factors apply rather consistently over an extended period, they may not seriously impair the usefulness of building permit statistics as prompt indicators of trends in residential construction activity.

Also, although these statistics are not subject to sampling variability, they are subject to various response and operational errors which can be attributed to many sources including the inability to obtain information about all cases, differences in interpretation of questions, inability or unwillingness by respondents to provide correct information, and errors made in processing the data. However, most of the important operational errors were detected and corrected in the course of the Bureau's review of data for reasonableness and consistency.

Moreover, the building permit data do not include mobile or manufactured homes because those are built under the Department of Housing and Urban Development (HUD) Code, which means, they are inspected at the factory. Since these units are not covered by the building permits issued in local municipalities, they are excluded from the new residential construction statistics. Building permit data also, exclude publicly owned buildings; group quarters, such as dormitories, jails, and nursing homes; demolitions,

residential additions, alterations, renovations and conversions or other structures on residential property, such as sheds, garages, pools.

Concerning the data from Bureau of Labor Statistics (BLS), some of the data were not available for a number of metropolitan areas. These missing data were due to the fact that, among data reported to BLS, some did not meet BLS or the states disclosure requirements, thus they were not disclosed to the public. Additionally, according to the BLS, minor differences exist in data files that are used when compiling the entire data set that is released to the public. Those minor differences are related to rounding, degree of precision and data revision issues of the files. However, BLS states that these minor variations have little effect on the analysis performed by the users. It should be noted however, that though all metropolitan areas were not included in this dissertation due to a lack of data or incomplete data, the dissertation still includes 358 MAs in the analysis.
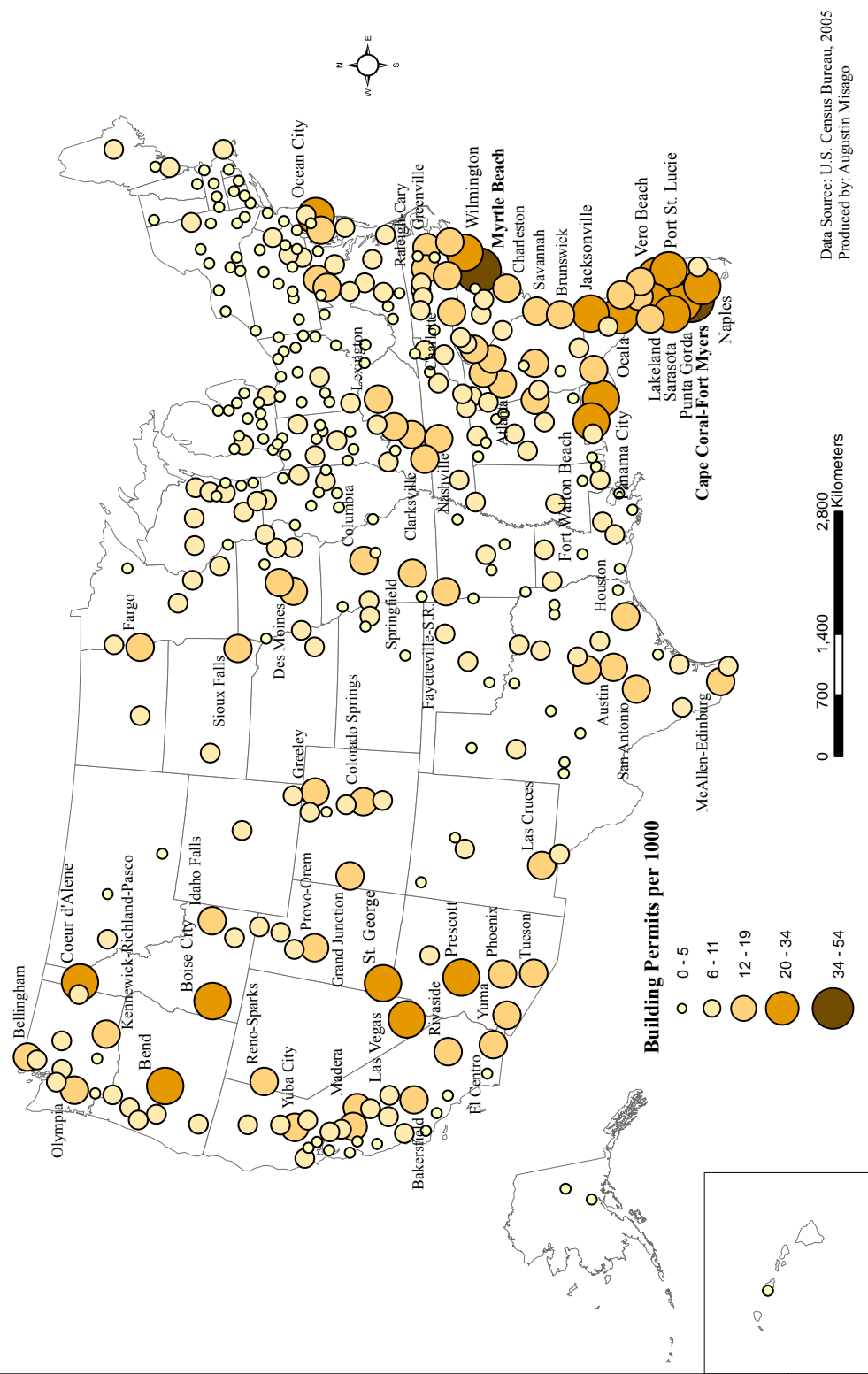
CHAPTER IV

FINDINGS

1. The Geographic Variation of Residential Building Permit Activity by Metropolitan Area

In the United States, residential building permit activity is unevenly distributed (and Figure 4.1 and 4.2). Of the 358 metropolitan statistical areas (MSAs), included in this study, 226 MSAs, or roughly two-thirds of them, issued fewer than 8.2 building permits per 1000 (the national average). By contrast, only just over one-third (132 of 358) were above the national average in terms of residential building permit activity per 1000 for 2005.

Figure 4.1 illustrates the geographic differences in residential building permit activity per 1000. The average number of building permits issued by metropolitan areas per 1000 was 8.2 with a high of 53.8 in Cape Coral-Fort Myers (FL) and a low of 0.47 in Weirton-Steubenville (WV-OH). The metropolitan areas with the highest number of building permits were predominantly clustered in two regions that included Florida and the Carolinas with a few additional "hot spots" in some of the western states (e.g. St. George, UT, Bend, OR, Las Vegas, Boise City, ID, and Prescott, AZ).

The primary spatial concentration of metropolitan areas experiencing high levels of building permit activity was predominantly located in Florida. Florida accounted for 11 of the top 20 metropolitan areas, including Cape Coral-Fort Myers (53.8), Panama City (34.3), Punta Gorda (29.8) Vero Beach (29.7) and Port St. Lucie-Fort Pierce (28.3)

Figure 4.1 Residential Building Permit Activity per 1000 by Metropolitan Area, 2005

Building Permits per 1000

- 0 - 5
- 6 - 11
- 12 - 19
- 20 - 34
- 34 - 54

Data Source: U.S. Census Bureau, 2005
Produced by: Augustin Misago

Two other metropolitan areas listed in the top 20 were from the Carolinas,

including Myrtle Beach (52.1), which ranked second in the nation, and Wilmington

(29.2) (see Figure 4.2.).

**Figure 4.2 Metropolitan Area Rankings by Residential Building Permit
        Activity per 1000, 2005**
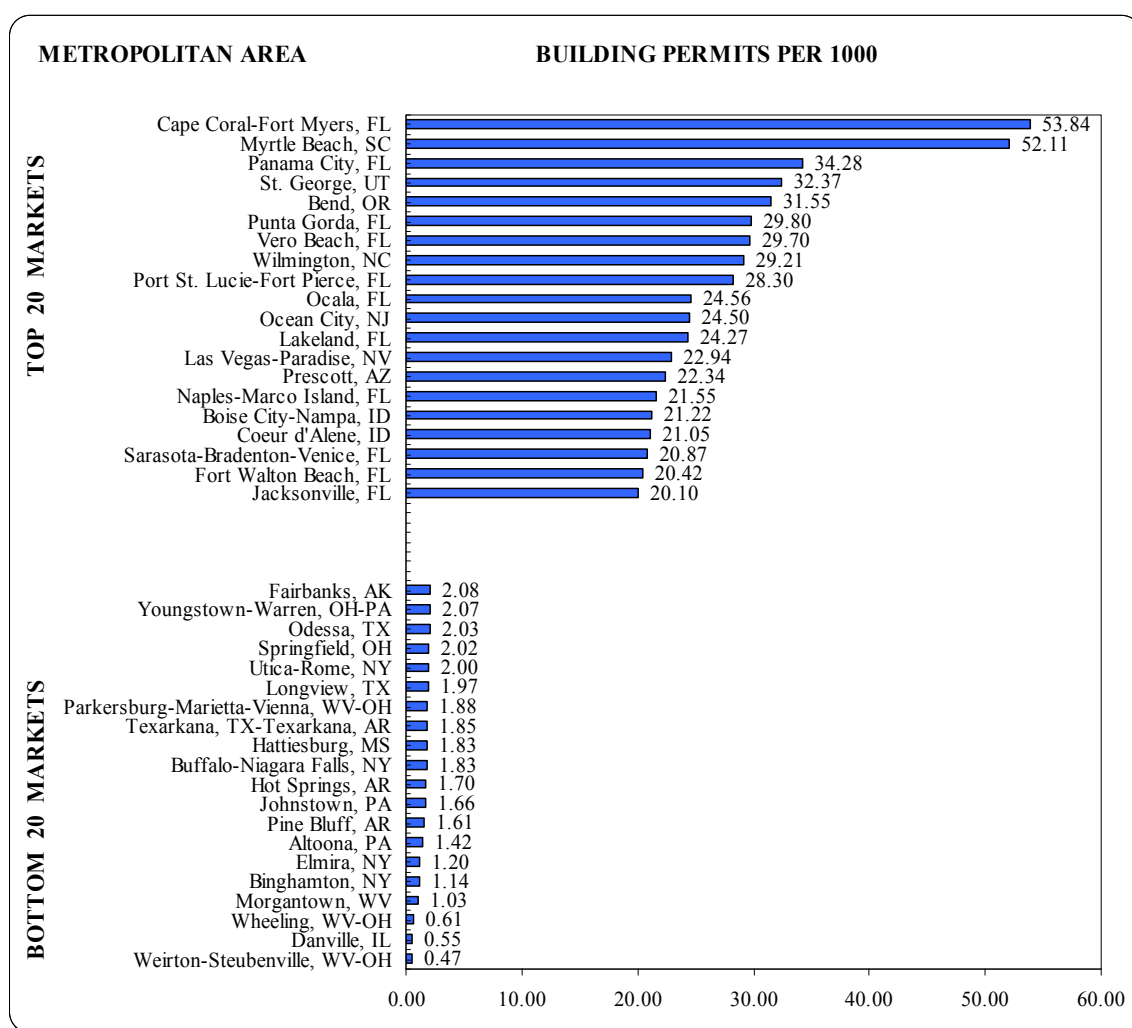
Besides the high proportion of fast growing residential housing markets in Florida, the overall housing market activity in the Southeast was significantly higher when compared to the national average (8.2) and the other regions of the country. For example, in North Carolina, six metropolitan areas reported building permit activity above the national average (8.2 per 1000). They included Wilmington (29.2), Greenville (15.8), Raleigh-Cary (15.4), Charlotte (14.5), Fayetteville (12.5), and Jacksonville (11.9). The state of Georgia accounted for five metropolitan markets with a building permit activity above the national average. They included Atlanta (14.8), Warner Robins (14.5), Gainesville (13.3), Savannah (13.2), and Brunswick (12.9). Other southern states with metropolitan markets above the national average included Kentucky (3 MAs), South Carolina (2), Tennessee (1), and Alabama (1).

A second "cluster" of metropolitan areas with above average building permit activity existed in the western region of the United States. Although these markets were more dispersed, the region contained six 'hot spots' that ranked in the top 20 metropolitan areas with the highest number of building permits per 1000. These metropolitan markets included St. George, UT (32. 7), Bend, OR (31.5), Las Vegas (22.9), Prescott, AZ (22.3), Boise City, ID (21.2), and Coeur d'Alene, ID (21.0). Secondary markets with above average permitting activity included California and Arizona. The California markets included Yuba City (19.2), Madera (15.9), Merced (15.2), El Centro (14.1), and Riverside-San Bernardino-Ontario (13), and Bakersfield (11.7). In Arizona, they included Phoenix-Mesa-Scottsdale (16.2), Yuma (12.7) and Tucson (12.6). Other states also reported a few metropolitan areas with above average

building permits, including Colorado (3), Washington (3), Nevada (1) and Idaho (1). In addition, some isolated metropolitan areas with significant market activity were also found in the South Central Census Region.

For example, in Texas these included Austin (16), McAllen-Edinburg (13.1), Killeen-Temple-Fort Hood (12), San Antonio (11.8), and Houston (11.8). By contrast, in the New England Census Region, only two metropolitan areas issued a number of building permits greater than the national average, and these included Ocean City, NJ (24.5), which ranked in the top 20 metro nationally, and Glens Falls, NY (9.2).

The metropolitan areas with the lowest number of building permits per 1000 (i.e. less than the national average of 8.2) were mainly concentrated in two regions of the United States. These regions included the Northeast and the Midwest. In the Northeastern states, the sluggish housing markets occurred throughout the states of Connecticut, Maine, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont. Some of the metropolitan areas with the lowest levels of building permit activity included Binghamton (1.1) Elmira (1. 2), Altoona (1.4), Johnstown (1.7), Buffalo-Niagara Falls (1.8), Utica-Rome (2), and Youngstown (2.1). In the Midwest, especially in the East North Central Census Region, the sluggish market activity was significant in West Virginia, Ohio, Wisconsin, Michigan, Indiana, and Illinois. Some of the most underperforming metropolitan areas included Weirton-Steubenville (0.5), Danville (0.5), Wheeling (0.6), Morgantown (1), Parkersburg (1.9), and Springfield (2.0).

In addition to the Northeast and Midwest regions, some isolated metropolitan areas with sluggish housing market activity were also identified in the South Central

states. These markets included Pine Bluff (1.6), Hot Springs (1.7), Hattiesburg (1.8), Texarkana-Texarkana (1.8), Longview (1.9), and Odessa (2.0). Furthermore, a number of markets in coastal central California also surprisingly experienced below average activity, including Santa Barbara (2.6), San Jose (3.3), Santa Cruz (3.4), Salinas (3.5), and San Francisco (3.6), although these markets may be sluggish not because of a depressed economy but because of the lack of land and the high cost of doing business.

2. Regional Trends in Residential Building Permit Activity, 2005

Tables 4.1 and 4.2 summarize the major regional trends in residential building permit activity across the country. Table 4.1 highlights those metropolitan areas by states that exceeded the national average (8.2) in terms of building permit per 1000.

In the South Atlantic region, the 19 metropolitan areas in Florida experiencing above average permit activity represented 14.1 percent of all residential building permits issued for the 358 MAs included in this study. These Florida metropolitan areas generated 16 permits per 1000, which was almost the double the national rate of 8.2 per 1000. In North and South Carolina, 16 metropolitan areas out of a total of 22 MAs exceeded the national average, accounting for six percent of all residential building permits issued. The Carolinas generated 14.3 permits per 1000, which was well above the national average. In the western region, 18 metropolitan areas from five states accounted for 10.2 percent of the national total building permit activity. Collectively, these 18 metropolitan areas generated 15 permits per 1000. Overall, 53 metropolitan areas from these eight high growth states accounted for nearly one-third of all permits issued in 2005, even though these 53 MAs accounted for only 15.1 percent of the total MA

population.

The Northeast, Midwest and South Central were the most distressed regions in terms of

new residential building permit activity. Table 4.2 lists these states with a

disproportionate number of metropolitan areas where residential housing market activity

was sluggish and the number of building permits authorized was below the national

average.

Table 4.1 Metropolitan Areas by Region with Above Average Residential Building Permit Activity, 2005

Regions: States with a disproportionate number of above average markets	Number of MA's where Building Permits per 1000 ≥ National Average(8.2)	Total Population	Total Building Permits	Percent of U.S. Total Residential Building Permits ①	Aggregate Rate of Residential Building Permits per 1000
South Atlantic: ♦*Florida*	19	16,670,088	266,448	14.1	16
♦*Carolinas*	16	7,837,889	112,036	6	14.3
West: *NV, ID, UT, AZ, OR*	18	12,819,562	192,061	10.2	15
Total	53	37,327,539	570,545	30.3	15.3
Percent of U.S. Total①	14.8	15.1	30.3	-	-

① Total includes all 358 Metropolitan Areas

In the Northeast Census Region, 42 metropolitan areas included in this study generated below average permit activity and collectively accounted for less than 10 percent of all the building permits authorized nationwide. Only two metropolitan areas in the region generated above average permit activity. The entire region only issued 3.6 permits per 1000, which was far below the national average. In the Midwest region, 67 out of a total of 74 metropolitan areas reported below average building permit activity. The South Central region did a little better, but 42 of the 57 MAs in the region performed below the national average.

Table 4.2 Metropolitan Areas by Region with Below Average Residential Building Permit Activity per 1000, 2005

Regions: States with a disproportionate number of below average markets	Number of MAs where Building Permits per 1000 ≤ National Average (8.2)	Total Population	Total Building Permits	Percent of Total U.S. Residential Building Permits①	Aggregate Rate of Residential Building Permits per 1000
Northeast: *NY, PA, NH, VT, CT, MA, ME, RI, NJ*	42	47,940,219	173,827	9.2	3.6
Midwest: *OH, IL, IN, MI, WI,MN,KS, NE,*	67	39,808,003	203,267	10.8	5.1
South Central: *TX, OK, AR, LA, Al, MS*	42	1,262,8791	68,878	3.6	5.5
Total	151	100,377,013	445,972	23.7	4.4
Percent of U.S. Total①	42.2	40.7	23.7	-	-

① Total includes all 358 Metropolitan Areas

Overall, the 23 states with a disproportionate share of the slowest growing metropolitan markets included 151 MAs below average that accounted for 40.7 percent of the total population. Yet, these same MAs generated only 23.7 percent of all building permits authorized at the national level.

a. **Markets with Above Average Residential Building Permits per 1000 Persons**

This section details the possible key driving forces that shaped the geography of residential housing markets between regions across the nation in 2005. The focus is twofold; *first,* it highlights some of the potential key factors that influenced the high volume of residential construction activity in the fastest growing regions. *Second*, it points out the possible key elements that impeded the "depressed regions" in terms of new residential housing supply.

(1) The Florida Market: The Special Case of Cape Coral-Fort Myers and Southwest Florida

The Southwest Florida region featured three major metropolitan areas that generated significant building permit activity and they included Cape Coral-Fort Myers (53.8 permits per 1000), Punta Gorda (29.8), and Naples (21.5). This sub-region, characterized by beautiful beaches, verdant subtropical flora and affluent island resorts, is served by the Southwest Florida International Airport located in the Cape Coral-Fort Myers metropolitan area. *Money* Magazine selected Cape Coral-Fort Myers as the 6th best place to live in America out of the 300 largest metropolitan areas in the United States. *INC* Magazine (2005) ranked Cape Coral-Fort Myers ninth among the top 25 medium sized metropolitan areas for entrepreneurs. *Consumers Digest* Magazine has

named Florida Gulf Coast University eleventh among the top 50 best values for public colleges and universities in the nation.

One of the potential key factors that influenced the high level of residential construction in this region included the vibrant regional economy as measured by the number and type of new jobs and the rate of in-migrant population growth. Job growth in the Cape Coral-Fort Myers area was 6.7 percent in 2004 and most impressively, it reported a job growth rate of 20.2 percent over the most recent 5-year period. Much of this job growth was generated by the expansion of the travel and tourism sector, financial services and back-office operations, and the high-tech manufacturing industry.

Also, from 2003 to 2006, the overall population increase in Cape Coral-Fort Myers area exceeded 400,000 and a significant proportion of this growth was less than 55 years of age. The commonly held notion that a large proportion of the in-migrants moving to Florida are primarily comprised of retirees may be less than accurate. However, Florida has been the leading destination in the country for retirement migration for many years and the area is still an attractive location for retirees with more than 25 percent of its population being over 65 years of age. According to the US Census Bureau, an average of 20,700 people moves to Lee County (Fort Myers, Cape Coral, and Sanibel/Captiva) annually.

In a related point, from 1999 to 2005, the overall region's payroll increased 72 percent, from $886 million to $1.5 billion. This economic impact has largely boosted the number of workers and their income revenues, which consequently, likely increased housing demand.

(2) The Carolina Market: The Special Case of Myrtle Beach

Another impressive sub-region that experienced a high volume of residential building permit activity included several North and South Carolina metropolitan markets. The metropolitan areas with a disproportionate amount of building permit activity included Myrtle Beach (52.1), Wilmington, NC (29.2), Charleston, SC (18.2), Greenville, NC (15.8), Raleigh-Cary (15.4), and Charlotte (14.5). All of these metropolitan areas have experienced significant population growth rates in recent years which, in turn, have led to significant residential housing construction activity rates in response to the high demand for residential housing units.

In 2005, the Myrtle Beach metropolitan area ranked second in the nation for residential building permit activity. The explanation for this high level of housing demand lies partly with the rapid development of the tourist industry in the Myrtle Beach area. In recent years, Myrtle Beach has become known as the Golf Capital of the nation. Horry County currently hosts over 120 golf courses accounting for over 2,000 holes, making Myrtle Beach the most "golf intensive" resort area in the world. In 2006, *Golf Digest* magazine named Myrtle Beach as both the top "Golf-Home Community in the Southeast" and "America's Number 1 Golf-Home Community" based on data from the Longitudes Group that evaluates cities using criteria such as the number of highly ranked courses, playable days per year, cost of living, and off-course diversions.

Additionally, Myrtle Beach has developed a reputation as a year-round resort with many hotels, water parks, restaurants, theaters, live entertainment, shopping complexes, variety shows, and annual festivals among others. Consequently, the Myrtle Beach area

has emerged as one of the country's premiere destinations, with an estimated 13.3 million visitors a year and many of these visitors ultimately invest in Myrtle Beach real estate to acquire future retirement homes (second homes) or for immediate permanent residency.

Consequently, the Myrtle Beach housing and condominium market has seen record appreciation rates in the past two years as many individuals relocate, retire or buy second homes. According to the Myrtle Beach Regional Economic Development Corporation (2005), retail sales, employment and construction activity in the Myrtle Beach market are all intimately tied to the tourism industry.

Furthermore, although the Myrtle Beach metropolitan area is continuously attracting thousands of new residents every year, the cost of living is still affordable compared to other metropolitan areas of a similar standing. For example, *Forbes* Magazine *(*2007*)* ranked Myrtle Beach as one of the top "100 Small Places for Business and Careers." The Forbes rankings were based on the average cost of doing business, the potential for job growth, the average education of the population, and the total number of area inhabitants. Also, in 2005, the ACCRA cost of living Composite Index for the Myrtle Beach Metropolitan Area was only 94.9 (the national average was 100) which suggests a relatively affordable cost of living.

(3) The Western Markets

In the Western census region of the United States, only six metropolitan areas distributed across five states ranked among the top 20 metropolitan areas with the highest residential building permit activity rates. Most of those metropolitan areas were located in the Rocky Mountain region and they included St. George, UT (32.4), Bend, OR

(31.5), Prescott, AZ (22.3), Las Vegas, (21.5), Boise City (21.2), and Coeur d'Alene, ID (21.1). One of the common potential driving forces triggering the high demand for housing included strong economic growth which in turn tended to generate rapid population growth rates. For example, the Rocky Mountain region economy added 111,400 additional nonfarm employment jobs in 2005, and Utah was one of the fastest growing states in the nation, with an annual job growth rate of 3.4 percent (or 37,400 jobs).

A growing number of new residents in the state found employment in construction, government, and the professional and business services sectors in recent years. Much of the housing development in the West has been generated by builders that actively developed large subdivisions in smaller towns in outlying areas within commuting distance of larger metropolitan areas in order to meet the growing demand for affordable new homes. The St. George metropolitan area was one of these outlying cities that generated a high volume of residential construction activity. The St. George metropolitan area is located in the extreme southwest corner of the state, about 110 miles northeast of Las Vegas. Some of the key factors that triggered the high level of residential building activity in this market included the following:

➢ **Geographic location and the lower cost of living:** St. George serves as an economic and service center for the entire southwestern Utah and northeastern Arizona region. Also, strong real estate prices and the high cost of living in the neighboring states of California and Nevada (Las Vegas) have increasingly stimulated retirement migration to St. George attracted by the relatively lower cost of living. Additionally, the strong

demand for housing was also stimulated by low interest rates and a high level of demand for second homes for vacation purposes.

➢ **Economic impact of the tourism industry:** The area's tourism industry has flourished because of the area's scenic beauty and geographic proximity to Grand Canyon, Zion, and Bryce Canyon National Parks. Overall, tourism and travel related employment account for nearly 10 percent of all non-agricultural jobs in Utah and tourism is the sixth largest industry in the state.

➢ **Health care:** The Dixie Regional Medical Center located in St. George has contributed to attracting new residents in the area. The center is a $110 million state-of-the-art facility that serves southern Utah and bordering counties in neighboring states.

Another major urban oasis market with a thriving residential building permit market was Las Vegas. The Las Vegas market was stimulated by the following factors:

➢ **Strong demographic growth:** The Las Vegas metropolitan area continues to be one of the fastest growing metropolitan areas in the nation. Approximately 85 percent of the population growth since 1990 has been due to in-migration largely triggered by the expanding economy, increasing employment opportunities, a relatively affordable housing cost and the overall cost of living. In-migrants to Las Vegas largely comprise two different groups: young adults seeking employment and retirees relocating from California due to the high cost of living in that state. According to HUD (2005), retirees from California accounted for approximately 36 percent of the in-migration to Las Vegas in 2005. Net in-migration has averaged 68,600 annually since 2000, or 26 percent more than the average national rate during the 1990s for all metropolitan areas combined.

➢ **Strong economic growth:** Tourism, real estate development and construction were the dominant growth industries. The gaming industry and related leisure and hospitality industries also generated significant employment opportunities which in turn created a strong demand for residential housing units to house the newcomers.

b. **Markets with Below Average Residential Building Permits per 1000 Persons**

The Northeast, Midwest and the South Central census regions that included 175 metropolitan areas experienced the slowest building activity in 2005 as indicated by the number of building permits per 1000. While the Southeast and selected Western metropolitan areas have experienced substantial levels of building activity, the Northeast, Midwest and Central census regions expressed a significant slowdown in housing market activity.

(1) The Northeast and Midwest Markets

The Northeast metropolitan areas of the United States experienced the lowest rate of building permits per 1000. Some of the most sluggish markets included Weirton-Steubenville, WV (0.47), Danville, IL (0.55); Wheeling (WV-OH); Buffalo-Niagara (1.83); and Youngstown-Warren, OH-PA (2.07). Some of the potential reasons behind the sluggish building activity rates in these selected "Rust Belt" metropolitan areas may include the following:

➢ **Demographic factors**: Metropolitan areas that are located in the Northeast and Midwest experienced at best modest gains in natural population growth rates and continue to lose population due to significant employment losses and resulting out migration. For example, Frey (2005) reported that 16 Northeastern and Midwestern

metropolitan areas grew by less than 25 percent from 1960 to 2004, including Pittsburgh, Buffalo, Scranton and Youngstown. A similar study conducted by Perry (2004) also revealed that between 2000 and 2004 the Northeast and the Midwest metropolitan areas were experiencing a net out-migration to the South, while Southern metropolitan areas were experiencing in-migration. Metropolitan areas like Scranton have low rates of natural increase and tend to have low levels of in-migration and a high proportion of the population tends to be elderly. Without a significant in-migrant flow, these metropolitan areas tend to experience both a lower natural population increase and a large amount of out-migration and as a result their population growth rates were low or negative (Frey 2005).

➢ **Economic conditions**: Another factor that might explain the reduced rates of residential building activity in the Northeast include the extensive deindustrialization and manufacturing job losses in several metropolitan areas that have acted to weaken the local economy and have reduced many households' capacity for buying new homes. This economic struggle was especially in the manufacturing sector, retail, and information sectors. For example, between 2000 and 2005 Youngstown has lost 18,000 jobs, while the motor vehicle and related industries alone experienced a 3.1 percent decrease in manufacturing jobs.

Additionally, the most depressed housing markets in the Northeast and Midwest were often located in markets characterized by traditional manufacturing industry (e.g. factories that traditionally produced most of the country's steel, as well as a significant percentage of the national motor vehicles and motor vehicle parts: e.g. Milwaukee,

Chicago, Cleveland, and Pittsburgh). Some of these metropolitan areas have not been able to attract today's rapidly growing industries in sectors like electronics, biotechnology, finance, healthcare, leisure or entertainment industries. As a result, a significant number of young professional workers have elected to move to the Southeast and West to seek employment. At the same time, a small but growing number of elderly have also increasingly opted to leave the "Frost Belt" for the "Sun Belt." These two trends in tandem have led to negative net population growth rates for some metropolitan areas in the Northeast and Midwest, leading to a large number of vacant housing units and a reduced demand for new housing in some Northeast and Midwest markets.

➢ **Housing characteristics and related market effects:** Some of the sluggishness in construction activity for new residential housing units in the Northeast and Midwest is linked to higher interest rates, mounting inventories of units for sale, and a considerable vacancy rate for rental housing units. For example, a report from the Boston Federal Reserve Bank (2006) indicated that a growing number of employers and policymakers were warning that the region's high cost of housing was actually undermining its ability to attract and retain workers and businesses in the Northeast. In addition, the same report showed that low employment opportunity and high housing costs were among the top leading reasons for out-migration from selected northeast metropolitan areas (Bluestone 2006).

Similarly, in most metropolitan areas of the Midwest, the increased inventory of unsold new homes, fewer potential home-buyers, a lower demand for condominiums and rental units due to the slower economy, and substantial job losses in key sectors of the

economy all acted to depress residential building activity. Furthermore, many of the "Rust Belt" metropolitan areas continue to suffer from substantial employment losses in the manufacturing industry leading to local economic instability and a reduced capacity to attract in-migrant residents. For example, in Akron, the sluggish employment market has been a leading factor in generating slow population and household growth rates that were estimated to be 0.3 and 0.8 percent, respectively, during the five years ending in 2005.

(2) The South Central Region

Most South Central region metropolitan areas of the United States experienced some of the slowest rates of building permit activity in the nation. Some of the most sluggish markets included Pine Bluff, AR (1.61), Hot Springs, AR(1.70), Hattiesburg, MS(1.83), Texarkana, TX-Texarkana, AR (1.85), Longview, TX (1.97), and Odessa, TX (2.03). A few of the potential reasons behind the sluggish building activity in these "Sunbelt" metropolitan areas include the following:

➢ **Economic reasons**: Most of the metropolitan areas in the South Central region experienced some of the lowest income levels in the nation. In 2005, the average annual median household income for the U.S. metropolitan areas selected in this study was $43,832. However, 14 of the 20 metropolitan areas with the lowest annual household median income in this study were located in the South Central region, including McAllen-Edinburg-Mission, TX ($24,501), Brownsville-Harlingen, TX ($24,684), Pine Bluff, AR ($31,846), Texarkana, TX-Texarkana, AR ($31,934), and Hot Springs, AR ($31,986). Additionally, some metropolitan areas in the South Central region with the

lowest level of building permit activity tended to experience unemployment rates well above the 2005 average of 5.2 percent (e.g. Hattiesburg, MS (6.3 %), Pine Bluff, AR (7.1%) and Beaumont-Port Arthur, TX (7.7%).

➢ **Demographic factors:** Most metropolitan areas in the South Central region experienced very low in-migration rates and some experienced negative population growth rates, including Pine Bluff, AR (-4.1%), Abilene, TX (-3.86%) and Wichita Falls, TX (-5.61%). Also, in terms of demographic profile, a significant number of people among the southern metropolitan populations are identified as Hispanics or African-Americans and since a large number in these minority groups are generally from low income groups, those metropolitan areas tended to generate low demand rates for new homes.

➢ **Weather effects:** Another factor that might partly explain the low number of building permits per 1000 in some South Central metropolitan areas is related to both Hurricanes Rita and Katrina, which in 2005 caused substantial property damage along the Gulf Coast. These two natural disasters likely worsened the already poor metropolitan economic conditions of many Gulf Coast metropolitan economies in Louisiana, Mississippi and Alabama. The hurricane damages forced thousands of people to leave their homes, increased the number of unemployed workers, and destroyed much of the public and private infrastructures of many of these metropolitan areas.

3. A Multivariate Analysis of Metropolitan Housing Markets and Building Permit Activity

a. The Regression Model

(1) The Statistical Analysis Procedure

In this dissertation, the overall hypothesis suggested that three groups of independent variables can have a significant (positive or negative) impact on residential building permit activity. These three groups of independent variables included those representing <u>the composition of the overall metropolitan economy</u> (e.g. unemployment rates, employment mix, average annual wages etc), <u>existing housing characteristics</u> (e.g. vacancy rate, median house value, percent of old dwelling units, total housing units), and <u>the socio-demographic characteristics</u> of the population (e.g. net migration, percent elderly, educational attainment, percent single family household). The goal was to determine which variables or group of variables best explain the spatial distribution of residential building permits authorized per 1000 by metropolitan area. It was hypothesized that the principal causal agents regarding the geography of residential building activity will include some mix of variables from these three major groups of independent variables outlined above. The following section describes the regression model procedure that was used to identify the subset of independent variables that appeared in the final model.

A stepwise multiple regression model was performed between the dependent variable (residential building permits) and the three groups of independent variables. Stepwise regression model is a multivariate statistical technique that is appropriate for this research hypothesis because it can do the following:

♦ examine the relationship between several continuously distributed independent variables and one continuously distributed dependent variable (but it is censored at zero- not negative)

♦ determine which subset of independent variables best predicts the dependent variable at a high level of accuracy, and

♦ maximize the adjusted R² (or some other statistical criterion that may be maximized or minimized) while minimizing the number of predictors (Newton & Rudestam, 1999).

In stepwise multiple regression technique, the order of entry of the independent variables into the regression equation is determined by a selection algorithm. Basically, the goal of any stepwise regression is to take a set of independent variables and put them into a regression one at a time in a specific manner until all variables have been added or until a specified criterion has been met (Cody & Smith, 2006). The criterion is usually one of statistical significance or an improvement in the explained variance. Stepwise is most commonly used because it capitalizes on the advantages of both adding and subtracting predictor variables, where the procedure automatically adds a variable or subtracts a variable depending on which independent variable most significantly enhances the model (i.e. increases the R squared) and yields a model that best fits (Newton & Rudestam,1999).

While in multiple regression statistical analysis many techniques exist for the selection of the explanatory variables (e.g. forward selection, backward elimination, Maxr, Minr), the stepwise procedure was selected as the most appropriate alternative

because it is a combination of both forward selection and backward elimination

techniques. In the stepwise procedure, the selection of variables within a group of

independent variables proceeds step by step following two criteria, one for entering a

variable and one for removing a variable; then at each next step, variables already in the

equation are evaluated according to the selection criteria for removal; while variables not

in the equation are evaluated for entry. The stepwise selection procedure stops when no

additional variable is eligible to meet the entry criterion (i.e. the significance level for

entering a variable must be smaller than the significance level for removing a variable).

This process repeats until no variable in the group is eligible for entry (Norušis 2002).

Following these criteria, the stepwise multiple regression procedure selected five

independent variables among the 52 independent variables that were included in the

model as likely predictors of residential building permit activity by metropolitan area.

The final model was a simple SAS multiple regression of the five independent variables

that included the SPEC and ACOV options to test and control for heteroscedascity using

the White (1980) method.

B coefficient or unstandardized regression coefficient represents the amount of

change in the dependent variable associated with a one-unit change in that independent

variable. The unstandardized regression coefficients are optimal values by which to

multiply predictor values to obtain estimates of criterion values and they are useful for

making actual prediction.

The degree tolerance measures the strength of the linear relationship among the

independent variables. For each independent variable, the tolerance is the proportion of

variability of that variable that is not explained by its linear relationships with the other independent variables in the model. The tolerance values range from 0 to1, and a value close to 1 indicates that an independent variable has little of its variability explained by the other independent variables. And a value close to 0 indicates that a variable is almost a linear combination with the other independent variables, which is a sign of a multicollinearity problem (Norusis, 2002).

(2) Results

Table 4.3 represents the result of the SAS simple multiple regression analysis for residential building permits per 1000 by metropolitan area. The final model included the SPEC and ACOV options which adjusted the coefficient estimates to account for problems of heteroscedascity. The results indicate that the five independent variables chosen for the final model explain 71.75 percent of the variance in the dependent variable (i.e. residential building permits per 1000).

Building permits = -1.57 + 0.69*PG* + 0.42*VH* + 0.22 *NH* -0.31 *HJ* + 0.18 *PE*

Where,

   PG = % <u>Pop. Growth</u>: the percent of 2005 population due to net migration 2000-2005

   VH = % <u>Vacant Housing</u>: the percent of vacant housing units

   NH = % <u>New Housing</u>: the percent of housing units built between 1990 and 2004

   HJ = % <u>Health Jobs</u>: the percent employment in health care and social assistance

   PE = % <u>Elderly</u>: the percent of the population 65 years old and over

For example, the above model suggests that if the percent 2005 population share due to net migration from 2000-2005 increases by one percent, the number of building

permits will rise by 0.69 points per 1000 persons, or if the percent vacant housing units

increases by one percent, the number of building permits will rise by 0.42 points per 1000

persons.

Although all five independent variables were statistically significant, it was the

percent population increase through net migration that most positively impacted

residential building permit activity by metropolitan area. The suggestion here is that

metropolitan areas experiencing a higher percent of positive net migration tended to

generate the higher residential building permit activity rates. The expected implication is

that population increases associated with high levels of net migration can create a

substantial demand for housing which, in turn, can trigger an increase in new housing

construction in response to that demand. That said, the second independent variable to

enter the model was the percentage of vacant housing units in a metropolitan area.

Table 4.3 Summary of Regression Coefficient for Residential Building Permits

Variable	B (Parameter Estimate)	Std. Error	T value	P value
(Constant)	-1.6073	1.78032	-0.90	0.3674
% Pop. Growth	0.6923	0.07551	9.17	<0.0001
% Vacant Housing	0.4216	0.04924	8.56	<0.0001
% New Housing	0.2244	0.04278	5.25	<0.0001
% Health Jobs	-0.3073	0.07858	-3.91	0.0001
% Elderly	0.1776	0.09298	1.91	0.0570

Note that, according to the American Community Survey a <u>housing unit</u> is considered vacant if no one is living in it at the time of enumeration, unless its occupants are only temporarily absent. Units temporarily occupied at the time of enumeration entirely by people who have a usual residence elsewhere are also classified as vacant. So, unoccupied housing units are considered vacant because vacancy status is determined by the terms under which the unit may be occupied, e.g., for rent, for sale, or for seasonal use only.

One possible implication of the strong positive relationship that exist between building permit activity and vacancy rates is that a high vacancy rate reflects the high level of confidence that developers embrace in "hot" markets. In fast growing markets, developers may have a tendency to continue building new homes ahead of demand because they want to keep up the inventory of new homes for potential new homebuyers. Furthermore, the metropolitan areas with the highest vacancy rates are not the sluggish markets of the Frost Belt states as it was expected. Instead, the metropolitan areas with the highest vacancy rates are those metropolitan areas that have generated a vibrant resort-based tourist economy in the southeastern state and in places like Ocean City and Prescott, a point discussed later in this chapter. By contrast, the sluggish markets in the Northeastern and Midwestern states tended to have lower vacancy rates and little additional capacity was being added to inventory.

A third key independent variable that appears to influence building permit activity rates included the percent of housing built between 1990 and 2004. It appears that those metropolitan areas that generated a lot of building permit activity are also those markets

with an unusually high percent of 1990-2004 homes. The suggestion seems to be that markets with a lengthy construction history of building new homes tend to become self-fulfilling prophecies.

By contrast, the percent of employment in health care and social assistance had a slightly negative impact on building permit rates. The suggestion is that metropolitan areas with a higher percent of employment in health care and social assistance will tend to generate reduced home-buying capacity given the low wages offered in much of this sector. For example, according to the U.S. Bureau of Labor Statistics (BLS), in 2006, the median hourly wage of nursing aides and attendants was $10.67, while for home health aides the median hourly wage was just $9.34.

The last independent variable to enter the final model was the percent of the population 65 years old and over, which was positively related to residential building permit activity. A high percent elderly population can be a key trigger for housing consumption, especially in those metropolitan areas in the Sunbelt where a large number of affluent retirees from the Northeast and the Midwest have invested in second homes (e.g. Myrtle Beach, Naples, Cape Coral-Fort Myers, Prescott, and St. George).

Table 4.4 presents the coefficient of determination (R^2) for the formal stepwise multiple regression model. It appears that population growth rates (adjusted R^2=0.56 with $p<0.001$) was the most significant variable accounting for 56 percent of the variance in building permit activity. Furthermore, these findings confirm the Maisel (1963) and Bourne (1981) models articulated earlier in Chapter Three. The results were consistent with the overall hypothesis that suggested that <u>the composition of the metropolitan</u>

economy, the existing housing stock and various socio-demographic characteristics will all simultaneously impact residential building permit activity in metropolitan markets.

The five variables included in the final regression model, included at least one variable from the three major influences that Maisel (1963) and Bourne (1981) indicated shaped the geography of housing supply and building permit activity rates. For example, the percent of vacant housing and the percent of housing built between 1990 and 2004 were variables that were included as measures of existing housing characteristics, while percent population growth by net migration and percent elderly are more broadly socio-demographic characteristics of the resident population.

Table 4.4 Model Summary of Residential Building Permits

Model	Variable	R Square	Adjusted R Square	Std. Error of the Estimate	Partial R Square	Sig. F Change
1	Predictors: % pop growth	0.562	0.560	5.14015	0.562	<0.000
2	Predictors: % Pop Growth, % Vacant Housing	0.674	0.670	4.44809	0.112	<0.000
3	Predictors: % Pop. Growth, % Vacant Housing, % New Housing	0.718	0.713	4.14733	0.044	<0.000
4	Predictors: % Pop. Growth, % Vacant Housing, % New Housing, % Health Jobs	0.735	0.730	4.02509	0.018	0.000
5	Predictors: % Pop. Growth, % Vacant Housing, % New Housing, % Health Jobs, % Elderly	0.744	0.737	3.97115	0.008	0.011

Finally, the percent employment in health care and social assistance is one of the variables used to assess the composition of the metropolitan economy. The overall suggestion is that the final model selected illustrates how these three major influences simultaneously interact together in complex ways when determining new residential building activity rates by metropolitan area.

(3) Diagnosis Analysis

Several diagnostic tools were employed to ensure that the final model was robust and parsimonious. First, a correlation matrix was utilized to isolate those independent variables that were highly correlated with other independent variables in an attempt to isolate multicollinearity. Both a variance inflation factor (VIF) and a degree of tolerance were utilized, where the VIF measures how the variance of a regression coefficient is inflated because other independent variables contain the same information as the variable in question. Large VIF values (e.g. >3) can be a sign of serious multicollinearity. Moreover, the degree of tolerance (when values are closer to zero) of the independent variable in the model can be sign of multicollinearity.

The degree of tolerance measures the strength of the linear relationship among the independent variables. For each independent variable, the tolerance is the proportion of variability of that variable that is not explained by its linear relationships with the other independent variables in the model. The tolerance values range from 0 to1, and a value close to 1 indicates that an independent variable has little of its variability explained by the other independent variables. And a value close to 0 indicates that a variable is almost a linear combination with the other independent variables, which is a

sign of a multicollinearity problem (Norusis, 2002).

Second, scatterplots of residuals, partial regression plots, and studentized deleted residuals were generated and checked to evaluate the assumptions of normality and linearity and to verify the occurrence of various outliers. The result suggested that the regression assumptions of normality and linearity were met. However, some outliers were identified and these will be discussed in the next section. Finally, Cook's D procedure was used to evaluate whether there was any particular data point that potentially could have influenced the regression model. The results showed no sign of such influence. The geography of each of the key independent variables selected in the final simple regression model, beginning with an analysis of the most influential variable--percent of 2005 population due to net migration 2000-2005 will now be discussed.

b. Percent of 2005 Population due to Net Migration 2000-2005 by Metropolitan Area, 2005

In 2005, percent of 2005 population due to net migration 2000-2005 was unevenly distributed across the United States (Figures 4.3 and 4.4). The average population growth by net migration was 2.29 percent with a high of 19.01 in Cape Coral-Fort Myers (FL) and a low of -7.09 in Lawton (OK). Those metropolitan areas with above average growth rates were predominately clustered in the Southeast and West Coast. By contrast, the Northeast, Midwest and South West Central part of the country experienced much lower, even negative population growth rates.

In the Southeast region, the majority of metropolitan areas with the highest population growth rates were spatially clustered in the state of Florida, the Carolinas and Georgia. Florida alone accounted for half of the top 20 metropolitan areas, including

Cape Coral-Fort Myers (19.01), Port St. Lucie-Fort Pierce (16.94), Naples (16.29), Ocala

(16.00), Vero Beach (14.16), Punta Gorda (14.00), and Sarasota-Bradenton-Venice

(13.86). The western states accounted for eight of the top 20 metropolitan areas,

including St. George, UT (18.88), Bend, OR (16.52), Prescott, AZ (16.58), Las Vegas,

NV (15.90), and Greeley, CO (15.70).

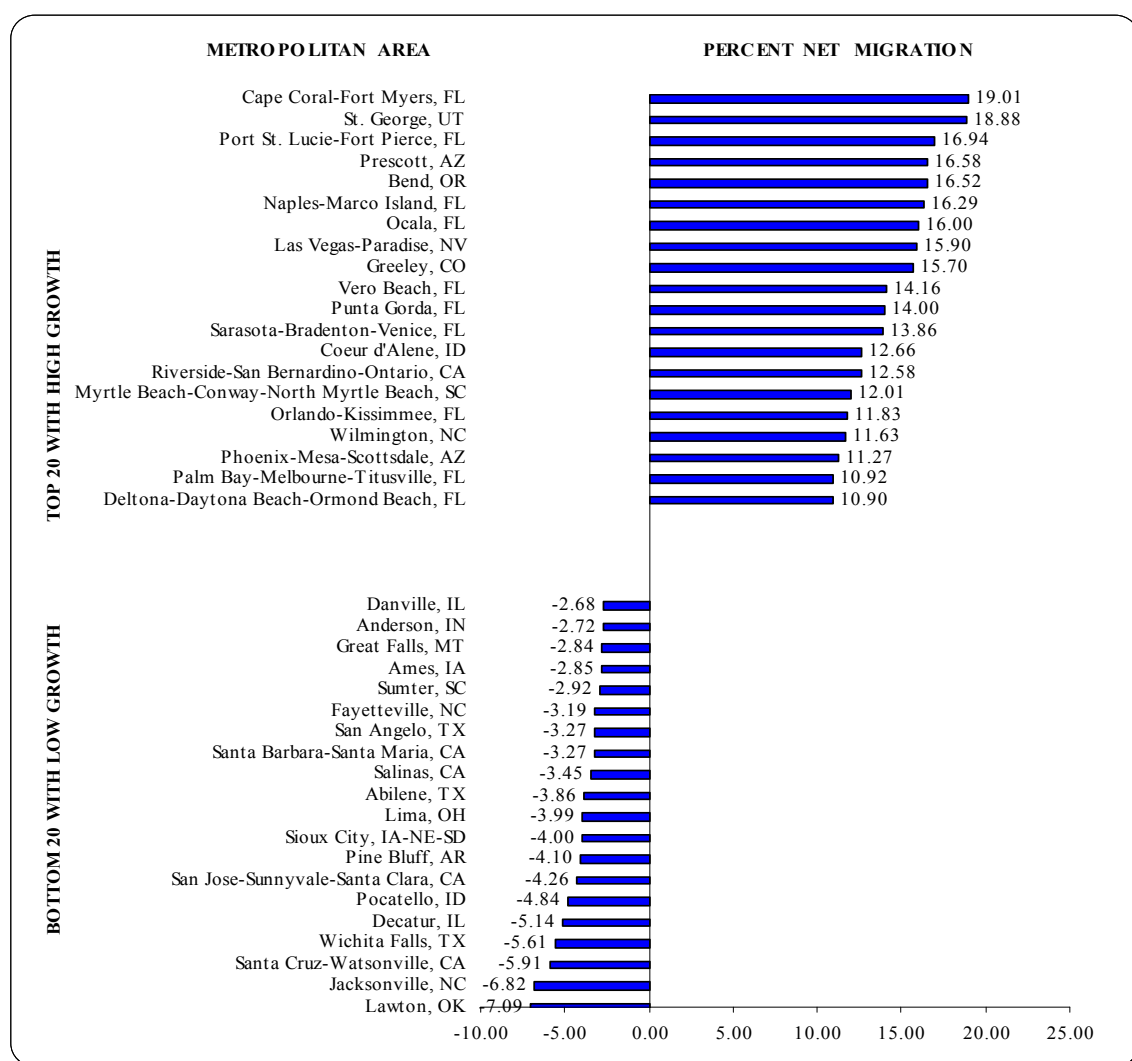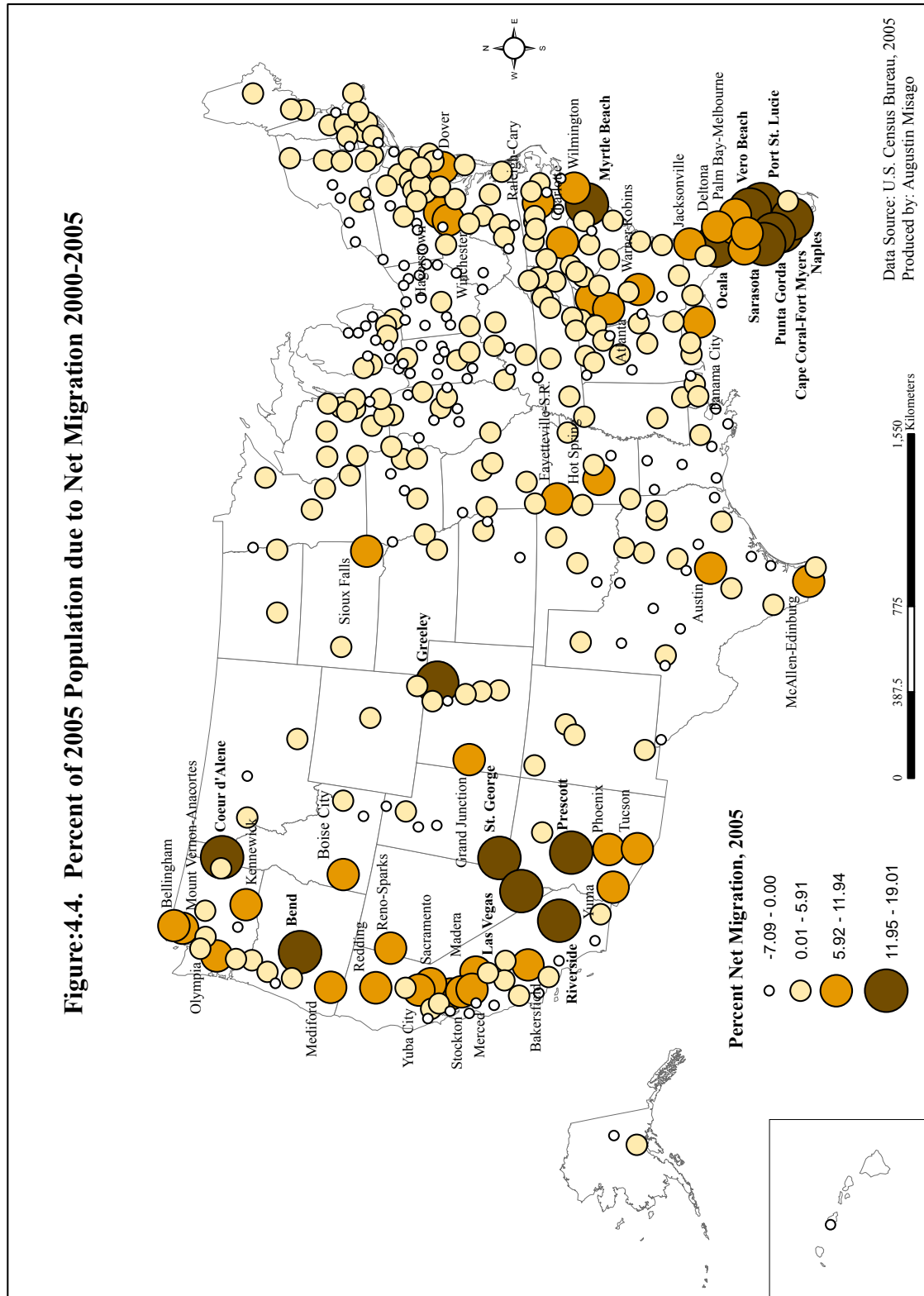**Figure 4.3 Metropolitan Area Rankings by Percent of 2005 Population due to Net Migration 2000-2005**

Figure:4.4. Percent of 2005 Population due to Net Migration 2000-2005

Data Source: U.S. Census Bureau, 2005
Produced by : Augustin Misago

Percent Net Migration, 2005

○ -7.09 - 0.00
○ 0.01 - 5.91
● 5.92 - 11.94
● 11.95 - 19.01

However, those metropolitan areas with either the lowest percent of 2005 population attributed to net migration or negative percent of 2005 population attributed to net migration were dispersed in many states across the country. For example, Lawton, OK (-7.09), Wichita Falls, TX (-5.61), Pine Bluff, AR (-4.10), Jacksonville, NC (-6.82), Fayetteville, NC (-3.19) were all located in the South. However, Santa Cruz (-5.91) and San Jose (-4.26) were California metropolitan areas while Ames, IA (-2.85) Decatur, IL (-5.14), Lima, OH (-3.99), and Sioux City, IA-NE-SD (-4.00) were all located in the Midwest.

Figure 4.5 is a scatter diagram of residential building permits and the percent 2005 population attributed to net migration 2000-2005. It indicates that a strong positive linear relationship existed between the two variables, as evidenced by the Pearson's Correlation Coefficient score of 0.75, statistically significant at the 15 level.

The overall trend between the variables indicates that the number of building permits per 1000 persons increases proportionately with population growth rates. The logic here seemed to be that the law of demand and supply applied. Positive population growth rates appeared to trigger higher levels of residential housing demand, and in response to that demand, developers reacted by increasing residential housing output as measured by building permits.

However, although a strong relationship existed between those variables, four metropolitan areas appeared to generate disproportionately high permit activity rates and these included Cape Coral-Fort Myers, Myrtle Beach, Panama City, and Ocean City (NJ). These metropolitan areas appeared as anomalies in the scatter plot because they appeared

to generate a higher number of building permits than expected based on the line of best fit.

Figure 4.5 Scatter Diagram for Residential Building Permits per 1000 and the Percent of 2005 Population due to Net Migration 2000-2005 by MA
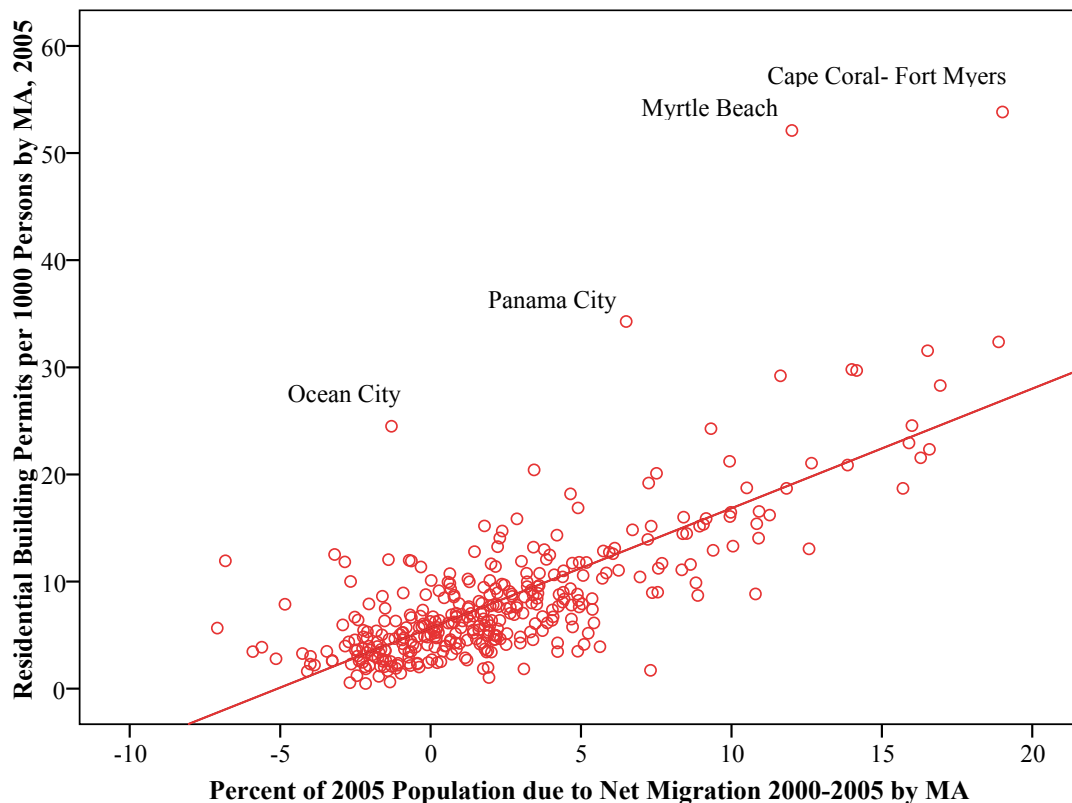
For example, Cape Coral-Fort Myers experienced a 19 percent of 20005 population attributed to net migration 2000-2005, although the line of best fit suggested that the market should have generated around 27 permits per 1000. However, the actual permit figure was much higher at 53.84 per 1000 persons. Similar figures were found for Panama City, Myrtle Beach and Ocean City. What these anomalies have in common are a vibrant tourist industry combined with a high percent elderly population (65 years old

and over).

c. Percent of Vacant Housing Units by Metropolitan Area, 2005

In 2005, the spatial distribution of the percent vacant housing units by metropolitan areas was also highly varied. The average vacancy rate was 10.35 percent with a high of 55.65 percent in Ocean City, NJ and a low of 3.38 percent in Lancaster, PA. Figure 4.6 presents the top 20 metropolitan areas with the highest percentages of vacant housing units and the bottom 20 metropolitan areas with the lowest percentages of vacant housing units. Figure 4.7 displays the spatial distribution of the percent of vacant housing units by metropolitan area. Clearly, it was possible to identify two main groups of metropolitan areas based on the percent vacant housing units.

The first group included those metropolitan areas with above average percent vacant housing units located in the Northeast and South census regions, which included Ocean City, NJ, Wilmington, NC, Myrtle Beach, SC and several Florida metropolitan areas. The second group represented the below average metropolitan areas which included about 220 metropolitan areas scattered across the country (Figure 4.7).
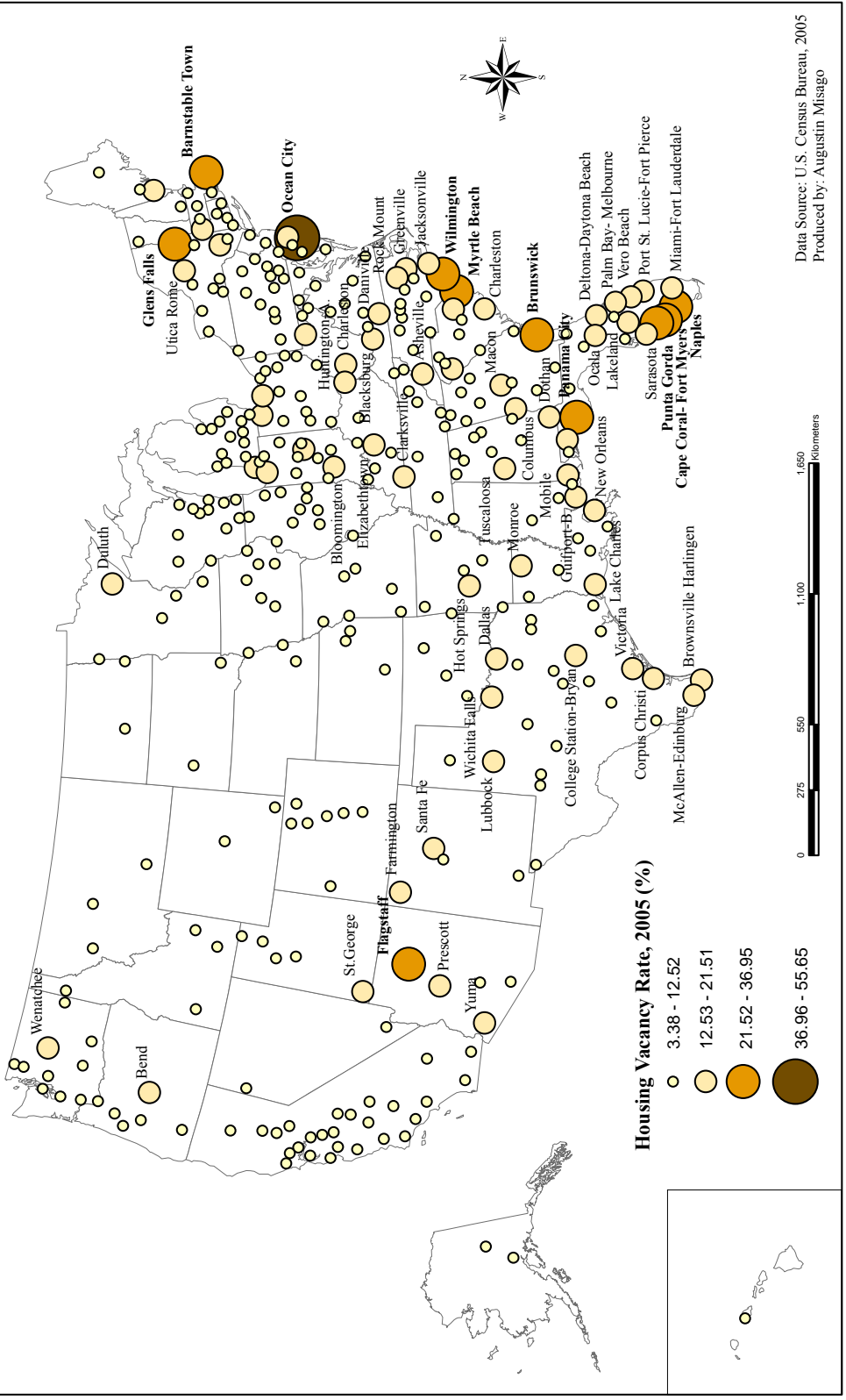
Regarding those metropolitan areas with a high vacancy rate, Florida alone accounted for eight of the top 20 markets, including Naples-Marco Island (33.15), Cape Coral-Fort Myers (24.84), Panama City-Lynn Haven (22.75), and Punta Gorda (22.60) among others. The other metropolitan areas with high vacancy rates were geographically dispersed across eight states including New Jersey with Ocean City (55.65) and Atlantic City (17.43) and North Carolina with Wilmington (23.56) and Jacksonville (17.62).

Figure 4.6 Metropolitan Area Rankings by Percent Vacant Housing Units, 2005
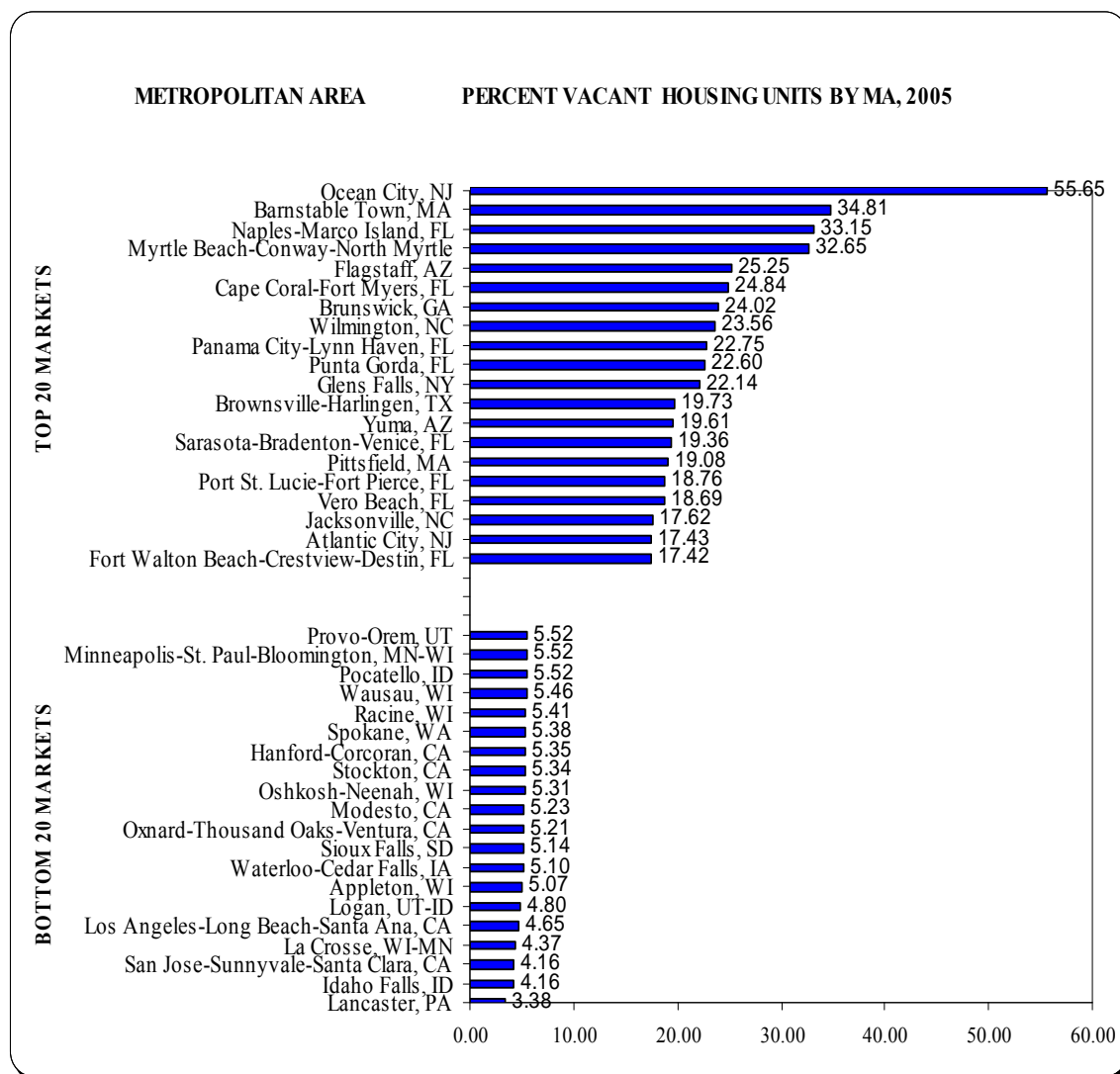

The scatter diagram of residential building permits per 1000 and the percent of vacant housing units (Figure 4.8) indicated that a moderate and positive linear relationship existed between the variables with some anomalies. This was verified by a Pearson correlation coefficient of 0.44 which was significant at the one percent level.

Figure 4.7 Percent of Vacant Housing Units by MA, 2005

Housing Vacancy Rate, 2005 (%)

○ 3.38 - 12.52

○ 12.53 - 21.51

○ 21.52 - 36.95

● 36.96 - 55.65

Data Source: U.S. Census Bureau, 2005
Produced by: Augustin Misago

Those anomalies included Cape Coral-Fort Myers and Panama City (FL), Myrtle Beach (SC), St. George (UT), Ocean City (NJ), and Barnstable Town (MA). The positive relationship that existed between residential building permits and the percent of vacant housing units was surprising, because it was assumed in the hypothesis that a higher number of vacant housing units would be inversely related to the number of building permits issued.

Figure 4.8   Scatter Diagram for Residential Building Permits per 1000 and the Percent of Vacant Housing Units by MA, 2005
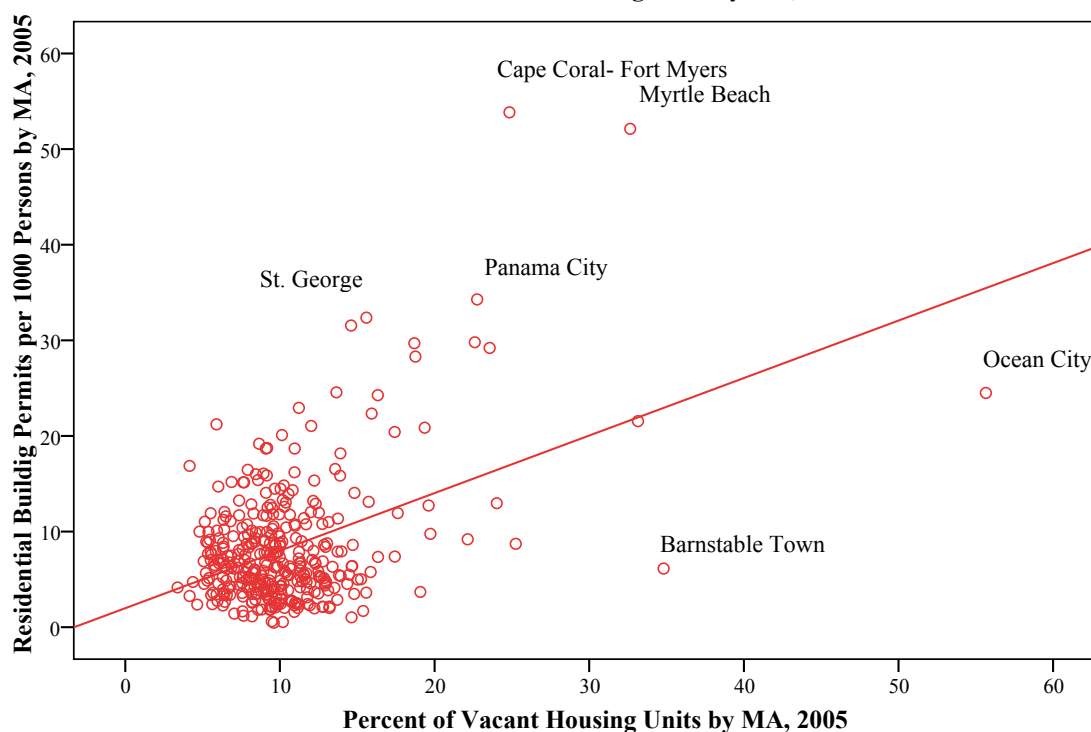
However, one possible reason for the positive relationship might be related to the peculiar nature of the housing market in metropolitan areas with resort-based economies that experienced significant growth in their tourism industries, that attracted a significant

number of second home buyers, and had real estate investors seeking to capitalize on housing rent profits (e.g. Naples, Cape Coral-Fort Myers, Panama City, Punta Gorda and Sarasota-Bradenton in Florida, Myrtle Beach and Wilmington in the Carolinas, and Ocean City, New Jersey).

d. Percent of Housing Built Between 1990 and 2004 by Metropolitan Area

Data on housing construction rates over the last decade indicate that the average percent housing built between 1990 and 2004 was 22.60 percent for metropolitan statistical areas with a high of 49.87 percent in St. George, UT and a low of 5.76 percent in Pittsfield, MA (Figure 4.9). The percent of housing built between 1990 and 2004 by metropolitan areas was less unevenly distributed across the country than the prior independent variables (Figure 4.10).

Many metropolitan statistical areas had between 23 and 32 percent of the housing stock built between 1990 and 2004 (140 out of the 358 metropolitan areas). Only 32 metropolitan areas had more than 32 percent of their housing built between 1990 and 2004 and these were largely located in the Southeast (e.g. Raleigh, Ocala, and Charlotte) and in the West (e.g. St. George, Las Vegas, Bend, and Boise City). The remaining 186 metropolitan statistical areas experienced 1990-2004 percentages that were below the national average. Most of the metropolitan statistical areas with lower percentages of housing built in last decade were located in the Northeast and Midwest of the U.S. including Pittsfield, MA, Binghamton, NY and Casper, WY.

Figure 4.9 Metropolitan Area Rankings by Percent Residential Housing Built Between 1990 and 2004

METROPOLITAN AREA	PERCENT HOUSING BUILT BETWEEN 1990-2004

TOP 20 MARKETS

Metropolitan Area	Percent
St. George, UT	49.87
Las Vegas-Paradise, NV	48.96
Raleigh-Cary, NC	45.76
Gainesville, GA	43.65
Bend, OR	43.44
Auburn-Opelika, AL	43.19
Laredo, TX	42.68
Boise City-Nampa, ID	41.08
Coeur d'Alene, ID	40.46
Fayetteville-Springdale-Rogers, AR-MO	38.96
Prescott, AZ	38.45
McAllen-Edinburg-Mission, TX	38.14
Ocala, FL	37.92
Charlotte-Gastonia-Concord, NC-SC	37.91
Greenville, NC	37.79
Austin-Round Rock, TX	37.70
Orlando-Kissimmee, FL	37.64
Atlanta-Sandy Springs-Marietta, GA	37.44
Provo-Orem, UT	37.43
Greeley, CO	36.13

BOTTOM 20 MARKETS

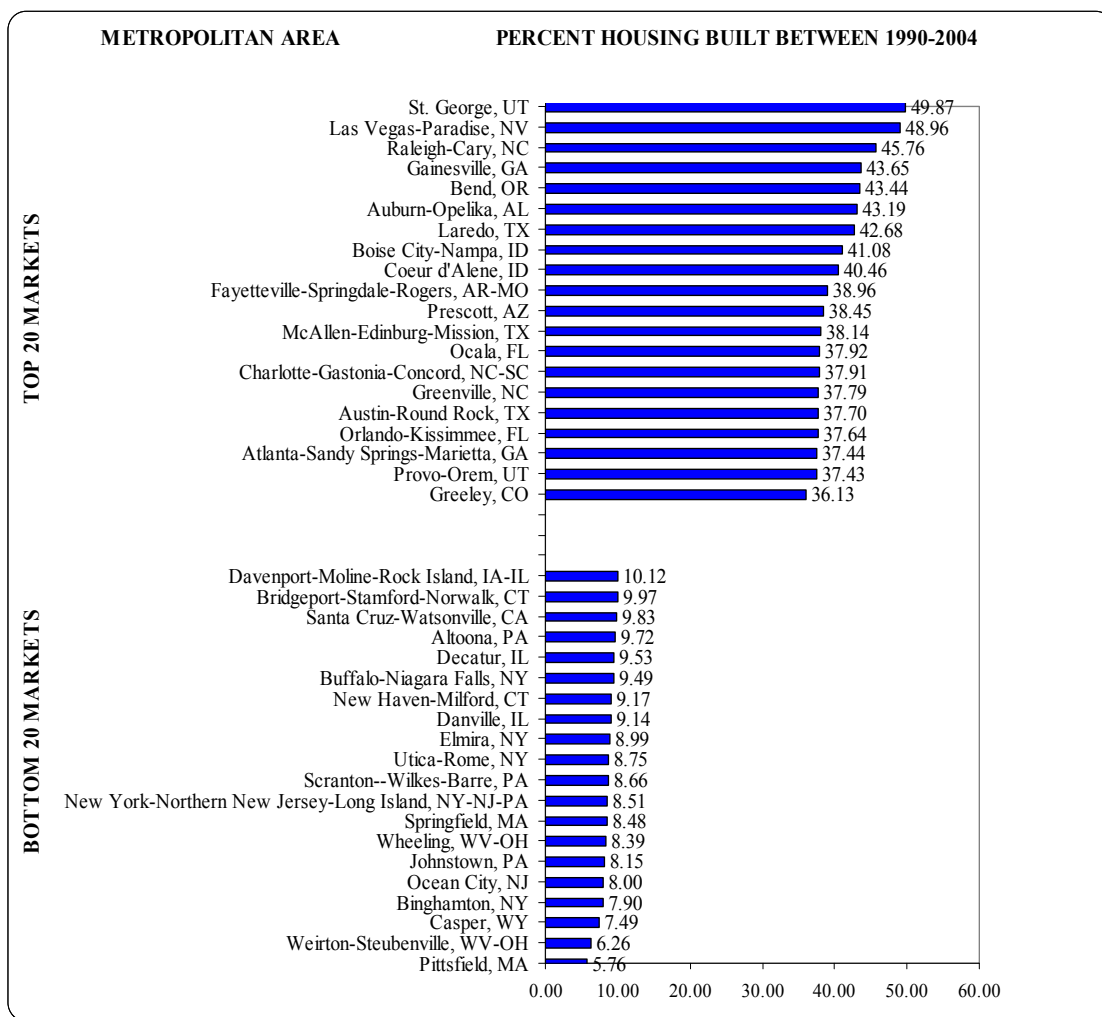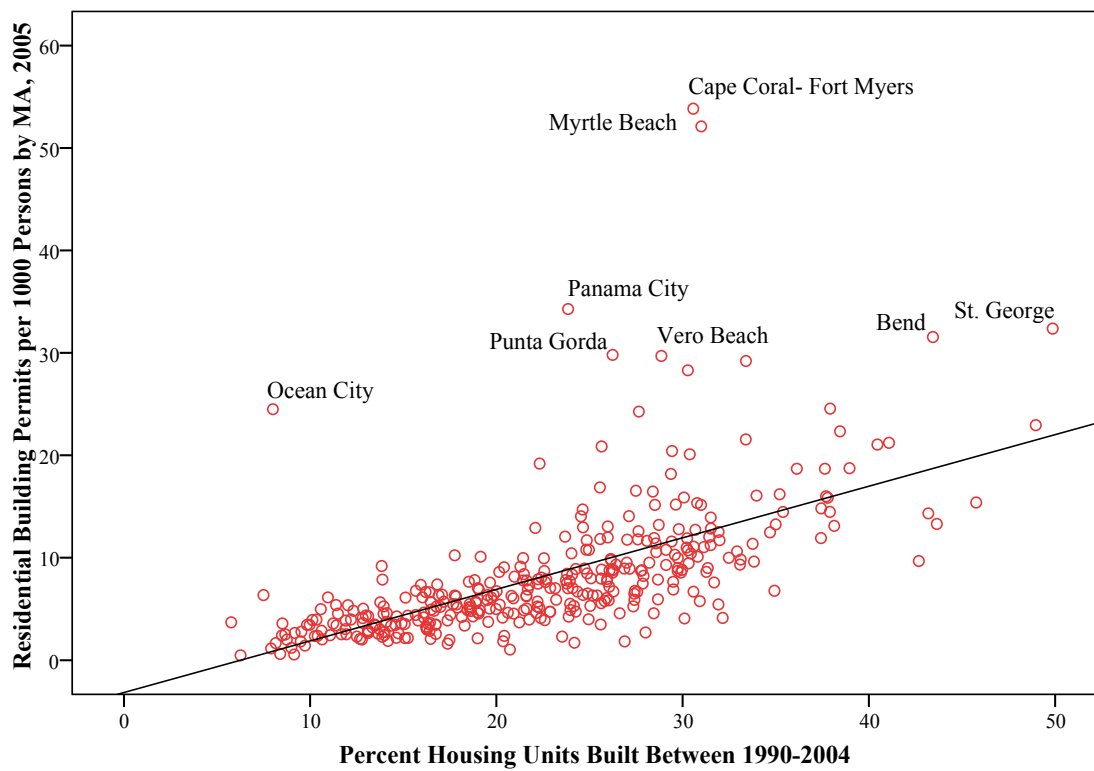| Metropolitan Area	Percent
Davenport-Moline-Rock Island, IA-IL	10.12
Bridgeport-Stamford-Norwalk, CT	9.97
Santa Cruz-Watsonville, CA	9.83
Altoona, PA	9.72
Decatur, IL	9.53
Buffalo-Niagara Falls, NY	9.49
New Haven-Milford, CT	9.17
Danville, IL	9.14
Elmira, NY	8.99
Utica-Rome, NY	8.75
Scranton--Wilkes-Barre, PA	8.66
New York-Northern New Jersey-Long Island, NY-NJ-PA	8.51
Springfield, MA	8.48
Wheeling, WV-OH	8.39
Johnstown, PA	8.15
Ocean City, NJ	8.00
Binghamton, NY	7.90
Casper, WY	7.49
Weirton-Steubenville, WV-OH	6.26
Pittsfield, MA	5.76

Figure 4.11 is the scatter diagram for residential building permits per 1000 and the percent of housing units built between 1990 and 2004. It suggested that a strong linear positive relationship existed between the variables (the Pearson's correlation coefficient was 0.62 at the 1 percent level of significance) with some anomalies that deserve an explanation.

Figure 4.10 Percent of Housing Units Built Between 1990-2004 by Metropolitan Area
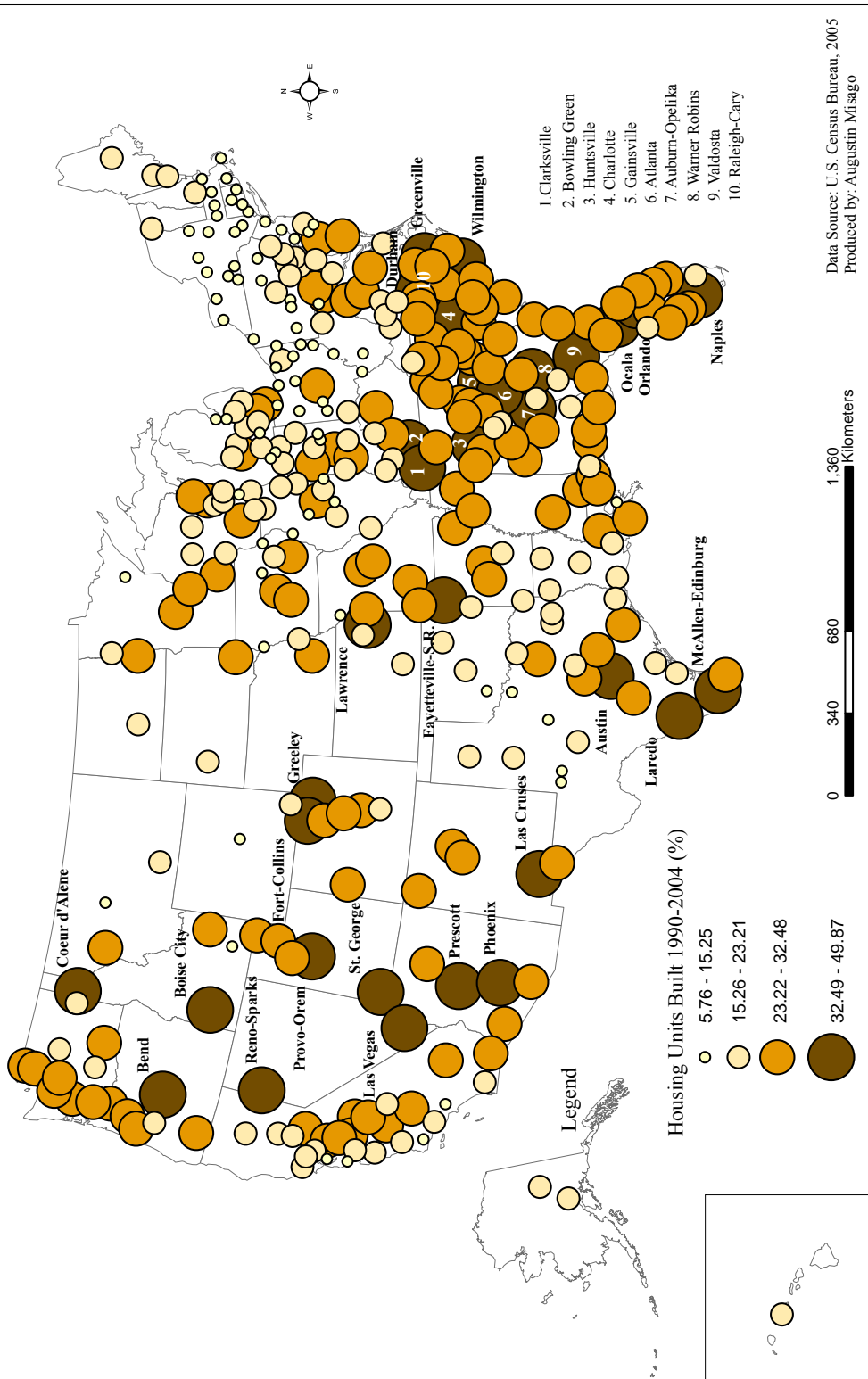
These anomalies included Cape Coral-Fort Myers and Myrtle Beach. Fort Myers and Myrtle Beach can be partly explained by the strong in-migration of both retirees and young upwardly mobile professionals to both markets. In addition, both metropolitan areas attracted a significant number of tourists who enjoyed the large number of golf courses and year-round good weather. Because these two areas attracted a large number of new residents, residential investment is largely driven by pre-emptive house purchases that attempt to minimize the impact of rapidly escalating house prices on investment cost. Also, a number of real estate investors in those coastal metropolitan areas buy homes to rent out to other individuals or for their own future use (second homes).

Figure 4.11 Scatter Diagram for Residential Building Permits per 1000 and the Percent Housing Units Built Between 1990-2004

e. Percent Employment in Health Care and Social Assistance by Metropolitan Area, 2005

The percent employment in health care and social assistance was unevenly distributed across the nation by metropolitan area. The average percent employment in this sector was 10.8 percent, with a high of 32.1 percent in Rochester, MN and a low of 3.9 percent in Jacksonville, NC. Figure 4.12 displays the top 20 metropolitan areas with the highest percent employment in health care and social assistance, and the bottom 20 metropolitan areas with the lowest percent employment in health care and social assistance economic sector. Figure 4.13 illustrates the spatial distribution of the health care and social assistance. It suggests that a disproportionate number of Frost Belt metropolitan areas generated above average market shares in this industry, especially relative to the lower shares in the Sunbelt metropolitan areas.

Among the top 20 metropolitan areas with high market shares in health care and social assistance, only nine metropolitan areas were located in South including Brownsville-Harlingen, TX (20.06), McAllen-Edinburg-Mission, TX (18.71) and Tyler, TX (17.59). The Midwest region accounted for six metropolitan areas in the top 20, including Rochester, MN (32.14), La Crosse, WI-MN (16.72), Muncie, IN (16.23), Duluth, MN-WI 16.46, Lima, OH (15.55), and Springfield, OH (15.45).

For the bottom 20 metropolitan areas with the lowest percent employment in health care and social assistance, 13 were located in the South, with nine in the South Atlantic census division, including Fort Walton Beach-Crestview-Destin, FL (6.61), Charlotte-Gastonia-Concord (6.52), Anderson, SC (6.45), Fayetteville, NC (6.19), Spartanburg, SC (6.16) and Myrtle Beach (5.84).

Figure 4.14 illustrates the scatter diagram for residential building permits per 1000 and percent employment in health care and social assistance. It suggests that a moderate inverse linear relationship exists between the two variables. This was confirmed by a Pearson's correlation coefficient score of -0.26 at the one percent level of significance.

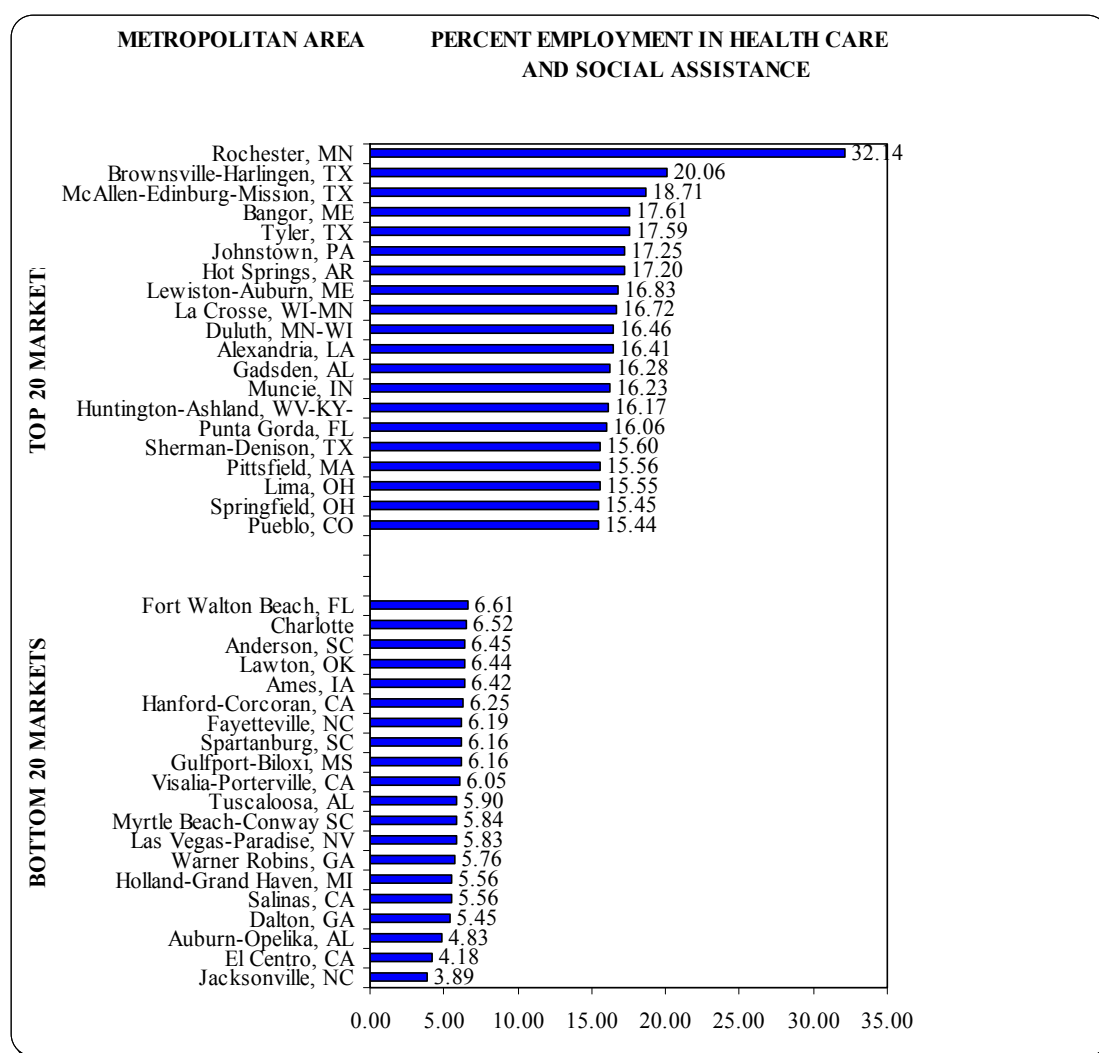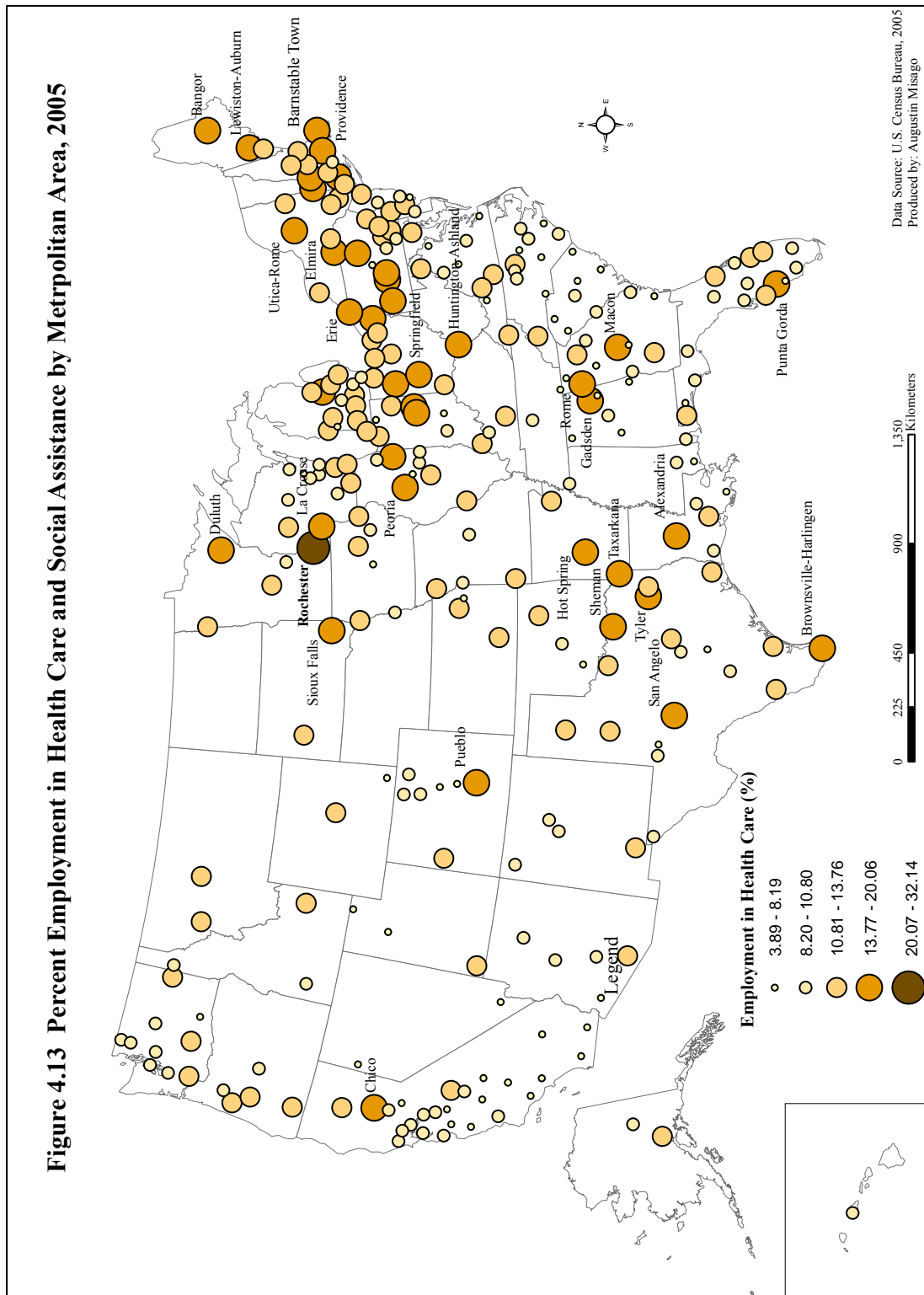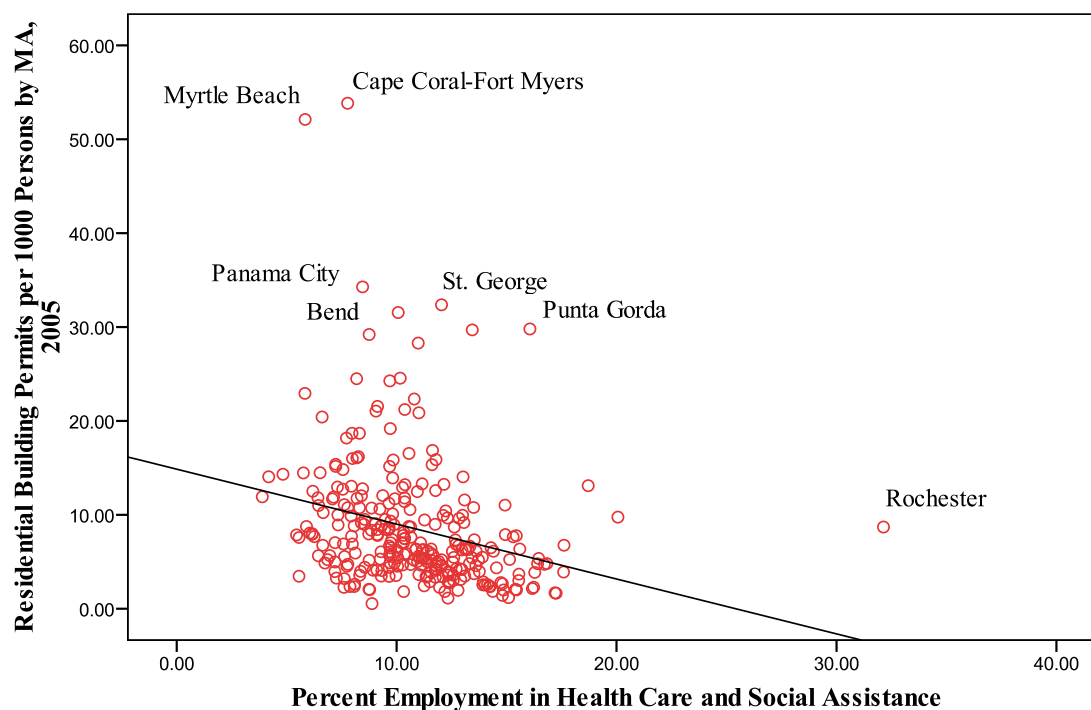**Figure 4.12 Metropolitan Area Rankings by Percent Employment in Health Care and Social Assistance, 2005**

Figure 4.13 Percent Employment in Health Care and Social Assistance by Metropolitan Area, 2005

Employment in Health Care (%)

Legend

3.89 - 8.19
8.20 - 10.80
10.81 - 13.76
13.77 - 20.06
20.07 - 32.14

Metropolitan areas with an above average number of building permits per 1000 persons

tended to have a lower percent employment in health care and social assistance.

Figure 4.14 Scatter Diagram for Residential Building Permits per 1000 and the Percent Employment in Health Care and Social Assistance by MA, 2005

One possible explanation for this inverse relationship may be related to the lower

wages traditionally offered in health care and social assistance industries. Indeed, a

significant number of jobs in this economic sector do not require high skill levels (e.g.

jobs in nursing homes, assisted living facilities) and, consequently, these jobs tend to pay

wages closer to the minimum wage.

These low wage jobs partly contribute towards a low building activity rate since

they do not generate enough income to afford new housing. Additionally, it is hard for

metropolitan areas with a high percent employment in low paying jobs to attract a large number of new residents; in contrast, a significant number of residents tend to out-migrate to metropolitan areas where high paying jobs are located.

f. Percent Population 65 Years and Over by Metropolitan Areas, 2005

The average percentage of the population 65 years and over was 12.44 percent for metropolitan areas with a high of 33.5 percent in Punta Gorda (FL) and a low of 5.2 percent in Fairbanks (AK). Figure 4.15 presents the top 20 markets with the highest percent elderly and the bottom 20 markets with the lowest percent elderly.

For the top 20 metropolitan areas with the highest percent elderly, 14 were located in the Sunbelt region with 10 in Florida, including Punta Gorda (33.5), Vero Beach (26.8), Sarasota-Bradenton-Venice (25.9), and Naples (23.5). The remaining six metropolitan areas were unevenly distributed in the Northeastern Rust Belt region, including Ocean City, NJ (20.2), Barnstable Town, MA (23.1), Johnstown, PA (18.9), Weirton-Steubenville, WV-OH (18.3), Wheeling, WV-OH (17.5), and Cumberland, MD-WV (17.5).

The bottom 20 metropolitan areas with the lowest percentage of elderly were spatially dispersed throughout the United States, although 14 were located in the Sunbelt region. Figure 4.16 displays the spatial distribution of percent elderly by metropolitan area in 2005. Not unexpectedly, Florida generated a large number of markets with a high percent elderly population. Other relatively isolated metropolitan areas with a high percentage of elderly were located in Barnstable Town, MA (23.01), Prescott, AZ (21.6), Hot Spring, AK (20.7), and Ocean City, NJ (20.2).

Figure 4.15 Metropolitan Area Rankings by Percent Population 65 Years and Over, 2005
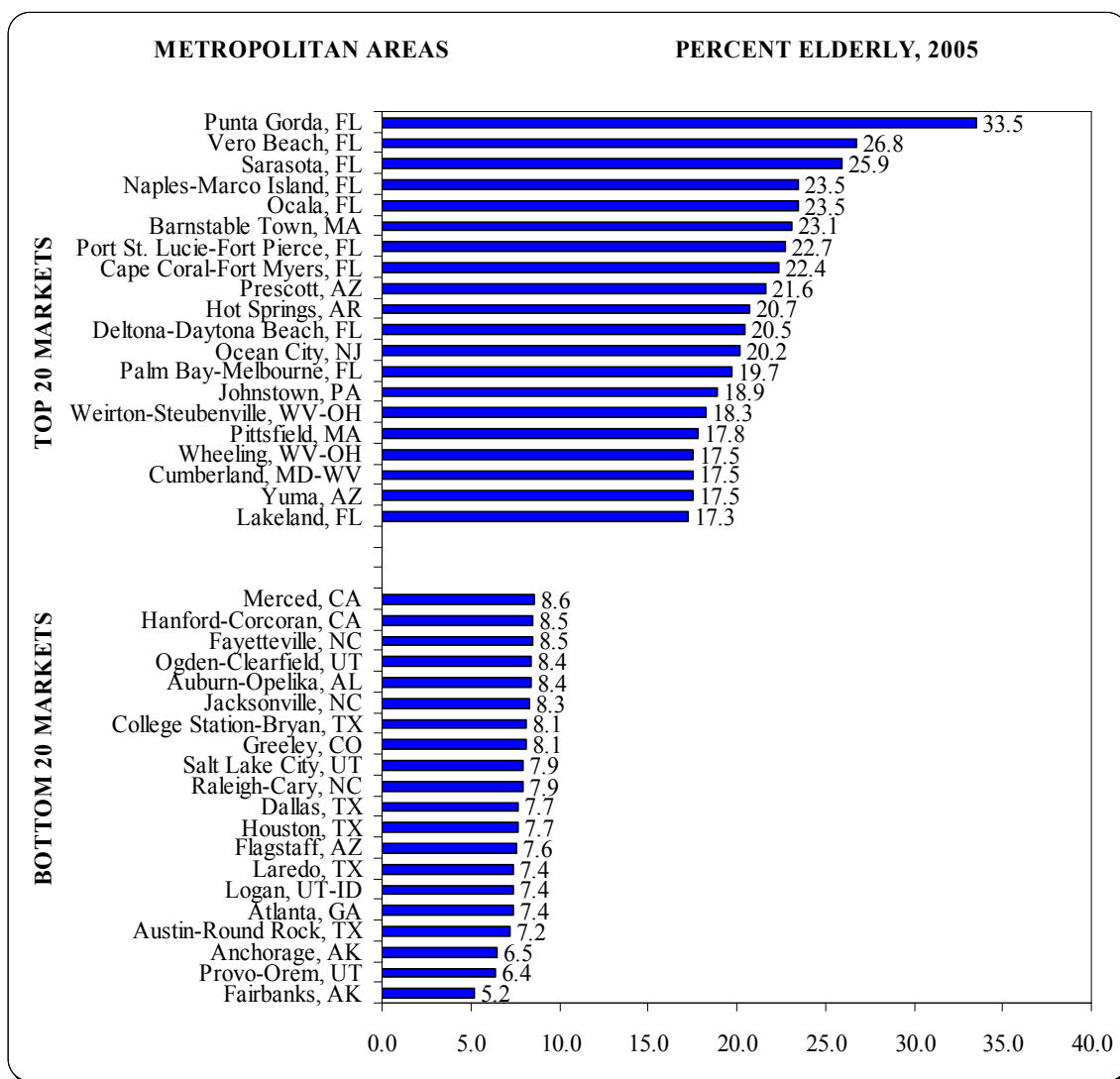

Figure 4.17 is the scatter diagram for residential building permits per 1000 persons and the percent elderly. It suggests that a weak but positive linear relationship exist between the two variables. This was supported by the Pearson's correlation coefficient score of 0.19 at the one percent level of significance.

Figure 4.16. Percent Population with 65 Years Old and Over by Metropolitan Area, 2005
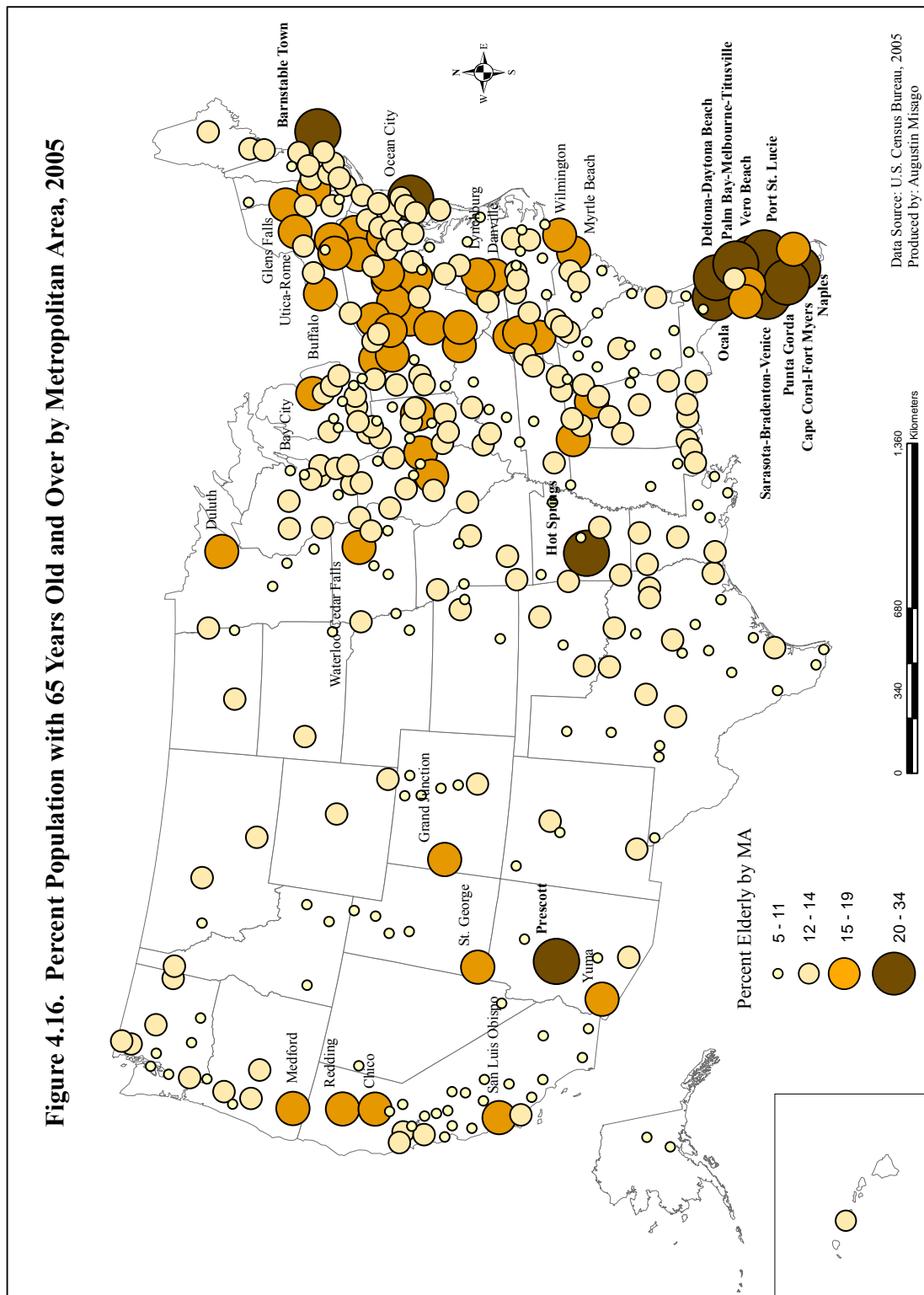
Metropolitan areas with above average number of building permits per 1000 tended to have a higher percent elderly, implying that Florida metropolitan areas like Punta Gorda, Sarasota, and Naples with a high percent elderly population are strongly linked with above average housing market activity rates. However, some anomalies existed in Florida and in the Carolinas.

Figure 4.17. Scatter Diagram for Residential Building Permits per 1000 and the Percent Population 65 Years Old and Over by MA, 2005
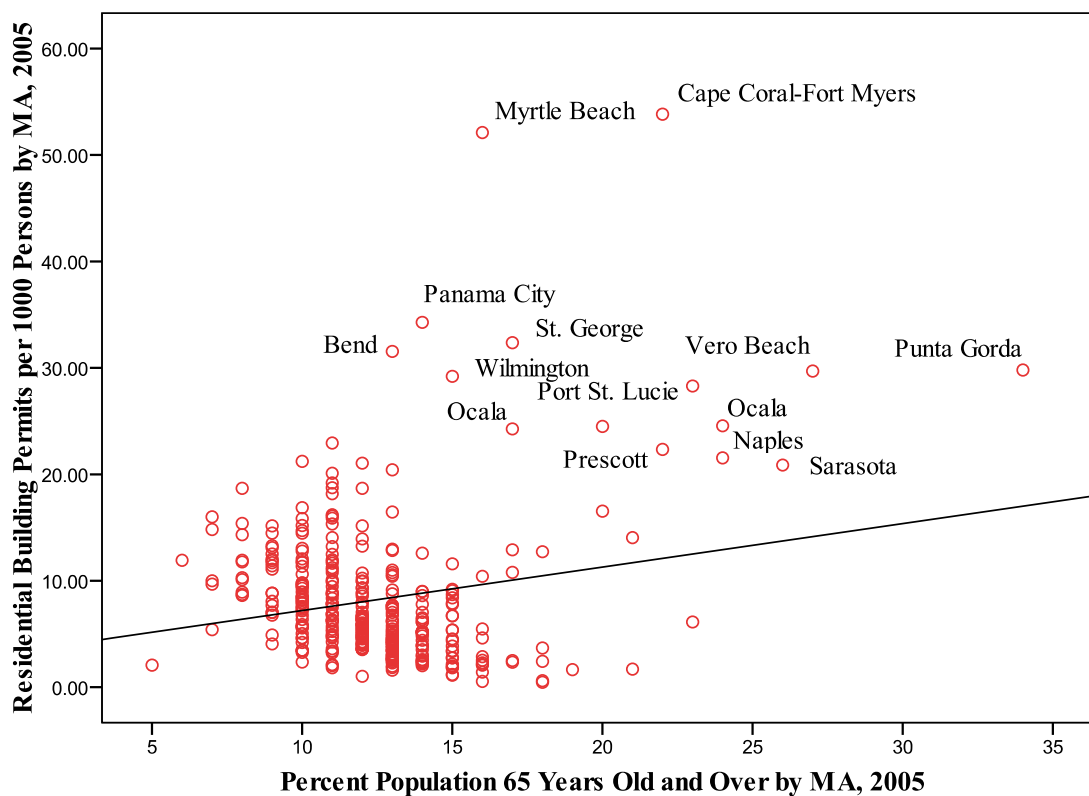
g. Summary

Residential building permits and housing starts are traditionally a lead indicator of the strength of the real estate market since they indicate pending new construction rates.

A primary focus of this dissertation was to isolate the key determinants of residential building permit activity by metropolitan area. The spatial analysis revealed a strong uneven distribution in permitting rates with very active markets in both the southern states and in isolated urban oasis locations in the Rocky Mountain region. Stagnant housing markets seemed to be concentrated in the Northeastern and Midwestern Frost Belt states.

The simple multiple regression analysis suggested that five variables were statistically significant and strongly linked to residential building permit rates by metropolitan area and these included population growth rates, housing vacancy rates, percent housing built between 1990 and 2004, percent employment in health care and social assistance, and the percent of the population aged 65 years and over. It was hypothesized that the composition of the metropolitan economy, existing housing characteristics and certain key socio-demographic characteristics will all simultaneously shape building permit activity as theorized by both Maisel (1963)and Bourne (1981).

The five key explanatory variables identified in this dissertation were chosen from 52 independent variables that collectively represented each of these three groups. For each of the three groups, at least one variable was included in the final five variables defined by simple regression model. Also, a positive relationship existed between the number of residential building permits issued per 1000 and four of the variables selected in the final model, including population growth rate, percent elderly, percent vacant housing and the percent of housing built between 1990 and 2004, and they all were statistically significant at the one percent level. However, an inverse relationship existed

between residential building permits per 1000 and percent employment in health care and social assistance and the relationship was statistically significant at the one percent level of significance.

Additionally, the geography of housing activity was influenced by one key measure of the composition of the economy (percent employment in health care and social assistance), two variables that capture housing stock characteristics (vacancy rate, and percent housing built between 1990 and 2004), and two socio-demographic measures (percent of the 2005 population due to net migration and percent elderly).

However, the literature has suggested that a large number of additional variables could influence residential housing market activity. Some of those frequently mentioned in the literature include household income levels, house prices, household composition and the percent of older housing units, among others. In this dissertation, these variables were included in the simple multiple regression analysis. A big surprise, however, was that none of these variables were retained for the final regression model. One of the possible reasons for this was that these variables were either strongly correlated with one another or with some of the variables included in the final model.

To some extent, it is also surprising that the composition of the metropolitan economy did not feature as substantially as expected in the final model. The literature suggested that larger metropolitan economies can create a large number of new high paying jobs, low levels of unemployment, and a thriving industry base which can in turn trigger a higher household income per capita and attract a significant number of new residents and ultimately create a demand for additional residential housing units.

However, it appeared that those economic indicators have not played as significant a role as expected in determining the number of residential building permits issued by metropolitan area. One of the potential reasons might be that such economic indicators are systematically linked to various socio-demographic indicators and particularly the percent of the 2005 population due to in-migration, which was included in the final model. It is possible that the real effects of the composition of the metropolitan economy are captured by a high level of in-migrant population since this more effectively speaks to metropolitan economic growth. Another potential reason for the exclusion of some variables from the final model could be related to the scale of geographic analysis. It is possible that some variables may perform more rigorously at a different geographic scale of analysis (e.g. neighborhood level) in terms of measuring their impact on residential housing market activity rates.

CHAPTER V

CONCLUSIONS

Residential building permits can be an important indicator of both residential housing construction activity and the overall health of the real estate market. Building permits can also be seen as a proxy for housing demand and supply. Spatially, residential development fundamentally shapes urban morphology since it typically accounts for around one-third of all land use acreage in a city. Furthermore, an explicitly geographic analysis of residential building permit activity can help urban planners and urban policy makers at different levels (local and state) better understand the key determinants influencing housing demand and supply, which can, in turn, lead to a better understanding of many aspects of urban growth dynamics.

This dissertation also fills an important gap in the existing literature on the geography of housing because prior research by geographers has tended to overlook the geography of housing market activity at the metropolitan scale, and especially by using building permit data as a surrogate for housing demand and supply. Geographers have, instead, mainly focused on urban housing market at the neighborhood scale by analyzing how population mobility and other factors affect inter-urban or intra-urban housing market activity rates. In this dissertation, the focus was on explaining the spatial distribution of residential building permits per 1000 persons by metropolitan area. Based on a statistical analysis of U.S. Census data and other data sources (BLS, BEA), this

dissertation sought to provide answers to questions of why and how residential building permit distribution varies across the nation and what key determining factors influence the geography of housing supply at a macro-scale.

It was hypothesized that the geography of residential building permits per 1000 was simultaneously influenced by the overall composition of the metropolitan economy, existing housing characteristics, and the socio-demographics of the resident population. This hypothesis was based on the existing theoretical framework established by Maisel (1963) who examined the fluctuations in residential construction starts, and later by Bourne (1981) who investigated the determinants of new construction. Both authors have suggested that urban housing market activity can be influenced by variables that can be represented by these three groups.

This dissertation examined 358 metropolitan areas and 52 independent variables that represented each of these three major groupings. Two regions of the country dominated residential housing market activity in 2005, and these included the South Atlantic region essentially the Florida and Carolinas metropolitan areas, and some relatively isolated Rocky Mountain metroplitan areas. Florida accounted for 11 of the top 20 metropolitan areas with the highest rate of building permits issued per 1000 persons. The fastest growing western metropolitan areas were unevenly distributed across six states (Figure 4.1). However, the Northeast and the Midwest metropolitan markets experienced below average permitting rates.

The statistical results from the simple multiple regression model revealed five key explanatory variables that most influenced the spatial pattern of residential housing

market activity in 2005. Those variables included the percent population growth rate by net migration, the percent vacant housing rate, the percent of housing built between 1990 and 2004, the percent employment in health care and social assistance, and the percent of the population aged 65 years and over. For all five independent variables included in the final model, consistent anomalies included Cape Coral-Fort Myers and Myrtle Beach. The logic behind these two anomalies could be attributed to key factors. Both markets attracted large numbers of affluent retiree in-migrants, especially from the rustbelt region, and both markets supported thriving tourism industries that attracted a large number of second home purchases, vacation rentals and outright relocations.

In this dissertation, the findings were consistent with the long established theoretical work of Maisel and Bourne who suggested that the overall metropolitan economy (employment composition), existing housing characteristics, and the socio-demographic characteristics of the resident population all greatly influence the level of residential housing market activity. However, although housing vacancy rates was expected to have a negative influence on the rate of new housing construction, this dissertation found that the percent of vacant housing units was positively associated with the number of residential building permits per 1000 persons. Those metropolitan areas with the highest vacancy rates were not the sluggish markets of the Frost Belt states. Instead, the metropolitan areas with the highest vacancy rates were those metropolitan areas that have generated vibrant resort-based tourist economies largely located in the Southeastern States and in other places like Ocean City, NJ and Prescott, AZ. By contrast, the sluggish markets in the Northeastern and Midwestern states tended to have

lower vacancy rates and little additional capacity was being added to inventory.

While this dissertation provides a small step towards better understanding the geography of new residential housing markets, additional research should include variables that can capture the role of the natural environment (e.g. temperature), the overall quality of public services, cost of living indexes, the role of planning and government regulations, and the impact of public housing since these factors were not fully explored in this dissertation.

Additionally, because this dissertation examined residential building permit activity in just 2005, future research should utilize a time series analysis to investigate the historical variation of residential housing markets across the country. By doing so, it becomes possible to develop a clearer picture of how housing market activity varies over time and to better understand how future housing market activity rates may fluctuate.

Finally, this dissertation examined residential building permit activity at a national scale by metropolitan area. Future research should focus on a smaller scale of analysis to investigate whether the key determinants that influence residential building permit activity at the metropolitan level apply at the scale of neighborhoods or whether different influences shape permitting rates at a more disaggregated scale of analysis.

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