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# Are Amenities Important for the Migration of Highly Educated Workers? The Role of Built-Amenities in the Migration of Highly Educated Workers

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ARE AMENITIES IMPORTANT FOR THE MIGRATION OF HIGHLY EDUCATED WORKERS?

THE ROLE OF BUILT-AMENIITES IN THE MIGRATION OF HIGHLYEDUCATED WORKERS

MIJIN JOO

## ABSTRACT

Across the past two decades, public officials have debated and social scientists have studied the importance of tourist amenities in attracting and retaining human capital. Few studies, however, have examined the relationship between tourist amenities and the migration of educated workers. Information of this nature is needed by public officials considering the best use of tax dollars to attract human capital and advance local economies. This dissertation addresses this need an analysis of the relationship between built amenities and the migration of educated workers. This study's focus was on the importance of built amenities such as sports facilities, museums, and restaurants. Public investments can change the distribution of these amenities; in contrast, the advantages provided by natural amenities (e.g., weather, coastlines, and mountains) are less susceptible to public interventions. For that reason, areas lacking in those assets have focused on sports, the arts, and culture to attract human capital. Knowing if any of those investments have an effect on migration patterns is essential for cities across the North American Midwest and in many other parts of the world. This study focused on both migration (attraction) and non-movement (retention) of different types (age, education) of workers. Empirical tests using IPUMS (Integrated Public Use Micro-data

Series) data between 2005 and 2008 show that small tourist amenities help retain workers while some big amenities do have an impact on the immigration of some groups of educated workers. These findings can help cities create the desired environments to foster attraction and retention of educated workers for economic development.

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# CHAPTER I

# INTRODUCTION

## 1.1 Introduction

For social scientists and policy makers focused on economic development a recurring question has been why some regions have grown more than others. This is not merely an issue that has attracted attention in light of the decline of the American Midwest compared to other parts of the United States. Plato, Aristotle, and the post-Confucian philosophers of China weighed in on the subject in ancient times. Some of the founding treatises for the modern discipline of economics included assessments of the distribution of capital and the reasons for its concentration. Today, leaders in cities across America's Midwest are striving to understand what can be done to respond to declining comparative advantages to enhance regional economic development.

In response, three sets of ides have emerged based on traditional economic models and perspectives related to the attraction and retention of human capital through the building of amenities. A cornerstone of traditional economic models regarding development is the concept of diminishing returns: products or companies that get ahead in a market eventually run into limitations, so that a predictable equilibrium of prices and market shares is reached (Arthur,1996). Based on the concept of decreasing returns, economic growth slows and might eventually stop at a certain point. In the 1950s, Robert Solow illustrated how diminishing returns affect both capital and labor. In his model, however, technical knowledge was treated as a third or new factor that continued to develop economic productivity and growth. In modern terminology, increasing technical knowledge could re-invent an economy and thus sustain higher levels of development. The consistent introduction of new or technical knowledge could lead to a series of reinventions and accelerating or sustained growth. Solow's ideas allowed economists to continue to model the economy using decreasing returns, but only at the cost of excluding technology from the economic model (Cortright, 2001). Hence, in the traditional theories, accumulation of capital was seen as the engine of growth with the possibility of reinvention through the introduction of new knowledge.

In this traditional view, firms and corporations were treated as the important actors for the accumulation of capital. Classically, a location rich in production such as labor, capital, and land would generate more jobs, which in turn would attract more human capital. Traditional theories implied that regions with more firms and corporations could develop and expand more amenities than others. However, current economies such as the Silicon Valley could not be largely explained by production factors that traditional economists used to

explain manufacturing industries (in the absence of new knowledge and its impact on transforming economies and the growth of firms). What, then, drives economic growth in the knowledge-based era?

The focus on knowledge as the agent of economic transformation has shifted the focus of economic development from firms and their size to people and their ideas as the engines of growth. The exogenous growth models developed by Solow and other neoclassical scholars largely did not try to explain what caused technology to improve over time, even though some of the work explicitly or implicitly touched on issues of knowledge. New growth theory revived an old tradition of thinking about the effects of increasing returns with knowledge as its focus.

Some human capital theorists (Romer 1986; Lucas1988; Bhatta and Lobo 2000) emphasize that people are one of the fundamental driving forces behind the knowledge-based economy. These theorists point to the creations and innovations of talented people that lead to new jobs for a region. Straubhaar (2000) has raised interesting questions regarding the policy implications of such a focus. Should firms or a society invest in the accumulation of knowledge, or is that the responsibility of the public sector through the funding of schools and research activities? Or, should an economy "free ride and import" human capital that has been produced outside the country or the region as is sometimes done through creative and flexible immigration policies biased towards those with advanced degrees?

Although these questions are fundamental and important to policy makers, thorough discussions are sometimes absent from the consideration of human capital theories. Some have suggested that human capital should be considered a factor of production, implying that its location is fixed (Clark, 2004).Human capital theorists, such as Grossman and Helpman

(1991) have focused on strategies to attract educated workers through the establishment of education programs and training systems. Glaesar (2005) argues that human capital builds or "feeds" off itself. According to him, universities as a result assume a key role in creating initial advantages in human capital, which can become self-reinforcing and sustaining across time.

In general the movement of workers has been explained by using traditional labor market theories based on observations drawn from the manufacturing sector. Traditional theories suggest that outcomes are a result of disequilibrium in a labor market. Because relocation is expensive, an individual's decision to migrate must be accompanied by an expectation of higher benefits at the new location (Clark and Cosgrove, 1990). In this framework, households migrate from areas of relatively low earnings to areas of high earnings in an attempt to increase the return on the capital asset they have developed.

Recently, some scholars including Straubhar (2000), Florida (2000) and Clark (2004) have raised issues regarding the attraction of educated and skilled workers. These scholars point out that in the modern knowledge-based economy what affects the residential choices of skilled and educated workers has changed, with entertainment or consumption elements of similar importance as factors that influence the choices made.

Florida (2000) and Clark (2004) suggest that the distribution of educated and skilled workers is affected by the distribution of amenities. According to amenity theories, local amenities are designed to attract talented workers and are of equal or more importance than the use of production factors (incentives) to attract firms. The concept of amenities is expanded to the concept of quality of place suggested by Florida (2002). According to his theory, quality of place refers to the unique set of characteristics that defines a place, making

it attractive and livable. Recently, studies of different urban economies are paying increasing attention to amenities and the distribution of workers (Kordrzychi, 2001; Gabriel and Rosenthal, 2004; Mathur and Stein, 2005; Shapiro, 2006; Arntz, 2006).

On the other hand, despite this recent interest in amenities and "quality of place" issues to explain growth, the topic is hardly new for many public officials. Many cities and states have made large public investments in "big ticket" amenity items such as sports facilities, concert halls, convention centers and art museums to enhance the image and appearance of their areas while also expanding the base of commercial leisure-time venues. These cities and regions expect that these are essential investments that will result in a larger concentration of highly educated workers. Between 1976 and 1986, 250 convention centers, sports facilities, community centers, and performing arts halls were constructed or began, at a cost of more than $ 10 billion (US News and World Report, 1986). When each facility is built there is an anticipation that restaurants, bars, etc. will also open. Since the early 1980s, the downtown areas of American cities have experienced a conversion of land use wrought by the massive urban renewal clearance projects of the 1950s and the 1960s (Judd, 2003). However, it is not clear if most local governments intended to relate investments in amenities to regions and the concept of human capital. Clark (2004) suggests that classic urban theories are no longer relevant because of the processes of globalization and because of the role of amenities. Their analysis is from an ongoing study of 35 countries and 10,000 cities, plus an in-depth study of Chicago. They argue that amenities are a factor in contemporary economic development, and they suggest that the growth machine model for urban redevelopment is no longer relevant. A new economy has emerged as well that focuses on information technology.

Thus, amenity theories, as related to human capital, are supporting the commitment to amenities made by local policy makers.

Amenity theories have sparked extensive discussion and debate, and have not been accepted without criticism. Amenity theories suggest that individuals' residential choices focus or include substantial consideration of the quality of life elements available in a city or region, and these are as important as or even more so than a job offer (Clark, Lloyd, Wong & Jain, 2002). Advocates of amenity theory suggest that quality of life factors have assumed elevated importance as a result of the changing nature of work and life in the post-industrial age and because of globalizing trends. In their view, citizens in the postindustrial era make residential choices based on the quality of life in each city, treating their own urban location as if they were tourists, emphasizing aesthetic concerns. Little empirical work exists to sustain this perspective. Few, if any, studies validate the relationship between a movement of educated and skilled workers and amenities based on time series data.

Clark (2004) explains that human capital aggregations and amenities act jointly to create a location that is a desirable place to live and work. He stated that old ways of thinking—old paradigms such as "Land, labor, capital, and management generate economic development"—is too simple. He pointed out that the developer's classic "location, location, location" is similarly incomplete. He raised the questions, "location near what?"-"amenities" was the answer to found. The research question that will guide this dissertation is similar. "Amenity, amenity, amenity" is too simple and broad for policy makers. The real issue is which amenities, if any, actually impact the distribution of human capital. Amenities include tourist-amenities —for visitors and residents alike – such as nightlife, museums, sports, and other forms of entertainment and non-tourist amenities include such things as the quality of

schools and crime levels. This dissertation is focused on tourist-amenities instead of non-tourist amenities.

Clark, Lloyd, Wong and Jain (2002) insist that the gentrified neighborhood as a distinct type of urban community differs considerably from the neighborhood studies in past classics of urban sociology, for example Gans (1962) or Putnam (1996). According to them, the important local amenities are no longer schools, churches, and neighborhood associations. Rather, security exclusiveness, and a social environment geared towards recreation and consumption concerns has assumed elevated importance.

B. Joseph Pine II and James H. Gilmore (1999) argued that society has entered a new era where experiences are the economic offerings that are in highest demand. In today's environment of ever more sophisticated consumers, those who deliver memorable customer experiences consistently create superior value and competitive advantage (Colin Shaw, 2007). The World Tourism Organization (2002) reports, "There is a shift from active holidays to holidays as an experience. The point is to achieve a complete participative experience that provides new knowledge and authentic experiences." The tourism industry has embraced the concept "experience".

To understand if a relationship exists between built-amenities and the movement of educated workers migration patterns must be assessed; the assessment must look at immigration, emigration and non-movement. The relationship between these three categories and tourist amenities variables would produce a more sophisticated assessment of the importance of amenities for the residential choices made by educated workers. This dissertation aims to provide insight in the loss of human capital – often described as a "brain drain" – that plagues numerous communities. Few studies exist examining the relationship

between the existence of tourist amenities and the attraction and retention of educated and skilled workers. This study addresses this limitation through an analysis of the relationship between built amenities and the presence of educated workers in metropolitan areas. In many previous studies, the concept of amenities is poorly defined.

## 1.2 Research Questions

This dissertation addresses three main research questions associated with the relationship between workers and amenities. The questions themselves were developed after a thorough review of the literature discussed in a subsequent chapter that included work by students of regional economics, human resource development, migration, and amenity theory.

1. Is there a positive association between the level of amenities in a region and the migration of "general" workers when other relevant factors are controlled?

2. Is there a relationship between the level of amenities and the migration of "educated" workers, when other relevant factors are controlled?

3. Is there a positive relationship between the level of amenities and the migration of educated workers of different age groups, when other relevant factors are controlled?

Answers or insights into these questions will add some clarity to the debate on the extent to which a relationship exists between workers and amenities. For example, insight regarding the first question can demonstrate the importance of amenities on the migration of

general workers, including both less and highly educated workers. Clark, Lloyd, Wong and Jain (2002) suggested that globalization has widely affected the migration of each individual to consume amenities in cities because of relative decline in the explanatory power of classical variables affecting the location of development (e.g., distance, transportation costs, and local labor costs) and a rise in the importance of leisure pursuits to workers, including not only educated workers but less educated workers. Thus, it is necessary to know the importance of amenities generally before analyzing the relationship between educated workers and amenities.

Answers to the second question address the key point of the relationship between amenities and educated workers. Endogenous growth theory predicts positive externalities and spillover effects from development of a high valued-added knowledge economy that is able to develop and maintain a competitive advantage in growth industries in the global economy (Babatunde and Adefabi, 2005). More recent research (Glaeser et al 1995; Glaeser 1998, 1999, 2000; Simon 1998: Florida 2002, 2005 and 2006) has demonstrated the seemingly obvious or self-evident importance of human capital for regional development and growth. What is needed, however, is research, that helps to understand whether more educated workers are attracted to a region because of the level of amenities.

The third question directs a focus on younger workers. Clark (2004) suggested that young skilled and educated workers are more attracted by amenities than other workers. Wozniak (2006) argued that workers are likely to be most similar in terms of how changes in local labor market conditions affect them, early in their careers. He suggested that early career workers also minimize dynamic considerations, since the migration choices of older workers are likely determined by an array of the labor market shocks and employment

outcomes they experienced over their careers as well as more complicated family and lifecycle considerations. Therefore, it is necessary to test the hypothesis that young workers with high educations would be more attracted by amenities than any other workers. Understanding if different amenity package attract different mixes of human capital could have policy implications for city leaders.

As explained above, migration will be categorized based on their characters. Therefore, research questions are redesigned in detail based on the three different types of migration: non-movement and immigration.

1. Is there a relationship between the level of amenities and the non-movement of general workers, educated workers and educated workers of different ages, when other relevant factors are controlled?
2. Is there a relationship between the level of amenities and the immigration of general workers, educated workers, and educated workers of different ages, when other relevant factors are controlled?

## 1.3 Objectives

This dissertation will develop both a conceptual and a statistical model to determine if a relationship exists between the level and distribution of human capital and amenities. The investigation attempts to build on previous research assessing and evaluating a migration of workers and amenities by focusing on the following objectives:

1. Create a quantitative measurement tool by which the level and distribution of workers with high level of educations and built amenities can be determined;

2. Determine if a relationship exists between built amenities and the level and distribution of workers with high educations;

3. Identify regional amenities and their association with patterns of different types of migration and workers;

4. Explore if a relationship exists between the movements of workers with higher levels of formal education and built amenities;

## 1.4 Contribution to the Literature

The study will make a contribution to the field of regional economic growth by providing insight into the relationship between the distribution of human capital and built amenities. This study also examines the relationship between human capital and amenities as core components of a regional economy as well as offering theoretical and practical contributions. One of criticisms of the importance of amenity packages is that their contribution to regional economic development is overestimated. Many empirical studies of human capital (Herzog, Schlottmann, and Johnson 1986; Glaeser and Saiz 2003; Artnz 2006; Gottlieb and Josep 2006; Heur, 2010) suggest that amenities are less important than economic factors in explaining migration. These empirical studies, however, have some critical limitations for the development of public policies. One is that migration is defined over a given period of time and consequently the importance of amenities is assessed within a cross-sectional framework.

A more complete treatment requires an assessment of the importance of amenities and economic factors on migration patterns across a longer period. The other limitation is that the characteristic of migration was rarely considered in empirical studies. Community leaders

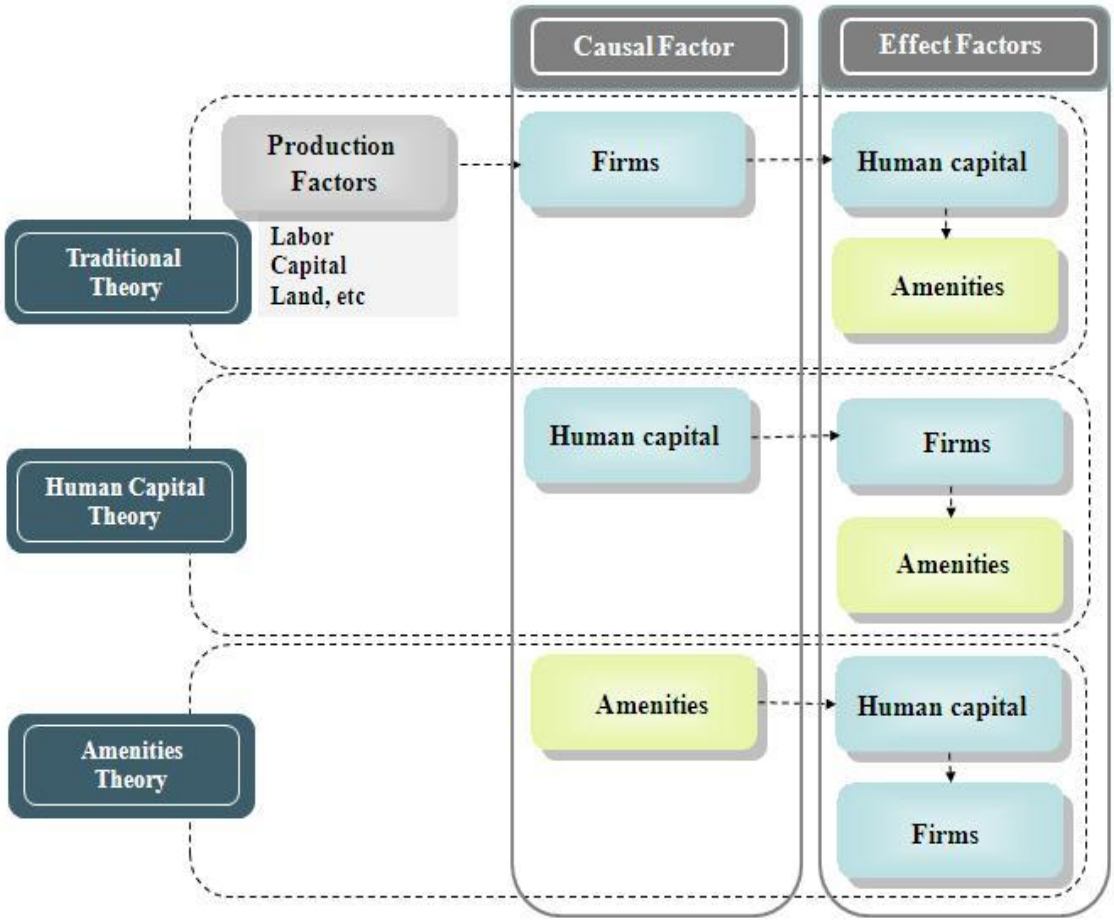
that are considering investments in amenities need insight into the relationship between the movement of educated worker and amenities based on different types of migration.

Traditional theories of economic development and the distribution of human capital have implied that the presence of amenities is a result of the interaction between the disposable income of workers and entrepreneurs responding to increasing salary levels. As a result if the number of firms declines there is likely to be fewer workers leading to lower salaries and fewer amenities. Conversely, if the number of firms increases and there is a higher demand for labor, the resulting growth in wealth should lead to higher levels of amenities. Under this perspective the level of amenities in a region is a function of the distribution of wealth and the resulting demand for entertainment and experiences.

Amenity theories assume an alternative relationship. These theories imply that amenities should be built to develop regional economic growth through the creation of environments wanted by highly skilled workers. Just as the public sector is responsible for other elements of a region's infrastructure to advance development, in an era where experiences are considered valuable amenities, the public sector should invest in such things as sports facilities and concert halls. It could be argued that this idea is tied to perspectives even advanced by Benjamin Franklin in the 18$^{th}$ and 19$^{th}$ centuries that cities needed public parks paid for by the public sector to advance economic activity. Can amenities really attract educated and skilled human capital workers? Such a relationship is antithetical to traditional perspectives that focus principally on the locational choices of firms and the resulting demand for labor that is produced. A theory focused on amenities would suggest as these assets are developed they attract firms that are confident that the human capital they require will be present or easy to recruit because of the high levels of amenities in the area. To

sustain the validity of the impact or import of amenities a study is needed that focuses on the relationship between the migration of workers and the presence of amenities based on time-series data. Time-series analysis can illustrate the importance of amenities in the migration of educated workers. The research questions that I explore in the dissertation will contribute to a resolution of this conflictive perspective. <Figure 1> shows the relationship between human capital and amenities in each theory.

Figure 1 The Relationships Between Firms, Human Capital and Amenities



### Practical Contribution to Regional Policy Makers

This study is designed to assist policy makers by helping them understand the potential for amenities to enhance regional development strategies. The findings of this study will prove helpful in developing appropriate amenities strategies related to human capital workers. In addition, understanding differences between amenities investments in regions, based on case studies, will present in-depth assessments of political and practical issues related to the implementation of strategies to build amenities. Given the economic importance and scale of amenity investments and the growing interest of governments in constructing "big ticket" items such as sports facilities to attract workers, it is difficult to believe that this issue has been under-researched.

## 1.5 Organization of the Study

Chapter 1 presents an overview of the study and describes the context within which it was conceived and developed. This includes the background and overview of the problem, the research questions, the knowledge foundation, and objectives. A theoretical model and a measurement model for human capital and amenities are offered. Research design and methodology are discussed. The theoretical and practical contributions of the study are also detailed.

Chapter 2 provides a review of the available literature pertaining to the distribution of human capital and level of amenities in a region. The background literature referring to a concept of human capital and amenities, a relationship between a migration of human capital and amenities, human capital and amenities packages, and human capital and its public

investment is identified. This chapter includes a discussion of the procedures used to human capital and amenities.

Chapter 3 and 4 focuses on the conceptual model, research hypotheses, research design, and methods of measurement. The conceptual model provides the overall process of how amenities affect human capital and its migration. Hypotheses are grouped into two categories: (1) the relationship between non-movement and amenities, and (2) the relationship between immigration and amenities.

Chapter 5 provides the analysis and results of a migration of well-educated people based on amenities and the research hypotheses introduced in Chapter Three. Finally, it presents the overall measure of amenities attractiveness and human capital in regions.

Chapter 6 of this dissertation summarizes the significance of the research findings and presents conclusions based on the analysis of the data. In the first section the summary and discussion of how amenities affect human capital are presented based on the results of statistical methods, such as panel model. Theoretical and practical implications, as well as resulting limitations of this empirical study are presented. The last section of this chapter is dedicated to proposed recommendations for amenities attraction research advancement.

# CHAPTER II

# LITERATURE REVIEW

## 2.1 Introduction

This literature review establishes the current level of knowledge regarding the relationship between amenities, the migration of human capital, and economic development. The current body of knowledge identifies the most appropriate tools and procedures to examine the subject matter and the methodological challenges. Finally the literature reviews identifies the gaps in knowledge that this dissertation will address.

This review of literature concentrates on three different clusters of studies: the role of human capital in regional development, the importance of the movement of human capital, and the role of amenities in attracting human capital. The last section of the chapter then explores and defines amenities and the various packages used by governments to enhance economic development.

## 2.2 The Role of Educated Workers for Regional Development

Research produced in recent years has produced a greater understanding of the key role played by skilled workers in regional development. Straubhaar(2001) and Solimano(2005) suggested that highly qualified people and human talent are essential economic assets. Earlier, new economic growth theorists such as Lucas (1998) and Romer (1990) point out the importance of bridge between knowledge, human capital, and development. A number of empirical researchers (Barro 1991, Glasesar, Sheinkaman, and Sheifer 1995, Simon 1998, Glendon 1998, Glaeser et al. 1995, 1998, 2000, 2004, Glaeser and Saiz 2004) have verified the linkage between human capital and regional development and growth.

Research by Glaesar, Sheinkmand and Sheifer (1995) found a positive relationship between per capita income growth and human capital. Simon (1998) found a strong relationship between levels of human capital and regional employment growth from 1940-1986. Glendon (1998) found a strong positive relationship between the level of human capital in a city at the turn of the $20^{th}$ century and subsequent economic growth. Glaeser (2000) provided empirical verification of the correlation between human capital and regional economic growth. Firms locate in areas of high human capital concentration to gain competitive advantages, rather than letting the location of suppliers or customers dictate locations. Looking specifically at high-technology or knowledge-based sectors, it has been shown that a flexible labor market and highly-qualified personnel play a central role for the emergence and dynamics of high technology industries (Keeble and Wilkinson 2000). A survey of Californian biotechnology companies, for example, revealed that the availability of

qualified workers was a key factor determining the location of these firms (Acs and Audretsch 2003). Florida's recent work on the creative class (2002a, 2002b, 2005a, 2005b) supports these ideas as it also identifies talented workers as the driving force behind regional development. His research indicates that the economic geography of talent exerts considerable effects on the location of high-technology industries and regional incomes. A vast level of research has also shown that human capital worker is becoming more concentrated (Florida 2002; Berry and Glaeser 2005), and there are reasons to believe that this division will continue, affecting not only regional growth levels, but also housing markets (Shapiro 2005; Gyourko, Mayer and Sinai, 2006)

Although Florida's idea about the role of the creative class in regional development has encountered substantial criticism (Glaeser 2004; Lang and Danielsen 2005; Hansen et al. 2005; Markusen 2006; Scott 2006), many local governments have accepted the basic concept that attracting and retaining skilled workers is essential for regional economic development. The issue is the extent to which amenity packages assume a large role in the task of making a region attractive to highly skilled workers. To explain the role of skilled workers, Florida (2005) tried to criticize the weak relationship between social capital and economic growth. He writes that there has been a change in the kinds of communities that people create due to their changing desires rather than a lack of "sense of community" itself. Social capital can strengthen bonds between people but it can also "shut out newcomers, raise barriers to entry, and retard innovation" (Florida, 2005: 31).

According to Glaeser (2004), human capital theory is highly correlated with Florida's concept of creative capital. In response to Glaeser's investigation, Florida (2004b) largely agrees with Glaeser's assessment of the link between human capital and creative capital.

Recent U.S. immigration policy and other policies such as the ban on federal funding for new stem cell lines has deflected talented people from the country. Graduate students and talented faculty from around the world are choosing to go elsewhere, and countries like Canada, Australia and the UK are benefiting (Florida 2004a). Florida (2004a) calls this a "reverse brain drain." Evidence is growing that other economic gains, such as international conferences, are being located elsewhere because of the stringent requirements for international travelers to enter the United States (Florida 2004a). Mak and Moncur (2003) found that states that invest more in higher education produce higher quality and lower cost education. They also found that more education choice, in the form of a higher number of institutions, attracts more college freshman into states.

## 2.3 Amenities and Educated and Skilled Workers

There is little consensus on which factor attracts highly skilled labor and consequently, shapes the economic distribution of human capital workers. The most important approach has been suggested by Florida (2000) and his colleagues. They suggest that amenities are one of important factors attracting human capital. This section investigates the linkages between the mobility of highly skilled labor and amenities.

### 2.3.1 The Relationship between Amenities and Human Capital

Despite robust recent interest by cities in the building of amenities to advance economic development, the idea that these assets are inducements has been discussed for decades. Sjaasted (1962) was one of the first scholars to imply that migration could be analyzed using a human capital framework, but it always been clear that migration is driven

by economic forces. Since Sjaasted suggested or put forward the idea that amenities were important to and associated with economic development many others have looked at the relationship. Greenwood and Cormely (1971) and Cebula(1974) found that Americans were attracted by a temperate climate. The presence of institutions of higher education in receiving areas have been shown to attract migration by Sahota (1968) and Greenwood (1969), and to retard migration from sending areas by Sahota (1968) and Beals, Levy and Moses (1967). Pollution, health services, crime rates and housing stock have also been shown to be related to migration in the expected directions; Cebula and Vedder (1973), and Pack (1973). Heaton, Clifford and Fuguitt (1981) suggested that economic factors are more important determinates of migration for the young then for the elderly. Howell and Fese (1983) illustrated that a majority of migrants in the United States were motivated by preference for particular kinds of housing and communities. Gravesn (1979) and Graves et.al (1982) found evidence suggesting that amenities affect people's migration decisions. Clark and Cosgrove (1991) found that both economic factors and amenity differentials were significant factors in explaining regional migration. The literature on amenities provides theoretical and empirical evidence for migration related to amenity differentials. However, these migration studies were not commonly associated with regional economic growth patterns.

While amenity theories consider assets as key factors in the attraction of human capital that, in turn, drives the location choices of firms. Hence, they insist that amenities can help advance regional economic growth. There is little consensus that sufficient empirical evidence has been produced to sustain these relationships. While empirical studies using a variety of techniques has found that amenities are less important than economic factors in explaining their migration (Herzog, Schlottmann, and Jonson 1986; Glaeser and Saiz 2003;

Heur 2004; Artnz 2006; Gottlieb and Josep 2006), other studies (Arora, Florida, Gates and Kamlet 2000; Hansen, Kodrzycki, 2001;Ban and Huggins, 2003; Florida 2002; Hansen, Ban, and Huggins 2003; Gottlieb 2004) provide empirical evidence that amenities are important in the migration of educated and skilled human capital workers.

Meanwhile, logistic models, regression models and surveys were used employing micro-data. Only Florida (2002, 2007) used path analysis and structural equations to examine the relationship between talent, regional development, and quality of place. In addition, a few studies such as those by Mathur and Stein (2005) were focused on an economic theoretical model and a conceptual model on explaining the mechanism of the relationship between human capital and amenities,

First, few studies have tried to develop theoretical and conceptual models related to human capital attractions and the presence of different amenity packages. Shapiro (2003) tried to explain the relationship between college-educated residents and employment growth. He analyzed this correlations based on local productivity growth, and local consumption amenities. His research relied on data on growth in wages and house values. He suggested several possible mechanisms or factors associated with the relationship between the concentration of skilled residents in a metropolitan area and subsequent growth in the area's quality of life. The first relationship he tried to analyze is that skilled residents may be the first to flee areas experiencing declines in consumption amenities and the first to enter areas experiencing improvements. The second relationship is that concentrations of skilled residents may encourage the growth of consumer markets, such as restaurants and bars, which then make an area more attractive to potential migrants. The last relationship is that highly educated households may act, through the political system or privately to improve

local quality of life, perhaps because of a desire to raise property values. Mathur and Stein (2005) presented a theoretical model demonstrating the conditions that must be satisfied before an amenity based program for economic development can succeed. To explain the role of amenities in regional economic development, they used the ratio of the productivity of knowledge workers (the "*H* people") and unskilled workers (the "*L* people"). They assumed that *H*s have a stronger preference for amenity than *L*s do, and that an exogenous amenity shock attracts both *H* and *L* people. However, they found that the ratio of *H* to *L* falls in the long-run equilibrium and then per capita income may fall even though per capita utility rises.

Second, many empirical studies have found a weak relationship between educated and skilled workers and amenities. An early study analyzed by Herzog, Schlottmann, and Johnson (1986) presented a thorough analysis of high-technology worker mobility into (out of) metropolitan areas using 1980 public micro-sample data. They focused on the differences between the migration pattern of technology and non-technology workers. Few differences in the migration behavior of technology and non-technology workers were found. Both types of workers valued personal factors, but far less significant results were found for place factors. Although they did not use the concept of human capital and amenities in their analysis, this early study showed that the motivation behind human capital's decision regarding location was related to earnings.

Recent studies, however, show more ambiguous and complex relationships between educated and skilled workers and amenities. Kordrzcki (2001) found that both factors including state economic and quality-of-life conditions influence migration. He presented information on the geographic mobility of young adults by educational attainment and region of country. To track migration patterns, this study used the National Longitudinal Survey of

Youth (NLSY), a project of the U.S Bureau of Labor Statistics. According to his analysis, five years after college graduation, 30 percent of the graduates no longer live in the state where they attended college and 35 percent no longer live in the state where they attended high school.

Glaeser and Saiz (2003) focused on cities with skilled human capital workers, called skilled cities. Their analysis involved a study of all US MSAs and counties between 1970 and 1990.They found that skilled cities grew as they become more economically productive, not because these cities were becoming more attractive places to live. This finding was complicated by different outcomes at the metropolitan and city level. At the metropolitan level, the available evidence appeared to show quite clearly that skills predict productivity growth and not an increase in amenity levels. At the city level, they counsel attention being paid to basic public services, public schools, and other amenities as a way for declining central cities to begin to attract the skilled workers necessary to economically advance.

Heur(2004) examined the effects of education, employment, and background characteristics on the migration of a recent cohort of bachelor degree recipients. The National Postsecondary Student Aid Study (NPSAS, 2000) data and the Baccalaureate and Beyond (B&B,:2000/2001) data were used to address several questions. Who migrates after graduating from college? Do they migrate to rural or urban areas? How far do they migrate? And, are they citing employment or quality of life reasons for migrating? Approximately one-half of the samples of recent college graduates were living more than 50 miles from where they lived when they completed high school. In general, recent graduates tend to migrate to metropolitan areas, although certain characteristics (e.g., older graduates, those who are married, those who have children, and those who grew up in a rural area or small

town) are associated with migration to nonmetropolitan areas. Similarly, most recent graduates cited employment reasons for migrating, although those in certain high demand fields, those currently enrolled, singles, males, and younger graduates were more likely than their counterparts to cite quality of life reasons.

Waggoner(2004) studied whether highly educated workers moved between labor markets to take advantage of geographic differentials in wage level and employment conditions. He used U.S Census of Population micro data from 1980 to 2000 and an index of deviations of state employment from trend when a cohort was 18 to 22 years of age. He concluded that the residential location choices of college-educated workers are much more sensitive to early labor market conditions than are those of high school graduates.

Gottlieb and Joseph (2006) estimated a series of random parameter logit models of the college-to-work migration decisions of technology graduates and holders of doctorates within the United States. They employed detailed information on the migration-relevant characteristics of individuals, as well as on their actual origins and destinations at the metropolitan scale. They found that science and technology graduates migrate to areas with higher proportions of better educated individuals, other things equal. They also found that doctoral graduates pay greater attention to amenity characteristics than other degree holders, and that foreign students from some immigrant groups migrate to places where those groups are concentrated.

Finally, Arntz (2006) suggested that there is no evidence indicating amenities are more highly valued by high-skilled job movers when controlling for the type of job move. He noted that recent European studies did not clarify whether relocation of high-skilled individuals was due to a mixture of higher urban wages, job opportunities or consumer

amenities. His paper tried to fill the gap by investigating to what extent pecuniary and non-pecuniary factors may explain migration flows of different individuals in Germany. Using partially nested logit analysis his work observed that higher amenity valuations of people who moved to similar jobs were weakly associated to the distribution of skills across regions.

Although many studies have underscored that amenities are not strong factors in explaining the migration of human capital, some empirical evidence has emerged to support a positive relationship between two factors. The empirical findings by Arora, Florida, Gates, and Kemlet (2000), and Florida (2000) suggest that certain amenities play a significant role in attracting knowledge workers. They argue that quality-of-place or amenities matter not only to the geographic distribution of human capital but to the joint distribution of human capital and industry. They focused their research on how the distribution of amenities affects the distribution of human capital and industries. They found that quality-of-place characteristics (that is amenities) affect the distribution of human capital and industries. They found a clear association between places with higher endowments of human capital and measurements of quality-of-place.

Hansen et al. (2003) found that amenities did retain some college graduates in the Pittsburgh area. These amenities, including cultural attractions, nightlife, outdoor recreation, ethnic and social diversity, and climate, were important to recent graduates. Strong family ties acted to retain local students but were also a pull factor away from the city for non-local students. More important to graduates of the local high-tech university programs were competitive salaries and benefits (Hansen et al. 2003). Other factors present in the Pittsburgh area, such as affordable housing, transportation and growing opportunities in science and technology, were also amenities for graduates (Hansen et al. 2003).

Mellander and Floida (2007) examined the factors that shape the geographic distribution of human capital and the creative class across Swedish regions. They found that occupational or "creative class" measures tend to outperform educational measures in accounting for regional development across their sample of Swedish regions. They also found that universities, amenities or service diversity, and openness and tolerance affect the distribution of human capital. A key finding is also that each of these factors was associated with a different type of human capital and thus they play complimentary roles in the geographic distribution of talent.

Mellander and Florida (2007) addressed two central issues: the measurement of human capital and the factors that influence the geographic distribution of human capital in the first place. They used educational attainment to measure levels of human capital. They conclude that universities, amenities or service diversity, and openness and tolerance affect the distribution of human capital.

In addition, a few studies have tried to divide migration into age and income categories. (Murdock, 1984; Long,1988; Clark and Hunter, 1992; Gottlieb, 2004; Bartley, 2006).Murdock et al. (1984) suggest that economic factors may provide the best explanations for migration patterns in some areas in some time periods and for some age groups, while at other times or for other groups ecological or amenity or familial ties will provide the best explanations for migration patterns. Economic factors, including high wages and diverse occupational opportunities typically associated with urban employment, are important to young adults (Morgan & Robb, 1981; Mueser et al., 1988). Furthermore, some of the detractors of city life, such as high crime rates, are less of a concern for young adults who tend to be less risk-averse than older adults.

Long (1988) looked at the relationship between age and reasons for moving, expecting that stages in the life cycle would help explain the reasons people relocate. He foundthe proportion of individuals citing job transfers as the main reason increased with age, peaking when respondents were 35 to 40and then declining as respondents aged. The proportion of migrants who moved to take a new job was highest for those under 30 years of age and gradually drops as age increases. The percent of migrants who cited climate as the main reason was much greater for those over50. Likewise, moves to be near relatives were greater for older respondents, growing increasingly important after age 45.

Williams and Jobes (1990) found that households with higher socioeconomic status generally mentioned both economic and quality of life factors in their reasons for migrating while lower socioeconomic status families cited only quality of life factors. They suggest that migration that is motivated by noneconomic factors involves some rejection of conventional values, at least for all but the very affluent. Those with higher educational attainment, income, and occupational status are more likely to choose a destination based on economic considerations while lower socioeconomic movers favor destinations where they have family ties (Maynard et al., 1997; Ritchey, 1976; Schachter, 2001a). Maynard concluded that personal characteristics affect what the potential migrant values, which in turn influences his or her choice of destinations.

Clark and Hunter (1992) attempted to integrate all three categories of determinants of migration into a life-cycle frame work. Empirical findings generated from a countrywide model of white male migration, over the period 1970 to 1980, reveal that all three types of determinants are important. Specifically, economic opportunities are most influential for males during their working years. Amenities are also found to follow a life-cycle pattern with

older migrants more attracted toamen able locations than their younger cohorts. Finally, state income and death taxes display life-cycle effects; working males in their peak earning years are detracted by high income taxes while all migrants aged 55 to 69 avoid counties in states with high inheritance and estate taxes.

Gottllieb (2004) analyzed the dynamics of labor supply in the 100 largest metropolitan areas in the U.S. based on their population in Census 2000. This analysis focused primarily on the cohort aged 25-to-34 in 2000. Nationally,79 percent of this age group wasin the labor force in 2000, and only11 percent was enrolled in college or graduate school. Compared to older workers (aged35-to-64), young workers migrated more often to high-amenity, high human-capital metropolitan areas during the 1990s. San Francisco, Denver, Seattle, and Atlanta ranked among the metro areas with the largest net growth in young workers relative to older workers. Bartley (2006) insisted that high concentrations of high technology and finance occupations generally have a positive pull of migrants, with younger migrants most attracted to technology jobs. However, the explanatory power of employment and quality of life variables declines for modeling age-specific in migration to metropolitan statistical areas (MSAs).

Table I. Relationship between Human Capital and Amenities

| Correlation | Year | Authors | Country | Data Year | Method | Variables | | Aspect |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Dependent Variable (Human capital) | Independent Variables (Amenity) | |
| Weak or Ambiguous | 1986 | Herzog, Scholottmann, Johnson | US | 1975-1980 | Logistic Regression | High-technology workers | MSA characteristics: Climate, home prices, local taxes, educational quality, accessibility, economic conditions, city scale | -Weak |
| | 2001 | Kordrzychi | US(NLSY) | 1979-1996 | Regression model | College graduates | Seacoast, Less windy, Clearer weather, Fewer degree days, | -Mixed (amenity and economic condition) |
| | 2003 | Glaeser and Saiz | US MSA and counties | 1970, 1980, 1990, 2000 | Regression model | persons 25 or older with a bachelor's degree and above | Museums, Eating and drinking establishments per capita, motion picture, health , amusement and recreational service | -Weak: MSA -Strong: local level |
| | 2004 | Heuer | US (B&B, NPSAS) | 2000 /2001 | Logistic Regression | College graduate | Change Climates, Prefer location, better quality of life | -Weak: College graduate, -Strong; Single, male, younger graduates |
| | 2006 | Gottlieb and Joseph | USA (104,616 individuals from the SESTAT files) | 1995 | The Conditional logit model (CL) and Random parameters logit (RPL) | Adults with BA degree or above in science and engineering | Place rate climate score, place rated cost of living score, places of crime score, places rated recreation score | -Weak: Technology graduates -Strong; Doctorial graduates |
| | 2006 | Artnz | Germany (IAB employmen t sub-sample) | 1975-2001 | Logistic Regression | Movers with a college or university degree | Crime Rate, Hotel capacity, Child care facilities, land price | -Weak: Job-to-job movers |

| Correlation | Year | Authors | Country | Data Year | Method | Variables | | Aspect |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Dependent Variable (Human capital) | Independent Variables (Amenity) | |
| Strong | 2000 | Arora, Florida, Gates and Kamlet | US (67 large MSA) | 1990 | Logistic Regression | Education attainment*employment | 1. Culture;2. Recreation, 3.Climate, 4, Housing price, 5.Diversity or gay index | Strong |
| | 2003 | Hansen, Ban, and Huggins | USA | 2001 | Survey and logistic regression | College graduates | Cultural, other young people, night life, recreation, diversity, climate, sports, others | Strong |
| | 2002 | Florida | US (the largest 50 MSA) | 1990 | Regression model | Persons with a bachelor's degree and above | Bohemian Index, Tech pole. Coolness, Culture, Gay Index, Melting Pot | Strong |
| | 2007 | Maallander and Florida | Sweden (81 Labor Market) | 2003 | Path analysis | 1.Persons with a bachelor's degree and above 2. Occupations | Service diversity | Strong |

### 2.3.2 The Relationship between Different Amenities package and Educated and Skilled Human capital Workers

Studies of the relationship between different amenity packages and educated and skilled workers are less clear than studies on the relationship between workers and amenities because there is no agreement as to what defines an amenity package. Mahroum (2000a) developed a typology of skilled migration and argued that each group of mobile professionals is driven by different push and pull factors. As shown in <Table II >, the group of academics and scientists is mainly lured by bottom-up developments in academia and science, favorable working conditions, and the prestige of the host institution (Mahroum 2000a). In particular the latter aspect seems to be significant. Drawing on empirical results Mahroum (2000b) demonstrates that a high reputation of an academic or scientific institution can serve as important magnet of mobile talented scientists. This underscores the essential role of global centers of scientific gravity as a key location factor.

Table II. Classification of Highly Skilled Mobility and Types of Influencing Factors

| Group | Type of Push & Pull Factors |
|---|---|
| Managers and executives | Benefits and remuneration |
| Engineers and technicians | Economic factors (supply and demand mechanisms)<br>The state of the national economy |
| Academics and scientists | Bottom-up developments in science<br>Nature of conditions of work<br>Institutional Prestige |

Source: Mahroum (2000)

In a cross sectional study of 385 municipalities in northern New Jersey Gottlieb (1995) demonstrated that the proportion of employment in firms in the industry of Engineering and Management Services (SIC 87) was positively influenced by amenities

like rush-hour train service, teacher pupil ratio in public schools, and negatively influenced by dis-amenities such as crime and toxic waste. He suggested that amenity orientation for this employment sector is better described as avoidance of dis-amenities than as attraction to amenities. Artnz (2006) pointed out that high-skilled job-to-job movers were more responsive to pull factors than all other sub-groups. Improving destination conditions disproportionately mobilizes this group and that affects the skill composition of internal job matching flows.

According to Florida (2000) the location of talent is strongly influenced by high levels of "diversity" (low entry barriers for human capital). To put it differently, talented people are attracted to locations that display a high degree of demographic diversity, i.e. places, where anyone from any background, race, ethnicity, gender, or sexual orientation can easily plug in. Other factors such as climate, cultural, and recreational amenities, in contrast, seem to play only a minor role. Clark (2003) classifies amenities into two categories, natural and built. He suggested that the total population moves toward amenities, controlling up to 20 variables in multiple regressions for 3,111 U.S counties. According to his analysis, college graduates are more numerous where there are fewer natural but more built amenities. The elderly concentrate in areas with natural amenities.

Shapiro (2006) extracted data from the IPUMS database (Ruggles & Sobeck, 1997) for allprime-age (25 to 55) white males living in Census-defined metropolitan areas in the years 1940, 1970, 1980, and 1990. He found through a preliminary investigation of several direct measures of quality of life indicators that the effect of college graduates may operate through "consumer city" amenities including the number of bars and restaurants rather than area attributes such as crime, schools, and pollution.

Table III. Amenities Package and Human Capital

| Year | Author | Sample | Data Year | Method | Variables | | Correlation |
|---|---|---|---|---|---|---|---|
| | | | | | Dependent Variable (Human capital) | Independent Variables (Amenity) | |
| 1995 | Gottlieb | 365 municipalities in 13 counties | 1990 | Regression Model | Employment in high technology (SIC 87) | Demographic, Business, Traffic, Crime, Pollution, Recreation, Public education, Public services | -Strong: amenities<br>-Weak: Dis-amenities |
| 2002 | Florida | US the largest 55 MSA | 1990 | Regression model and Path analysis | Professional and technical workers, scientists and engineers | Climate, Culture, Recreational amenities | -Strong: Culture<br>-Weak: Climate Recreation |
| 2003 | Clark | US counties | 2002 | Factor analysis and Regression analysis | College graduate | Natural and Built amenities | -Strong: Young people/Constructed Amenities<br>-Older people /Natural Amenities |
| 2006 | Arntz | Germany | 1975-2001 | Logistic Regression | High Skilled Individual with tertiary Education | Crime Rate, Hotel capacity, Child care facilities, and Land prices | Strong |
| 2006 | Shapiro | US MSA | 1940, 1970, 1980, 1990 | Regression model | Prime-age white males with a high school diploma or above | Restaurants Serious crime High school dropout rate | -Strong : Bar. Restaurants<br>-Weak: Crime, High school dropout |

## 2.4 Limitation of previous studies

While promising, the findings reviewed above are hampered by important limitations. The first is that there are few studies exploring the relationship between the different types of moves (first job, moves when older, etc.) made by educated workers and amenities. Most of migration studies related to amenities and education workers have focused on only one type of migration such as immigration or net migration. Recently,

many regions have suffered from the emigration of skilled and educated workers. With globalization, it is now becoming possible for highly educated workers to relocate (Kurien, 1999). To analyze the movement of educated worker in detail it is necessary to explore what variables are related to immigration, emigration and non-movement of educated workers at different times of their lives.

The second limitation concerns the concept of amenities. There is no agreed to definition across countries and among scholars of what characterizes the amenities that should be included in migration studies or what constitutes an amenity. The conventional measure of amenities is based on natural and built attractions. More recent research suggests it may be more important to measure what people feel than what they see (Florida 2002). However, evaluating evidence for the relationship between place-based amenities and economic development is complicated by the broadly defined concepts and wide variety of methods and data sources involved. Hence, earlier studies provided mixed political implications for policy makers.

The third limitation is that there are few assessments of the relationship between big ticket and small items. After the construction of big-ticket items, small items such as shopping mall and coffee shops are expected to develop in the area. Big ticket items such as sports facilities can cause the growth of smaller scale amenities that change the atmosphere of street life. Therefore, the link between big ticket items and smaller facilities needs to be analyzed.

# CHAPTER III

# CONCEPTUAL MODEL

## 3.1 Introduction

The relationship between human capital and amenities has been an important research topic that has recently attracted the attention of scholars. However, few studies have provided meaningful and valuable policy guidance for governments because definitions and categories of amenities have been blurred and Ambiguous. In addition, migration or movement is treated as a singular act when in fact people move at different points of their lives and at different point in their careers. Thus, before moving to the central part of the conceptual model, it is important to define what amenities are and how to classify them and then to focus on relocations made by workers of different ages. The decision not to move is also an important element that should be analyzed. Based on definitions and categories of amenities a conceptual model can demonstrate the logic of the relationship between the movement of human capital and various amenities. From this model several relevant hypotheses will be derived to examine whether or not built amenities are

important when educated workers move or stay in a certain area.

## 3.2 The Concept of Amenities

Several social scientists have argued that amenities assume an important role in shaping the distribution of human capital. Florida (2002), later joined by Majander (Majander and Florida, 2007) analyzed the role of amenities in labor migration. The definition of amenities used in these studies is both problematic and ambiguous. What constitutes an amenity and how it is measured have not been defined with appropriate precision. There are a number of complex factors that could be considered amenities that have been used to study migration: climate, recreation centers, a specially developed bohemian index, the number and quality of culture facilities, restaurants, and other assets, etc. The failure to adequately and carefully conceptualize amenities has left a substantial area of overlap and ambiguity. Thus, it is necessary to define what amenities are and how these assets are enumerated.

Admittedly, the concept of amenity is ambiguous and not formally defined. This concept can be defined in two different ways.

First, broadly, amenities were defined as location-specific goods and services including marketed and non-marketed assets. Diamond and Tolley (1982) suggested that consumption of goods such as air quality or local services can be changed only if individuals move to another "market" or location. According to them, these public goods are components of the social, physical or legal environment. Based on the definition of amenities, these can be grouped into two categories; local public service, and tourist amenities.

Local public services amenities were defined as services that are mainly or completely

funded by local governments (Humphreys, 1998). Generally, local public services include education, health care, local police, etc. Local public services are amenities that have been treated as important variables in regional economic since Tiebout (1956) explained how local public services attracted residents. A key perspective from his work is that people "vote with their feet" to find the community that provides their optimal bundle of taxes and public goods.

Tourist amenities are defined as the aggregate of all businesses that directly provide goods and services to facilitate leisure activities (S.Smith, 1988). These amenities are attributes that enhance a location such as an attractive area in which to live.

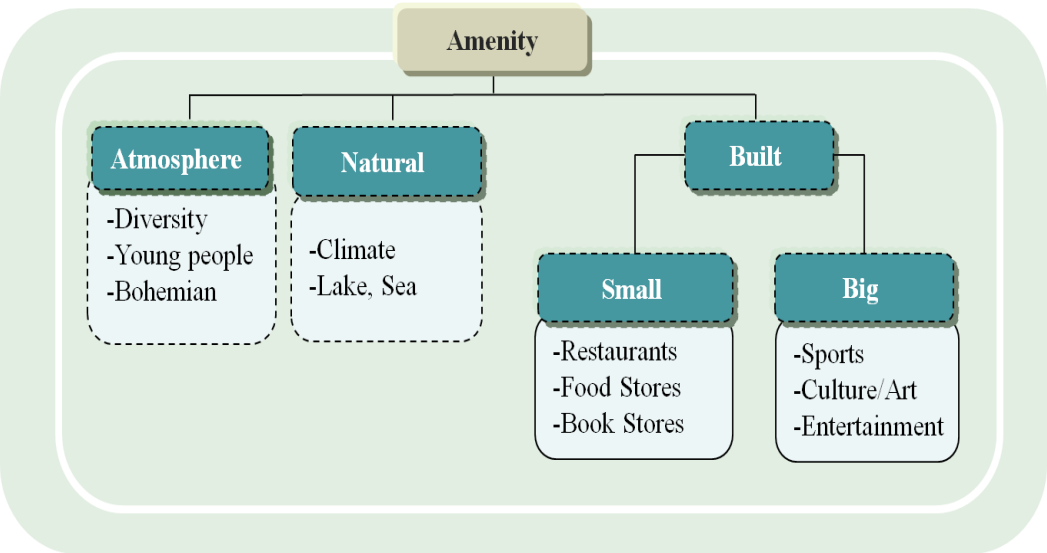
Second, recently, tourist amenities were more focused than other amenities. In many papers (Nelson, 1990; Purcell, 1991; and Clark, 2004), amenities were referred as only tourist amenities. Williams (2004) suggested that amenities might best be summed up as scenery, heritage, and culture, and have been similarly referred to as "civic tourism"(Nelson, 1990), "heritage tourism" (Purcell, 1991) and "nature-based tourism"(South Carolina Sea Grant, 1991) and "nature-based tourism"(South Carolina Sea Greant, 1991). Clark (2004) expanded the definition of amenities. He pointed out that amenities like museums or restaurants are semi-private goods, since persons may be excluded, and user fees charged. Some analysts who think individualistically neglect amenity aspects of restaurants, since they are conceived as providing a purely private good—food--to discrete individuals. According to him, for creative persons pondering where to live and work, restaurants are also more. Small amenities such as restaurants are part of the local market baskets of amenities that vary from place to place.

Florida (2004) used the concept of the quality of place to clarify amenities. He defined quality of place as "the unique set of characteristics that define a place and make it attractive". In his study, he used the atmospheric amenities such as "authenticity" to

define the concept of quality of place. The difference between the quality of place and tourist amenities that were traditionally defined is this atmospheric amenities.

In this study, amenities are defined as facilities related to beauty, pleasure, and experiences. Amenities can be categorized using many dimensions, such as geographic scale, degree of permanence and the extent to which they are tangible or intangible. Based on the definition of amenities, these can be grouped into three categories; atmosphere amenities, and natural amenities and built amenities. <Figure 2> shows how amenities are categorized for this analysis. These three amenities were analyzed based on how they have been treated in migration studies.

Figure 2. The Category of Amenities




First, the concept of atmospheric amenities is what is sometimes described as "authenticity" or "mood" in a particular city. These amenities are not transferred or exchanged across space. Thus, it is possible that atmosphere in a city is considered as a location-specific amenity. A large part of today's symbolic economy is based on such unquantifiable "feelings" rather than on just production (Trip, 2007). Andrews (2001),

Florida (2004), and Clark (2004) have addressed this concept. Andrews (2001) described 'quality of place' as the aggregated environmental factors of a location, which may impact the feeling of well being, or 'quality of life' experienced by an individual resident or visitor. Florida (2004) also distinguished between 'quality of place' and the "more traditional concept of quality of life". He defined quality of place as "the unique set of characteristics that define a place and make it attractive". He identified three dimensions of quality of place: *what's there* (built and natural environment), *who's there* (diverse people interacting), and *what's happening* (arts/culture/music scene, outdoor activities, street life). According to his work, there are some criteria including the melting pot index (who's there) and the bohemian index (what's happening) that explain migration patterns. Clark (2004) suggested values and attitudes of residents such as friendliness or hostility, tolerance, risk taking, individualism, and other items as criteria to be included in any assessment of migration. Atmosphere factors, however, are vague, abstract and hard to define and measure. The main reason is that authenticity is experienced subjectively and individually: some places have "got it" and others have not (Trip, 2007), but no one knows quite how to measure these impressions.

Traditionally, atmosphere or mood had not been the focus of many migration studies. In recent years, Florida (2002) pointed out the importance of atmosphere amenities in the migration of the individuals he describes as the creative class. He has argued that these individuals have become the key driving force of economic development. He has observed that cities have increasingly becoming centers of economic activity that can attract and appeal to highly mobile creative and talented workers. Atmosphere amenities such as the melting pot index, the gay index and an index of tolerance would be one possible measure of attractiveness in cities if it is accepted that these scales indeed measure mood or the psychological atmosphere in a region. There

are those who question the measurement techniques used. However, Hansen and Niedomysl (2009) point out that Florida (2002) and the literature that has followed (Hansen, 2007; Wojan et al., 2007; Andersen et al., 2008a, b; 192 . Hansen and Niedomysl Clifton, 2008) lack systematic studies of the migration of these individuals, an argument also voiced very recently by Houston et al. (2008). Recently, Hansen and Niedomysl (2009) studied the migration of the creative class in Sweden. Their findings did not support the notion that people described as members of this group move for any other reason than to accept or find a new job. The lack of empirical studies that support the relationship between **t**he migration of the creative class and atmosphere amenities has provoked a debate on causality and the direction of the relationship between the creative class (the cause) and atmosphere amenities (the effect).

Second, natural amenities pertain to the natural environment, rather than the cultural or social-economic environment. Natural environmental amenities include the regional climate, lakes, and mountains. Local governments can enhance access and reduce consumption costs to some of these amenities and build local parks based on a natural resource. Those parks can sometimes improve the available amenities even in cold weather areas. Natural amenities related to an area's climate have received attention largely in migration studies. However, there is still lacks of studies that link natural amenities to the migration of human capital.

Third**,** built amenities are defined as the aggregate of all businesses that directly provide goods and services to facilitate leisure activities (S.Smith, 1988). These amenities are attributes that enhance a location such as an attractive area in which to live. Although there is still debate on how to categorize built amenities they are generally classified into two categories based on Clark's study (2003): small and big amenities.

Built environments are categorized by "big ticket" items such as sports stadiums

and recreation centers, as well as smaller scale facilities such as coffee shops and restaurants. Although few studies including Clark (2004) have distinguished amenities into "big ticket item" and small facilities, most studies have neglected the difference between these two amenities. However, it is necessary to analyze how these two different amenities influence the choice of locations because their presence represents two very different public policy options. The building of "big-ticket" items requires some level of public support. As a result their presence involves a policy choice and information is needed that measures their influence on the choice of locations. The distinction between two amenities is analyzed in terms of the construction period and the ownership.

It is important to analyze how long it takes to build big and small amenities. In the traditional view individuals with more income create a demand for amenities that is addressed or responded to by entrepreneurs. Discrete individuals move in and out of cities all the time, yet big urban amenities like opera houses or sports stadiums change more slowly but may still effect location decisions (Clark, 2004). Based on this view, while individuals cannot affect long-term construction items easily, individuals can have an impact on short-term construction of smaller amenities. It seems reasonable then to observe that big-ticket amenities are less demand-driven while small amenities are more demand-driven.

In addition, many big ticket items are built by the public sector in the hope that these investments produce regional growth. In some larger markets, however, a few sports facilities have been privately funded. Regardless of the source of funding big-ticket amenities have become popular tools to attract new residents. In contrast, smaller amenities (e.g., restaurants, coffee shops, etc.) are developed by private entrepreneurs. Florida (2002) suggested that these smaller amenities are more important for the attraction of human capital. He has criticized big ticket items arguing they have far less

impact on the locational choices of workers. For example, cafes or small restaurants can change street life and mood. Clark (2003) pointed out that these amenities are similarly favored by “new urbanism” architects and planners who seek to recreate the vital street life of pre-automobile cities, lauded earlier by Jane Jacobs (1961).

Earlier works regarding the relationship between built amenities and migration referred to the semi-retired, consumption-orientated migrant who leads a peripatetic life style, shifting between two or more homes and migration from city to rural area (Willams and Hall, 2000). Specifically, migration from city to rural area has focused on tourism and migration analysis. This migration has been termed as “amenity migration,” a type of urban-to-rural residential movement. Moss (2005) suggested that amenity migration referred to "people moving into the mountains to reside year-round or intermittently, principally because of their actual and perceived greater environmental quality and cultural differentiation.” For him, amenity migrants come for both active recreation and passive contemplation; they tend to be economically active and usually need a well-developed information/communications support system as well as relatively convenient access to their new homes of choice.

Research on the relationship between permanent migration and tourism is still in an early stage of development. Loeffler and Ernst Steinike (2007) observed that the phenomenon of "amenity migration" constituted a relatively new area of geographical research. They explained how limited this topic was in tourism studies noting that most of the research on amenity migration and its impacts on mountain regions have been conducted by few scholars (Moss 1994, 2004; 2005; 2006). Williams and Hall (2000) also studied the relationship between tourism and migration noting that it had been largely neglected. In short, to provide meaningful guidance for local policy it is important to define and categorize amenities. For this study amenities are defined as

specific goods related to entertainment and pleasure and services classified into two categories: atmosphere, and tourism-related venues.

Since Florida (2000) and his colleagues raised the interest about the movement of human capital, this issue has been paid attention by regional economists. However, his interest has been criticized because of blurred and complex measurements. A lack of linearity has also plagued reviews as areas with colder climates have prospered defying the logic and consistency of his argument. The focus on big-ticket items is based on the demand for experience and enjoyment, and this has encouraged areas to build destinations that would attract visitors and human capital. Regardless, the role of built amenities in migration studies has received far less rigorous analysis because these amenities are considered as assets related to the temporary visit or stay instead of the permanent movement.

## 3.3 Conceptual model

The linkage between the presence of amenities and human capital has recently attracted a great deal of interest (Florida, 2002, Clark, 2004, and Rappaport, 2007). Based on this recent attention, theoretical economic models have emphasized the importance of consumption variety to explain why cities exist, and other work points toward the roe of amenities in enplaning cross-city difference (Carlino & Saiz, 2008).

Clark (2004) also points out that the consumer drives the modern economy. According to him, consumption is a new central issue, globally, driven by more visible consumption concerns of citizens. Glaeser, Kolko, and Saiz (2001) argue that innovations in transportation, production, and communication technologies have ambiguous impacts on agglomeration economies on the production side. Nevertheless, if consumers prefer a

large variety of goods and services, and there are substantial economies of scale in providing them, economic welfare will still depend on the size of the local market. The rise in real income has led to an increased demand for luxury goods, such as meals in gourmet restaurants and live theater, which are more plentiful in large cities (GSK, Rappaport, 2007).The demand for variety may increase more than proportionately with income, and as high-skill individuals account for a larger share of the work force in large cities (Lee, 2004).

Based on this argument, the conceptual model includes three main points: Human capital, amenities, and migration.

With amenities classified the next issue to be addressed is how human capital should be measured. Human capital is a key factor for regional development. Since endogenous growth theorists such as Lucas (1998) and Romer (1990) introduced the role of human capital in regional economies its importance has been repeatedly sustained (Barro 1991, Glasesar, Sheinkaman, and Sheifer 1995, Simon 1998, Glendon 1998, Glaeser et al. 1995, 1998, 2000, 2004; Glaeser and Saiz 2004; Rodriguez-Pose and Vilalta-Bufi 2005). To provide policy insights for local governments it is necessary to use human capital as a key variable. Human capital in this dissertation is defined as the skills that workers acquire through jobs, training and education.

Built amenities were chosen as the key independent variables. Clark, Lloyd, Wong and Jain (2002) provide guidance on why these amenities make important contributions to a region's economy. They described several new components of change: (1) a rise of the individual citizen/consumer in explanatory power, (2) a decline in large bureaucratic decision-makers in both the public and private sector, (3) relative decline in the explanatory power of classical variables after the economic base, (4) a rise of leisure pursuits (5) a rise of the arts and aesthetic considerations, (6) a new role for government

and public officials based on these new tastes. In the modern environment, then, schools, churches, and neighborhood association have become less important. Clark, Lloyd, Wong, and Jain (2002) also note that tourism is the world's third largest industry and attracting visitors and educated and skilled human capital workers have become big business for local officials who in turn build new stadiums, parks, museums, convention centers and similar facilities hoping to win the competition on amenities in cities.

Although the importance of built amenities has increased in regional economics, the question still remains if these assets are linked to the supply of human capital. The answer to that lies in what segment of the population move or are attracted by amenities. The reason why skilled and educated workers may be more interested in built amenities has been explored by Reich (1991) and Clark, Lloyd, Wong and Jain (2002). Skilled and educated workers are more important for regional economic development because they possess the knowledge and skills which increase their value to business owners. They are also more likely to receive more numerous job offers and can choose between different areas (Clark, Lloyd, Wong and Jain, 2002). As a result workers with knowledge and skills represent the most mobile part of any nation's work force. These individuals can choose where to live where and are likely to select areas where they can enjoy unique experiences or enjoyment (Reich, 1991).

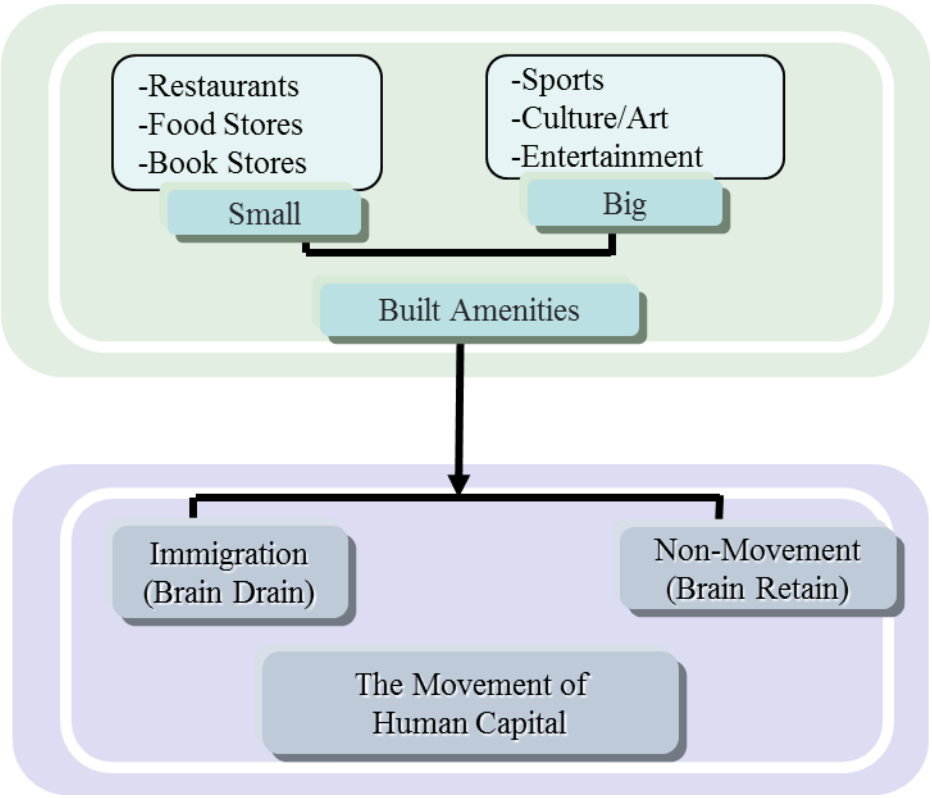
As noted earlier, built amenities include natural and built assets. Although natural environments can be found as important factors that can affect an immigrant's decision where to live, the policy implication of natural amenities is not higher than built amenities that local government can control. Therefore, built amenities were selected as the key independent variables in the model.

Another key issue is migration and non-movement. This dissertation focuses on migration which is defined as a move from one place in order to go and live in another

place for a continuous period of at least one year. Non-movement is defined as no arrival and leaving in regions for a continuous period of at least one year. These migration concepts can be used to explain the mobility of brains; Brain drain and gain are emigration and immigration of brains as well as brain retain as the non-movement of brains. The recent emphasis on the importance for economic growth of the average level of human capital in an economy has led many to presume that a 'brain drain' may leave poor regions in poverty trap (Mountfod, 1997). Some poor regions such as the Rust Belt, also known as the Factory Belt, have suffered from a 'brain drain'. These regions have fewer job opportunities, lower educational attainment, and lower returns to education relative the rest of the country. To solve the problem of 'brain drain', local governments have tried to know the answer to the question, how to attract and to retain highly educated workers. This dissertation was focused on this basic question. Therefore, immigration and non-movement were included in the analysis.

The relationship between these two categories of migration and built amenities variables provides deeper insight into the relationship between amenities and the mobility of human capital than has been previously been executed. The conceptual model is illustrated in Figure 3.

Figure 3. The Conceptual Model




## 3.4 The Hypotheses to be tested

The hypotheses that guide this study have been formulated by decomposing migration and seek an understanding of existence of a relationship between (1) non-movement and built amenities, and (2) between immigration and built amenities. Each hypothesis is individually assessed by carefully analyzing migration enhanced by three key propositions: (1) whether or not there are relationships between the movement of workers and built amenities; (2) whether or not there are relationships between the movement of different education group of workers and built amenities; and (3) whether or not there are relationships between different age groups of educated workers and built amenities.

The first proposition examines the relationships between the movement of workers and built amenities. It is generally claimed that various factors such as globalization and a rise of leisure pursuits enhances the demand of built amenities. However, there is a paucity of empirical studies assessing the relationship.

The second proposition deals with whether or not movers and non-movers prefer built amenities differently based on their education. Some scholars including Reich (1991), Florida (2000) and Clark, Lloyd, Wong and Jain(2002) have noted that educated workers have more desire for enjoyment and leisure. There is a lack of evidence to sustain their observation. As a result the second group of hypotheses is designed to compare the movement of educated and less educated workers.

The third proposition considers whether the value placed on tourism related amenities varies by the age of educated movers and non-movers. Generally, it is known that young educated workers move more than others and they have also place more value on experiences and amenities. Franklin (2003) used US Census data and found that young adults between the ages of 25 and 39 constitute a large share of migrants, perhaps because they are less risk-averse and have a longer time horizon to recoup an "investment" in migration. Specifically, he pointed out that young, single, and college-educated people were more mobile. He assumed that migration choices were influenced by housing or employment preferences, or simply preferences for a particular set of local amenities. Although many studies including Frederiksen (2002) and Franklin (2003) show that young educated worker are more mobile, what motivates a move is not fully explained based on age groups. The third proposition tests the relationship between the movement of different age groups of educated workers and amenities.

### 3.4.1 Hypotheses of Group I: Non-movement and Built Amenities

Brain drain refers to the emigration of skilled and educated personnel. The numbers of skilled and professional workers joining the brain drain has reached a peak in recent years in some areas and some regions have found it difficult to retain the skilled labor to advance their economy. If local communities are to retard the rate of at which educated workers are emigrating it is important to understand what variables affect the workers' decision not to move and to stay in regions. Therefore, the second set of hypotheses tests the relationship between non-movement and amenities.

**Proposition 1: The Relationship between Built Amenities and the Non-movement of Workers**

- **Hypothesis 1A**: There is a significant positive relationship between built amenities and the non-movement of workers.
    - **Hypothesis 1A-1**: There is a significant positive relationship between big built amenities and the non-movement of workers.
        - Hypothesis 1A-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the non-movement of workers.
    - **Hypothesis 1A-2**: There is a significant positive relationship between small built amenities and the non-movement of workers.
        - Hypothesis 1A-2-1: There are significant positive relationships between restaurant bookstores, food stores and the non-movement of workers.

**Proposition 2:The Relationship between Built Amenities and the Non-movement of Workers based on Their Education**

- **Hypothesis 2A**: There is a significant positive relationship between built amenities and the non-movement of educated works.
    - **Hypothesis 2A-1**: There is a significant positive relationship between big built amenities and the non-movement of educated workers.
        - Hypothesis 2A-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the non-movement of educated workers.
    - **Hypothesis 2A-2**: There is a significant positive relationship between small built amenities and the non-movement of educated workers.
        - Hypothesis 2A-2-1: There are significant positive relationships between restaurant bookstores, food stores and the non-movement of educated workers.

- **Hypothesis 2B**: There is a significant positive relationship between built amenities and the non-movement of less educated workers.
    - **Hypothesis 2B-1**: There is a significant positive relationship between big built amenities and the non-movement of less educated workers.
        - Hypothesis 2B-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the non-movement of less educated workers.
    - **Hypothesis 2B-2**: There is a significant positive relationship between

small built amenities and the non-movement of less educated workers.

- Hypothesis 2B-2-1: There are significant positive relationships between restaurant bookstores, food stores and the non-movement of less educated workers.

**Proposition 3:The Relationship between Built Amenities and the Non-movement of Educated Workers based on Their Age Group**

- **Hypothesis 3A**: There is a significant positive relationship between built amenities and the non-movement of young educated workers.
  - **Hypothesis 3A-1**: There is a significant positive relationship between big built amenities and the non-movement of young educated workers.
    - Hypothesis 3A-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the non-movement of young educated workers.
  - **Hypothesis 3A-2**: There is a significant positive relationship between small built amenities and the non-movement of young educated workers.
    - Hypothesis 3A-2-1: There are significant positive relationships between restaurant bookstores, food stores and the non-movement of young educated workers.

- **Hypothesis 3B**: There is a significant positive relationship between built amenities and the non-movement of middle educated workers.

- **Hypothesis 3B-1**: There is a significant positive relationship between big built amenities and the non-movement of middle educated workers.
    - Hypothesis 3B-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the non-movement of middle educated workers.
- **Hypothesis 3B-2**: There is a significant positive relationship between small built amenities and the non-movement of middle educated workers.
    - Hypothesis 3B-2-1: There are significant positive relationships between restaurant bookstores, food stores and the non-movement of middle educated workers.

- **Hypothesis 3C**: There is a significant positive relationship between built amenities and the non-movement of older educated workers.
    - **Hypothesis 3C-1**: There is a significant positive relationship between big built amenities and the non-movement of older educated workers.
        - Hypothesis 3C-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the non-movement of older educated workers.
    - **Hypothesis 3C-2**: There is a significant positive relationship between small built amenities and the non-movement of older educated workers.
        - Hypothesis 3C-2-1: There are significant positive relationships between restaurant bookstores, food stores and

the non-movement of older educated workers.

### 3.4.2 Hypotheses of Group II: Immigration and Built Amenities

Migration theories posit that the immigration of human capital has almost exclusively positive impacts on regional economics. The issue for region, then, is how best to attract highly educated workers. There are however, few studies dealing with what motivates the migration of educated workers. The third group of hypotheses tests the relationship between immigration and built amenities.

**Proposition 1: The Relationship between Built Amenities and the Immigration of Workers**

- **Hypothesis 1A**: There is a significant positive relationship between built amenities and the immigration of workers.
    - **Hypothesis 1A-1**: There is a significant positive relationship between big built amenities and the immigration of workers.
        - Hypothesis 1A-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the immigration of workers.
    - **Hypothesis 1A-2**: There is a significant positive relationship between small built amenities and the immigration of workers.
        - Hypothesis 1A-2-1: There are significant positive relationships between restaurant bookstores, food stores and the immigration of workers.

**Proposition 2:The Relationship between Built Amenities and the Immigration of Workers based on Their Education**

- **Hypothesis 2A**: There is a significant positive relationship between built amenities and the immigration of educated workers.
  - **Hypothesis 2A-1**: There is a significant positive relationship between big built amenities and the immigration of educated workers.
    - Hypothesis 2A-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the immigration of educated workers.
  - **Hypothesis 2A-2**: There is a significant positive relationship between small built amenities and the immigration of educated workers.
    - Hypothesis 2A-2-1: There are significant positive relationships between restaurant bookstores, food stores and the immigration of educated workers.

- **Hypothesis 2B**: There is a significant positive relationship between built amenities and the immigration of less educated workers.
  - **Hypothesis 2B-1**: There is a significant positive relationship between big built amenities and the immigration of less educated workers.
    - Hypothesis 2B-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the immigration of less educated workers.
  - **Hypothesis 2B-2**: There is a significant positive relationship between

small built amenities and the immigration of less educated workers.

- Hypothesis 2B-2-1: There are significant positive relationships between restaurant bookstores, food stores and the immigration of less educated workers.

**Proposition 3:The Relationship between Built Amenities and the Immigration of Educated Workers based on Their Age Group**

- **Hypothesis 3A**: There is a significant positive relationship between built amenities and the immigration of young educated workers.
  - **Hypothesis 3A-1**: There is a significant positive relationship between big built amenities and the immigration of young educated workers.
    - Hypothesis 3A-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the immigration of young educated workers.
  - **Hypothesis 3A-2**: There is a significant positive relationship between small built amenities and the immigration of young educated workers.
    - Hypothesis 3A-2-1: There are significant positive relationships between restaurant bookstores, food stores and the immigration of young educated workers.

- **Hypothesis 3B**: There is a significant positive relationship between built amenities and the immigration of middle educated workers.
  - **Hypothesis 3B-1**: There is a significant positive relationship between

big built amenities and the immigration of middle educated workers.

- Hypothesis 3B-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the immigration of middle educated workers.

- **Hypothesis 3B-2**: There is a significant positive relationship between small built amenities and the immigration of middle educated workers.
  - Hypothesis 3B-2-1: There are significant positive relationships between restaurant bookstores, food stores and the immigration of middle educated workers.

- **Hypothesis 3C**: There is a significant positive relationship between built amenities and the immigration of older educated workers.
  - **Hypothesis 3C-1**: There is a significant positive relationship between big built amenities and the immigration of older educated workers.
    - Hypothesis 3C-1-1: There are significant positive relationships between sports, cultural, recreation amenities, and the immigration of older educated workers.
  - **Hypothesis 3C-2**: There is a significant positive relationship between small built amenities and the immigration of older educated workers.
    - Hypothesis 3C-2-1: There are significant positive relationships between restaurant bookstores, food stores and the immigration of older educated workers.

# CHAPTER IV

# RESEARCH DESIGN & METHODOLOGY

## 4.1 Introduction

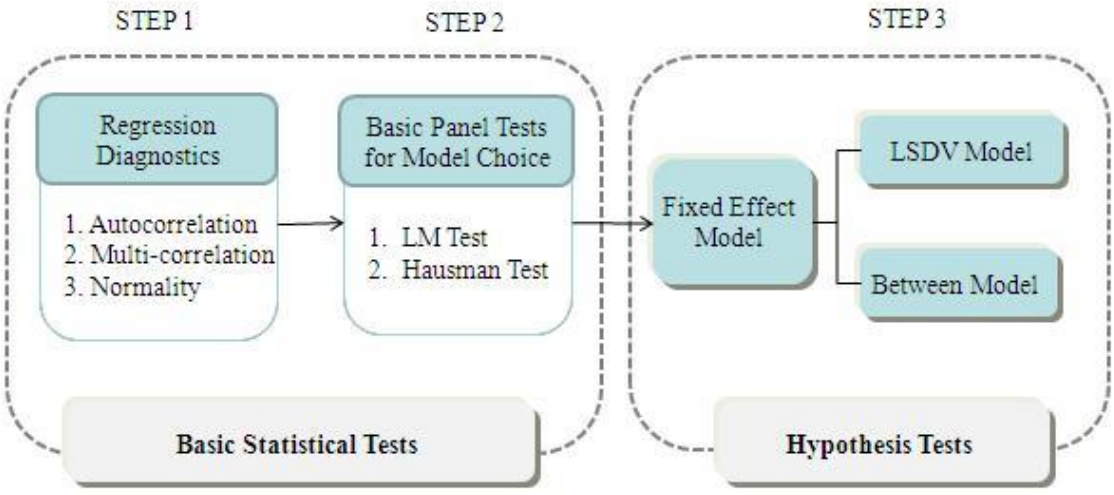
The purpose of this chapter is to present the research design employed in this study as well as the methodology that guided the work. This chapter has several components. The first section describes the research design for analyzing the relationship between the movement of educated workers and built amenities and the second section describes the methodology and defines the variables used. The last section explains data that were used for the study.

## 4.2 Research Design

To measure the relationship between built amenities and the movement of educated workers, it is necessary to quantify the importance of amenities to the location

of human capital. The proposed methodology makes it possible to test the several hypotheses that guide this study. <Figure 4> summarizes the steps involved in the data analysis procedure.

Figure 4 Summary of the Steps involved in the Analysis




First, several basic assumptions of multiple regression were tested before analyzing panel data. Most statistical tests depend on certain assumptions about the variables used in the analysis. When these assumptions are not met the results may not be trustworthy, resulting in over- or under-estimation of significance or effect size(s).In this study, three relevant assumptions were tested: multicollinearity, autocorrelation and heteroskedasticity.

Multicollinearity was defined as the existence of strong correlations among the independent variables. The most frequent result of having multicollinearity when doing a regression analysis is obtaining a very significant overall regions, while the partial coefficients are much less so (Freund, Wilson and Ping Sa, 2006). Autocorrelation is usually known as “serial correlation”, this is the case where the error term from one period in a regression is correlated with the error term from the previous period

(Kahane,1997). Heteroskedasticity has serious consequences for the OLS estimator. Although the OLS estimator remains unbiased, the estimated SE is wrong (Barretoand Howland, 2005).

In addition, a normality test was not applied based on the Central Limit Theorem (CLT) although panel models are fundamentally based on ordinary least squares(OLS) To use OLS, it is necessary to satisfy the assumption that the data are normally distributed. Baltagi (1998) noted that in economic panel data modeling it is important to adjust for departures of error components from normality. In the large data sets typical in migration data, however, most statistical methods rely on the Central Limit Theorem, which states that the average of a large number of independent random variables is approximately normally distributed around the true population mean (Lumley, Emerson, & Lu Chen, 2002). It is often suggested that a sample size of 30 will produce an approximately normal sampling distribution for the sample mean from a non-normal parent distribution (Smith and Wells, 2006). Thus, in this study, the normality test is not essential and necessary for the t-test and linear regression because the number in the sample used here is 430, which means that it is large enough to apply CLT.

The second step includes several basic tests for an appropriate panel model to analyze relationship between amenities and migration. To find more appropriate panel model in the study, several tests were applied.

(1) In choosing the appropriate panel model, coefficients for each individual and time unit must be tested to determine whether they are equal or differ. It is possible that panel data may have group effects, time effects or both. These group or time effects are usually analyzed by fixed effect and random effect models. Fixed effects are tested by the (incremental) F test, while random effects are examined by the Lagrange Multiplier (LM) test (Breusch and Pagan 1980). If the null hypothesis is not rejected, the pooled OLS

regression is favored (Hun Myoung Park,2009). To test group effects and time effects, the LM test was used in this study.

(2) After detecting group and time effects by using the LM test, a Hausman test was used to decide between fixed and random effect models. The fixed effect model is widely considered to be a more useful tool for estimating panel data. However, the random effect model can illustrate results under certain conditions. If an important variable that must be analyzed in the model is constant over time, the random effect model might be the better choice. Therefore, it is important to check more efficient model against a less efficient.

The third step involved an assessment of migration in relation to amenities using panel data. Several basic tests in step 2 showed that the best way to estimate coefficients of amenities related to migration was one-way group effect models such as the least squares dummy variable model *(*LSDV*)* and the between effect model to control group effect. Results of the between effect model were attached in the appendix.

## 4.3 Methodology and Variables

### 4.3.1 Methodology

Pooled data from two different years between 2005 and 2008 and various MSAs were utilized in the analysis. Pooled data refers to any database of individuals for whom there are repeated observations across a sequence of time periods. Pooled data are important to the analyst because they contain the information necessary to deal with both the inter-temporal dynamics and the individuality of entitles being investigated (Dielman, 1989). As pooled databases become increasingly common the need for a more structured

approach to the choice of model is evident (Dielmann, 2009). Panel data models analyze fixed and/or random effects.

There is a difference between fixed and random effect models. If dummy variables are included as a part of the intercept a fixed effect model is created. In a random effect model, the dummy variables act as an error term. A fixed effect model examines group differences in intercepts, assuming the same slopes and constant variance. Since a group (individual specific) effect is time invariant and considered a part of the intercept it can be correlated with other regressors. Fixed effect models use least squares dummy variable (LSDV) and within effect estimation methods. Ordinary least squares (OLS) regressions with dummy variables are fixed effect models (Hun Myoung Park, 2009).

According to Park (2009), a random effect model, by contrast, estimates variance components for groups (or times) and error. This model is based on the assumption that intercept and slopes are same. As shown in <Table IV>, the symbol *Ui* is a part of the errors and thus should not be correlated with any other regressor. If it was a core OLS assumption would be violated. The difference among groups (or time periods) lies in their variance of the error term, not in their intercepts. A random effect model is estimated by generalized least squares (GLS) when the omega matrix, a variance structure among groups, is known. The feasible generalized least squares (FGLS) method is used to estimate the variance structure when omega is not known. A typical example is the group wise heteroscedastic regression model (Greene 2003).

Table IV. Fixed Effect and Random Effect Models

| | Fixed Effect Model | Random Effect Model |
|---|---|---|
| Functional form* | $y_{it} = (\alpha + u_i) + X'_{it}\beta + v_{it}$ | $y_{it} = \alpha + X'_{it}\beta + (u_i + v_{it})$ |
| Intercepts | Varying across groups and/or times | Constant |
| Error variances | Constant | Varying across groups and/or times |
| Slopes | Constant | Constant |
| Estimation | LSDV, within effect method | GLS, FGLS |
| Hypothesis test | Incremental F test | Breusch-Pagan LM test |

* $v_{it} \sim IID(0, \sigma_v^2)$

Source: Hun Myoung Park, 2009

There are various estimation methods for FGLS including the maximum likelihood method and simulation (Baltagi & Cheng 1994). If one cross-sectional or time-series variable is considered (e.g., country, firm, and race), this is called a one-way fixed or random effect model. Two-way effect models have two sets of dummy variables for group and/or time variables (Hun Myoung Park, 2009). <Table V > shows various fixed and random effect models.

Table V. Panel Models

| Model | Classification | Category | Effect |
|---|---|---|---|
| 1 | One-way | Fixed | Group effect |
| 2 | | | Time effect |
| 3 | Two-way | | Group and Time effect |
| 4 | One-way | Random | Group effect |
| 5 | | | Time effect |
| 6 | Two-way | | Group and Time effect |
| 7 | Two-way | Mixed | Random group and Fixed time effect |
| 8 | | | Fixed group and Random time effect |

Source: An du-jin, "Analysis of Panel data using SAS PROC PANEL", 2008.

The significance of fixed effects is measured with an F test, while random effects are examined with the Lagrange Multiplier (LM) test (Breusch & Pagan 1980). In this study, the LM test was used to detect group and time effects. After analyzing the panel data collected for the study by using the LM *test.*, it was found that there were no serious

time effect issues, but there was a group effect that needed attention. To control this group effect the one-way fixed effect model was considered.

The one-way fixed group model analyzes difference in the intercepts. There are many fixed effect models such as the Least Squares Dummy Variables (LSDV), the within effect model, the between model and the first difference model. To analyze the coefficients of regional dummy variables, the LSDV model was chosen. The between effect model was also applied to compare the results from the LSDV model. The LSDV for the fixed model needs to create as many dummy variables as the number of groups or subjects while the between effect model uses group means of variables (Hun Myoung Park, 2009).

According to Dougherty (2006) in the least squares dummy variable (LSDV) regression model, the unobserved effect is brought explicitly into the model. Following description about the formula and explanation of LSDV model was written based on his study.

If dummy variables is defined as *Ai*, where *Ai* is equal to 1 in the case of an observation relating to individual *i* and 0 otherwise, the model can be rewritten

$$Y_{it} = \sum_{j=2}^{k} \beta_j X_{ijt} + \delta t + \sum_{i=1}^{n} \alpha_i A_i + \varepsilon_{it}.$$

Formally, the unobserved effect is treated as the coefficient of the individual-specific dummy variable, the *αiAi* term representing a fixed effect on the dependent variable *Yi* for individual *i* (this accounts for the name given to the fixed effects approach). Having re-specified the model in this way, it can be fitted using OLS.

Hun Myoung Park (2009) explained that the between effect model uses aggregate information, group means of variables. In other words, the unit of analysis is not an

individual observation, but groups or subjects. The number of observations declines to n from nT. This group mean regression produces different goodness-of-fits and parameter estimates from those of LSDV and the within effect model.

### 4.3.2 Model and Variables

This study is estimate the relationship between amenities and migration by the one-way fixed effect model. Dependent variables are two different migration variables of each different group of workers: non-movement and immigration. These different types of migration were defined based on the definition of migration in IPUMS between 2005 and 2008. Non-movers include workers who did not move since the reference year, as well as those who had moved but by the enumeration or survey date had returned to their earlier residence. In-migrants are referred as workers who had changed residence since a reference point 1 year ago. The number of non-movers and in-migrants in MSAs were divided by population. The model used for the study consists of migrant rate in regions, amenity rate, and error. The equation is as follows;

$$Ln\,(M) = {}_0 + \beta_1\, C + \beta_2\, A + \varepsilon$$

Where

Ln (M) = Log of migrant rate in MSAs;

C= Control variables in MSAs;

A= Amenities rate variables in MSAs;

$\varepsilon$ = Error term.

In this section each variable used for the analysis is introduced and the precise nature of the dependent and independent variable is explained and discussed. <Table 4-3> shows the detailed information about the resources and characteristic of each variable.

Table VI. Variables and Sources

| Variable | Category | | | Detail | Date Source |
|---|---|---|---|---|---|
| Dependent Variable | General Migrants Rate | | | The Number of General Migrants over age25/ Total Population | Ipumps (http://usa.ipums.org/) |
| | Educated Migrants Rate | | | The Number of Migrants over college degree/Total Population | |
| | Age | Young Migrants Rate | | The Number of Migrants between age 25 and 45 /Total Population | |
| | | Middle Migrants Rate | | The Number of Migrants between age 45 and 55 /Total Population | |
| | | Older Migrants Rate | | The Number of Migrants between over age 55 /Total Population | |
| Independent Variable | Economic Factor | Income | | Median household income | American Community survey 2005, 2008 |
| | | Log(Employment) | | Total employment | County Business Patterns, 2005, 2008 |
| | Social Factor | House Value | | Median value of owner-occupied-housing units | American community survey 2005,2008 |
| | | Crime | | Violent crime | Crime in the United States, FBI,2005, 2008 |
| | | Pupil ratio | | Teacher per pupil | IES(National Center for Educational Statics) |
| | Weather | Annual precipitation | | Annual precipitation (inches) | County and City Data Book 2000, 2008 |
| | | Average January temperature | | Average daily temperature (degrees Fahrenheit) | |
| | Amenities | Establishment Total Amenities Rate | | (Small + Big Amenities)/ Total Establishments | County Business Patterns 2005, 2008 |
| | | Small Amenities Rate | | (Restaurants + bookshops+ Food stores)/ Total Establishments | |
| | | Big Amenities Rate | | (Amusement + Cultural + Sports)/ Total Establishments | |
| | | Small | Restaurant Rate | Full-Service Restaurants (7221) )/ Total Establishments | County Business Patterns 2005, 2008 |
| | | | | Limited-Service Eating Places (7222) )/ Total Establishments | |
| | | | | Special Food Services (7223) )/ Total Establishments | |
| | | | | Drinking Places (7224) )/ Total Establishments | |
| | | | Book shops Rate | Book, Periodical, and Music Stores (4512) )/ Total Establishments | |
| | | | Food stores | Grocery Stores (4451) )/ Total Establishments | |

| | | | | | |
|---|---|---|---|---|---|
| | | | Rate | Specialty Food Stores (4452) )/ Total Establishments | |
| | | | | Beer, Wine, and Liquor Stores (4453) )/ Total Establishments | |
| | | Big | Amusement Rate | Amusement Parks and Arcades (7131) )/ Total Establishments | County Business Patterns 2005, 2008 |
| | | | | Gambling Industries (7132) )/ Total Establishments | |
| | | | | Other Amusement and Recreation Industries (7139) )/ Total Establishments | |
| | | | Cultural Rate | Performing Arts Companies (7111) )/ Total Establishments | |
| | | | | Museums, Historical Sites, and Similar Institutions (7121) )/ Total Establishments | |
| | | | Sports Rate | Spectator Sports (7112) )/ Total Establishments | |
| | | | | Promoters of Performing Arts, Sports, and Similar Events (7113) )/ Total Establishments | |
| | Region | Sun Belt Regions | | 4 States (Arizona, California, Florida, Texas) | Weinstein and Firestine, Regional Growth and Decline in the United States, 1978 |
| | | Rust Belt Regions | | 5 States (Michigan, Ohio, Pennsylvania, Illinois, Indiana) | Preston, American Steels, 1991 |

**Dependent variables**

To test three groups of hypotheses regarding the relationship between migration and built amenities, human capital was considered the dependent variable. There is, however, debate regarding the best approach to measure human capital. Miller (1996) suggested three approaches. One is to look at the cost of acquisition of certified knowledge, that is, the cost of formal education and training programs. The second method is to test people for their competences. The third method involves estimating productivity based on "achievement" indicators, such as a person's income level, job security, occupational status, and past references. Migration studies have generally used the first and third measurement methods. The second measurement is rarely used. Temple (1999) pointed out that measurements of quality could be included in the analysis of human capital workers by factoring in performance on standardized tests, but this would be difficult to implement.

The first measurement method, educational attainment, has been widely used in most migration studies although there are arguable grounds for this measurement. When doing cross-cultural comparisons human capital is often measured by the total number of years of schooling or the literacy rate of a country. Wossmann (2003) addressed other measurements such as training and experience. He suggested that education was just one method of accumulating human capital, and other important factors include on-the-job training, informal education, and experience.

Recently, the third method for measuring the results of human capital investment has been used by Florida (2002), Markusen (2004,2006) and Marlets and van Woorken (2004). Florida (2002) suggested that education was not the best way to measure human capital, arguing that it is more important to measure what people do than what they study. Florida's talent index was comprised of traditional measures of skilled human capital

workers, namely people with bachelor's degrees or more formal education, but he has also used, in certain analyses, the total employment of scientists, engineers, professional and technical workers (Florida 2002, 2004b, and 2004c). Measuring talent in general may be done more effectively by looking at occupations (Feser, 2003). For instance, high-tech jobs could be measured by looking at the occupations of individuals rather than the products of certain industries. Florida (2002) used this method in his creativity index. Several studies such as Markusen (2004) and Marlets and van Woorken (2004) have supported the usefulness of this occupationally based measure.

Although the creative class, the third method for measuring the results of human capital investment that was suggested by Florida (2002), sounds plausible and appealing, there are some empirical studies that suggest the concept is problematic. One critical view against such a creative class approach is that professions in data sets are categorized in terms of skill content and characteristics of the work process (Markusen et al, 2006). Florida considered professions in the creative class as the highly educated, excluding creative workers with a lower level of education (Boschma and Fritsch, 2007). Although criteria that distinguish creative from non-creative occupations should be defined, he only suggested the definition of creative people as workers who are engaged in identifying problems, figuring out new solutions and combining pieces of knowledge in new and innovative ways. Many critics have pointed to this profound weakness in his analyses (Markusen 2006). Florida adopted a rather pragmatic approach both at the conceptual level (what it is that can be regarded as creative) and the empirical level (how to measure what is creativity) (Boschma and Fritsch, 2007).

Educational attainment was used for the analysis because this approach is less controversial than other methods for measuring the results of human capital investment. Additionally, most studies that measured human capital by using education focused on

educational selectivity in migration. The term “educational selectivity in migration” is the tendency for migrants to be more talented, highly motivated, and more educated than non-immigrants. <Table VII > illustrates the measurement of human capital in earlier works. Eleven studies (78 percent) used educational attainment to measure human capital. As a result this dissertation focused on human capital workers with more years of formal education. Individuals were divided into two groups. College graduates and those with higher degrees were considered highly educated workers; those who had not completed high school degree or were high school graduates were less educated workers.

Migration is “primarily a phenomenon of late adolescence and early maturity” (Hinze,1977). Different age groups might have different interests or tastes when regarding the decision to move or to stay. Workers between 25 and 40 years old were considered as young workers (and more likely to move) while workers between 40 and 55 were described as middle age workers. Workers above 55 years were treated as older workers. Migration was expected to decline with age. To control for geographic unit issues, the number of migrants was divided by population.

Table VII. Attribute of Human Capital

| Index | | Occupation | | | | Education | | Age | Sex | Race |
|---|---|---|---|---|---|---|---|---|---|---|
| Factor | | High Technology | Professional | Scientists | Engineers | High School or above | College or above | 25 or above | Male | White |
| Total number of Studies | | 4 | 1 | 2 | 2 | 1 | 10 | 3 | 1 | 1 |
| Herzog, Scholottmann, Johnson | 1986 | X | | | | | | | | |
| Gottlib | 1995 | X | | | | | | | | |
| Arora, Florida, Gates and Kamlet | 2000 | | | | | | X | | | |
| Kordrzychi | 2001 | | | | | | X | | | |
| Florida | 2002 | X | X | X | X | | | | | |
| Florida | 2002 | | | | | | X | | | |
| Clark | 2003 | | | | | | X | | | |
| Glaeser and Saiz | 2003 | | | | | | X | X | | |
| Hansen, Ban and Huggins | 2003 | | | | | | X | | | |
| Heuer | 2004 | | | | | | X | | | |
| Shpiro | 2006 | | | | | X | | X | X | X |
| Gottlieb and Joseph | 2006 | | | X | X | | X | X | | |
| Artnz | 2006 | | | | | | X | | | |
| Mallender and Florida | 2007 | X | | | | | X | | | |

**Independent variables**

The independent variables utilized fall into three general categories based on the earlier review: total amenities, big amenities and small amenities. Large built amenities included sport, cultural, and amusement facilities. Small amenities include restaurants and bookstores. Each independent variable was divided by total establishments in each region.

**(1) Total amenities rate**: Total amenities include large built amenities and small amenities.

**(2) Big built amenities rate:** This study hypothesizes that there is a relationship between the migration of educated workers and built amenities. In order to test that hypothesis, the study differentiates between MSAs in terms of their big-ticket and small facilities. Three built amenities variables were chosen from three major big-ticket facilities including amusement facilities and cultural facilities as well as sports facilities

First, amusement parks and arcades, gambling industries, and other amusement and recreation industries were included in this category (NAICS codes 7131, 7132, and 7139). An amusement includes such assets as of cinemas, big box stores, themed restaurants, record and video superstores, simulation theatres, and virtual reality arcades. The second category was museums, historical sites, and performing arts companies (NAICS sectors 7121 and 7111). Third, spectator sports and promoters of performing arts, sports, and similar events awere enumerate (NAICS codes 7112 and 7113). Finally, accommodation and food Services in NAICS sector 72 were used as a measure of smaller facilities.

**(3) Small built amenities rate:** Retail trade business and eating place business were considered built amenities (NAICS sector 7221, 7222, 7223, 7724 and 7744).

#### Control Variables

Control variables may be related to tourism and must be taken into account in analyzing the relationships between the movement of human capital and built amenities to minimize a confounding of results (Kleinbaum, Kupper and Muller, 2008). The control variables used were divided into four categories: (1) natural amenities (2) local public services, (3) economic condition, and (4) a group of selected regional variables. Each grouping is described below. Natural amenities were measured using long-term average temperatures. The quality of local public services was measured by local crime rates and the ration of students per teacher in the public school system. Regional economic conditions were measured by assessing employment levels and median income. A "regions variable" was included given the fast growth in the southern and western parts of the United States and the slower growth rates in other parts of the country.

## 4.4. Data

This research used panel data from 2005 and 2008, respectively. To estimate the relationship between amenities and the movement of human capital many variables were analyzed. Economic data such as income and employment came from the US Bureau of the Census. Students per teacher information were taken from the National Center for Education

Statics (NCES) and the records maintained by the FBI were used to determine local crime rates. Housing values were from the American Community Survey.

Built amenities can be classified into two main groups: weather as a measure of natural amenities and built amenities. January temperatures and precipitation were used for the analysis of a relationship between natural amenities and the movement of human capital. *The County and City Data Books* for 2000 and 2008 were used to enumerate natural amenities. I matched MSAs to the corresponding major city's weather information. Generally, weather such as January temperatures or precipitation has not changed dramatically over the time. Therefore, weather data in 2000 was used instead of 2005 data because of the lack of data sources.

The built amenities data was obtained from *Metropolitan Business Patterns*. To analyze the more detailed character of amenities, industries with 4 digit NAICS were used. Amenities were categorized into small and big businesses based on the review of earlier studies. Small business amenities were restaurants, bookshops, and food service businesses while big business amenities were placed into one of three broad categories: amusement, art, or sports.

Migration information was obtained from the Integrated Public Use Micro Data Series (IPUMS) that was maintained by the Minnesota Population Center at the University of Minnesota. The IPUMS contains micro data on individuals and housing units, with self-reported values. American Community Survey samples in 2005 and 2008 from IPUMS were selected to compare the two different years. IMPUS do not provide any detailed migration category such as emigration, immigration and non-movement. Therefore, immigration and

non-movement migration was analyzed based on metropolitan area of residence data from 1 year ago by using the SAS program.

The focus on 2005 and 2008 permitted a look at recent changes. To compare different years, each 10-year period between 1980 and 2000 was considered at the beginning of the project. Data for 1980, 1990, and 2000 had to be discarded due to matching and other problems. Focusing on only two years, 2005 and 2008 raises the possibility that an insufficient time period was used to observe changes. This limitation will be addressed in the conclusions but suffice to note at this point that the data sill included a large number of people who moved. Further, the time period selected is a number of years after numerous cities had made substantial investments in sports facilities and cultural centers. If migration was affected by these investments it should be evident. It was inappropriate to collect data for longer periods for the study because of unexpected problems resulting from the changes in definitions about industry codes and Metropolitan Statistical Areas (MSAs). Data from 1980 and 1990 could not be used since the definition of industry code such as the Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS) changed The primary unit of observation in the built amenities data is based on NAICS. The problem in relation to NAICS is that NAICS was adopted in 1997 to replace SIC system. Although there is a correspondence table exact matches are not possible,

Data for 2000 could not be used because of comparability issues related to the migration data.. According to the website of IPUMS, IPUMS-USA is a project dedicated to collecting and distributing United States census data. Since United States census data is released on a website (http://usa.ipums.org), it is easy to data between 2000 and 2008 was considered as an alternative data. It turns out, however, that census data for 2000 and 2008

were not comparable. Census data in 2000 were collected from the 1 percent national random sample of the population while data from 2008 were collected from the American Community Survey sample. After analyzing those two samples, it was found that the population in each MSAs was not matched and comparable. The next best approach was to use data from the 2001 American Community Survey. Unfortunately, the American Community Survey samples from 2001 to 2004 do not provide migration data at the MSA level. The American Community Survey sample between 2005 and 2008 provided the best possible data for the study.

After the selection of data from 2005 and 2008 other databases were matched to these years. Information on the IPUMS web site illustrated the definition of MSAs and that guided the reformation of the other data sets. Metropolitan areas are listed according to their 1990 definition and given a four-digit code. Because of changes in the county composition of metropolitan areas over time, however, the coding system was modified somewhat from the 1990 scheme developed by the Census Bureau. If the county components of a 1990 metropolitan area were part of another metropolitan area during some earlier decade, then this metropolitan area is listed under its former classification with a detail code (http://usa.ipums.org/).

IPUMS Data from 2005 to 2008 were based on 1990 MSAs definition but other data followed the recent definition of MSAs, which means migration data from IPUMS and other data sets was not comparable. To solve the problem the other data was reoriented to the 1990s definition of MSAs. Economic, social and natural/built amenities data between 2005 and 2008 was collected at the county level. This county database was assigned to MSAs by

using 1990 MSA definitions to match the migration data from IPUMS. If a county was separated and included in more than two MSAs, that county was not included in the analysis.

Table VIII. Descriptive Statistics

| Variables | N | Min | Max | Mean | Std. Deviation | Variables | N | Min | Max | Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Log of General Non Movers Rate | 430 | -0.7 | 7.8 | 3.5 | 1.5 | Crime Rate | 430 | 84.0 | 76652.0 | 1181.6 | 3946.8 |
| Log of General Immigrant Rate | 430 | -2.9 | 5.4 | 1.5 | 1.5 | Pupil Ratio | 430 | 11.3 | 24.9 | 16.0 | 2.2 |
| Log of Educated Non Movers Rate | 430 | -1.4 | 7.3 | 3.1 | 1.5 | Average January | 430 | 5.9 | 73.0 | 36.3 | 13.6 |
| Log of Educated Immigrant Rate | 430 | -3.5 | 5.2 | 1.0 | 1.6 | Annual precipitation | 430 | 4.1 | 66.3 | 37.6 | 14.1 |
| Log of Young Educated Non Movers Rate | 430 | -2.3 | 6.6 | 2.3 | 1.5 | Total amenity Rate | 430 | 0.010 | 0.174 | 0.108 | 0.0160280065 |
| Log of Young Educated Immigrant Rate | 430 | -3.8 | 4.9 | 0.7 | 1.6 | Small Amenity Rate | 430 | 0.008 | 0.149 | 0.095 | 0.0145236161 |
| Log of Middle Educated Non Movers Rate | 430 | -2.7 | 6.0 | 1.9 | 1.5 | Big Amenity Rate | 430 | 0.002 | 0.027 | 0.013 | 0.0030632370 |
| Log of Middle Educated Immigrant Rate | 430 | -5.5 | 3.4 | -0.7 | 1.6 | Amusement Rate | 430 | 0.001 | 0.022 | 0.010 | 0.0025485903 |
| Log of Older Educated Non Movers Rate | 430 | -2.9 | 5.8 | 1.6 | 1.5 | Cultural Rate | 430 | 0.000 | 0.010 | 0.002 | 0.0009887776 |
| Log of Older Educated Immigrant Rate | 430 | -6.2 | 2.6 | -1.3 | 1.6 | Sports Rate | 430 | 0.000 | 0.005 | 0.001 | 0.0006644629 |
| Population | 430 | 99675 | 9807870 | 809375 | 1263604 | Restaurant Rate | 430 | 0.007 | 0.113 | 0.075 | 0.0112427952 |
| Income | 430 | 2001 | 86091 | 46912 | 9516 | Bookshops Rate | 430 | 0.000 | 0.006 | 0.002 | 0.0007692788 |
| Log of Employment | 430 | 10.3 | 15.2 | 12.1 | 1.1 | Food stores Rate | 430 | 0.001 | 0.038 | 0.018 | 0.0053861226 |
| House Price | 430 | 972.0 | 864167.0 | 181570.7 | 113941.6 | Valid N | 430 | | | | |

# CHAPTER V

# RESULTS

## 5.1 Introduction

The primary objective of this chapter is to explore the relationship between amenities and the migration of workers. If a reliable set of relationships exist, the government would have better insight into the amenity investments required to support or advance economic development. The first section shows results of several regression diagnostic tests and basic tests to make a decision which panel model is more appropriate for the data used in the study. The second and the third section of this chapter show interesting insights into the relationship between amenities and migration are explored by looking at retention of and attraction of highly educated individuals and which amenities are more and less important. The least squares dummy variable (LSDV) model and the between effect model were applied using SPSS, SAS, Minitab and Microsoft Access to edit, transform, and analyze panel data created for a more sophisticated analysis.

## 5.2 Results of Regression Diagnostic tests and Basic Panel Tests

Before analyzing panel data, several pre-tests in relation to regression diagnostic test and basic tests for finding the most suitable panel model were applied.

First, several basic regression diagnostic tests were applied to identify statistical problems with panel data used for the study: autocorrelation, multi-correlation, and heteroskedasticity issues. To detect the presence of autocorrelation in the residuals, a test statistic such as the Durbin–Watson statistic was applied. The panel data were taken from two time periods, from 2005 to 2008. It is possible that there is an autocorrelation problem between a given time series. However, after the Durbin-Watson test, it turns out that there is no serious autocorrelation problem for a given time period. With the MSAs dispersed throughout the United States, spatial autocorrelations were not tested.

Another basic test applied for the study was multi-correlation. Multi-correlation is a coefficient of correlation between random independent variable. An intuitive approach to the multiple regression analysis is to sum the squared correlations between the predictor variables and the criterion variable to obtain an index of the over-all relationship between the predictor variables and the criterion variable (Cohen, 2002). However, such a sum is often greater than one, suggesting that simple summation of the squared coefficients of correlations is not a correct procedure to employ (http://www.visualstatistics.net). To detect multi-correlation, a VIF and a tolerance value was used. It was found that population variable was strongly correlated with other variables. Thus, this variable was discarded. Another problematic multi-correlation was the relationship between an employment and amenity variable. Thus, an employment variable was transformed by using log to resolve this multi-correlation issue. During the analysis of panel data

with various small and big amenities variables, it was found that both types of amenities were correlated after VIF test, which means that it is easy to determine if a multicollinearity problem exists. There are several remedies that could be pursued including dropping a variable from the model, acquiring additional data or a new sample, rethinking the model, transformation of variables, etc. The employment variable with the same collinearity problem was transformed by using its natural log. It is somewhat more difficult, however, to transform the amenities variables because these are key explanatory factors being studied relative to the movement of workers. If it is transformed, it may not be easy to compare and draw insights. Therefore, the amenities were measured and were added together, and then analyzed. Each amenity variable was also individually analyzed. These two analyses were performed to offer the basis for a more precise conclusion.

The last test related to regression diagnostics is heteroscedasticity test. One of the key assumptions of regression is that the variance of the errors is constant across observations. If the errors have not constant variance, the errors are called heteroscedastic (SAS institute, 2000). There are several ways to detect this heteroscedastic issue: Park test, Glejser test, White test, Breusch–Pagan test, Goldfeld–Quandt test, Levene test, etc. A number of residual plots as well as statistical tests are also worth examining and are easily accessible. In this study, residual plots and the Levene's test were used to identify heteroscedastic problem for the data used in the study. As with the panel data related to non-movement and immigration, it was found that there is heteroscedastic issue. To solve this problem, the dependent variable was transformed by using log.

The second step involved several basic tests for finding the most suitable model for the study: the LM test and the Hausman test.

(1) To detect group and time effects, the LM test was applied. After applying the LM test, it was found that there was no serious time effect but a group effect did exist. Therefore, the one-way model (group effect) is better than the two-way model.

(2) The Hausman test was applied to make a decision which model is more appropriate than others. The Hausman test for the fixed versus random effects is under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model (Hun Myoung Park, 2009). If correlated, a random effect model produces biased estimators, so a fixed effect model is preferred. The Hausman test's result shows that the individual effects are correlated with the other regressors and then the fixed model is more appropriate for the panel data used for the study. Thus, it can be concluded that "one-way fixed effect model" was more suitable.

The third step involved some issues in relation to a decision which fixed effect model is more appropriate than others. One-way fixed group effect models examine group differences in the intercepts. There are several one-way fixed group effect models such the least squares dummy variable model (LSDV), the within effect model and the between effect model. The LSDV for the fixed model needs to create as many dummy variables as the number of groups or subjects. When many dummies are needed, the within effect model is useful since it transforms variables using group means to avoid dummies. The between effect model uses group means of variables (Hun Myoung Park, 2009).

The panel data used many group units and had limited time units. Therefore, the within effect model is the better way to estimate the coefficients of variables since the within effect model that does not use dummy variables retains larger degrees of freedom. The within effect model has smaller MSE, and smaller standard errors of parameters than those of LSDV. Regional variables such as temperatures for warmer climates and an measure for the rust belt

were considered. The within effect model does not report individual dummy coefficients. Instead of the within effect model, the LSDV model was used to show the results from the analysis of regional dummy variables such as warmer temperatures and the rust belt. The problem is that if dummy variables are created as many as the number of geographical units, the degrees of freedom will be much smaller. To solve this problem, MSAs were placed into four geographic zones -- South, West, North East and North Central. As described earlier, the least squares dummy variable (LSDV) regression is ordinary least squares (OLS) with dummy variables. The key issue in LSDV is how to avoid the perfect multicollinearity or so called "dummy variable trap". LSDV has three approaches to avoid getting caught in the trap: dropping a dummy variable, including all dummy variables and suppressing the intercept, and including the intercept and all dummies and then imposing a restriction on the model. These three approaches are different from each other with respect to model estimation and interpretation of dummy variable parameters (Suits 1984). They produce different dummy parameter estimates, but their results are equivalent .In LSDV1, the dummy variable that was eliminated from the model is set to zero and is used to reference group. LSDV2 includes all dummies and in turn, suppress the intercept. LSDV3 include the intercept and all dummies, and then impose a restriction that the sum of parameters of all dummies is zero. (Hun Myoung Park, 2009). To avoid "dummy variable trap", LSDV1 that drops dummy variable was applied for the study. Thus, south was used as reference group and then was eliminated from the model

In addition, the between effect model was also used to analyze the panel data and to compare the results of LSDV. The between effect model uses aggregate information, group means of variables. In other words, the unit of analysis is not an individual observation, but groups or subjects. The number of observations jumps down to n from nT( n=number of

geographical units and T=time).This group mean regression produces different goodness-of-fits and parameter estimates from those of LSDV and the within effect model (Hun Myoung Park, 2009).

In this study, two different one-way fixed effect models were used: the LSDV model and the between effect model. The LSDV model was chosen to control the fixed effect and to use regional dummy variables while the between effect model was used to compare the results from the LSDV model. Results of the between effect model were attached in the appendix.

## 5.3The Relationship between Amenities and the Non-Movement of workers

This section presents and compares results from several panel models that estimate the relationship between amenities and the non-movement (retention) of workers from 2005 to 2008. Tables in this section present the coefficients of variables from the LSDV model and the Between Effect model. The first seven rows of each model are the non-amenity and natural variables such as economic, social and weather variables. The middle rows are amenity variables including small and big ticket items. The remaining rows involve the regional dummy variables. In this study, directional hypotheses were used to assess the positive relationship between amenities and migration. As a result, one-tailed test was applied to test for the possibility of the relationship in one direction. For the general migration sample, economic and weather variables wre significant as were some amenities. To amplify the interpretation, amenity variables are categorized into small and big amenities based on their characteristics.

<Table IX> illustrates the relationship between general non-movers and various economic, social, weather and amenities variables by using the LSDV model. The general non-movers include all workers that had stayed in the same metropolitan area from 2005 to 2008. This table presents the employment variable as one of the economic variables that is meaningful as is usually expected. The employment variable was transformed by using its log to resolve multicollinearity. People favor warmer places and this explains why there is a negative relationship between rust belt areas and migration. Since the 1960s the South has enjoyed considerable growth. The growth of the South is part of the general correlation between warmth and growth across the U.S (Glaeser, 2007). Rust Belt cities, also known as the manufacturing or the factory belt have suffered big population losses. <Table IX> shows that there is a significant and negative correlation between non-movement of workers and the rust belt areas. When other social factors were controlled, it is interesting to note which built amenities are more and less important when people move and stay in a same area.

The total amenity variable represents the importance of the amenity itself; this includes all amenities such as big and small items. According to the LSDV model in <Table 5-1>, an amenity variable is not meaningful and there is no relationship between amenities and the non-movers. This result does not support hypothesis 1-B that there is a positive relationship between the level of amenities and the non-movement of workers. It was necessary, however, to take a more in-depth look at how the movement of educated workers and amenities interact and if any specific amenity was more important than the bundle of amenities. As described earlier, many amenities were categorized into big and small amenities based on their sizes and characteristics.

The LSDV model and the between effect model in <Table5-1>show the coefficients for the amenities variables. When analyzing variables individually, both small and big amenities

were not significant. In a more detailed category related to small and big amenities, only one variable, food stores, is positively correlated to the rate of the non-movement of general workers. On average and holding other variables fixed, a one standard deviation increase in the share of establishments that are food stores is associated with about a 0.096 percent increase in the non-mover rate (0.0.096%=100*0.18(the coefficient of food stores rate)* 0.0053861226(Std.dev of food stores)). This is a somewhat surprising finding and the inability of the theories consulted to explain its importance may well suggest the relationship requires further analysis or is accidental.

Greater insight is available from looking at the experiences of educated workers. To analyze educated workers, the standard of educational background was used. If workers graduated from a university (or had more advanced degrees) they were considered highly educated. <Table X> shows the result of the analysis. According to <Table X>, for educated workers, employment as one of economic variables is important as it was in non-movement. In terms of social factors, it was found that student ratios and warm weather were significant and important when workers consider staying in regions. As shown in <Table X>, total amenity is not as important variable for educated workers. As the result of the non-movement of general workers, food stores were found to have a positive relationship with then on-movements of educated workers. On average and holding other variables fixed, a one standard deviation increase in the share of establishments that are food stores is associated with a 0.045 percent increase in the educated non-mover rate.

The relationship between the non-movement of educated workers and amenities was analyzed based on their age. <Table XI > shows the result of the LSDV model. For younger educated workers, economic, social and natural factors drove their decisions to remain in an area. It is important to understand the relationship between amenities and these individuals as they are

among those that regions seek to retain. It was found that a statistically significant relationship between the total number of amenities and the presence of younger educated workers did not exist. On average and holding other variables fixed, a one standard deviation increase in the share of establishments that are food stores is associated with a 0.044 percent increase in the young educated non-mover rate. For middle-aged educated workers, economic, social and weather variables were important when they did not move. As with the relationship between amenities and the non-movement of middle educated workers, no significant relationship between the non-movement of workers and amenities was identified. Except for the food stores variable, almost every amenity was not significant with the non-movement of middle workers. On average and holding other variables fixed, a one standard deviation increase in the share of establishments that are food stores is associated with a 0.053 percent increase in the young educated non-mover rate. For older educated workers, economic and weather factors were important but there was no relationship between the non-movement of older workers and other factors including amenities except food stores. On average and holding other variables fixed, a one standard deviation increase in the share of establishments that are food stores is associated with a 0.043 percent increase in the older educated non-mover rate.

Relative to the effect of different amenities on the migration of educated workers of different ages, almost every individual amenity was not significant. The only investment with a potential for a positive return seems to be food stores. It may well be that Clark's assessment of the value of small amenities is valid if the food stores finding is actual a measure associated with neighborhood convenience. Those stores can make streets more livable and active. Richard Florida in 2002 suggests small amenities are more important than other amenities. Because these are similarly favored by New Urbanism architects and planners who seek to recreate the vital

street life of pre-automobile cities, lauded earlier by Jane Jacobs (1961). Clark in his study in 2004 also included small amenities such as book stores, juice bar, whole food stores, starbucks and bicycle events. Food stores might well be a proxy for what Jane Jacobs argued and what Terry Clark suggests now explains the distribution of wealth and capital.

However, to understand the meaning of food stores in non-movement, it is necessary to do more future research related to small amenities that can affect the neighborhood atmosphere.

Table IX. The Relationship between Amenities and the Non-movement of General Workers: LSDV

| Model | | Dependent Variable : Log (General Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.05* | 0.04* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.04 | -0.03 | -0.04 | -0.04 | -0.03 | -0.03 | -0.04 | -0.04 | -0.04 |
| Weather | Annual precipitation | -0.00 | -0.01 | -0.02 | -0.03 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Total Amenities Rate | | 0.02 | | | | | | | | | | | |
| Small Amenities Rate | | | 0.02 | 0.02 | | | | | | | | | |
| Big Amenities Rate | | | -0.02 | | 0.02 | | | | | | | | |
| Small | Restaurant Rate | | | | | | -0.06 | | | | -0.01 | | |
| | Book shops Rate | | | | | | 0.19 | | | | | 0.05 | |
| | Food stores Rate | | | | | | 0.23* | | | | | | 0.18* |
| Big | Amusement Rate | | | | | -0.14 | | -0.09 | | | | | |
| | Cultural Rate | | | | | 0.17 | | | 0.27 | | | | |
| | Sports Rate | | | | | 0.83 | | | | 0.78 | | | |
| Belt | Sun Belt | -0.18 | -0.19 | -0.18 | -0.18 | -0.17 | -0.18 | -0.18 | -0.18 | -0.17 | -0.18 | -0.18 | -0.19 |
| | Rust Belt | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* |
| Regional Effect | West | -0.23 | -0.23 | -0.23 | -0.23 | -0.23 | -0.23 | -0.23 | -0.22 | -0.23 | -0.23 | -0.23 | -0.24 |
| | South | -0.42* | -0.42* | -0.42* | -0.42* | -0.4* | -0.44* | -0.41* | -0.41* | -0.41* | -0.42* | -0.42* | -0.44* |
| | North Central | 0.11 | 0.11 | 0.11 | 0.12 | 0.12 | 0.09 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.09 |
| Adjusted R Square | | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Correlation is significant at the 0.01 level (1-tailed).

**: Correlation is significant at the 0.05 level (1-tailed).

Table X. The Relationship between Amenities and the Non-movement of Educated Workers: LSDV

| Model | | Dependent Variable : Log (Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.00 | | | | | | | | | | | |
| Small Amenities | | | 0.01 | 0.00 | | | | | | | | | |
| Big Amenities | | | -0.05 | | -0.03 | | | | | | | | |
| Small | Restaurant | | | | | | -0.52 | | | | -0.02 | | |
| | Book shops | | | | | | 0.53 | | | | | 0.39 | |
| | Food stores | | | | | | 0.13* | | | | | | 0.08* |
| Big | Amusement | | | | | -0.25 | | -0.19 | | | | | |
| | Cultural | | | | | 0.26 | | | 0.38 | | | | |
| | Sports | | | | | 1.03 | | | | 0.92 | | | |
| Belt | Sun Belt | -0.17 | -0.17 | -0.17 | -0.16 | -0.15 | -0.16 | -0.16 | -0.17 | -0.15 | -0.16 | -0.17 | -0.17 |
| | Rust Belt | -0.44* | -0.44* | -0.44* | -0.44* | -0.43* | -0.43* | -0.44* | -0.43* | -0.43* | -0.44* | -0.43* | -0.43* |
| Regional Effect | West | -0.26 | -0.26 | -0.26 | -0.26 | -0.26 | -0.25 | -0.26 | -0.25 | -0.26 | -0.25 | -0.25 | -0.26 |
| | South | -0.44* | -0.44* | -0.44* | -0.44* | -0.42* | -0.45* | -0.43* | -0.43* | -0.43* | -0.44* | -0.43* | -0.45* |
| | North Central | 0.08 | 0.08 | 0.08 | 0.08 | 0.09 | 0.07 | 0.09 | 0.09 | 0.08 | 0.08 | 0.08 | 0.07 |
| Adjusted R Square | | 0.58 | 0.58 | 0.58 | 0.58 | 0.59 | 0.59 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table XI. The Relationship between Amenities and the Non-movement of Young Educated Workers: LSDV

| Model | | Dependent Variable : Log (Young Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00 | 0.00* | 0.00 | 0.00* | 0.00* | 0.00 | 0.00* | 0.00* | 0.00 | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.00 | | | | | | | | | | | |
| Small Amenities | | | 0.02 | 0.01 | | | | | | | | | |
| Big Amenities | | | -0.14 | | -0.11 | | | | | | | | |
| Small | Restaurant | | | | | | -0.45 | | | | -0.01 | | |
| | Book shops | | | | | | 0.73 | | | | | 0.59 | |
| | Food stores | | | | | | 0.12* | | | | | | 0.083* |
| Big | Amusement | | | | | -0.32 | | -0.27 | | | | | |
| | Cultural | | | | | 0.18 | | | 0.29 | | | | |
| | Sports | | | | | 0.92 | | | | 0.74 | | | |
| Belt | Sun Belt | -0.17 | -0.17 | -0.17 | -0.17 | -0.16 | -0.17 | -0.17 | -0.17 | -0.16 | -0.17 | -0.17 | -0.17 |
| | Rust Belt | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.43* | -0.44* | -0.44* |
| Regional Effect | West | -0.23 | -0.23 | -0.23 | -0.23 | -0.23 | -0.22 | -0.23 | -0.23 | -0.23 | -0.24 | -0.26 | -0.26 |
| | South | -0.42* | -0.42* | -0.4* | -0.44* | -0.41* | -0.41* | -0.41* | -0.42* | -0.42* | -0.44* | -0.44* | -0.44* |
| | North Central | 0.11 | 0.12 | 0.12 | 0.09 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.09 | 0.08 | 0.08 |
| Adjusted R Square | | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.58 | 0.58 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table XII. The Relationship between Amenities and the Non-movement of Middle Educated Workers: LSDV

| Model | | Dependent Variable : Log (Middle Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.06* | 0.06* | 0.06* | 0.06* | 0.05* | 0.06* | 0.05* | 0.06* | 0.06* | 0.06* | 0.06* | 0.06* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00* | 0.00 | 0.00 | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.01 | | | | | | | | | | | |
| Small Amenities | | | 0.01 | 0.01 | | | | | | | | | |
| Big Amenities | | | 0.02 | | 0.03 | | | | | | | | |
| Small | Restaurant | | | | | | -0.53 | | | | -0.01 | | |
| | Book shops | | | | | | 0.46 | | | | | 0.33 | |
| | Food stores | | | | | | 0.15* | | | | | | 0.10* |
| Big | Amusement | | | | | -0.17 | | -0.11 | | | | | |
| | Cultural | | | | | 0.23 | | | 0.35 | | | | |
| | Sports | | | | | 1.04 | | | | 0.98 | | | |
| Belt | Sun Belt | -0.15 | -0.15 | -0.15 | -0.15 | -0.14 | -0.15 | -0.15 | -0.15 | -0.13 | -0.15 | -0.15 | -0.15 |
| | Rust Belt | -0.43* | -0.43* | -0.43* | -0.43* | -0.42* | -0.42* | -0.43* | -0.42* | -0.42* | -0.43* | -0.43* | -0.42* |
| Regional Effect | West | -0.26 | -0.26 | -0.26 | -0.26 | -0.26 | -0.26 | -0.26 | -0.25 | -0.26 | -0.26 | -0.25 | -0.26 |
| | South | -0.44* | -0.44* | -0.44* | -0.44* | -0.42* | -0.45* | -0.43* | -0.43* | -0.43* | -0.44* | -0.43* | -0.45* |
| | North Central | 0.09 | 0.09 | 0.09 | 0.09 | 0.10 | 0.08 | 0.10 | 0.10 | 0.09 | 0.09 | 0.09 | 0.08 |
| Adjusted R Square | | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table XIII. The Relationship between Amenities and the Non-movement of Older Educated Workers: LSDV

| Model | | Dependent Variable : Log (Older Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.03* | 0.02* | 0.03* | 0.02* | 0.02* | 0.03* | 0.02* | 0.03* | 0.03* | 0.03* | 0.03* | 0.03* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.04 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.00 | | | | | | | | | | | |
| Small Amenities | | | -0.01 | 0.00 | | | | | | | | | |
| Big Amenities | | | 0.03 | | 0.02 | | | | | | | | |
| Small | Restaurant | | | | | | -0.06 | | | | -0.03 | | |
| | Book shops | | | | | | 0.28 | | | | | 0.12 | |
| | Food stores | | | | | | 0.13* | | | | | | 0.08* |
| Big | Amusement | | | | | -0.24 | | -0.17 | | | | | |
| | Cultural | | | | | 0.41 | | | 0.55 | | | | |
| | Sports | | | | | 1.24 | | | | 1.16 | | | |
| Belt | Sun Belt | -0.16 | -0.16 | -0.16 | -0.16 | -0.15 | -0.16 | -0.16 | -0.17 | -0.15 | -0.16 | -0.16 | -0.17 |
| | Rust Belt | -0.45* | -0.45* | -0.45* | -0.45* | -0.44* | -0.45* | -0.45* | -0.45* | -0.44* | -0.45* | -0.45* | -0.45* |
| Regional Effect | West | -0.25 | -0.25 | -0.25 | -0.25 | -0.25 | -0.25 | -0.25 | -0.25 | -0.26 | -0.25 | -0.25 | -0.26 |
| | South | -0.43* | -0.43* | -0.43* | -0.43* | -0.41* | -0.45* | -0.43* | -0.42* | -0.43* | -0.4* | -0.4* | -0.4* |
| | North Central | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.09 | 0.11 | 0.11 | 0.10 | 0.11 | 0.10 | 0.09 |
| Adjusted R Square | | 0.57 | 0.57 | 0.57 | 0.57 | 0.58 | 0.58 | 0.57 | 0.57 | 0.58 | 0.57 | 0.57 | 0.57 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

## 5.4 The Relationship between Amenities and the Immigration of Workers

Panel data were used to focus on the effects of amenities on immigration. The first effect observed is that economic variables, as expected, are significant. Home values are important when people made a decision to move to a new region. As a natural amenity, average January temperature was significant. These results are similar to those regarding non-movement. Thus, economic, social and natural factors are, as expected, meaningful. When these economic, social, and natural factors are controlled, is it possible to find the difference between results of non-movement and immigration? When other relevant factors were controlled, which amenities are more and less important when people move in a certain area?

First, some scholars such as Clark, Lolyd and Jain (2002) suggested that what used to be purely economic reasons for migrating no longer hold in many cases. According to them, globalization has widely affected the migration of each individual to consume amenities in cities, because of a rise in the importance of leisure pursuits to workers including not only educated workers but less educated workers.

<Table XIV > shows the relationship between amenities and the migration of general workers including less and highly educated workers. According to <Table XIV >, it does not support the hypothesis that there is a strong significant relationship between total amenity packages including small and big amenities and general immigrants. This result is different from what Clark found in his paper in 2004. He suggested that total population moved

toward amenities including natural amenities and built amenities, when controlling up to 20 variables in multiple regressions for 3, 111 US counties. However, he used simply the percent change of the size of population, given the non-availability of migration data. Thus, his result is not good enough to prove the relationship between migration and amenities. <Table XIV> show**s** that although amenity scholars suggested that the significant relationship between amenities and the migration of general people, it is not as strong as they expected.

Second, the migration of educated workers has been paid attention widely since endogenous growth economists such as Lucas and Romer identified the role of human capital externalities in regional development. Many scholars assumed that higher educated workers would have different interest for amenities compared to general people's preference for amenities. According to <Table XV>, individual amenities such book stores and sports facilities are positively correlated to the migration of educated workers while the relationship between total amenity package including small and big amenities and the migration of educated works is not strong. On average and holding other variables fixed, a one standard deviation increase in the share of establishments that are book stores is associated with a 0.084 percent increase and are sports amenities associated with a 0.064 percent increase in the educated non-mover rate. This result might be explained that the power of individual amenities such as food stores and sports facilities lies in the attraction of educated individuals.

Third, the relationship between the immigration of educated workers and amenities was next analyzed based on the age of individuals. The result of immigration of young educated workers in <Table XVI> shows that young educated workers consider sports and book stores as significant variables when they move in a certain region. On average and

holding other variables fixed, a one standard deviation increase in the share of establishments that are book stores is associated with a 0.093 percent increase and are sports amenities associated with a 0.051 percent increase in the young educated non-mover rate. For middle-aged workers, every variable related to amenities is not significant. Intriguingly, older educated workers were attracted to areas with a concentration of big amenities. It does appear that cultural and sports are important factors when members of this group consider relocation. On average and holding other variables fixed, a one standard deviation increase in the share of establishments that are cultural amenities is associated with a 0.11 percent increase and are sports amenities associated with a 0.12 percent increase in the young educated non-mover rate. Another interesting finding is that there restaurants are negatively related to the movement of older educated workers. To understand this unusual result, it is necessary to do more research in the future.

Some significant implications were found when analyzing the relationship between immigration and amenities.

First, it turns out that amenities were not meaningful when general workers, that include educated and less educated workers, move. However, educated workers have more preference for amenities than general workers.

Second, there are different results of the analysis of educated workers based on age group. For young educated workers, small amenities such as book shops and big amenities such sports facilities are important. Old-aged educated workers have more preference for big amenities such as cultural and sports facilities, while they do not consider small amenities as import factors. In addition, there is no significant relationship between middle-aged workers.

Table XIV. The Relationship between Amenities and the Immigration of General Workers: LSDV

| Model | | Dependent Variable : Log (General Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.05* | 0.04* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.02 | -0.02 | -0.01 | -0.02 | -0.01 | -0.02 | -0.02 | -0.01 | -0.01 | -0.02 | -0.01 | -0.01 |
| Weather | Annual precipitation | -0.00 | -0.01 | -0.02 | -0.03 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | -0.01 | | | | | | | | | | | |
| Small Amenities | | | -0.01 | -0.01 | | | | | | | | | |
| Big Amenities | | | -0.05 | | -0.06 | | | | | | | | |
| Small | Restaurant | | | | | | -0.06 | | | | -0.03 | | |
| | Book shops | | | | | | 0.73 | | | | | 0.57 | |
| | Food stores | | | | | | 0.09 | | | | | | 0.04 |
| Big | Amusement | | | | | -0.32 | | -0.26 | | | | | |
| | Cultural | | | | | 0.48 | | | 0.60 | | | | |
| | Sports | | | | | 0.99 | | | | 0.87 | | | |
| Belt | Sun Belt | -0.17 | -0.17 | -0.17 | -0.17 | -0.16 | -0.17 | -0.17 | -0.18 | -0.16 | -0.17 | -0.17 | -0.18 |
| | Rust Belt | -0.47* | -0.47* | -0.47* | -0.47* | -0.45* | -0.46* | -0.47* | -0.46* | -0.46* | -0.47* | -0.46* | -0.46* |
| Regional Effect | West | -0.26 | -0.26 | -0.26 | -0.26 | -0.25 | -0.25 | -0.26 | -0.25 | -0.26 | -0.26 | -0.25 | -0.26 |
| | South | -0.47* | -0.47* | -0.47* | -0.47* | -0.45* | -0.48* | -0.47* | -0.46* | -0.47* | -0.47* | -0.47* | -0.48* |
| | North Central | 0.10 | 0.10 | 0.10 | 0.10 | 0.11 | 0.09 | 0.11 | 0.10 | 0.09 | 0.10 | 0.10 | 0.09 |
| Adjusted R Square | | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table XV. The Relationship between Amenities and the Immigration of Educated Workers: LSDV

| Model | | Dependent Variable : Log (Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.02 | -0.02 | -0.02 | -0.02 | -0.01 | -0.02 | -0.02 | -0.01 | -0.01 | -0.02 | -0.01 | -0.02 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | --0.03 | | | | | | | | | | | |
| Small Amenities | | | -0.03 | -0.03 | | | | | | | | | |
| Big Amenities | | | -0.05 | | -0.10 | | | | | | | | |
| Small | Restaurant | | | | | | -0.06 | | | | -0.05 | | |
| | Book shops | | | | | | 1.26* | | | | | 1.09* | |
| | Food stores | | | | | | -0.01 | | | | | | -0.06 |
| Big | Amusement | | | | | -0.43* | | -0.36* | | | | | |
| | Cultural | | | | | 0.70 | | | 0.83 | | | | |
| | Sports | | | | | 1.10* | | | | 0.96* | | | |
| Belt | Sun Belt | -0.16 | -0.16 | -0.16 | -0.16 | -0.15 | -0.15 | -0.16 | -0.17 | -0.15 | -0.15 | -0.17 | -0.16 |
| | Rust Belt | -0.46* | -0.46* | -0.45* | -0.45* | -0.44* | -0.45* | -0.45* | -0.45* | -0.45* | -0.45* | -0.45* | -0.45* |
| Regional Effect | West | -0.26 | -0.26 | -0.26 | -0.27 | -0.26 | -0.25 | -0.27 | -0.26 | -0.27 | -0.26 | -0.25 | -0.26 |
| | South | -0.46* | -0.46* | -0.46* | -0.47* | -0.44* | -0.46* | -0.46* | -0.45* | -0.46* | -0.47* | -0.46* | -0.46* |
| | North Central | 0.08 | 0.08 | 0.08 | 0.07 | 0.09 | 0.09 | 0.09 | 0.08 | 0.07 | 0.08 | 0.08 | 0.08 |
| Adjusted R Square | | 0.59 | 0.59 | 0.59 | 0.59 | 0.60 | 0.60 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table XVI. The Relationship between Amenities and the Immigration of Young Educated Workers: LSDV

| Model | | Dependent Variable : Log (Young Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.02 | -0.02 | -0.02 | -0.02 | -0.01 | -0.02 | -0.02 | -0.01 | -0.02 | -0.02 | -0.02 | -0.02 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.01* | 0.00* | 0.01* | 0.00* | 0.00* | 0.01* | 0.00* | 0.00* | 0.01* | 0.00* | 0.00* |
| Establishment Total Amenities | | --0.03 | | | | | | | | | | | |
| Small Amenities | | | -0.02 | -0.02 | | | | | | | | | |
| Big Amenities | | | -0.12 | | -0.15 | | | | | | | | |
| Small | Restaurant | | | | | | -0.05 | | | | -0.04 | | |
| | Book shops | | | | | | 1.35* | | | | | 1.21* | |
| | Food stores | | | | | | -0.01 | | | | | | -0.05 |
| Big | Amusement | | | | | -0.47* | | -0.41* | | | | | |
| | Cultural | | | | | 0.70 | | | 0.81 | | | | |
| | Sports | | | | | 0.83* | | | | 0.77* | | | |
| Belt | Sun Belt | -0.17 | -0.17 | -0.17 | -0.17 | -0.17 | -0.16 | -0.17 | -0.18 | -0.16 | -0.16 | -0.17 | -0.17 |
| | Rust Belt | -0.47* | -0.47* | -0.45* | -0.46* | -0.47* | -0.46* | -0.46* | -0.47* | -0.46* | -0.46* | -0.46* | -0.46* |
| Regional Effect | West | -0.26 | -0.26 | -0.25 | -0.25 | -0.26 | -0.25 | -0.26 | -0.26 | -0.25 | -0.26 | -0.26 | -0.26 |
| | South | -0.47* | -0.47* | -0.45* | -0.48* | -0.47* | -0.46* | -0.47* | -0.47* | -0.47* | -0.48* | -0.46* | -0.46* |
| | North Central | 0.10 | 0.10 | 0.11 | 0.09 | 0.11 | 0.10 | 0.09 | 0.10 | 0.10 | 0.09 | 0.08 | 0.08 |
| Adjusted R Square | | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.58 | 0.59 | 0.59 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table XVII. The Relationship between Amenities and the Immigration of Middle Educated Workers: LSDV

| Model | | Dependent Variable : Log (Middle Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.06* | 0.06* | 0.06* | 0.06* | 0.05* | 0.06* | 0.05* | 0.06* | 0.06* | 0.06* | 0.06* | 0.06* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.01 | -0.01 | -0.01 | -0.01 | 0.00 | -0.01 | -0.01 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.02* | 0.02* | 0.02* | 0.02* | 0.02* | 0.02* | 0.02* | 0.00* | 0.02* | 0.02* | 0.00* | 0.00* |
| Establishment Total Amenities | | --0.05 | | | | | | | | | | | |
| Small Amenities | | | -0.06 | -0.05 | | | | | | | | | |
| Big Amenities | | | 0.06 | | -0.04 | | | | | | | | |
| Small | Restaurant | | | | | | -0.09 | | | | -0.08 | | |
| | Book shops | | | | | | 1.42* | | | | | 1.17 | |
| | Food stores | | | | | | 0.00 | | | | | | -0.09 |
| Big | Amusement | | | | | -0.35 | | -0.27 | | | | | |
| | Cultural | | | | | 0.48 | | | 0.63 | | | | |
| | Sports | | | | | 1.31 | | | | 1.18 | | | |
| Belt | Sun Belt | -0.13 | -0.13 | -0.13 | -0.14 | -0.13 | -0.13 | -0.14 | -0.15 | -0.13 | -0.13 | -0.15 | -0.14 |
| | Rust Belt | -0.38* | -0.38* | -0.38* | -0.37* | -0.36* | -0.37* | -0.37* | -0.37* | -0.36* | -0.38* | -0.37* | -0.38* |
| Regional Effect | West | -0.32 | -0.32 | -0.32 | -0.33 | -0.32 | -0.30 | -0.32 | -0.32 | -0.33 | -0.32 | -0.31 | -0.32 |
| | South | -0.48* | -0.48* | -0.48* | -0.48* | -0.46* | -0.48* | -0.48* | -0.47* | -0.47* | -0.48* | -0.48* | -0.47* |
| | North Central | 0.01 | 0.01 | 0.01 | 0.00 | 0.01 | 0.02 | 0.01 | 0.00 | -0.01 | 0.01 | 0.00 | 0.01 |
| Adjusted R Square | | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 | 0.57 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table XVIII. The Relationship between Amenities and the Immigration of Older Educated Workers: LSDV

| Model | | Dependent Variable : Log (Older Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.03* | 0.02* | 0.03* | 0.02* | 0.02* | 0.03* | 0.02* | 0.03* | 0.03* | 0.03* | 0.03* | 0.03* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| | Pupil ratio | -0.01 | 0.00 | -0.01 | 0.00 | 0.01 | -0.01 | 0.00 | 0.01 | 0.00 | -0.01 | 0.00 | 0.00 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | -0.04 | | | | | | | | | | | |
| Small Amenities | | | -0.07 | -0.05 | | | | | | | | | |
| Big Amenities | | | 0.26 | | 0.14 | | | | | | | | |
| Small | Restaurant | | | | | | -0.13* | | | | -0.09* | | |
| | Book shops | | | | | | 0.72 | | | | | 0.37 | |
| | Food stores | | | | | | 0.13 | | | | | | 0.01 |
| Big | Amusement | | | | | -0.29 | | -0.18 | | | | | |
| | Cultural | | | | | 0.98 | | | 1.20* | | | | |
| | Sports | | | | | 1.90* | | | | 1.92* | | | |
| Belt | Sun Belt | -0.15 | -0.15 | -0.15 | -0.16 | -0.15 | -0.15 | -0.16 | -0.18 | -0.14 | -0.15 | -0.17 | -0.17 |
| | Rust Belt | -0.39* | -0.39* | -0.39* | -0.39* | -0.37* | -0.39* | -0.39* | -0.38* | -0.37* | -0.39* | -0.39* | -0.39* |
| Regional Effect | West | -0.27 | -0.26 | -0.27 | -0.27 | -0.26 | -0.26 | -0.27 | -0.26 | -0.28 | -0.27 | -0.26 | -0.27 |
| | South | -0.32 | -0.31 | -0.32 | -0.32 | -0.28 | -0.33 | -0.32 | -0.30 | -0.31 | -0.32 | -0.32 | -0.32 |
| | North Central | 0.11 | 0.10 | 0.11 | 0.09 | 0.11 | 0.10 | 0.10 | 0.10 | 0.09 | 0.11 | 0.09 | 0.09 |
| Adjusted R Square | | 0.51 | 0.51 | 0.51 | 0.51 | 0.52 | 0.51 | 0.51 | 0.51 | 0.52 | 0.51 | 0.51 | 0.51 |
| Number of Observation | | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |

* : Coefficient is significant at the 0.01 level (2-tailed).

**: Coefficient is significant at the 0.05 level (2-tailed).

# CHAPTER VI

# CONCLUSION

## 6.1 Introduction

This dissertation was designed to understand the influence of built amenities on the migration of different groups of workers. Migration patterns were analyzed for workers of different ages and levels of education. Migration patterns between 2005 and 2008 in most major metropolitan areas were studied. After summarizing results the implications of the findings are considered.

## 6.2 Summary of Study

Two research questions guided the study. First, the first group of the hypotheses focused on the relationship between amenities and the non-movement of workers. It was found that there was a significant positive relationship between the non-movement of

workers and food stores as one of the small amenities. The presence of big-ticket amenities was not related to the decision not to leave an area.

In addition, there was not an interesting difference among results based on different age groups of educated workers. For young, middle, and older educated workers only food stores were significantly associated with the decision not to leave an area.

Table XIX. Hypothesis Group I: The Relationship between Amenities and Non-movement*

| Proposition | Workers | Hypothesis | Amenities | Expected sign | Results | Sig |
|---|---|---|---|---|---|---|
| **Proposition 1** The Relationship between Amenities and Non-movement of Workers | General Workers | **H1A** | **Built Amenities** | + | + | |
| | | **H 1A-1** | **Big built amenities** | + | + | |
| | | H1A-1-1 | Amusement | + | - | |
| | | | Cultural | + | + | |
| | | | Sport | + | + | |
| | | **H 1A-2** | **Small built amenities** | + | + | |
| | | H1A-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | * |
| **Proposition 2** The Relationship between Amenities and Non-movement of Educated Workers | Educated Workers | **H2A** | **Built Amenities** | + | + | |
| | | **H 2A-1** | **Big built amenities** | + | - | |
| | | H2A-1-1 | Amusement | + | - | |
| | | | Cultural | + | + | |
| | | | Sport | + | + | * |
| | | **H21A-2** | **Small built amenities** | + | + | |
| | | H2A-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | * |
| **Proposition 3** The Relationship between Amenities Non-movement of Educated Workers | Young Educated Workers | **H3A** | **Built Amenities** | + | + | |
| | | **H 3A-1** | **Big built amenities** | + | - | |
| | | H3A-1-1 | Amusement | + | - | |
| | | | Cultural | + | + | |
| | | | Sport | + | + | |

| | | | | | | |
|---|---|---|---|---|---|---|
| of different ages | | **H 3A-2** | **Small built amenities** | + | + | |
| | | H3A-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | * |
| | Middle Educated Workers | **H3B** | **Built Amenities** | + | + | |
| | | **H 3B-1** | **Big built amenities** | + | + | |
| | | H3B-1-1 | Amusement | + | + | |
| | | | Cultural | + | + | |
| | | | Sport | + | + | |
| | | **H 3B-2** | **Small built amenities** | + | - | |
| | | H3B-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | * |
| | Older Educated Workers | **H3C** | **Built Amenities** | + | + | |
| | | **H 3C-1** | **Big built amenities** | + | + | |
| | | H3C-1-1 | Amusement | + | - | |
| | | | Cultural | + | - | |
| | | | Sport | + | - | |
| | | **H 3C-2** | **Small built amenities** | + | - | |
| | | H3C-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | * |

Note: 1. This table was made by LSDV and individual coefficients of variables

2. * = $\alpha \leq .10$, ** = $\alpha \leq .05$, *** = $\alpha \leq .01$

Second, <Table XX > shows the relationship between immigration and amenities. According to the <Table XX >, there is not a significant relationship between the level of amenities and the immigration of the general workers, including less educated and educated workers when other relevant factors are controlled. However, it is interesting to note that there is a positive relationship between the immigration of educated workers and small amenities such as book shops. The correlation between the immigration of young educated

workers and amenities was also interesting. Sports facilities and book stores were important factors affecting the immigration of young educated workers. However, the correlation between the immigration of middle-aged educated workers is weak. It turns out that every amenity does not correlate to the immigration of middle-aged educated workers. Particularly, older educated workers have more preference for big amenities, such as cultural and sports facilities while, there is a weak correlation between the immigration of older educated workers and small facilities.

Table XX. Hypothesis Group II: The Relationship between Amenities and Immigration*

| Proposition | Workers | Hypothesis | Amenities | Expected sign | Results | Sig |
|---|---|---|---|---|---|---|
| **Proposition 1** The Relationship between Amenities and the Immigration of Workers | General Workers | **H1A** | **Built Amenities** | + | - | |
| | | **H 1A-1** | **Big built amenities** | + | - | |
| | | H1A-1-1 | Amusement | + | - | |
| | | | Cultural | + | + | |
| | | | Sport | + | + | |
| | | **H 1A-2** | **Small built amenities** | + | - | |
| | | H1A-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | |
| **Proposition 2** The Relationship between Amenities and the Immigration of Educated Workers | Educated Workers | **H2A** | **Built Amenities** | + | - | |
| | | **H 2A-1** | **Big built amenities** | + | - | |
| | | H2A-1-1 | Amusement | + | - | * |
| | | | Cultural | + | + | |
| | | | Sport | + | + | |
| | | **H21A-2** | **Small built amenities** | + | - | |
| | | H2A-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | * |
| | | | Food stores | + | + | |
| **Proposition 3** | Young | **H3A** | **Built Amenities** | + | - | |

| | | | | | | |
|---|---|---|---|---|---|---|
| The Relationship between Amenities the Immigration of Educated Workers of different ages | Educated Workers | **H 3A-1** | **Big built amenities** | + | - | |
| | | H3A-1-1 | Amusement | + | - | * |
| | | | Cultural | + | + | |
| | | | Sport | + | + | * |
| | | **H 3A-2** | **Small built amenities** | + | - | |
| | | H3A-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | * |
| | | | Food stores | + | - | |
| | Middle Educated Workers | **H3B** | **Built Amenities** | + | - | |
| | | **H 3B-1** | **Big built amenities** | + | - | |
| | | H3B-1-1 | Amusement | + | + | |
| | | | Cultural | + | + | |
| | | | Sport | + | + | |
| | | **H 3B-2** | **Small built amenities** | + | - | |
| | | H3B-2-1 | Restaurant | + | - | |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | |
| | Older Educated Workers | **H3C** | **Built Amenities** | + | - | |
| | | **H 3C-1** | **Big built amenities** | + | - | |
| | | H3C-1-1 | Amusement | + | - | |
| | | | Cultural | + | + | * |
| | | | Sport | + | + | * |
| | | **H 3C-2** | **Small built amenities** | + | - | |
| | | H3C-2-1 | Restaurant | + | - | * |
| | | | Bookstores | + | + | |
| | | | Food stores | + | + | |

Note: 1. This table was made by LSDV and individual coefficients of variables

2. * = $\alpha \leq .10$, ** = $\alpha \leq .05$, *** = $\alpha \leq .01$

## 6.3 Conclusion

Endogenous growth theorists (Lucas, 1988 and Romer, 1990) have stressed the role of human capital in regional economics. It is widely recognized that countries and regions with higher level of human capital can expect higher growth rates than areas with lower levels of educated workers (Ramos, 2009). Some scholars criticized a narrow definition of human capital. Clark (2000) among others has noted that human capital is not acquired only through formal educational channels. Human capital, in his view, is the set of skills or knowledge that a worker acquires through experience and education. A limitation of this study was its reliance on the years of education as the measure of human capital. It is acknowledged that human capital can be expanded through job-related education and had data been available that measured that growth different results might have been observed. The focus on the migration of human capital or relatively highly educated individuals relates to the concept of "brain drain" and "brain gain." Many countries and regions have suffered through the loss of educated workers. Many elected and community leaders believe amenities are the important factors in the migration of general workers (Rosentraub, 1997) and that relatively highly educated workers place more value on amenities than other groups of workers.

In this dissertation, the simple proposition "amenities attract and retain people" does hold relative to initial moves although the correlation between amenities and migration is not simple to understand. For a detailed discussion, the result from the analysis of the panel data between 2005 and 2008 was explained based on three research questions addressed in the first chapter.

The first research question is “Is there a positive association between the level of amenities in a region and the migration of “general” workers when other relevant factors are controlled?”Answer or insight into this question is related to the relationship between amenities and the migration of general workers including not only educated workers but less educated workers. Some of amenity theorists such Clark, Lloyd, Wong and Jain (2002) have focused on the role of amenities in relation to the migration of general workers because of relative decline in the explanatory power of classical variables affecting the location of development and a rise in the importance of leisure pursuits to workers, including not only educated workers but less educated workers. According to their theory, it should be found that there is a positive relationship between amenities and the migration of general workers. The result in this dissertation supports the part of their theory. There is a positive correlation between food stores, one of small amenities and the “non-movement” of general workers while there is no significant relationship between amenities and the “immigration” of general workers. Food stores are only one significant variable when general workers move. Thus, it can be conclude that the relationship between amenities and the migration of general worker is not stronger than amenity theorists implied it would be.

The second research question is “Is there a relationship between the level of amenities and the migration of educated workers, when other relevant factors are controlled?”As explained in earlier, the important role of educated workers in regional economies was supported by the endogenous growth theory. More recent research has also empirically supported how important human capital is in regional development and growth. Based on a strong interest about educated workers, amenity theorists raised the relevant questions about how to attract and to retain those highly educated workers. According to their theory,

amenities should be a key variable affecting the migration of educated workers. The analysis about the relationship between amenities and the migration of educated workers shows that small amenities such as food stores and bookshops are meaningful when educated workers move or stay in a certain area. Food store are correlated to non-movement while bookshops are correlated with immigration. In addition, the role of big amenities such as sport facilities is strong in the migration of educated workers.

The third research question is "Is there a positive relationship between the level of amenities and the migration of educated workers of different age groups, when other relevant factors are controlled? ". This question addresses how important amenities are when different age groups of educated workers move or stay. The result in the study shows that different age groups of educated workers have different interest about each amenity when they move. In contrast, different age groups have similar tastes for amenities when they consider staying in a certain area. Food stores are only one significant variable affecting the non-movement of different age groups of educated workers.

Results of the analysis about the relationship between the immigration and educated workers based on age groups show that there is a strong relationship between book stores and sports facilities, and the immigration of young workers. Young workers prefer book stores and sports facilities when to move. Every amenity is not significant in the immigration of middle educated workers. Older educated workers consider big amenities including cultural and sport facilities as important factors when they move.

Finally, it is important to note meaningful policy implications drawn from the analysis. First, aggregate variables such as total amenity packages, small and big amenities are not related to migration while some individual amenities such as food stores, book stores,

sports and cultural facilities are related to migration. We can think of two possibilities to explain this result. The first possibility is that the role of total amenity package itself in migration is not as powerful as amenity theorists insist although each individual amenity is important. The other explanation is that local governments have invested in a specific amenity individually without a comprehensive plan to develop amenity packages including both small and big amenities. The result would show the failure of policy strategy that local governments have not known about how to link each individual amenity effectively and to develop both of them together. However, this study does not show how each amenity is connected to other items. Thus, to have more reliable explanation for this result, it is necessary to do a more detailed analysis in future. .

Second, there is a significant relationship between small amenities such as food stores and non-movement while big amenities such as sports and cultural amenities are correlated to the immigration of young and older educated workers. This result shows that small amenities such as food stores that are basic consumption amenities for living are powerful to retain people. Big amenities, more luxury consumption amenities related to enjoyment and leisure are considered as important variables to attract workers into regions.

The result of this study provides a useful ground to think about the relationship between amenities and migration. However, there are a number of important empirical questions that remain unanswered. Thus, it is necessary to recognize that the conclusions drawn from this dissertation are limited by a few factors.

First, one of the major limitations is the time period of the analysis; a longer time horizon might yield different results. Although many local governments have invested amenities to attract and retain workers with skills and knowledge for a long time, there are

lacks of studies to show how these investments have changed and have affected regional economics.

Second, in particular, this study provides insight into one of the potential streams of benefits policy makers can receive from developing built amenities including big and small amenities. This study does not inform policymakers, however, whether it is worth developing these amenities. The positive relationship between amenities and migration does not imply the influence of amenities on the migration. The relationship is essentially a question of causality as to whether "amenities follow people" or "people follow amenities". Determination of causal relationships may require more extensive experimentation. To analyze the role of amenities in the migration of educated workers, it is necessary that future research should explore the causal relationships between them.

Third, this study includes the quantity of amenities, the rate of amenities in regions instead of the quality of amenities. In the 46 years between 1959 and 2005, real per capita income more than doubled in the United States. The rise in real income has led to an increased demand for luxury goods, such as meals in gourmet restaurants and live theater, which are more plentiful in large cities (GSK, Rappaport, 2007). The demand for variety may increase more than proportionately with income, and as high-skill individual account for a larger share of the work force in large cities (Lee, 2004). Thus, it is necessary to analyze the relationship between the migration of educated workers and the quality of consumption amenities. However, this study used the quantity of amenities, because of a lack of data about the quality of amenities. Thus, it remains to be seen how the quality of luxury amenities and basic items affects the migration of educated workers.

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# APPENDIX A. The Result of the Between Effect Model

Table 1-1 The Relationship between Amenities and the Non-movement of General Workers: Between Effect Model

| Model | | Dependent Variable : Log (General Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.05* | 0.04* |
| Social Factor | House Value | -0.00* | -0.0* | -0.0* | -0.0* | -0.0* | -0.0* | -0.0* | -0.0* | -0.00* | -0.0* | -0.0* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 | -0.04 |
| Weather | Annual precipitation | -0.00 | -0.01 | -0.02 | -0.03 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.03 | | | | | | | | | | | |
| Small Amenities | | | 0.03 | 0.03 | | | | | | | | | |
| Big Amenities | | | -0.01 | | -0.05 | | | | | | | | |
| Small | | | | | | | -0.06 | | | | 0.00 | | |
| | Book shops | | | | | | 0.22 | | | | | -0.01 | |
| | Food stores | | | | | | 0.25* | | | | | | 0.19* |
| Big | Amusement | | | | | -0.15 | | -0.07 | | | | | |
| | Cultural | | | | | 0.11 | | | 0.26 | | | | |
| | Sports | | | | | 1.21 | | | | 1.13 | | | |
| Adjusted R Square | | 0.18 | 0.19 | 0.19 | 0.19 | 0.21 | 0.26 | 0.20 | 0.19 | 0.19 | 0.19 | 0.19 | 0.21 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-2 The Relationship between Amenities and the Non-movement of Educated Workers: Between Effect Model

| Model | | Dependent Variable : Log (Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.01 | | | | | | | | | | | |
| Small Amenities | | | 0.01 | 0.01 | | | | | | | | | |
| Big Amenities | | | -0.03 | | -0.01 | | | | | | | | |
| Small | | | | | | | -0.05 | | | | -0.01 | | |
| | Book shops | | | | | | 0.62 | | | | | 0.41 | |
| | Food stores | | | | | | 0.15* | | | | | | 0.10* |
| Big | Amusement | | | | | -0.27 | | -0.18 | | | | | |
| | Cultural | | | | | 0.20 | | | 0.38 | | | | |
| | Sports | | | | | 00.14* | | | | 1.27 | | | |
| Adjusted R Square | | 0.18 | 0.19 | 0.18 | 0.18 | 0.20 | 0.25 | 0.19 | 0.18 | 0.18 | 0.18 | 0.18 | 0.21 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-3 The Relationship between Amenities and the Non-movement of Young Educated Workers: Between Effect Model

| Model | | Dependent Variable : Log (Young Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00 | 0.00* | 0.00 | 0.00* | 0.00* | 0.00 | 0.00* | 0.00* | 0.01 | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.01 | | | | | | | | | | | |
| Small Amenities | | | 0.02 | 0.02 | | | | | | | | | |
| Big Amenities | | | -0.13 | | -0.08 | | | | | | | | |
| Small | | | | | | | -0.04 | | | | 0.00 | | |
| | Book shops | | | | | | 0.77 | | | | | 0.61 | |
| | Food stores | | | | | | 0.13* | | | | | | 0.09* |
| Big | Amusement | | | | | -0.35 | | -0.26 | | | | | |
| | Cultural | | | | | 0.14 | | | 0.30 | | | | |
| | Sports | | | | | 1.33 | | | | 1.09 | | | |
| Adjusted R Square | | 0.16 | 0.17 | 0.16 | 0.16 | 0.18 | 0.23 | 0.17 | 0.17 | 0.16 | 0.16 | 0.17 | 0.19 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-4 The Relationship between Amenities and the Non-movement of Middle Educated Workers: The Between Effect Model

| Model | | Dependent Variable : Log (Middle Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.06* | 0.06* | 0.06* | 0.06* | 0.05* | 0.06* | 0.05* | 0.06* | 0.06* | 0.06* | 0.06* | 0.06* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00* | 0.01 | 0.01 | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.02 | | | | | | | | | | | |
| Small Amenities | | | 0.02 | 0.02 | | | | | | | | | |
| Big Amenities | | | -0.02 | | -0.05 | | | | | | | | |
| Small | | | | | | | -0.04 | | | | -0.00 | | |
| | Book shops | | | | | | 0.43 | | | | | 0.25 | |
| | Food stores | | | | | | 0.16* | | | | | | 0.11* |
| Big | Amusement | | | | | -0.20 | | -0.11 | | | | | |
| | Cultural | | | | | 0.18 | | | 0.35 | | | | |
| | Sports | | | | | 1.46 | | | | 1.35 | | | |
| Adjusted R Square | | 0.19 | 0.20 | 0.19 | 0.20 | 0.22 | 0.26 | 0.21 | 0.20 | 0.19 | 0.19 | 0.20 | 0.22 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-5 The Relationship between Amenities and the Non-movement of Older Educated Workers: Between Effect Model

| Model | | Dependent Variable : Log (Older Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.03* | 0.02* | 0.03* | 0.02* | 0.02* | 0.03* | 0.02* | 0.03* | 0.03* | 0.03* | 0.03* | 0.03* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| | Pupil ratio | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 | -0.03 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | 0.00 | | | | | | | | | | | |
| Small Amenities | | | 0.00 | 0.00 | | | | | | | | | |
| Big Amenities | | | -0.07 | | -0.06 | | | | | | | | |
| Small | | | | | | | -0.08 | | | | -0.03 | | |
| | Book shops | | | | | | 0.58 | | | | | 0.29 | |
| | Food stores | | | | | | 0.17* | | | | | | 0.10* |
| Big | Amusement | | | | | -0.23 | | -0.13 | | | | | |
| | Cultural | | | | | 0.34 | | | 0.53 | | | | |
| | Sports | | | | | 1.58 | | | | 1.49 | | | |
| Adjusted R Square | | 0.31 | 0.34 | 0.31 | 0.33 | 0.33 | 0.33 | 0.33 | 0.31 | 0.31 | 0.31 | 0.31 | 0.32 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (2-tailed).

**: Coefficient is significant at the 0.05 level (2-tailed).

Table 1-6 The Relationship between Amenities and the Immigration of General Workers: Between Effect Model

| Model | | Dependent Variable : Log (General Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.04* | 0.05* | 0.04* | 0.05* | 0.04* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.02 | -0.02 | -0.02 | -0.02 | -0.01 | -0.02 | -0.02 | -0.01 | -0.01 | -0.02 | -0.02 | -0.02 |
| Weather | Annual precipitation | -0.00 | -0.01 | -0.02 | -0.03 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | -0.00 | | | | | | | | | | | |
| Small Amenities | | | 0.00 | 00.00 | | | | | | | | | |
| Big Amenities | | | -0.05 | | -0.05 | | | | | | | | |
| Small | Restaurant | | | | | | -0.05 | | | | -0.02 | | |
| | Book shops | | | | | | 0.72 | | | | | 0.52 | |
| | Food stores | | | | | | 0.09 | | | | | | 0.04 |
| Big | Amusement | | | | | -0.38 | | -0.28 | | | | | |
| | Cultural | | | | | 0.43 | | | 0.61 | | | | |
| | Sports | | | | | 1.47* | | | | 1.29 | | | |
| Adjusted R Square | | 0.18 | 0.19 | 0.19 | 0.19 | 0.21 | 0.26 | 0.20 | 0.19 | 0.19 | 0.19 | 0.19 | 0.21 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-7 The Relationship between Amenities and the Immigration of Educated Workers: Between Effect Model

| Model | | Dependent Variable : Log (Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.02 | -0.02 | -0.02 | -0.02 | -0.01 | -0.02 | -0.02 | -0.01 | -0.01 | -0.02 | -0.01 | -0.02 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | -0.02 | | | | | | | | | | | |
| Small Amenities | | | -0.02 | -0.03 | | | | | | | | | |
| Big Amenities | | | -0.05 | | -0.09 | | | | | | | | |
| Small | | | | | | | -0.05 | | | | -0.03 | | |
| | Book shops | | | | | | 1.25 | | | | | 1.07 | |
| | Food stores | | | | | | -0.01 | | | | | | -0.06 |
| Big | Amusement | | | | | -0.49 | | -0.39* | | | | | |
| | Cultural | | | | | 0.66 | | | 0.86 | | | | |
| | Sports | | | | | 1.60 | | | | 1.37* | | | |
| Adjusted R Square | | 0.18 | 0.19 | 0.18 | 0.18 | 0.20 | 0.25 | 0.19 | 0.18 | 0.18 | 0.18 | 0.18 | 0.21 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-8 The Relationship between Amenities and the Immigration of Young Educated Workers: Between Effect Model

| Model | | Dependent Variable : Log (Young Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.05* | 0.04* | 0.05* | 0.05* | 0.04* | 0.05* | 0.04* | 0.05* | 0.05* | 0.05* | 0.05* | 0.05* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.02 | -0.02 | -0.02 | -0.02 | -0.01 | -0.02 | -0.02 | -0.01 | -0.02 | -0.02 | -0.02 | -0.02 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.01* | 0.00* | 0.01* | 0.00* | 0.00* | 0.01* | 0.00* | 0.00* | 0.01* | 0.00* | 0.00* |
| Establishment Total Amenities | | -0.02 | | | | | | | | | | | |
| Small Amenities | | | -0.01 | -0.02 | | | | | | | | | |
| Big Amenities | | | -0.14 | | -0.15 | | | | | | | | |
| Small | | | | | | | -0.04 | | | | -0.02 | | |
| | Book shops | | | | | | 1.40* | | | | | 1.24* | |
| | Food stores | | | | | | -0.01 | | | | | | -0.05 |
| Big | Amusement | | | | | -0.54* | | -0.45* | | | | | |
| | Cultural | | | | | 0.65 | | | 0.83 | | | | |
| | Sports | | | | | 1.43* | | | | 1.16* | | | |
| Adjusted R Square | | 0.16 | 0.17 | 0.16 | 0.16 | 0.18 | 0.23 | 0.17 | 0.17 | 0.16 | 0.16 | 0.17 | 0.19 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-9 The Relationship between Amenities and the Immigration of Middle Educated Workers: The Between Effect Model

| Model | | Dependent Variable : Log (Middle Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.06* | 0.06* | 0.06* | 0.06* | 0.05* | 0.06* | 0.05* | 0.06* | 0.06* | 0.06* | 0.06* | 0.06* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Pupil ratio | -0.01 | -0.01 | -0.01 | -0.01 | 0.00 | -0.01 | -0.01 | 0.00 | -0.01 | -0.01 | -0.01 | -0.01 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.02* | 0.02* | 0.02* | 0.02* | 0.02* | 0.02* | 0.02* | 0.00* | 0.03* | 0.02* | 0.00* | 0.00* |
| Establishment Total Amenities | | --0.04 | | | | | | | | | | | |
| Small Amenities | | | -0.05 | -0.05 | | | | | | | | | |
| Big Amenities | | | 0-0.06 | | --0.03 | | | | | | | | |
| Small | | | | | | | --0.08 | | | | --0.06 | | |
| | Book shops | | | | | | 1.31 | | | | | 1.04 | |
| | Food stores | | | | | | -0.01 | | | | | | -0.09 |
| Big | Amusement | | | | | --0.41 | | --0.30 | | | | | |
| | Cultural | | | | | 0.48 | | | 0.70 | | | | |
| | Sports | | | | | 1.82* | | | | 1.62 | | | |
| Adjusted R Square | | 0.19 | 0.20 | 0.19 | 0.20 | 0.22 | 0.26 | 0.21 | 0.20 | 0.19 | 0.19 | 0.20 | 0.22 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).

Table 1-10 The Relationship between Amenities and the Immigration of Older Educated Workers: Between Effect Model

| Model | | Dependent Variable : Log (Older Educated Migration Rate) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Economic Factor | Income | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Log(Employment) | 0.03* | 0.02* | 0.03* | 0.02* | 0.02* | 0.03* | 0.02* | 0.03* | 0.03* | 0.03* | 0.03* | 0.03* |
| Social Factor | House Value | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* | -0.00* |
| | Crime Rate | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| | Pupil ratio | -0.01 | 0.00 | -0.01 | 0.00 | 0.01 | -0.01 | -0.01 | 0.01 | 0.00 | -0.01 | 0.00 | 0.00 |
| Weather | Annual precipitation | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 | -0.00 |
| | Average January temperature | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* | 0.00* |
| Establishment Total Amenities | | -0.03 | | | | | | | | | | | |
| Small Amenities | | | -0.06 | -0.04 | | | | | | | | | |
| Big Amenities | | | 0-0.29 | | 0-0.19 | | | | | | | | |
| Small | | | | | | | -0.12* | | | | -0.07 | | |
| | Book shops | | | | | | 0.85 | | | | | 0.41 | |
| | Food stores | | | | | | 0.14 | | | | | | 0.03 |
| Big | Amusement | | | | | -0.26 | | -0.13 | | | | | |
| | Cultural | | | | | 0.96 | | | 1.21* | | | | |
| | Sports | | | | | 2.14 | | | | 2.16* | | | |
| Adjusted R Square | | 0.31 | 0.34 | 0.31 | 0.33 | 0.33 | 0.33 | 0.33 | 0.31 | 0.31 | 0.31 | 0.31 | 0.32 |
| Number of Cross Sections | | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 | 215 |
| Time Series Length | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

* : Coefficient is significant at the 0.01 level (1-tailed).

**: Coefficient is significant at the 0.05 level (1-tailed).