The Effect of Regional Quality of Life on College Completion and the Creation of Human Capital in the United States

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Prior research has been conducted examining the effects of multiple attributes' affect on persistence and graduation rates at higher education institutions (HEIs). This research has examined individual, family, peer, neighborhood, and institutional characteristics and their relationship with college graduation rates. There has been very little research conducted on the relationship of regional quality of life (QoL) on educational attainment. This study examined nine separate aspects (Income and Wealth, Housing, Educational Attainment, Work/Life Balance, Health Status, Personal Security, Environmental Quality, Social Capital, and Jobs and Earnings) of QoL to determine their relationship with the graduation rates at both two- and four-year HEIs. It was found that relationships exist between most of the social indicators of QoL and graduation rates. These findings lead to areas of interest that the stakeholders in higher education can consider when making policy changes that effect human capital development.

Dedication

I dedicate this dissertation to my amazing wife, Jen Haight. Thank you!! It was because of her support, encouragement, and support, which provided me with the motivation to complete this dissertation.

I also dedicate this dissertation to my in-laws, Hal and Donna Beyer, who provided a great deal of support in times of need. I also want to thank Hal for reading through the dissertation and providing edits and comments.

Acknowledgment

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CHAPTER 1

INTRODUCTION

The United States, over the past several decades have shifted from being an economy that was primarily based on firms utilizing manual labor into firms utilizing knowledge labor. This shift in the labor market has occurred, as many manufacturing jobs are outsourced to other countries. The United States currently ranks 14th in the world, in the percentage of the population with college degrees (Schleicher, 2012). At the same time, only a fraction of students who enter four-year higher education institutions (HEIs) graduate with a baccalaureate degree six years later (Aud, Hussar, & Kena, 2012). In addition, the increase in health and technological fields has spurred the need for increased human capital. This change in the type of firms operating in the United States requires a workforce of individuals who a possess higher education credential. This can be seen as an inefficiency in higher education production.

To be competitive in the world economy the United States will need to increase the percentage of the population with a higher education credential. The success of the number of college graduates each year relates to increases in human capital, and subsequently increased economic development (Rosen, 1989; Sweetland, 1996; Topel, 1999). The larger percentage of college graduates is directly related to improved economic development in the United States and regions within the nation (Brown & Lauder, 1996; Gottlieb & Fogarty, 2003; Mincer, 1996). The Executive Branch of the Federal Government has stated that one of its policy goals is to increase the number of students who graduate with baccalaureate degrees (The White House, United States Government, 2013).

To increase the number of individuals with higher education, an increase in graduation rates must occur at HEIs. To accomplish this goal, factors that effect educational attainment need be identified. There are known factors that affect both the individual and the institution directly. Factors that have an effect on the individual include: family characteristics, peer characteristics, and institutional effects. Institutional factors include: governmental policy, institutional policy, and regional quality of life (QoL).

In typical markets it is far less expensive to retain consumers than it is to recruit new consumers (Czepiel & Rosenberg, 1983). This is true for HEIs as it has been estimated that it can cost three to five times more to recruit a new student then it is to retain a current student (Bean, 2012; Cuseo, 2003; Schuh & Gansemer-Topf, 2012). A 2011 report by Noel-Levitz found that four-year private institutions spend $2,185 per student and four-year public institutions spend $457 per student to recruit a new student (Noel-Levitz, LLC., 2011). CollegeMeasure.org estimates that all four-year HEIs in the United States spent $4.46 billion educating first-year, full-time students who did not return for their second year (CollegeMeasures.org, 2013).

Retaining a larger number of students in consecutive semesters eases the financial burden of recruiting additional students each year. Therefore, institutions able to retain additional students year-to-year and progress them to on-time graduation will see larger financial benefits. Having a larger proportion of students graduating can also benefit an institution by increasing its reputation and attracting additional students to enroll.

It has been observed when the economy moves into a recession, there is an increase to the total number of individuals who enroll in HEIs (R. Fry, 2010; Paulsen, 1990). Typically when the economy is in a recession, less jobs are available and individuals have a lower opportunity cost to attend college. The reverse of this

is also true. As the economy moves out of a recession and the job market improves, individuals drop out of college to rejoin the workforce. Therefore, graduation rates may be effected by the strength of the economy. The graduation rate for that period will be impacted if there is an improvement to the economy and a number of individuals drop out of college.

Federal and state governments, along with HEIs, and public policy centers have identified some factors that affect a student's ability to persist from their freshman year through graduation. The majority of the literature to this point have focused on characteristics of the student and their family (Brand & Xie, 2010; W. H. Sewell & Shah, 1967; Teachman, 1987) and characteristics of the HEI (Astin, 1984; Carey, 2004; Spady, 1970; Tinto, 1975). HEIs can implement programs that mitigate the effects from known factors related to certain characteristics of the student and their family. HEIs have made changes or additions to the type of programs (academic and co-curricular) that are offered based upon successes and best practices from other institutions. However, there are factors outside of the direct control of the HEI and the student that influence and impact whether that student will persist through their undergraduate academic careers.

This study will explore the effect that neighborhood and environmental factors of QoL have on the graduation rates at HEIs. Utilizing a multi-variable fixed-effects model, this study will use these social indicators to understand the relationship with graduation rates. Where possible, changes to QoL can be created through activities conducted by stakeholders including governments, institutions, and organizations (i.e. businesses and non-governmental). This study can lead to the identification of policy mechanisms that can be employed by governments to increase graduates and overall human capital. HEIs will benefit from the identification of social indicators to provide them with information related to their interaction with the region. This is accomplished through partnerships with

businesses and government, service activities, and educational programs.

This study will utilize social indicators (e.g. material wellbeing, health, safety, family life, community life, climate, job security, and gender equality) to approximate the regional QoL of metropolitan regions in the United States. The identified social indicators for each metropolitan region will be used as regressors to determine if there was an effect on an HEI's graduation rate. Graduation rates are presented as the percentage of students who completed their program within 100 or 150 percent of normal time to completion.

Problem Statement

Of all of the first-time, full-time students who started at a four-year HEI in the fall of 2004, only 58 percent of students attained their degree within 150% of normal completion time (6 years) (Aud et al., 2012). Figure 1 illustrates that of five nationwide cohorts from 2000 to 2004, the graduation rates for all students within six years were under 60% (National Center for Education Statistics, 2013). Meaning that over 40% of those students either dropped out of college or were still taking courses after six years. This is a large portion of students who had utilized resources of an institution and of the government and failed to produce the final outcome of degree attainment within six years.

There are a number of stakeholders who would like to see an increase in the graduation rates at HEIs. Institutions attempt to increase their own graduation rates in order to increase their reputation, which leads to easier recruitment of new and more qualified students (Breu & Raab, 1994; Monks & Ehrenberg, 1999; Volkwein & Sweitzer, 2006). Governments are also looking for ways of increasing the number of students who attain degrees in a reasonable time frame. Governments are interested in having a larger number of graduates, as they are able to enter the workforce at a higher level than those without a degree. These

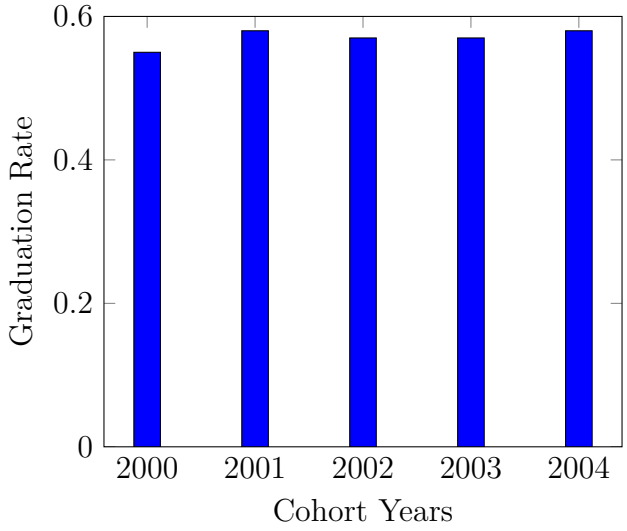

Figure 1. Six Year Graduation Rates of Four Year HEIs for Cohorts starting in the years 2000 to 2004.

graduates add human capital to the region, as well as the nation, which further boosts the economy (Benhabib & Spiegel, 1994; Tamura, 2006). The nation also understands that individuals with college degrees contribute more time to service, consume less public services, and commit fewer crimes (Tinto, 2004).

The federal government is further interested in increasing the graduation rates of baccalaureate institutions to mitigate the increasing student debt load that individuals with and without degrees are holding (The American Council on Education (ACE), 2010). The quicker a student graduates, the lower the student debt. The lower the student debt and with college graduates earning more than non-college graduates, on average, student debt should be paid off in a shorter time frame (Pew Research, 2014; U.S. News & World Report, 2008).

Purpose Statement

The purpose of this study is to describe the effect that social indicators of QoL have on graduation rates at two- and four-year HEIs in the United States. This study explores whether HEIs that are located in regions with a higher perceived QoL

will have students who graduate faster than HEIs in regions with lower perceived QoL. Exploring the rationale that if a region enjoys a higher QoL, certain personal needs of students within the HEIs are more easily satisfied. Research has been conducted on the effect of individual QoL measures on student success (Pascarella, 2006), however there has not been any research conducted on regional QoL as externalities of an HEI and the effects QoL has on the overall institutional success.

Studies have shown that if an individual attains a college degree it increases that individual's QoL (Michael, 1982; Pascarella, 2006). The attainment of formal education increases productivity in non-labor-market activities that are related to perceived QoL. These personal increases to QoL are partially due to psychological and sociological impacts that formal education has on a particular individual (Campbell, 1981; Witter, Okun, Stock, & Haring, 1984).

Individuals who have obtained college degrees will often migrate to areas with higher perceived QoL (Whisler, Waldorf, Mulligan, & Plane, 2008a). One explanation for this migration is that individuals will move to regions with a particular basket of amenities that satisfy their needs. Selection of region due to amenities is related to Tiebout effects, where individuals vote for particular amenities by moving to different regions (Tiebout, 1956).

Individuals deciding to attend a college/university would make similar decisions on the amenities at the HEI and the region. Ideally, individuals would be making choices of the HEI to attend based upon those amenities that would lead the individual to the 'good-life' and would satisfy their individual needs.

However, not all individuals have the luxury of choosing to live in regions with a high QoL due to financial and social constraints. There are also some individual motivational factors associated with degree attainment. An individual's needs and wants may change over the course of their degree program affecting the pursuit of degree attainment. A student may simply be more interested in staying

in college for a longer period of time for a variety of reasons.

The influence of neighborhood and environmental factors of QoL effect HEIs directly. Regions in which HEIs operate have a perceived QoL that can influence who works for the HEI, the types of businesses that are associated with the HEI, the level of support by public and private sources, and the type of students that are willing to live in the region. Regions with a higher QoL will attract more skilled and knowledgeable individuals, which thereby increases the human capital available for employment at an HEI or other organizations (Brasington & Hite, 2005; Rudzitis, 1999; van Kamp, Leidelmeijer, Marsman, & de Hollander, 2003). HEIs who understand the relationships between neighborhood and environmental factors would be more able to respond to the needs of their students and the surrounding community.

Research Question

In order to effectively understand the effects of regional QoL on degree production, this study will be guided by the following question:

1. Does regional QoL, as measured by social indicators, have a positive or negative effect on HEI graduation rates?

Definition of Terms

Higher Education Institution (HEI): HEIs are any accredited, public and private university or college that is degree-granting. For the purpose of this study, the term HEI will be used exclusively to mean any accredited, public or private university or college that grants two- or four-year degrees. HEIs that grant only certificates or only advanced degrees were excluded from this study.

Degree Attainment/Status Attainment: The terms degree attainment and status attainment are used interchangeably in the literature; these terms are used to

describe an individual who has met all requirements of the HEI and appropriate accrediting bodies to graduate with a particular degree. There are some nuanced differences between degree and status attainment, where degree relates directly to academia, and status attainment relates to any event in a person's life that changes their status in society (a baccalaureate degree being just one instance).

100% Time to Graduation Rate: The measure of 100% of normal time to graduation is used to capture the number of students who are graduating from a HEIs within four years. If a student drops out and then resumes at the institution, the break period is included in the time calculation. All first-time, first-year students who graduate within four years from beginning at the HEI are included in the 100% completion time measure.

150% Time to Graduation Rate: The use of 150% of normal time to graduation was chosen as the measure of a reasonable time to graduation. This time is calculated from the time a first-time, undergraduate student begins at a postsecondary institution to the time they graduate. If a student drops out and then resumes at the institution, the break period is included in the time calculation. All first-time, first-year students who graduate within six years of matriculation are included in the 150% completion time measure.

Quality of Life (QoL): Quality of life is composed of multiple variables and is a subjective sum of the physical, mental, social, well-being of an individual or group of individuals (Carr, Gibson, & Robinson, 2001; Cella, 1994; Diener & Suh, 1997). This measure is a subjective or perceived measure of the satisfaction or dissatisfaction of one's environment. QoL in this study is the perceived, regional level of satisfaction with the environmental components that effect the overall well-being of a group of individuals.

Social Indicators: A social indicator is a statistic of observable civil and societal phenomena used to approximate group behavior (Bauer, 1966; Land, 1971;

Zapf, 1972). Approaches to measuring social indicators include the normative well-being indicator, the satisfaction indicator, and the descriptive social indicator methods (Land, 1983). The normative well-being indicator method uses output variables that are a measure of a number of items within a predefined area. The satisfaction indicators method attempts to measure the social-psychological state of the population to determine how satisfied each individual is with their life. Finally, the descriptive social indicator method is a more general model that assumes that these variables measure both objective and subjective well-being and that changes occur over time for different portions of the population. Examples of social indicators can be found in Table 1. This study utilized the descriptive social indicator method as the approach of identifying social indicators leading to quality of life.

Core Based Statistical Areas (CBSAs): A Core Based Statistical Area (CBSA) is a combined term for metropolitan and micropolitan regions within the United States as defined by the Office of Management and Budget (OMB). A metropolitan region describes any core urban area with a population greater than or equal to 50,000 individuals. A micropolitan region describes any core urban area with a population greater than or equal to 10,000 and less than 50,000 individuals. The CBSA includes the main county of the urban core and any adjacent counties with social and economic integration (United States Census Bureau, 2013). Appendix A is the map of the United States with each CBSA highlighted.

Table 1
Social Indicators of Quality of Life as defined by the OECD.

Material Conditions
Income and Wealth
Household net adjusted disposable income per person
Household financial net wealth per person
Jobs and Earnings
Employment rate
Long-term unemployment rate
Housing
Number of rooms per person
Dwelling with basic facilities
Quality of Life
Health Status
Life-expectancy at birth
Self-reported health status
Work and Life
Employees working very long hours
Time devoted to leisure and personal care
Education and Skills
Educational attainment
Students' cognitive skills
Social Capital
Contacts with others
Social network support
Civic Engagement and Governance
Voter Turn-out
Consultation on rule-making
Environmental Quality
Air pollution
Personal Security
Intentional homicides
Self-reported victimization
Subjective Well-being
Life-satisfaction

Source: (Organisation for Economic Co-operation and Development, 2011).

CHAPTER 2

REVIEW OF THE LITERATURE

There are numerous factors and characteristics that contribute to a student attaining a degree from an HEI, and thereby affects the overall production of degrees by HEIs. This section begins with an examination of the pertinent theories related to status attainment; a look at why students pursue and ultimately attain educational (i.e. K-12 and Higher Education) degrees. This allowed for prior theory to inform the development of a theoretical framework for this study which drove the conceptualization of the institutional degree production function. These prior theories also provided a particular lens to view this study and drive the discourse.

To further set the stage, an examination of the literature over the past several decades was conducted to explain the various factors and characteristics that affect an individual student's ability to attain educational degrees. Looking at the micro-level of educational attainment helps inform the study and analysis.

This section examined literature to establish the institutional factors that HEIs have control over and how those factors affect degree attainment at the university level. These institutional factors typically include physical space, faculty and staff, overall climate, campus safety, faculty support of students, academic rigor of the institution, and the student's involvement, among others. Institutional factors distinguish HEIs from one another within a metro/micropolitan region for multiple reasons. Students may choose a particular institution for one reason or another, which thereby affects the initial input of that institution. If an HEI does not have the student to begin with, that institution cannot educate and ultimately graduate that student. This entire process is the production of the degree.

Secondly, these factors also affect the student while at the institution. If there is not enough funding, the environment of the institution is not supportive enough, or the university is not safe enough that student may drop out and not graduate.

Lastly, prior research on QoL and the effects that the neighborhood and environmental factors have on individuals and various firms was explored to determine the effect that these factors have on educational attainment. The interplay between the natural, physical/built, socio-economic, community, and perceived environment and graduation rates will be explored through the literature, demonstrating the link between the environment and the individual living the 'good-life'. Social indicators of QoL are objective and quantifiable variables that approximate the perceived level of an individual being able to live the 'good-life'.

Human Capital and Higher Education as a Market

In order to account for the discrepancies between the amount of physical capital and labor in the United States, to the growth of income, scholars began to investigate human capital (Becker, 1964). It was noted that the amount of physical capital and labor was not able to equate to the change in growth of income and that there must be something else adding value to the economy. Human capital was found to be the missing variable, when included in the aggregate, a closer estimation of economic development was able to be conducted.

Human capital in its simplest terms, refers to the education and training an individual receives. However, human capital is also the economic value of the total productive resources (knowledge, skills, and abilities) which all individuals possess and have attained to perform labor (Blundell, Dearden, Meghir, & Sianesi, 1999). To further define knowledge, skills, and abilities: abilities are the talents an individual possesses which are either acquired or innate. Knowledge represents the information and qualifications that an individual obtains from formal education (i.e.

K-12, vocational, and Higher Education), and skills that are acquired through training and include competencies and expertise in a particular area. An educational degree is the level of formal education an individual has received and certifies they have a particular level of knowledge; some degrees may also certify that the individual has a particular set of skills (i.e. vocational degrees). An educational degree signals to the market that an individual possesses the required bundle of knowledge, skills, and abilities for a particular job.

Educational degree production is an important measure as it is an observed variable that represents a type of human capital. Human capital can be created through various means, including: formal education, on-the-job training, auto-didacticism, and any other means in which an individual is able to acquire new knowledge, skills, and abilities (Becker, 1962; Schultz, 1961). To focus specifically on formal education, particularly higher education, the HEI (*the firm*) utilizes its resources (capital and labor) to provide a specialized service; the production of human capital for the education of the individual (*the consumer*) who has decided to attend that particular institution (Becker, 1964). The firm charges a rate in exchange for the service to the consumer. If the consumer is willing to pay for educational services they will enter the market for education. Typically, the consumer does not bear the full cost of the education, in the United States and many developed nations, as higher education has been deemed a public good (Becker & Tomes, 1994; Heckman, 1999, 2000; P. M. Romer, 1989). The costs of attending a HEI is subsidized by the government and non-profits in the form of reduced in-state tuition, scholarships, grants, and low interest loans. The student makes a decision to give up the ability to make a full wage during the educational period in return for higher future wages.

The consumer. The cost (i.e. monetary, labor, and capital) associated with the creation of human capital combined with the diminishing utility associated

with education, creates a downward-sloping demand for education. This means that individuals will only consume a particular amount of education to the point that they are satisfied. An individual's utility for education is based on a number of factors that include their preferences, experiences, opportunity costs, and externalities. This demand is elastic because individuals have alternatives to attending a higher education institution, such as directly entering the work-force in order to earn an immediate wage (Becker, 1964). Because higher education operates as a market, consumers make decisions about whether to attend an institution and to exit the institution prior to completing all requirements for the degree. Consumer preferences play a large part in decisions made around higher education. The individual's decision making process and preferences are influenced by outside factors, which I will show are associated with social indicators of regional quality of life.

A factor that a rational individual uses to make the decision to consume additional education is whether the increased personal human capital will gain them increased wages in the future. If an individual does not consume additional education they will drop out of education and will not ultimately graduate; students in aggregate at an HEI who do not consume additional education will affect the institution's graduation rate. An individual will decide whether to take this path when they determine that the costs and benefits (present and future) outweigh that of the next best alternative. This decision to forgo the next best alternative, includes a number of factors as discussed above. However it is not just one factor that makes an individual decide to consume education.

Individuals who decide to attend a HEI not only have to forgo possible higher wages in the short-run but must also forgo direct and indirect wages, reducing their net earnings. Individuals examine their net earnings while in school and potential lifetime net earnings after consuming education. They compare this with the net

earnings the individual could earn if they drop out and enter the workforce. The equation below illustrates the net earnings of a student while consuming education:

$$W = MP_0 - (MP_0 - MP + k) = MP_0 - C \quad \text{(i)}$$

where W represents wages; MP is the marginal product (approximately equal to earnings); MP_0 is the marginal product that the student could have received if working and not attending a HEI; k are direct schooling costs; and C are direct and indirect schooling costs (Becker, 1964).

There are also a number of other factors that influence a individual to attend a HEI. These factors include: family, peer, teacher, and environmental effects. Similar factors also play a large part in determining if the student will stay in school and finish their degree. All of these factors interact with one another in the individual's decision to increase their personal human capital.

The firm. Higher education institutions' main business is to provide a service - the formal education of students. Rather then the institution (the firm) charging for the final product or outcome (graduation) as in most markets, the institution charges tuition and fees for services rendered at a period of time (Rothschild & White, 1995). Therefore, it is possible for a student to pay enough money to graduate, but have not completed the necessary requirements for graduation. However, this sort of price model is not unique to education; Health care and law firms utilize similar models where individuals pay for the services rendered and not the final outcome (e.g. being healthy or winning the case, respectively).

HEIs resemble non-profit firms in many ways, as they must be able to create revenue to support their operations (Winston, 1999). HEIs must ensure that their revenues exceed their expenditures as a means of continuing operations and quality improvement. Most HEIs do not focus on the typical profit maximization model,

but rather a model of what has been termed "prestige maximization" (Clotfelter, 1996; James, 1990). Institutions strive toward being an excellent college or university, providing premier services to the students and community. Anecdotally, this can be seen in many of the vision and mission statements for higher education institutions or their academic units, with statements of "being the premier educator" or "the preeminent school". The drive of being the best is part of academia's DNA, where it is part of the daily function of an institution to push the envelope and make continual changes in order to add to the body of knowledge.

A measure of the quality of an institution can be linked to the quality of the students that are enrolled in the institution, because a large effect on the quality of the education depends on the quality of the student's peers (Winston, 1999). A quantitative factor, typically a good indicator of institutional quality, is that of the institution's average student performance scores (i.e. ACT and SAT scores) (Long, 2010). If students are thought of as a raw material, it can be assumed that the higher the quality of the raw material, the higher the quality of the final product will be. Therefore, HEIs who admit students with higher performance scores will see students graduating, being of a higher caliber. Students differ from the typical construct of raw material because, individually, they grow personally, professionally, academically, and incrementally throughout their education. An individual's interactions with one another can have profound effect on the learning of one another. A student is more dynamic than that of raw material. HEIs starting with students whom have acquired higher performance scores will see the growth from the start to end of their academic career and will, on average, be higher than that of students with lower performance scores.

Firms are also affected by the environment, where the QoL of the region has an affect on their employees (Herzog & Schlottmann, 1989; Salvesen & Renski, 2002). These environmental factors influence the individuals within the firm, such

that firms in a region with a better QoL will see their employees be more productive than firms in regions with a lower QoL, *ceteris paribus*. In the case of HEIs, the raw material (students) are also affected by the QoL of the region. If this assumption is similar to employees, HEIs in regions with a better QoL should experience their students out-performing those compared to HEIs in regions with a lower QoL, *ceteris paribus*.

The product. The production of training by a HEI, at first glance would appear similar to that of other firms. The final product of an institution, a diploma or certification, is that the individual has met all requirements to earn an educational title. This degree in part is a standardized good, as on the surface all degrees represent one thing, that the individual whom the degree was issued to has completed a particular training. However, when examining the difference of education individuals receive from two institutions, there is uncertainty whether a Bachelor of Arts in Political Science is identical if received from an ivy league institution as opposed to a state institution, and by that fact, within the same institution. The raw material (matriculating students) are of different abilities, from different backgrounds, had different experiences, and with differing motives. This is true within institutions and states, as each HEI and state has its own admission and graduation standards and students select based on individual preferences, where to attend. A student may choose to stay in their home state to be close to family rather than move out of state to attend a more prestigious institution. Peers may play a role in influencing the individual to attend one institution over another, and of course, grades make an enormous impact on where a student may even be considered or offered admission.

The time at the institution can also have a impact on the ultimate product of attending the HEI. During the student's time at each institution an individual may choose different courses and electives, and have different co-curricular and

extra-curricular activities. A student who elects to take an internship at a local business may have different employment opportunities after graduation than the student who chooses to take an easy elective, in order to have extra time to socialize with friends. It may also turn out that the student who chooses to socialize may, in fact, make a very important connection that could lead to employment after graduation. No one decision is always better than another, it just leads students down different paths, and allows for specialized training within predetermined educational constructs. Overall, institutions are not creating the same good. The degrees are standardized goods, whereas, the actual training is non-standardized and specialized. Also, we can say that a four-year degree from an 'ivy league' university is valued differently than that of a four-year degree from a regional state university.

Overall, each HEI provides very unique and specialized education for their region and the nation. These institutions provide services for varying levels of socio-economic status, student educational level, and student preferences. Each student who successfully graduates from a HEI has an increased level of human capital and therefore can add to the economic growth and development of his or her region and nation.

Economic growth and development. If a student elects to attend a HEI, that individual is making this decision in order to increase their future earning capabilities (Mincer, 1984). Increases to individual human capital can increase the individual's income growth, as far as they apply their instilled human capital to do so. If these increases to individual human capital are aggregated, an increase to the aggregate, national economic development will occur (Lucas, 1988; P. Romer, 1990). In addition, including human capital into the Solow growth model does show that economic growth differences among countries can be explained not just in savings and population growth, but also through education (Mankiw, Romer, & Weil, 1992). In a study by Cohen and Soto, the measure of human capital was captured

with the length of education of the population in years (D. Cohen & Soto, 2007).

Hanushek and Kimko discuss education as an input to production which relates education to a country's growth (2000). Therefore the growth rate of a country is directly related to the stock of human capital. Utilizing international test scores from the International Association for the Evaluation of Education Achievement (IEA) and the International Assessment of Education Progress (IEAP), Hanushek and Kimko found a direct relationship between the quality of education and per capita growth rates. It can be assumed that the stock of human capital is influenced more by the quality of education than the quantity of education; it is better to have individuals educated by top minds then a large number of individuals educated by the average mind. Barro and Lee utilized the total years of education for the adult population, student-teacher ratios, and school dropout rates to approximate the current level of educational quality (1997; 2001). Utilizing panel data, Barro determined that growth rates had a statistically significant and positive relationship with the male population at all educational levels, but the study found no relationship between female educational attainment and growth rates (2001).

Educational Production Function

An educational production function (EPF) is a means to measure the inputs from students, families, peers, educational institution, and environment; the EPF estimates a educational institution's output, or more specifically the productivity of the graduates (Bowles, 1970; Krueger, 1999). Hanushek states that it is important to understand the conceptual nature of educational production functions when conducting analyses which focus on many policy areas in education (1979). The educational production function is the underlaying framework of the relationships between what happens within the academy and the forces placed upon it from the external world. This framework aids in the understanding of what may happen to

output (student achievement) if changes to various inputs are made.

The educational production function includes all inputs that directly or indirectly effect the student and his/her educational achievement (Bowles, 1970). Bowles defines an educational production function as:

$$A = f(X_1, \ldots, X_m, X_n, \ldots, X_v, X_w \ldots, X_z) \tag{ii}$$

Where A is equal to student achievement; $X_1, \ldots, X_m$ are a vector of the school's environment; $X_n, \ldots, X_v$ are a vector of environmental factors (e.g. families, peers, etc); and $X_w, \ldots, X_z$ are a vector of the student's ability and prior educational experiences. In theory, these factors would represent all observable and unobservable inputs to an individual, however, in practicality we can only measure observable factors or utilize proxies and instrumental variables to estimate these unobservable factors.

Hanushek (1979), presents a basic conceptual model of an EPF, in which he accounts for the time period and each individual. This model takes the form of:

$$A_{it} = f(B_i^{(t)}, P_i^{(t)}, S_i^{(t)}, I_i) \tag{iii}$$

Where A_{it} is equal to student achievement for student i during period t; B are a vector family characteristics; P are a vector of peer influences; S are a vector of school inputs; and I are the innate abilities of the individual. Incorporating time in the EPF allows for the model to account for the accumulative nature of education. Because knowledge, skills, and abilities are not zero sum, the information and knowledge students learn in subsequent time periods adds to prior knowledge; therefore, it is important to account for time in the model.

From these EPFs, we can see that student achievement is related to multiple factors; these factors range from the student's internal motivations and abilities, the

effects from family, peers, and educational institutions, to the effects of environmental factors which may support or hinder a student in their educational achievement. It would be ideal to measure these outputs in long term outcomes (i.e. employment and wages), however we are limited to the data that is available, typically through higher education governmental agencies and institutions (Bowles, 1970). Since there is not a way to directly measure the increase of an individual's knowledge, skills, and abilities, researchers must use a proxy as a method to approximate the increase to student learning.

The use of achievement, A, as an output is the typical method of measuring the increase of an individual's knowledge skills and abilities. Proxies for the measurement of student achievement include, but are not limited to, student test scores, college entrance exam scores (e.g. ACT, SAT, & GRE), and degree attainment.

The output of any production function is constrained by effects onto the inputs (Pritchett & Filmer, 1999). In the world of education, these constraints, being processes in nature, are related to the ability to educate individuals during the pedagogical process. There are limits on what can be done to increase human capital among individuals as the inputs affect the behavioral side of the individual. Whereas, the EPF looks fairly straight forward on paper, in the real world it is not that simple and many factors can influence the achievement of an individual. Lecturing to a student about biology may not increase his achievement in the sciences if that student is not motivated to learn the topic. Thusly, Pritchett, et. al., states a need for a behavioral theory to understand the relationship in an education production function, not a technical theory.

The EPF is a means of understanding the inputs that affect a student's achievement. When using this method to understand the student's output, it is important to understand that the EPF is not a means of being able to account for

everything that affects the student's achievement, but rather a means of estimating the effects that observable factors have on students. Also, when interpreting findings that use an EPF, one must understand that students, parents, and schools have choices. Since we cannot observe all data, we must be cautious in our interpretation of our analyses (Todd & Wolpin, 2003). Just because a school expends a certain dollar amount on education does not equate to that institution educating all of their students efficiently and effectively. We would need to be able to observe the needs and learning styles of each student, and the 'if' and the 'how' the schools are teaching to each of those students, in order to get a fair estimation of the true effect of the school's teaching expenditures on student achievement. However, with that said, the EPF does allow us to estimate closely the effects of these observable variables.

Theories of Status Attainment/Educational Attainment

The literature review to this point has explored the importance of education and training in the creation of human capital which increases individual earnings, productivity, and economic growth. This discussion led to an inquiry into educational production functions, which identifies how various social, economic, institutional, and environmental factors effect student achievement. Next, the individual factors that are associated with student status/degree attainment will be explored through the literature. These factors are the inputs that aid in the explanation of what makes a successful student which can be certified by an institution to possess certain knowledge, skills, and abilities to attain a degree. The scope of these factors is closely associated with the factors utilized in looking at student achievement in educational production functions, and are no doubt related to one another, as a student must be able to maintain a certain level of achievement in school in order to attain a degree. Since education plays a large part in the

economy, politics, and social positions, the allocation of education and more specifically degrees is highly important to the overall well being of a nation. (Meyer, 1977)

Theories of status attainment. The study of status attainment has been ongoing for over fifty years and is an important concept to include when trying to understand the effects that QoL factors have on students attaining a higher education degree. There are many individual, social, family, peer, environmental, economic, and institutional characteristics that are confounding factors to degree attainment, and it is important to know why. A large body of early research had come from empirical studies in the area of the sociology of education, especially from the study of social equality and more specifically the equality of educational opportunities and the process of status attainment (Hallinan, 1988). The interest in social equality emerges from the civil rights and women's rights movements of the 1960s; where the concepts of equality, power, and socio-economic status began to be investigated to determine why differences among groups exist and what effects these differences have on individuals interacting in the world. Hallinan states that past research that had been conducted in the sociology of education since the 1960s had been in the areas of the equality of educational opportunities (utilizing the status attainment models and school effects research), educational institutional organizations, and educational processes. The research of sociology of education led to several foundational studies related to status attainment.

A number of studies have found that the parent's social status, ability, and social-psychological factors are related to status attainment (Breen & Jonsson, 2005; Inoue, 1999; Schoon, 2008; Walpole, 2003). Duncan and Hodge employed a regression analysis to determine if a father's socioeconomic status (SES) had an effect on the future status of the father's son (Duncan & Hodge, 1963). This study found that for white males the father's education played a larger part in his son's

educational attainment than that of the father's occupation. The authors noted that the father's educational level had a confounding influence on his occupation; typically the level of education leads the individual to a certain level of work thereby effecting the SES of that individual. This is explained partly by the fact that individuals who receive a higher education degree tend to earn a higher wage, on average, over their lifetime then those who do not attend a HEI (Murphy & Welch, 1989; Taubman & Wales, 1974; Wachtel, 1976; B. Weisbrod & Karpoff, 1968). Because of this, the father's education played a larger role in determining the son's educational attainment. Blau and Duncan continued this line of research, examining the effects of a father's characteristics and degree attainment on his son, and found that the father's occupation establishes a certain level at which the son will start at on a social scale (Blau & Duncan, 1967); the higher ranked the father's occupation the better off the son will be socio-economically. Over time, however, the study shows a diminishing effect as the son grows older.

There have been numerous studies that have looked at degree attainment from the perspective of student persistence and attrition (Astin et al., 1993; Bean, 1980; Pascarella & Terenzini, 1991; Spady, 1971; Stage, 1989; Tinto, 1975, 1987). These studies have focused mainly on the interactions that the student had with their peers, faculty, staff, and the institution. Astin focused his work on student involvement, or more simply the effort an individual puts towards attaining knowledge, skills, and abilities (Astin, 1984). A number of studies conducted in the 1970s and 1980s utilized Durkheim's work on social integration and suicide, as a theoretical framework to explain why students drop out of higher education institutions (Durkheim, Spaulding, & Simpson, 2010). These studies focused on the use of family and prior educational background, academic potential, peer support, intellectual development, academic performance, social integration, satisfaction, and institutional commitment to explain why students decide to drop out of college.

Bean utilized multiple regression and path analysis to find that institutional commitment was the number one reason for students dropping out; satisfaction and opportunity were other factors that were found to be associated with why students drop out (Bean, 1980). Bean also noted that not every case of student attrition is negative, as sometimes students leave an institution for positive reasons that are more beneficial to the student in the long run. If HEIs provide mechanisms that support students with these factors they can reduce the possibility that the student will drop out.

In addition to the external factors discussed above, ability and social-psychological factors have an influence on the status attainment of individuals investigated in the Wisconsin Status Attainment studies (W. Sewell, Haller, & Ohlendorf, 1970; W. Sewell, Haller, & Portes, 1969; W. Sewell & Hauser, 1975). The studies utilizing the Wisconsin Status Attainment report found that an individual's cognition and motivation is developed due to the orientations that are established in that individual's household. Individuals are not isolated from those around them and are not only influenced from their father's occupation; there are other influences that may affect an individual. Observations of their own ability, by peers and other individuals in one's community, one's own aspirations, and the quality of the school also influence factors. However, it was later found that the Wisconsin status attainment studies had an issue with their estimation procedure; a later analysis found that the Wisconsin study underestimated the importance of family background and overestimated the effects of the individual's motivations and aspirations (R. Hauser, Tsai, & Sewell, 1983; Jencks, Crouse, & Mueser, 1983).

General characteristics that effect degree attainment

A lot of attention is paid to the idea of student persistence when researchers explore the characteristics of students and the effects on educational attainment

(Astin, 1977; Pascarella & Terenzini, 1991; Tinto, 1987, 1997). Discussions revolving around the involvement of the student in various activities and social groups are typically central to a student progressing from their first year to their second and then eventually to graduation. For a student to be involved, there are several factors that must exist. The institution must provide opportunities for students to get involved, students must be willing to be involved, and students should have a support network of family and peers.

Research has shown that there are various factors that influence the future social status of an individual. Some of these factors can be be controlled by the individual, however there are a number of factors that are not in the realm of control for the student. Next, I will explore the literature related to studies that aim to find factors that are directly related to an individual's attainment of an educational degree, secondary or higher education degree. Whereas, these factors will be related directly to an individual, this study is looking at effects at an institutional level. Some of these factors were utilized to develop aggregate measures to approximate these factors at the institutional level.

Individual characteristics and educational attainment. There are particular characteristics that can have an influence on an individual's educational attainment (Karen, 1991; Peltier, Laden, & Matranga, 1999; Thomas, Alexander, & Eckland, 1979). These differentiate one individual from all others and make each individual unique in the educational production process. Some of these characteristics have influence over a student's educational attainment because of gaps in the education system, such as the gender- and ethnicity- gap. Ethnicity, gender, and age, are not factors that students have control over changing. While characteristics such as place of residence, student involvement, and fraternity/sorority affiliation, allow students to make conscious choices of where to live and which activities to be involved.

In addition, historically black and other minority students have had a more difficult time persisting at universities than white students (Astin & Oseguera, 2005; Fleming, 1984; Gloria, Kurpius, Hamilton, & Willson, 1999). Kerckhoff, noticing that prior research had included only white students or had failed to look at comparisons between whites and black, sampled a group of ninth graders in 1969 and followed up with them five years later when they were in high school (1977). The study found that the social economic status of the student's family is much more of a predictor for white students, than that of black students. When high school academic performance is included into the model, the model becomes much more explanatory in nature for black students. An even stronger relationship is demonstrated when discipline is added to the model as it shows that students who behave well at school have a greater likelihood to attain a degree.

After seeing high attrition rates among minority students, especially among the black population during the 1980s a number of studies were conducted that found that academic variables (e.g. GPA) were a significant factor in degree attainment (Pantages & Creedon, 1978; Suen, 1983). Black male students had a negative relationship with university persistence if they had attended a predominantly black high school. Hood found that the high school rank of black males was the largest predictor of persistence; however the study also found that a large proportion of black students left the university due to academic dismissal (1992). Alternatively, an additional study looking at black freshman students at predominantly white universities found that black female students tended to stay at the university based upon their roommate's characteristics, the proportion of students varying by races in the residence hall, and the academic performance of the student during high school (Trippi & Baker, 1989).

Noting that a larger section of Hispanic students were beginning to attend HEIs and these students were struggling with persistence; a number of studies began

to investigate the factors pertaining to why this was occurring and if these factors were similar to what black students were facing. Hispanics are typically very family oriented, and it is not unusual for a Hispanic student, after attending class, to have to go work or go home in order to support their family (R. A. Fry, 2002; Nora, Barlow, & Crisp, 2006; Von Destinon, 1989). Because of this time spent supporting their family, Hispanic students tend to have less time available for studying and integrating into the university community. Due to this lack of time dedicated to being a part of the community, Hispanic students find it difficult to integrate with the student bodies at many universities where their life experiences differ so much from the white majority (Cabrera & Nora, 1994; Fiske, 1988). Using Tinto's Social Integration Model (1975), Bean's Model of Student Attrition (1980) as theoretical framework, found that these Hispanic students whom were academically and socially integrated with the HEIs tended to persist longer than their counterparts (1997).

Family characteristics and educational attainment. Family characteristics, such as the parents' highest educational level, parents' socio-economic status, and family background have effects on how a student will perform in school and ultimately if and when that student will graduate and attain a degree (Blau & Duncan, 1967; R. M. Hauser & Wong, 1989).

Mare conducted a study in which he looked at family background and school continuation decisions, in which he found parent's schooling and socio-economic status had a positive relationship to the student's educational attainment (Mare, 1980). The study also identified background variables which include broken families, a farm background, and being born in the Southern United States, all of which had negative relationships with higher education persistence.

A number of studies have examined family background and socio-economic indicators to describe how home environments are related to the attainment of higher education degrees (Blanden & Gregg, 2004; Clark-Kauffman, Duncan, &

Morris, 2003; Scarr & Weinberg, 1978). The work of Blau and Duncan in 1967 and Teachman and Hauser 1978 focused on creating models to describe and determine effects on educational attainment (Blau & Duncan, 1967; Teachman, 1987). The Teachman study utilized the National Longitudinal Study of the High School Class of 1972 (NLS-72) and 1979 (NLS-79) utilizing a two-stage probability sample of seniors in high schools in the United States. The study accounted for the parent's use of academic materials in the home environment (which fosters academic skills, motivation, and orientation). This study found that utilizing these academic materials have positive and statistically significant effects on the educational attainments for both male and female students. These findings illustrated that socioeconomic status is still a large factor in educational attainment, but these academic materials may be price prohibitive to some families in lower socioeconomic standing.

Institutional effects on educational attainment. Education institutions can have an enormous effect on student persistence and educational attainment. There are a number of factors specific to an HEI that affect the level of student persistence at a particular institution: living on campus, first-year grade point average, and degree attainment related to the perceptions of institutional quality. An institution can influence numerous factors to cause a positive or negative impact on their student body (Card & Krueger, 1996; Pritchett & Filmer, 1999; J. Ryan, 2005).

Where an institution expends its resources, as well as the amount, can have an impact on the educational attainment and future earnings of their students. Because expenditures are related to student achievement, more than that of institutional policies, they are important to include in the analysis of educational attainment (J. F. Ryan, 2004). When using institutional expenditures as a variable to estimate the institutional effects, total expenditures cannot simply be used; we

must know where and how institutions are using their dollars, as HEI's instructional and academic support expenditures are related to graduation rates. In other words the effect of expenditures on educational attainment is not based on the amount of money an institution expends, rather where and how the institution spends its resources.

Quality of life and educational attainment

Quality of Life (QoL) can be separated into two distinct factors which have effects on educational attainment. The first factor is composed of the characteristics of individuals who live in an area, these characteristics in aggregate are the neighborhood factor. The neighborhood factor influences the behavior of the individuals and organizations of an area through peer effects (Bobonis & Finan, 2009; Brook, Nomura, & Cohen, 1989; Gaviria & Raphael, 2001; Gonzales, Cauce, Friedman, & Mason, 1996; Leventhal & Brooks-Gunn, 2000). The second factor is composed of the characteristics of the environment (natural, physical/built, socio-economic, community, and perceived environment). These characteristics, in aggregate. compose the environmental factor, which has an affect on the physical and mental health of individuals (S. Cohen, Glass, & Phillips, 1979; Lynch et al., 2001; Maslow, 1961; Mitchell & Popham, 2008; Yen & Syme, 1999).

Neighborhood effects on educational attainment. Neighborhood effects are important to examine when looking at why certain individuals attain educational degrees and others do not; these have influence on those in the community and can lead individuals to follow similar paths as those in their neighborhood similar to that of a contagious disease (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Crane, 1991). Also since family characteristics only explain a portion of the variance seen in what affects educational attainment, neighborhood characteristics are just as important in explaining differences between

racial educational attainment (Datcher, 1982). Garner and Raudenbush examined the neighborhood effects on educational attainment utilizing a Hierarchical Linear Modeling (HLM) to determine if variation in educational attainment exists between neighborhoods (1991). This study found that the socioeconomic condition, or more specifically the neighborhood deprivation has a large effect on educational attainment of those individuals from that neighborhood. The study supports the theory that individuals from lower socioeconomic areas tend to be more educationally disadvantaged.

Neighborhood effects differ for black and white individuals. A study by Vartanian and Gleason, looked at the educational attainment of black versus white respondents at the age of 25 and neighborhood effects of the area in which they lived when they were 14 through 18 years of age (Vartanian & Gleason, 1999). Utilizing logistic regression, and controlling for various characteristics, this study found that neighborhood conditions do effect educational attainment. Average neighborhood income has a positive effect on the educational level of white students and no statistical effect for black students according to Datcher's study. Neighborhood characteristics have a larger effect on blacks in less advantaged neighborhoods than that of white individuals in similar neighborhoods. These differences may exist because of differing positive role models, family resources, and educational quality of K-12 institutions.

Environmental effects on educational attainment. Environmental effects impact the overall health characteristics of individuals living in a region. Bowling, et. al. found that the perception an individual has regarding their surrounding environment contributes a large portion of influence on that individual's health (2006). The factors that were considered to have influence on health included health services, transportation options, trash collection, and neighborliness; as well as negative factors such as crime, noise, air quality, traffic,

and graffiti. The effect of these environmental factors on the individual is measured as quality of life (Brock, 1989).

The environmental factors, as described above, influences quality of life and plays a large part in living a "good life". A study by Cheung explored a theory which states that the "good life" should include four factors: 1) the hedonist good life, 2) the dialectical good life, 3) the humanist good life, and 4) the formalist good life (Cheung, 1997). More simply, the good life should include the pursuit of pleasure, the pursuit of interpersonal interactions, the pursuit of self-actualization, and the pursuit for what is right. A survey related to life satisfaction, containing a number of 5-point Likert scale items, was administered to 276 individuals in Hong Kong, China; a confirmatory factor analysis was conducted to assess the fit of the items within each factor. The author found that life satisfaction was positively associated with a hedonist good life and that depression was negatively associated. A dialectical good life was associated with marital satisfaction and consensus. Work alienation was negatively associated with a humanist good life and materialism and existentialism was positively associated. Lastly, a formalist good life was associated with religion. All four of these factors can be combined into a single factor to measure the overall "good life". Overall, the concept of QoL has been defined as a beneficial environment (Veenhoven, 1996) and satisfaction with one's environment (Dow & Juster, 1985). These definitions fit well within the concept of this study, as it is useful to be able to measure QoL as a means of describing the level of satisfaction a region has related to a particular need.

Social indicators of quality of life. Social indicators are a means to identify measures of QoL that are objective and quantifiable (Andrews & Withey, 1976; Diener & Suh, 1997; Land & Spilerman, 1975). Therefore, social indicators are used as a means to approximate QoL measures. A few examples of how social indicators are used to measure QoL include using mortality rates to approximate

health related QoL, using homicide rates to approximate safety related QoL, and using unemployment rates to approximate job security related QoL. Social indicators are observable variables that are directly related to and approximate the perceived QoL and is the overall estimated quality of life of all individuals that live within that region. This is a different measure than health-related QoL, which is the measure of an individual's QoL (Marsella, Levi, & Ekblad, 1997).

The Organisation for Economic Co-operation and Development (OECD), in their efforts to measure well-being and the progress of individuals throughout the world, developed a framework for statistics relating to the distribution of household income, consumption, and wealth (Organisation for Economic Co-operation and Development, 2013). This statistical framework will be used to aid in the identification of social indicators of QoL and to explain overall well-being of individuals in predefined regions.

Theoretical Framework. To understand how and why regional QoL affects degree attainment, the following theoretical framework guided the analysis and understanding of what effect the environment had on HEI graduation rates and subsequently on human capital development. In addition to neighborhood and environmental factors, other inputs to the education production process include the student, the employees (faculty and staff), the environment of the campus, government policies, and government expenditures.

To understand the many items that affect HEIs and subsequently their graduation rates, a production process was utilized. Figure 2 is a visual representation of the various inputs and outputs of HEIs in context for this study.

The factors of interest are neighborhood and environmental factors that influence regional QoL, and regional QoL's effect on HEI graduation rates. This model illustrates the relationship that the factors of QoL have on not only the HEI but also the students and the employees of the HEIs. Regional QoL has an effect on

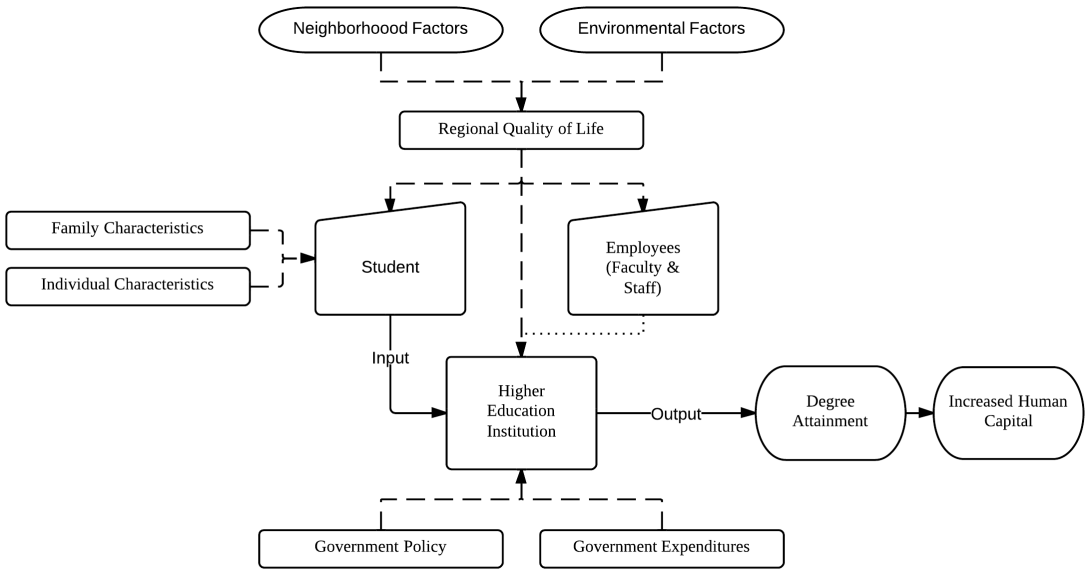

Figure 2. Production Process of Higher Education

all entities (human and organization) that live or operate within the region. This study focused its analysis on the effect that QoL had on HEIs directly.

Final Thoughts on Literature

The literature illustrates the complex nature of educational attainment, where there are numerous factors that effect an HEI's ability to produce graduates throughout the educational production function. It has shown that there are motivational aspects to an individual choosing to not only pursue a degree initially but also to attain a degree. These aspects include increasing one's lifetime earnings to obtaining a particular career path. The literature has also shown that an individual's family plays a large part in the student's educational production function and whether the individual has the ability to attain a degree. The student's prior experiences at educational institutions including the institution they are currently attending, affects the individual's ability to graduate. HEIs that focus on creating an environment conducive to learning will see students persist through

their degree. Finally, the literature demonstrates that there are factors outside the individual and the HEI that have an effect not only on the individual, but also affects the HEI and how it operates in their region. Neighborhood and environmental factors influence the way the individuals and organizations behave in a region.

CHAPTER 3

METHODS

This study utilized a fixed-effects model to measure the effect of social indicators of QoL on the degree attainment of individuals attending two- and four-year, public and not-for-profit private HEIs within Core Based Statistical Areas (CBSAs). The use of social indicators of QoL allowed the study to estimate the effect that regional QoL had on HEIs and its graduation rates.

Whereas, this study does not measure the effect of social indicators on individual degree attainment, the social indicators approximate the metropolitan/micropolitan QoL effects on total graduation rates. Students at each HEI are inputs in the production process and were accounted for in the model that describes degree attainment. Since this study did not use individuals' measures, aggregate measures were used throughout the analysis to control for the various differences between HEIs within and between metropolitan/micropolitan regions.

This study utilized data from multiple United States Governmental Agencies which were complied into panel dataset by the researcher. Social indicators of QoL were associated with two- and four-year HEIs who operate within each CBSA.

Fixed-Effect Model

This study utilized a fixed-effects model to estimate the effect that social indicators, as a measure of perceived QoL, had on two- and four-year HEI graduation rates. This model utilized the benefits of fixed-effects at the institutional level to aid in accounting for unobserved characteristics within each HEI.

To account for the effect from the social indicators that may occur over the

academic career (from matriculation to graduation) of individuals within the time period, a distributed lag was incorporated into the model to measure the effect of the regressors over time on the dependent variable (Judge, Griffiths, Hill, Lütkepohl, & Lee, 1980; Kennedy, 2003). The finite distributed lag procedure allowed for the effect of the predictor variables to be accounted for over a finite time period that the student was attending the institution (Almon, 1965; Gujarati, 1995; Pesaran & Smith, 1995). At a four-year institution, where a student graduates in six years, the effect of the predictor variables in the student's first year affects the HEI graduation rate at some amount similar to that of the predictor variables in the graduation year ($t = 0$). This lag length was set at a finite value, as entry and exit from this market is predetermined and incorporated in the dependent variable.

Four-year HEI, 100% time to graduation model. The first model estimated the effect of social indicators of QoL on the 100% time to graduation rate among four-year HEIs. The model takes the form of:

$$Y_{it} = \beta_0 + \beta_1 X_{it-s} + \beta_2 \alpha_{it-s} + \beta_3 \mu_{it-s} + \theta_i + \epsilon_{it-s} \tag{1}$$

Where Y_{it} is the 100% time to graduation rate for institution i, during year t; X are a vector of observed social indicators, where lag $s = 0, 1, 2, 3$ for four-year HEIs; α are a vector of observed institutional characteristics; μ are observed economic indicators of quality of life; θ is an institutional fixed-effect, and ϵ is the stochastic term clustered by institution.

Four-year HEI, 150% time to graduation model. The next model estimates the effect of social indicators of QoL on the 150% time to graduation rate among four-year HEIs. This model takes the form of:

$$Y_{it} = \beta_0 + \beta_1 X_{it-s} + \beta_2 \alpha_{it-s} + \beta_3 \mu_{it-s} + \theta_i + \epsilon_{it-s} \tag{2}$$

Where Y_{it} is the 150% time to graduation rate for institution i, during year t; where $s = 0, 1, ..., 4, 5$.

Two-year HEI, 150% time to graduation model. The final model examines the effect of the social indicators of QoL on the 150% time to graduation rate among two-year HEIs. A model estimating the effect on the 100% time to graduation rate was not estimated among two-year HEIs because this variable was not reported consistently among two-year HEIs. This model takes the form of:

$$Y_{it} = \beta_0 + \beta_1 X_{it-s} + \beta_2 \alpha_{it-s} + \beta_3 \mu_{it-s} + \theta_i + \epsilon_{it-s} \quad (3)$$

Where Y_{it} is the 150% time to graduation rate for institution i, during year t, where $s = 0, 1, 2$.

Social Indicators of Quality of Life

Merged with the dataset are social indicators of QoL that were matched to HEIs using regional (CBSA) identifiers. The social indicators of QoL included in the dataset were measures for income and wealth, jobs and earnings, housing, health status, work and life, education and skills, social capital, environmental quality, and personal security. The variables from within the OECD social indicator framework 1 had been adapted for use within the United States; the OCED framework was designed for use internationally and therefore some measures were not collected regionally in the United States.

It has been suggested that the social indicators used to measure QoL should be selected intuitively (Diener & Suh, 1997; Ferriss, 2000; Hajiran, 2006). Below are descriptions of the social indicators that were selected for used as measures of QoL of metropolitan and micropolitan regions in the United States.

Dependent Variable - Graduation Rates

Table 2 describes the average 100% time to graduation rate for public and private four-year HEIs from the year 2002 to 2010. Two-year institutions did not report graduation rate for 100% time-graduation rates. Nationally, graduation rates over time have remained relatively flat over the time period. On average, private HEIs graduate more students on-time then public HEIs.

Table 2
Average Number of Students who Graduated within 100% Time to Graduation Rates

Year	4-Year Public	4-Year Private
2002	22%	42%
2003	22%	43%
2004	23%	42%
2005	23%	43%
2006	24%	43%
2007	24%	44%
2008	25%	44%
2009	25%	44%
2010	26%	44%
Average	24%	43%

Table 3 describes the average 150% time to graduation rate for two- and four-year HEIs between 2002 and 2010. Again, graduation rates remained steady within each institution type over the eleven years. Private institutions continued to graduate more students within 150% time then that of public institutions.

Table 3
Average Number of Students who Graduated within 150% Time to Graduation Rates

Year	4-Year Public	4-Year Private	2-Year Public	2-Year Private
2002	45%	55%	23%	54%
2003	46%	55%	24%	57%
2004	46%	55%	24%	56%
2005	47%	56%	24%	58%
2006	48%	55%	23%	59%
2007	48%	56%	21%	54%
2008	47%	56%	21%	50%
2009	48%	56%	22%	50%
2010	48%	56%	22%	53%
Average	47%	56%	23%	54%

Higher Education Institution Variables

The dataset included variables related to HEIs for eleven years (2000-2010), for all public and not-for-profit private, two- and four-year HEIs within metropolitan and micropolitan regions in the United States of America. These data were retrieved from the Delta Cost Project at the National Center for Education Statistics (National Center For Education Statistics, 2013). The Delta Cost Project utilizes data from the Integrated Postsecondary Education Data System (IPEDS), which includes survey data collected by NCES from HEIs in the United States. The data in the The Delta Cost Project dataset includes institutional characteristics, enrollment, financial aid, graduation, revenue, student, and expenditure data.

The dataset was modified for this study by dropping all non-classified HEIs and all for-profit HEIs. Observations were dropped if the institution did not report full-time enrollments (FTE), expenditures, or graduation data. Any institution not physically located in a CBSA were dropped, as QoL data would not be available. Any HEI that did not have data for all eleven years were dropped. The dataset included 19,602 observations for 1,782 HEIs (Table 4).

Table 4
Number of HEIs and Observations by Institution Type

HEI Type	# HEIs	Observations
2 Year Public HEI	521	5,893
2 Year Private HEI	47	551
4 Year Public HEI	379	4,007
4 Year Private HEI	835	9,151
Total	1,782	19,602

Institutional expenditures. Three variables related to a HEI's expenditures were used for these analyses to control for variances in spending, by year, within institutions. The variables included were selected due to their direct relationship to the services provided directly to students. Expenditures for instruction was included, as this variable is directly related to the education that a student receives. Expenditures for academic support was included as these are curricular services provided to students in their quest for education. Expenditures for student services were included as these are the dollars spent to support co-curricular and extra-curricular activities that relate to enhancing the student's on-campus environment.

All institutional expenditures were transformed into 1,000,000's of dollars (i.e. $1,000,000 is represented as $1), in order to scale the values of the variables to an appropriate level to be regressed onto the dependent variable.

Table 5 describes the median, minimum, and maximum dollars an institution expends on instructional activity. The NCES defines instructional activity as expenses of instructional units of HEIs (National Center For Education Statistics, 2013). These expenses include general academic instruction and general education and does not include administrative costs associated with managing an instructional unit. For each of the 4 HEI types, it is observed that expenditures for instruction increases yearly from 1999-2000 to 2009-2010.

Table 5
Descriptive Statistics of Expenditures for Instruction

Year	4-Year Public	4-Year Private	2-Year Public	2-Year Private
1999-2000				
Median	$37,719,952	$7,362,657	$11,623,424	$823,754
Minimum	$1,187,787	$8,677	$1,012,334	$88,279
Maximum	$1,435,417,856	$639,661,760	$145,882,862	$9,557,897
Std. Dev.	$126,463,915	$59,215,280	$16,576,161	$1,519,349
2000-2001				
Median	$39,044,596	$7,702,126	$12,578,986	$863,955
Minimum	$1,547	$19,813	$894,206	$107,911
Maximum	$1,513,875,584	$710,522,368	$157,265,840	$10,312,239
Std. Dev.	$135,575,497	$64,034,766	$18,083,055	$1,671,634
2001-2002				
Median	$40,385,952	$8,110,575	$12,970,648	$903,110
Minimum	$1,547,931	$139,799	$1,113,111	$4,829
Maximum	$1,678,864,640	$752,958,336	$207,784,784	$9,835,118
Std. Dev.	$144,210,221	$69,689,850	$20,658,013	$1,616,754
2002-2003				
Median	$42,235,104	$8,658,968	$13,793,960	$1,007,857
Minimum	$1,688,679	$48,538	$1,053,986	$46,070
Maximum	$1,786,345,600	$878,690,432	$197,491,248	$11,047,450
Std. Dev.	$153,371,375	$78,548,045	$20,548,896	$1,783,489
2003-2004				
Median	$44,875,624	$9,329,694	$14,139,677	$1,267,337
Minimum	$1,538,487	$99,630	$595,238	$73,627
Maximum	$1,857,184,768	$995,110,333	$193,025,872	$13,019,358
Std. Dev.	$157,018,136	$83,101,059	$20,677,694	$2,147,527
2004-2005				
Median	$47,256,404	$9,930,682	$14,719,825	$1,336,358
Minimum	$1,855,362	$196,876	$877,173	$92,571
Maximum	$2,042,867,712	$1,098,632,472	$201,771,104	$12,560,420
Std. Dev.	$169,768,332	$93,125,167	$20,736,513	$2,098,463
2005-2006				
Median	$49,454,010	$10,312,841	$15,618,635	$1,435,565
Minimum	$2,912,598	$113,158	$840,325	$92,571
Maximum	$2,187,188,992	$1,145,879,960	$226,818,464	$8,126,558
Std. Dev.	$177,469,433	$97,712,511	$22,213,145	$1,535,950
2006-2007				
Median	$52,795,648	$11,084,920	$16,553,888	$1,665,814
Minimum	$2,555,763	$289,074	$869,507	$126,807
Maximum	$2,314,669,312	$1,267,004,016	$243,111,632	$14,502,443
Std. Dev.	$190,972,475	$106,596,818	$23,929,589	$2,396,151
2007-2008				
Median	$56,794,484	$11,796,653	$17,698,981	$1,648,998
Minimum	$1,766,845	$21,133	$847,000	$43,635
Maximum	$2,370,905,486	$1,696,425,998	$263,323,639	$8,262,802
Std. Dev.	$201,086,288	$117,568,184	$26,065,355	$1,793,628
2008-2009				
Median	$58,626,488	$12,251,343	$18,394,662	$1,467,162
Minimum	$2,643,499	$193,352	$768,259	$49,181
Maximum	$2,517,901,391	$1,809,578,180	$270,056,521	$5,792,308
Std. Dev.	$214,724,869	$124,197,444	$26,908,396	$1,528,956
2009-2010				
Median	$60,465,564	$12,513,762	$19,603,190	$1,577,160
Minimum	$2,451,588	$218,618	$987,497	$51,678
Maximum	$2,923,291,536	$1,772,935,003	$245,131,747	$6,356,516
Std. Dev.	$234,386,669	$126,852,329	$28,250,838	$1,547,055

Table 6 describes the median, minimum, and maximum dollars expended on academic support at institutions. The NCES defines academic support expenditures as the costs associated with the services and activities that support an HEI's primary mission of education, research, and service (National Center For Education Statistics, 2013). It is observed that among the four institution types, expenditures for academic support had increased over each year.

Table 6
Descriptive Statistics of Expenditures for Academic Support

Year	4-Year Public	4-Year Private	2-Year Public	2-Year Private
1999-2000				
Median	$9,415,528	$1,535,789	$2,070,416	$249,412
Minimum	$288,725	$9,437	$87,730	$8,432
Maximum	$238,295,008	$454,525,824	$27,915,030	$1,176,928
Std. Dev.	$32,595,683	$20,652,879	$3,578,945	$274,210
2000-2001				
Median	$10,455,331	$1,630,478	$2,225,133	$287,464
Minimum	$326,241	$18,789	$70,183	$8,791
Maximum	$250,328,992	$471,906,784	$34,587,392	$1,209,401
Std. Dev.	$35,941,028	$22,247,079	$3,954,630	$273,660
2001-2002				
Median	$10,170,664	$1,757,668	$2,257,217	$294,145
Minimum	$330,168	$4,580	$80,978	$13,014
Maximum	$264,071,024	$497,765,888	$42,182,868	$928,220
Std. Dev.	$36,014,388	$23,204,526	$4,345,407	$253,984
2002-2003				
Median	$10,534,848	$1,960,082	$2,293,431	$295,416
Minimum	$332,499	$6,420	$65,758	$42,964
Maximum	$253,949,232	$538,203,584	$35,519,752	$1,203,986
Std. Dev.	$36,313,457	$24,877,929	$4,345,281	$293,166
2003-2004				
Median	$10,885,844	$2,046,933	$2,355,368	$351,599
Minimum	$332,697	$1,165	$67,666	$52,316
Maximum	$259,790,832	$584,087,984	$33,375,912	$1,541,591
Std. Dev.	$37,105,862	$27,338,201	$4,471,356	$307,598
2004-2005				
Median	$11,431,932	$2,151,910	$2,556,546	$343,779
Minimum	$310,082	$29,043	$77,083	$41,214
Maximum	$278,986,240	$599,069,008	$31,255,592	$1,796,428
Std. Dev.	$38,479,565	$28,097,074	$4,578,936	$346,544
2005-2006				
Median	$11,613,681	$2,295,824	$2,754,940	$308,378
Minimum	$201,671	$20,198	$77,082	$59,183
Maximum	$311,247,648	$565,769,976	$32,321,816	$1,106,805
Std. Dev.	$40,871,905	$28,584,175	$4,840,064	$290,659
2006-2007				
Median	$13,138,084	$2,415,502	$2,843,817	$305,830
Minimum	$382,682	$15,738	$77,509	$47,347
Maximum	$345,116,864	$620,496,016	$34,186,408	$1,994,199
Std. Dev.	$44,238,276	$30,825,010	$5,154,959	$390,391
2007-2008				
Median	$13,966,909	$2,527,988	$3,092,635	$363,407
Minimum	$197,523	$4,427	$96,447	$27,382
Maximum	$385,339,986	$654,748,000	$51,564,701	$1,200,507
Std. Dev.	$51,307,246	$33,152,438	$5,885,307	$307,335
2008-2009				
Median	$14,941,012	$2,717,835	$3,277,703	$329,648
Minimum	$200,151	$2,833	$95,563	$52,368
Maximum	$415,106,630	$696,077,000	$63,608,000	$1,259,721
Std. Dev.	$55,912,145	$34,861,061	$6,317,042	$361,629
2009-2010				
Median	$14,824,008	$2,734,648	$3,517,663	$359,569
Minimum	$89,154	$4,496	$98,533	$28,340
Maximum	$474,309,993	$706,145,000	$58,529,792	$1,569,694
Std. Dev.	$60,262,494	$35,835,378	$6,715,944	$390,617

Table 7 describes the median, minimum, and maximum dollars expended on student services at institutions. The NCES defines student services as programs that promote student's emotional and physical well-being National Center For Education Statistics (2013). Similar to academic support, expended dollars on student services increased over the eleven years.

Table 7
Descriptive Statistics of Expenditures for Student Services

Year	4-Year Public	4-Year Private	2-Year Public	2-Year Private
1999-2000				
Median	$6,941,649	$2,702,696	$2,482,938	$304,118
Minimum	$537,543	$1,347	$97,001	$45
Maximum	$152,580,992	$55,455,620	$79,143,792	$2,129,155
Std. Dev.	$14,277,066	$5,676,666	$5,096,910	$617,800
2000-2001				
Median	$7,396,000	$2,932,282	$2,638,787	$251,710
Minimum	$562,983	$9,378	$155,394	$10,608
Maximum	$167,721,888	$56,993,216	$85,674,984	$3,004,429
Std. Dev.	$15,529,789	$6,273,717	$5,578,187	$671,674
2001-2002				
Median	$7,867,639	$3,168,738	$2,754,991	$377,276
Minimum	$581,833	$13,896	$123,563	$4,178
Maximum	$155,750,656	$69,014,088	$69,536,176	$3,316,837
Std. Dev.	$16,085,972	$7,032,593	$5,472,480	$753,262
2002-2003				
Median	$8,026,330	$3,435,998	$2,992,432	$401,178
Minimum	$638,568	$9,824	$156,477	$11,425
Maximum	$189,001,920	$78,241,296	$57,022,816	$4,592,148
Std. Dev.	$17,632,617	$7,697,102	$5,150,151	$932,222
2003-2004				
Median	$8,692,826	$3,684,408	$3,065,040	$410,942
Minimum	$754,118	$4,811	$156,460	$23,455
Maximum	$192,519,856	$78,393,323	$56,396,404	$5,971,209
Std. Dev.	$18,199,549	$8,208,856	$5,260,433	$1,161,404
2004-2005				
Median	$9,090,648	$3,956,987	$3,229,989	$437,069
Minimum	$879,047	$11,409	$54,103	$15,000
Maximum	$217,985,056	$83,382,000	$60,995,560	$6,781,271
Std. Dev.	$19,945,088	$9,053,654	$5,606,441	$1,361,574
2005-2006				
Median	$9,372,722	$4,197,997	$3,439,435	$443,769
Minimum	$1,004,325	$10,686	$67,077	$15,000
Maximum	$221,794,512	$92,029,000	$63,902,456	$6,275,611
Std. Dev.	$20,647,223	$10,076,291	$5,941,606	$1,116,208
2006-2007				
Median	$10,271,294	$4,574,323	$3,600,775	$481,331
Minimum	$889,999	$10,616	$290,026	$15,000
Maximum	$233,648,000	$99,976,000	$72,152,152	$6,123,876
Std. Dev.	$21,715,484	$10,980,856	$6,460,705	$1,126,363
2007-2008				
Median	$11,425,652	$4,996,875	$3,958,042	$546,043
Minimum	$727,677	$5,804	$327,449	$15,000
Maximum	$268,106,913	$105,298,000	$79,160,961	$6,905,081
Std. Dev.	$24,053,977	$11,787,464	$6,754,119	$1,258,460
2008-2009				
Median	$12,132,018	$5,383,373	$4,345,160	$526,362
Minimum	$1,070,105	$9,122	$227,584	$4,500
Maximum	$295,747,602	$116,542,000	$81,098,704	$4,026,923
Std. Dev.	$25,840,900	$12,772,920	$7,012,005	$966,939
2009-2010				
Median	$12,842,190	$5,284,318	$4,665,023	$610,703
Minimum	$1,196,126	$13,957	$265,592	$54,722
Maximum	$333,630,441	$187,684,000	$72,632,087	$4,209,477
Std. Dev.	$27,677,092	$13,926,316	$7,351,035	$1,029,154

Characteristics of students. Two variables related to student characteristics at a HEI were included into this study. These variables were selected due to their relationship to the number and type of students that are enrolled at the institution. Number of students enrolled at an HEI was selected to account for the size of the institution. The average in-district tuition was selected to account for the amount of money a particular student has to decide to spend in order to receive an education.

Table 8 describes the mean, minimum, and maximum number of students enrolled at HEIs. The NCES defines total enrollment as the number of students enrolled during the fall semester who are enrolled in courses creditable towards a degree or certificate (National Center For Education Statistics, 2013). The average enrollment at HEIs have increased over the eleven years of this study.

Table 8
Descriptive Statistics of Total Enrollment

Year	4-Year Public	4-Year Private	2-Year Public	2-Year Private
1999-2000				
Median	14501	2790	7690	364
Minimum	133	18	204	42
Maximum	193875	37132	88059	1081
Std. Dev.	16892	3796	8054	279
2000-2001				
Median	14673	2825	8234	349
Minimum	139	8	148	4
Maximum	195403	37150	125678	1059
Std. Dev.	17206	3825	9652	281
2001-2002				
Median	15114	2898	8688	392
Minimum	44	47	174	14
Maximum	197354	37134	139093	1226
Std. Dev.	17443	3916	10361	312
2002-2003				
Median	15683	2998	9157	405
Minimum	155	14	244	8
Maximum	208862	38096	137825	1268
Std. Dev.	18286	4080	10736	309
2003-2004				
Median	15965	3081	9053	454
Minimum	154	27	162	85
Maximum	212711	38188	117766	1809
Std. Dev.	18683	4208	9891	379
2004-2005				
Median	16067	3162	9171	461
Minimum	176	59	195	93
Maximum	218134	39408	116839	1961
Std. Dev.	18963	4380	10108	379
2005-2006				
Median	16001	3193	9163	416
Minimum	113	70	189	98
Maximum	220727	40004	118128	1269
Std. Dev.	18977	4451	10287	308
2006-2007				
Median	16335	3239	9247	451
Minimum	192	70	198	99
Maximum	225962	40870	122669	1357
Std. Dev.	19483	4515	10492	360
2007-2008				
Median	16492	3292	9535	443
Minimum	231	59	222	93
Maximum	232960	41783	129490	1502
Std. Dev.	19782	4602	11062	358
2008-2009				
Median	16858	3329	10044	441
Minimum	249	61	221	101
Maximum	244273	42189	155003	1639
Std. Dev.	20375	4651	12023	388
2009-2010				
Median	17377	3427	10886	455
Minimum	350	79	233	110
Maximum	259515	46312	154142	1589
Std. Dev.	21103	4919	12712	375

Table 9 describes the mean, minimum, and maximum cost of tuition for in-district students. The NCES defines in-district tuition as the cost the HEI charges an undergraduate student who resides within the institution's locality (National Center For Education Statistics, 2013). The average cost of tuition remained relatively flat among public institutions from 1999-2000 to 2002-2003, increase to tuition is observed each year after that. Public institutions, on average, increased their tuition each year during this study.

Table 9
Descriptive Statistics of Average In-District Tuition

Year	4-Year Public	4-Year Private	2-Year Public	2-Year Private
1999-2000				
Median	$2,419	$12,510	$1,227	$6,675
Minimum	$0	$150	$0	$1,095
Maximum	$6,384	$25,950	$4,800	$14,600
Std. Dev.	$1,296	$5,210	$696	$2,865
2000-2001				
Median	$2,492	$13,171	$1,280	$7,251
Minimum	$0	$795	$0	$1,440
Maximum	$6,672	$26,040	$4,800	$15,200
Std. Dev.	$1,353	$5,398	$695	$2,918
2001-2002				
Median	$2,628	$13,935	$1,344	$7,840
Minimum	$0	$0	$0	$1,650
Maximum	$7,054	$27,330	$4,640	$15,900
Std. Dev.	$1,431	$5,700	$702	$3,179
2002-2003				
Median	$2,886	$14,900	$1,440	$8,215
Minimum	$0	$0	$0	$1,950
Maximum	$8,008	$28,680	$4,640	$16,900
Std. Dev.	$1,594	$5,971	$746	$3,341
2003-2004				
Median	$3,312	$15,960	$1,590	$8,800
Minimum	$0	$2,340	$0	$2,325
Maximum	$8,796	$30,120	$5,140	$18,180
Std. Dev.	$1,774	$6,269	$772	$3,637
2004-2005				
Median	$3,722	$16,860	$1,680	$9,000
Minimum	$0	$0	$0	$2,400
Maximum	$18,236	$34,000	$5,140	$19,620
Std. Dev.	$2,064	$6,617	$795	$3,731
2005-2006				
Median	$3,814	$17,760	$1,746	$9,230
Minimum	$0	$0	$0	$2,480
Maximum	$19,877	$33,992	$5,140	$20,780
Std. Dev.	$2,230	$7,051	$846	$3,981
2006-2007				
Median	$4,034	$18,850	$1,868	$9,900
Minimum	$0	$0	$0	$2,540
Maximum	$20,991	$35,604	$5,390	$22,590
Std. Dev.	$2,365	$7,503	$897	$4,130
2007-2008				
Median	$4,270	$20,050	$1,913	$10,865
Minimum	$0	$0	$0	$2,600
Maximum	$12,284	$39,600	$5,640	$23,940
Std. Dev.	$2,314	$7,956	$948	$4,448
2008-2009				
Median	$4,350	$21,320	$2,049	$11,210
Minimum	$0	$0	$0	$2,700
Maximum	$13,014	$39,635	$5,920	$23,352
Std. Dev.	$2,457	$8,420	$979	$4,409
2009-2010				
Median	$4,950	$22,304	$2,119	$11,480
Minimum	$0	$0	$0	$2,800
Maximum	$13,604	$45,360	$6,220	$26,500
Std. Dev.	$2,507	$8,772	$985	$5,250

Transformations

A log base e transformation was applied to all variables for ease of interpretation of the results. Transforming these variables to log base e allowed for the direct interpretation of coefficients as a proportional difference (Gelman & Hill, 2006; Gujarati, 1995). This transformation allowed the analysis to determine how elastic graduation rates are when there is a change in QoL. Using a log-log regression, the results from the analyses are interpreted at a one-percent change in the independent variable which is related to a change in the dependent variable equal to the coefficient.

QoL Factors

An exploratory factor analysis was conducted to determine which factor each of the social indicators should load under. The factor analysis utilized a principle component factor model for extraction and a oblique rotation using Promax was employed due to correlation that exists between each of the variables. Table 10 reports the factor loadings of the social indicators into the two QoL factors. The negative factor loading for marriage rate indicates that this social indicator has a relationship opposite than the other variables that loaded into the environmental factor. Table 11 categorizes each of the social indicator into their matching QoL factor.

Table 10
Exploratory Factor Analysis of Social Indicators

	Neighborhood Factor	Environmental Factor	Uniqueness
Per Capita Personal Income	0.92		0.15
Housing Price Index	0.84		0.25
Bachelor Degree Rate	0.83		0.30
Avg. Commute Time	0.74		0.22
Life Expectancy	0.64		0.44
Murder Rate		0.83	0.32
Air Quality Index		0.61	0.48
Marriage Rate		-0.61	0.57
Unemployment Rate		0.48	0.71

Table 11
Social Indicators of Quality of Life.

Neighborhood Factor
Income and Wealth
Per Capita Personal Income (PCPI)
Housing
Housing Price Index (HPI)
Education and Skills
Educational Attainment
Work and Life
Mean Commute Time in Minutes
Health Status
Life Expectancy
Environmental Factor
Personal Security
Murder Rate
Environmental Quality
Air Quality
Social Capital
Marriage Rate
Jobs and Earnings
Unemployment Rate

CHAPTER 4
NEIGHBORHOOD FACTOR

Neighborhoods are influential in shaping the values and behaviors of individuals (Ellen & Turner, 1997). Based upon the neighborhood factor, the region develops a character that influences how one behaves. Because neighborhood conditions affect individuals, it has an impact on the educational attainment of individuals in the region (Garner & Raudenbush, 1991).

This chapter examines the effect that the social indicators (Income and Wealth, Housing, Education and Skills, Work and Life Balance, and Health Status) related to the neighborhood factor of QoL have on the graduation rates at two- and four-year HEIs. It begins with a discussion of why each of the social indicators are related to the neighborhood factor and their relationship to graduation rates at HEIs. Second, the chapter analyzes and discusses the interactions between the neighborhood factors and graduation rates. The chapter concludes with a discussion of what should be considered by the stakeholders (HEI, Organizations/Businesses, Faculty/Staff, Students, and Governments) when making considering human capital in their region.

Income and Wealth

Income and wealth, in the context of QoL captures the financial well-being of the region and those individuals living within that region. Income is considered the measure of financial well-being at the individual level and wealth is the measure of regional financial well-being. The average per-person income of individuals in a region is used to approximate the overall wealth of the region (Lorenz, 1905;

B. A. Weisbrod & Hansen, 1968). Income and wealth is directly related to socio-economic status (SES) and affects the overall social structure of a region (Cummins, 1996). The association with SES is why income and wealth is included in the neighborhood factor, where the average income of a region has an effect on the education attainment of individuals (Datcher, 1982).

Income and wealth is also an important aspect of QoL. When income increases, so does the life satisfaction of individuals living in that particular region (Schyns, 2002). If life satisfaction of a region increases, the overall QoL increases correspondingly, creating a better living environment. Individuals who have the financial means due to their income are able to acquire additional resources that allow them to live the 'good-life' (Ferriss, 2006). When individuals are able to afford additional resources, they are left with wanting for less, thereby increasing their QoL.

Vartanian (1999) found that wealth is positively related to increased educational attainment. Wealthier regions tend to have the ability to provide additional resources to their HEIs either through direct support by residents and alums, or through local and state funding. Also, as incomes increase, individuals may be more motivated to graduate from an HEI in order to take advantage of a job with a higher paying salary. However, individuals from less wealthy regions may be negatively impacted by wealthier neighborhoods, having to compete with students with more resources (Jencks & Mayer, 1990). It is expected that, on average, when a region's income and wealth increases the graduation rates at HEIs will increase.

Social indicator of income and wealth. Per capital personal income (PCPI) was selected as the social indicator for income and wealth due to its direct relationship to the average income of individuals in a region. PCPI had been found to be a referent for socio-economic status (SES) (Malizia, 1975); where an individual's personal financial well-being is related to the overall well-being of that

individual (Diener & Suh, 1997). PCPI is fairly accurate in approximating the financial well-being of residents in a particular region and is a suitable social indicator for measuring income and wealth (Berry, Fording, & Hanson, 2000; Gillingham & Reece, 1980; Sharpe, 1999).

Several studies had also found a relationship between PCPI, health outcomes and increased mortality. (Kaplan, Pamuk, Lynch, Cohen, & Balfour, 1996; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997). This relationship exists because typically individuals in regions with lower PCPI are unable to afford adequate health insurance or even access to health care. This relationship between PCPI and health could create collinearity between the income and wealth social indicator and the health status indicator.

PCPI was calculated by the U.S. Bureau of Economic Analysis (BEA) by using the total personal income of a region, divided by the population of that region (Bureau of Economic Analysis, 2014). PCPI that is lower than the national average is used as an indicator of poverty in particular regions (Lok-Dessallien, 1999). The PCPI data was retrieved from the BEA's Interactive Data website (Bureau of Economic Analysis, 2014). This dataset included all personal income by CBSA region for eleven year (2000-2010). These data were merged with the HEI dataset, linked by CBSA region. The data for PCPI are continuous data, expressed in dollars.

Descriptive statistics of the PCPI for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 12. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded.

Table 12
Descriptive Statistics of Regional Per Capita Personal Income ($s) by Year

Year	Median	Minimum	Maximum	Standard Dev.
2000	$29,891.00	$13,842.00	$54,785.00	$6,004.50
2001	$31,140.00	$15,133.00	$49,365.00	$5,837.26
2002	$31,702.00	$15,568.00	$47,961.00	$5,638.73
2003	$32,538.00	$16,032.00	$48,784.00	$5,666.13
2004	$33,989.00	$16,636.00	$51,901.00	$6,096.23
2005	$35,156.00	$17,685.00	$55,626.00	$6,542.88
2006	$37,477.00	$18,536.00	$62,063.00	$7,289.84
2007	$38,345.00	$19,422.00	$64,342.00	$7,753.48
2008	$39,742.00	$20,692.00	$67,415.00	$7,704.61
2009	$38,106.00	$20,926.00	$57,542.00	$7,073.22
2010	$38,705.00	$21,519.00	$61,260.00	$7,283.69

The median PCPI in 2000 was $29,891.00, in 2010 the median PCPI increased to $38,705.00. In 2000, the McAllen-Edinburg-Mission, TX CBSA had the lowest PCPI at $13,842.00, by 2010 this CBSA continued to have the lowest PCPI, increasing to $21,519.00. The highest PCPI, in 2000, was in the San Francisco-Oakland-San Jose, CA CBSA at $54,785.00; by the year 2010 the Odessa-Midland, TX CBSA had the highest PCPI at $61,260.00.

Relationship between income and wealth and graduation rates. This study have found statistically significant relationships for all or most of the the time periods for each of the analyses. This indicates that the PCPI variable is related to graduation rates at HEIs. The relationship was positive as expected for four-year HEIs. This relationship could be the result of students who attend four-year HEIs choosing to maximizing their lifetime earnings by identifying a higher paying job market (Allen, 1999).

Two-year HEIs had surprisingly different results, a negative relationship what found between PCPI and graduation rates. This negative relationship may be related to the particular industries that these students have chosen to enter after graduation. Associate degrees are typically associated with particular career paths,

and their salary may differ from the average PCPI of the region (A. M. Cohen & Brawer, 2003; Napoli & Wortman, 1998).

The results for the 100% time to graduation rate among four year HEIs indicate that there is approximately a 0.50% or larger change in the graduation rate for every one percent change in the regional PCPI (Table 13). The relationship seem to decline over time from t=-3 to the year of graduation.

Table 13
Fixed Effects Regression of Per Capita Personal Income on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(PCPI)	0.49***	0.58***	0.60***	0.59***
	(0.06)	(0.05)	(0.05)	(0.06)
Constant	-8.96***	-8.56***	-7.95***	-7.86***
	(0.35)	(0.33)	(0.31)	(0.38)
Observations	9244	9236	9227	8228
# of HEIs	1093	1091	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.92
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

The results for the 150% time to graduation rate among four year HEIs indicate a smaller relationship than that of the 100% time to graduation rate, where there exists approximately a 0.20% in the graduation rate for every one percent change in the regional PCPI (Table 14). This relationship appears to remain steady over the time periods with a small decrease in the graduation year.

Table 14
Fixed Effects Regression of Per Capita Personal Income on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(PCPI)	0.14***	0.19***	0.20***	0.19***	0.20***	0.21***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
Constant	-3.74***	-3.64***	-3.54***	-3.34***	-3.36***	-3.25***
	(0.14)	(0.13)	(0.12)	(0.14)	(0.17)	(0.21)
Observations	9300	9290	9274	8278	7242	6201
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Two-year HEIs had a negative relationship between graduation rates and PCPI for the first two time periods, in which a one percent increase in the PCPI is related to approximately a 0.50% decline in graduation rates (Table 15). Once again, this is a surprising result and further investigation will need to occur to determine this inverse relationship.

Table 15
Fixed Effects Regression of Per Capita Personal Income on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(PCPI)	-0.15	-0.44*	-0.46**
	(0.31)	(0.25)	(0.21)
Constant	1.96	2.50	1.74
	(2.01)	(2.03)	(1.72)
Observations	443	437	434
# of HEIs	62	61	61
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

In summary, the effects of PCPI could be due to multiple reasons: including

personal motivation, opportunity costs, and overall financial security. No matter the reason, stakeholders should consider this relationship when determining what can be done to change graduation rates.

Housing

Housing as a social indicator is a critical aspect that must be included in estimations of regional QoL (Rooy, 1978). Housing and QoL go hand-in-hand, where the quality and value of a home increases with the QoL of the region (Sirgy & Cornwell, 2002). The quality and value of homes in a region can define the community and drive individuals who own homes to maintain and improve their properties to keep up the defined standards. Individuals make decisions to improve existing homes or build newer homes if the area the home is in meets perceived QoL standards. Individuals will not invest money into a market that will result in negative returns. The only method to aid in guaranteeing a return is to select a region or location that is attractive to future buyers.

Increases to home values are related to a region's level of sustainable development. Individuals decide to live in a particular region because they choose the basket of goods and services that are available to them in that region (Leitmann, 1999). As a region's level of sustainable development increases, overall regional QoL increase along side it (Maliene, Howe, & Malys, 2008). This in turn affects the value of homes in the region.

The availability and affordability of housing has a direct influence on the migration of individuals into and out of a region (C. H. Mulder, 2006). If suitable homes do not exist and QoL is lower then what is demanded by individuals, they may make the decision to move to another region. A home purchase is a decision not only to buy property but also to become connected with the region and become less likely to migrate to another region.

Firms find it easier to recruit and retain individuals when suitable housing exist. The type of housing available signals to employees (current and future) that the environment presents aspects that are related to life satisfaction. This should hold true for HEIs as well, where availability of suitable housing will make it easier to retain and attract qualified individuals for faculty and staff positions.

Regions in which suitable housing is available allow HEIs to retain and attract qualified individuals for faculty and staff position. Individuals currently employed at an HEI may decide not to move to a position at a different institution based upon the increasing value of their home. Future employees may also make decisions to move to a particular region based upon the perceived future increase of value of homes in the region. These decisions by the higher education workforce can have an impact on the quality of education provided by the HEI and the overall graduation rate.

Social indicator of housing. It is expected that Housing Price Index (HPI) is collinear with many of the other social indicators of QoL; as discussed earlier there is a close relationship with housing and many social indicators. HPI should provide a positive relationship with graduation rates in a univariable analysis, but may be factored out in a multivariable analysis.

The HPI was selected as the social indicator for housing due to its relationship with increases in housing value and prices. The HPI was retrieved from the Federal Housing Finance Agency's (FHFA) data website. The HPI was calculated using a weighted-repeat sales methodology, in which sales prices of single-family homes are used in its calculation (Federal Housing Finance Agency, 2014). The HPI is a measure of the movement of housing prices for the selected region; a larger HPI indicates an larger increase in housing prices, where a low HPI indicates less change in housing prices (Wang & Zorn, 1997). This index is helpful in creating a single, equal measure that is able to distinguish price variation

between multiple metropolitan regions (Ozanne & Thibodeau, 1983; Roback, 1982).

Descriptive statistics of HPI for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 16. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded.

Table 16
Descriptive Statistics for Regional Housing Price Index by Year

Year	Median	Minimum	Maximum	Standard Dev.
2000	127.14	99.85	345.94	68.40
2001	135.24	108.33	377.86	76.62
2002	140.88	111.80	417.21	86.38
2003	149.06	117.87	459.64	97.00
2004	160.64	122.32	511.95	114.35
2005	173.45	127.49	585.54	141.37
2006	185.43	130.93	640.29	159.08
2007	193.82	133.97	642.14	157.32
2008	194.03	131.56	627.47	141.13
2009	184.44	123.39	599.33	128.47
2010	175.04	114.00	573.41	124.01

The median HPI for all metropolitan and micropolitan regions in the U.S. was 127.14 in 2000, increasing to 175.04 in 2010. The minimum HPI in 2000 was in the Cumberland, MD-WV CBSA and was 99.85; the minimum HPI in 2010 was calculated at 114 in the Detroit-Ann Arbor-Flint, MI CBSA. The maximum HPI was 345.94 in 2000 for the New York-Northern New Jersey-Long Island, NY-NJ-CT-PA CBSA; the maximum HPI was in the same CBSA and increased to 573.41.

Relationship of housing on graduation rates. Tables 17, 18, and 19 reports the results of the analysis of the social indicator of housing on graduation rates. At four-year HEIs there is a positive relationship between graduation rates and the HPI as was expected. The relationship at two-year HEIs was opposite than expected with a negative relationship.

It was found that among four-year HEIs, that the relationship between HPI and graduation rates declined on average from the year that students enter a HEI to the graduation year. It would seem that regions with a higher HPI had HEIs in which students entering the program graduated at a higher percentage than regions with lower HPIs. This could be due to the relationship between increases in HPI and regional wealth (Lovenheim & Reynolds, 2013). HEIs in regions of increasing housing prices could experience an increase in quality due to a relationship between housing prices and wealth. As the wealth of the region increases, government tax revenue increases which allows for additional funding to public HEIs.

Table 17
Fixed Effects Regression of the Housing Price Index on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(HPI)	0.09***	0.18***	0.25***	0.25***
	(0.03)	(0.03)	(0.02)	(0.03)
Constant	-7.22***	-6.13***	-4.82***	-4.15***
	(0.44)	(0.43)	(0.39)	(0.47)
Observations	9244	9236	9227	8228
# of HEIs	1093	1092	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.92
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 18
Fixed Effects Regression of the Housing Price Index on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(HPI)	0.04***	0.07***	0.09***	0.08***	0.09***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-3.20***	-2.79***	-2.45***	-2.14***	-1.93***	-1.57***
	(0.18)	(0.18)	(0.18)	(0.19)	(0.20)	(0.21)
Observations	9300	9290	9274	8278	7242	6201
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

There is a negative relationship between HPI and graduation rates at two-year HEIs in t=-2 19. This relationship is opposite of what was initially hypothesized. Housing valuation is directly associated with the cost of rents in a region, increased home prices equate to increased rents for apartments and homes (Gallin, 2008). Since many two-year HEIs do not offer on-campus housing for their students, increases to regional rents could affect the ability for two-year college students to afford housing. These students may need to drop out of college in order to work and pay for a place to live.

Table 19
Fixed Effects Regression of the Housing Price Index on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(HPI)	0.07	-0.16	-0.29**
	(0.19)	(0.14)	(0.11)
Constant	1.46	0.15	-1.17
	(1.66)	(1.53)	(0.93)
Observations	443	437	434
# of HEIs	62	61	61
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Education and Skills

Having an educated citizenry is related to the overall quality of the environment due to several factors. An educated citizenry is created through formal education through colleges and universities. Formal education impacts the environment through the following methods: provides a means to pass on values, knowledge, and skills; provides a process to allocate opportunity; increases human capital, and; credentials individuals to signal their KSAs to employers (Edgerton, Roberts, & Below, 2012). These effects of formal education on individuals, organizations, and the economy has an impact on regional QoL.

A region with a larger proportion of baccalaureate degrees is related to an increased number of students enrolling into college and who are more likely to graduate (Bailey, Jeong, & Cho, 2010; Hahs-Vaughn, 2004; W. H. Sewell & Shah, 1967). This relationship is due to the culture that is created by family and neighborhood effects that influences young individuals in understanding the importance of higher education on their future.

In addition to the effects that education plays with the economy, college

degrees have an effect on the well-being of individuals. Individuals who have attained higher education degrees tend to have lower levels of emotional and physical distress, overall (Ross & Van Willigen, 1997). The lower level of distress is related to individuals possessing higher paying jobs and have access to economic resources. This financial and economic benefit leads to higher levels of personal control for educated individuals.

In times of economic hardship and recession, individuals with college degrees tend to fare better then those without a degree, (Houseman, 1995). Individuals with college degrees possess jobs that are more resistant to changes in the economy and are less likely to loose their job during times of economic recession. Therefore, there are multiple benefits of a region with a larger number of individuals with college degrees; the region will be more resistant to issues of unemployment and the individuals will be happier because they are able to maintain employment. This overall has a positive effect on the overall QoL.

It was hypothesized that there is a positive relationship between the education and skills social indicator and graduation rates at HEIs. The effect of education and skills on the faculty and staff of HEIs is a bit cloudy, as a large majority of individuals that are employed by HEIs possess college, advanced, and/or terminal degrees as a condition of working for the institution.

The level of education and skills in a region has an effect on students who decide to attend the institution. The education level of parents of college students has an effect on the success of the student (Hahs-Vaughn, 2004). Students who come from families where one or more of their parents graduated from college have a higher success rate in college than first-generation students. In may be assumed that, due to neighborhood effects, individuals who live in regions with a higher proportion of college degrees may also have a higher rate of success in college.

Individuals with college degrees have a tendency to migrate to regions with

higher levels of QoL (Whisler, Waldorf, Mulligan, & Plane, 2008b). This means that as individuals graduates they will move to a region in which they believe is better suited for them. If a HEI is located in a region that is not attractive to the student, the rate of college graduates in the region may not increase, effectively reducing the overall level of QoL. Therefore, it may be beneficial for HEIs to work with their region to improve overall QoL in order to retain individuals after graduation.

Social indicator of education and skills. The social indicator selected for education and skills of a region was the percent of the population, 25 years or older, with a baccalaureate degree or higher. These data were collected from the U.S. Census American Community Survey (ACS) (U.S. Census Bureau, 2014). The data were merged with the IPEDS data and linked to HEI using CBSA identifiers.

It is projected that regions with increases to the proportion of individuals with baccalaureate degrees, will also experience increases to the graduation rates of regional HEIs. This is hypothesized because of the effect of regional education and skills on the individual's success in college.

Descriptive statistics of the percent of individuals in a region with a baccalaureate degree or higher for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 20. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded from the analysis.

Table 20
Descriptive Statistics for Percent Population with Baccalaureate Degree or Higher by Year

Year	Median	Minimum	Maximum	Standard Dev.
2000	25.30%	11.00%	47.60%	5.98%
2001	27.16%	11.79%	46.04%	5.49%
2002	27.77%	10.54%	41.82%	5.44%
2003	28.65%	11.94%	44.64%	5.77%
2004	20.50%	10.53%	47.70%	7.70%
2005	27.80%	10.90%	57.60%	7.41%
2006	27.80%	10.00%	56.10%	7.30%
2007	28.10%	10.60%	54.50%	7.37%
2008	28.70%	10.90%	57.00%	7.39%
2009	28.20%	10.30%	57.90%	7.46%
2010	29.10%	9.40%	57.50%	7.47%

The median percent of individuals with baccalaureate degrees or higher in 2000 was 25.30% and 29.10% in 2010. In 2000, the Merced, CA CBSA had the lowest percent of college educated individuals 11%; the Iowa City, IA CBSA had the highest percentage at 47.60%. In 2010, the Lakeland–Winter Haven, FL CBSA had the lowest percentage of college educated individuals, at 9.40%; and the Denver–Boulder–Greeley, CO CBSA had the highest percent at 57.5%.

Relationship between education and skills and graduation rates. Results find that there are statistically significant relationships between graduation rates at four-year HEIs and the percentage of the regional population with baccalaureate degrees (Tables 21 & 22). Individuals in a region have an influence on those around them. A higher number of higher education trained individuals would signal to individuals in college to behave in a similar means and graduate with a degree. Overall, regions in which there are a higher proportion of individuals with baccalaureate degree or higher will tend to have a larger percentage of individuals graduate from a four-year HEI.

A larger proportion of individuals with baccalaureate degrees would also indicate a higher level of human capital. This higher level of human capital leads to

increased productivity among business and have a direct impact on the PCPI of individuals in a region. The increase in PCPI could indicate collinearity between the two social indicators.

Table 21
Fixed Effects Regression of Educational Attainment on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(Bachelor Degree)	0.07***	0.06***	0.05***	0.05***
	(0.02)	(0.01)	(0.02)	(0.02)
Constant	-6.99***	-6.88***	-6.84***	-6.92***
	(0.48)	(0.45)	(0.40)	(0.38)
Observations	9072	9004	8994	7992
# of HEIs	1093	1091	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 22
Fixed Effects Regression of Educational Attainment on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(Bachelor Degree)	0.02***	0.01**	0.01**	0.01***	0.01**	-0.004
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-3.17***	-3.11***	-3.20***	-3.04***	-2.90***	-2.54***
	(0.20)	(0.19)	(0.17)	(0.15)	(0.17)	(0.19)
Observations	9129	9058	9039	8041	7004	5962
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

No statistically significant relationship was found at two-year HEIs (Table 23). However, this effect may not apply to two-year HEIs due to differing motivations or other life circumstances among those individuals. The relationship

among two-year HEIs may not exist because individuals attending the two-year HEI may not see those with four-year degrees in the same light or value academic pursuits over practical matters.

Table 23
Fixed Effects Regression of Educational Attainment on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(Bachelor Degree)	0.002	0.05	-0.11
	(0.07)	(0.06)	(0.13)
Constant	1.24	0.47	-0.60
	(1.61)	(1.54)	(1.24)
Observations	438	430	427
# of HEIs	61	60	61
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Work and Life Balance

Work and life balance is an indication of the proportion of time individuals are spending working compared to the amount of time they are spending on personal matters. Being able to balance time between these work and non-work domains leads to higher levels of satisfaction and therefore increased overall QoL (Clark, 2000; Guest, 2002).

As individuals increase the amount of time they spend on work related activities, they have less available time to devote to activities that may increase their personal QoL. As more individuals in a region increase the time spent on work activities there is a decrease in the number of external activities that they may participate in that raises QoL for themselves and their community. Therefore the overall regional QoL could decrease.

Typically individuals are not balanced when they work too many hours and thereby not have time for themselves. Individuals with this sort of poor work and life balance are affected by issues such as burnout from work, low performance at work, and the neglecting duties with family and home. (Caproni, 2004; Hill, Hawkins, Ferris, & Weitzman, 2001; Shanafelt, 2012). These negative consequences not only affect the individual but can have an effect on the community and region.

Organizations in regions with poor work and life balance are afflicted with increased turnover among employees and decreased productivity (Beauregard & Henry, 2009). These negative effects on organizations affect the ability to produce goods and services. Whereas with HEIs, faculty and staff with poor work and life conditions will perform at a lower level than their counter parts at other HEIs, *ceteris paribus*. This lower performance and overall production can reduce the level of education a student receives. Overall, this could reduce the percentage of graduates each year.

Social indicator of work/life balance. The average commute time (in minutes) of all employees in a region were used as the social indicator of work and life balance. The average commute time of a region is correlated with QoL, where a lower commute time is related to more balance between work and non-work activities (Gabriel, Mattey, & Wascher, 2003; Hill, Miller, Weiner, & Colihan, 1998). This is true because the more time individuals spend commuting to and from work, the less likely those individuals would be willing to devote more time to work.

It is projected that if the average commute time of a region decreases, graduation rates at HEIs will increase. This relationship as hypothesized because if commute time decreases, it assumed that individuals will have more non-work time. This creates the possibility of more balance between work and leisure activities. This can, in turn, lead to more productivity, which should lead to better education and more individuals attaining degrees.

These data were obtained from the U.S. Census Bureau's American Community Survey (ACS) (U.S. Census Bureau, 2014). The average commute time was calculated from a sample of individuals across the United States. Individuals, 16 years and older, who did not work at home, were asked how long they commute to work. These data were linked to the IPEDS dataset using CBSA regional codes.

Descriptive statistics of the average commute time for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 24. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded from the analysis.

Table 24
Descriptive Statistics for Average Commute Time (in Minutes) by Year

Year	Median	Minimum	Maximum	Standard Dev.
2000	24.30	15.10	34.00	4.56
2001	22.48	16.81	37.40	5.22
2002	22.57	15.81	37.50	5.18
2003	22.85	16.22	37.30	5.14
2004	24.44	16.52	37.30	5.01
2005	23.50	14.00	40.70	4.56
2006	23.50	14.30	37.70	4.51
2007	23.80	14.70	39.10	4.57
2008	24.00	14.30	40.50	4.52
2009	23.90	14.20	38.10	4.45
2010	24.10	14.20	40.30	4.40

The median commute time for all CBSA regions was 24.30 minutes in 2000, and decreased a small amount to 24.10 minutes in 2010. In 2000, the shortest average commute time was 15.10 minutes in the Grand Forks, ND-MN CBSA and the longest average commute time was 34 minutes in the New York-Newark-Edison, NY-NJ-PA; Trenton-Ewing, NJ; Allentown-Bethlehem-Easton, PA-NJ; and Poughkeepsie-Newburgh-Middletown, NY CBSAs. In 2010, the Grand Forks, ND-MN CBSA remained as the region with the shortest average commute time at 14.20 minutes and the longest average commute time was in the East Stroudsburg,

PA CBSA at 40.30 minutes.

Relationship of work-life balance on graduation rates. Table 25 and 27 displays no statistically significant relationship between commute time and graduation rates at two- or four-year HEIs at the 100% and 150% time to graduation rate, respectively. There was some level of statistical significance at the 150% time to graduation rate among four-year HEIs (Table 26).

Table 25
Fixed Effects Regression of Mean Commute Time on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(Commute Time)	-0.05	-0.01	0.04	0.04
	(0.04)	(0.03)	(0.03)	(0.04)
Constant	-7.24***	-7.14***	-7.18***	-7.13***
	(0.47)	(0.44)	(0.40)	(0.39)
Observations	9072	9004	8994	7992
# of HEIs	1093	1091	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 26
Fixed Effects Regression of Mean Commute Time on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(Commute Time)	0.01	0.03**	0.02*	0.02	0.01	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Constant	-3.31***	-3.26***	-3.32***	-3.15***	-2.98***	-2.61***
	(0.19)	(0.18)	(0.17)	(0.15)	(0.17)	(0.19)
Observations	9129	9058	9039	8041	7004	5962
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 27
Fixed Effects Regression of Mean Commute Time on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(Commute Time)	0.31	-0.03	-0.11
	(0.20)	(0.20)	(0.19)
Constant	0.34	0.68	-0.24
	(1.84)	(1.55)	(1.38)
Observations	438	430	427
# of HEIs	61	60	61
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Health Status

Within the literature there are two forms of health-related QoL. The first being focused on the well-being of a patient, which is termed health-related QoL (Centers for Disease Control and Prevention, 2014). The second, and focus of this study, are regional health QoL measure and is focused on the well-being of a

population (Young, 2008). Regional health QoL is estimated utilizing social indicators that are observable health-related attributes that can affect the entire population.

A number of social indicators have been used to estimate regional health QoL in the past. A few measures that have been used in previous studies include: infant mortality, doctors per capita, life expectancy, and access to health care (Chen, Bush, & Patrick, 1975; Diener & Suh, 1997). The social indicator used must be one that has or could have an effect on the population of study. Hence, the use of the rate of malaria infections for a study in the United States would not be appropriate since malaria is not a disease that effects most individuals who live within the United States.

Life expectancy was chosen for this study due to the fact that this social indicator is a measure that is universal among all individuals. Life expectancy is closely aligned to the overall health quality of individuals in different regions (Breyer & Felder, 2006; Larson & Wilford, 1979; Lubitz, Cai, Kramarow, & Lentzner, 2003). This relations exists because life expectancy is related to many health factors, including access to health care and morbidities among individuals.

It would be expected that regions with longer life expectancy would have individuals that are healthier. Therefore, the regional QoL would be higher due to this relationship. It is expected that as life expectancy increases, the number of graduates from HEIs would increase.

This increase among degree attainment is related to the effect of healthy individuals on the production of degrees at the HEI level. When an institution employs individuals who are healthier, the employees are likely happier and provide increased production to the institution. They may be less likely to worry about their own health and can concentrate on educating and guiding students through the educational process. This holds true from the student perspective as well, healthier

students may be more likely to engage in activities conducive to attaining a degree.

Social indicator of health status. Life expectancy was selected as the social indicator of the health status of a population in a region. These data were retrieved from the Institute for Health Metrics and Evaluations (IHME) and matched to HEIs by CBSA regions (Institute for Health Metrics and Evaluation, 2014). Life expectancy is calculated by measuring the average number of years individuals are projected to live to, in a CBSA region.

Descriptive statistics of life expectancy for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 28. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded.

Table 28
Descriptive Statistics for Regional Life Expectancy by Year

Year	Median	Minimum	Maximum	Standard Dev.
2000	76.85	68.65	80.65	1.82
2001	76.90	68.90	80.80	1.83
2002	76.97	69.20	81.00	1.83
2003	77.05	69.35	81.30	1.86
2004	77.15	69.55	81.70	1.89
2005	77.40	70.10	81.90	1.93
2006	77.53	70.25	82.15	1.99
2007	77.70	70.85	82.60	2.01
2008	77.90	71.15	83.10	2.03
2009	78.00	71.70	83.00	2.03
2010	78.25	71.95	83.35	2.05

The median life expectancy in 2000 was 76.85 years of age, increasing to 78.25 years of age in 2010. The lowest life expectancy for the year 2000 was in the Baltimore-Towson, MD CBSA at 68.65 years; in 2010 the lowest life expectancy was 71.95 years in the Rocky Mount, NC CBSA. The highest life expectancy for the year 2000 was in the Washington-Arlington-Alexandria, DV-CA-MD-WV CBSA at 80.65 years; in 2010 the highest life expectancy was 83.35 years in the San

Francisco-Oakland-Fremont, CA CBSA.

Relationship of health status on graduation rates. Among four-year HEIs a statistically significant relationship between life expectancy and graduation rates exists for all time periods. The largest of the relationships is at the 100% time to graduation rate where a one percent increase in the regional life expectancy is related to around a 5.50% to 6.50% increase in the graduation rate (Table 29). The relationship with the 150% time to graduation rate is fairly large as well, with approximately a two percent to 2.75% change in graduate rates for every one percent increase in the life expectancy (Table 30). These relationships were as expected, indicating that there was a positive relationship between the two variables.

It can be seen that as regional health status (as measured by the the life expectancy of the region) increases there is an increase to the percentage of individuals who graduate on time. An increased focus on health could mean that individual in the region are focused on behaviors that lead to higher levels of productivity. This translates into students who are more focused on their academics and educational goals by aligning their lifestyle to be productive.

Table 29
Fixed Effects Regression of Life Expectancy on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(Life Expectancy)	5.54***	6.26***	6.52***	6.53***
	(0.77)	(0.82)	(0.85)	(1.04)
Constant	-28.24***	-31.00***	-32.10***	-32.23***
	(2.90)	(3.16)	(3.35)	(4.10)
Observations	9244	9236	9227	8228
# of HEIs	1093	1091	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.92
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 30
Fixed Effects Regression of Life Expectancy on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(Life Expectancy)	2.01***	2.22***	2.24***	2.26***	2.79***	2.73***
	(0.37)	(0.34)	(0.33)	(0.32)	(0.36)	(0.45)
Constant	-10.83***	-11.63***	-11.85***	-11.79***	-13.79***	-13.36***
	(1.35)	(1.29)	(1.27)	(1.23)	(1.43)	(1.80)
Observations	9300	9290	9274	8278	7242	6201
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

The negative relationship among two-year HEIs continues the trend of the selected social indicators behaved opposite as what was initially predicted (Table 31. This could be an indication that individuals attending two-year HEIs are differently motivated then four-year students. It could also mean that students are attending two-year HEIs to gain lower priced credits in the general curriculum then transferring to a four-year HEI. Further investigation will need to be conducted to determine why these relationships occur.

Table 31
Fixed Effects Regression of Life Expectancy on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(Life Expectancy)	-3.94	-3.75	-6.35*
	(3.02)	(3.26)	(3.58)
Constant	16.89	15.77	25.56*
	(12.34)	(13.56)	(14.99)
Observations	443	437	434
# of HEIs	62	61	61
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Neighborhood Factor Results

Tables 32, 33, and 34 reports the analysis of the effect of neighborhood factors on graduation rates while controlling for internal HEI characteristics. Statistically significant relationships existed for four-year HEIs at both graduation rates. No significance was found among two-year HEIs.

At the 100% time to graduation rate for four-year HEIs, PCPI and life expectancy was significant for all four time periods, with life expectancy being the strongest relationship. HPI, bachelor degree, and commute time were significant for one or more time periods throughout the four years.

Table 32
Fixed Effects Regression of the Neighborhood Factor on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(PCPI)	0.48***	0.45***	0.32***	0.27***
	(0.07)	(0.08)	(0.07)	(0.08)
ln(HPI)	-0.09***	-0.02	0.09**	0.11***
	(0.03)	(0.03)	(0.03)	(0.04)
ln(Bachelor Degree)	0.04***	0.02*	0.02	0.02
	(0.01)	(0.01)	(0.02)	(0.02)
ln(Commute Time)	-0.01	0.03	0.06*	0.03
	(0.04)	(0.03)	(0.03)	(0.04)
ln(Life Expectancy)	3.27***	3.48***	3.04***	2.79**
	(0.79)	(0.97)	(1.06)	(1.23)
Constant	-21.19***	-21.64***	-18.64***	-16.93***
	(2.95)	(3.75)	(4.27)	(5.08)
Observations	9072	9004	8994	7992
# of HEIs	1093	1091	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.92
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

At the 150% time to graduation rate among four-year HEIs, it was found that PCPI was significant for all years except t=-5 and life expectancy was significant for all years; similar to the 100% time to graduation rate above. HPI and commute time was also found to be significant for a number of the time periods within the six years. However, differing from the model above, bachelor degrees were not significant.

Table 33
Fixed Effects Regression of the Neighborhood Factor on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(PCPI)	0.08**	0.13***	0.11***	0.10***	0.10***	0.06
	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
ln(HPI)	0.001	0.01	0.03**	0.03**	0.03**	0.06***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
ln(Bachelor Degree)	0.01	0.00	-0.002	0.01	0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln(Commute Time)	0.02	0.04***	0.03**	0.02*	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
ln(Life Expectancy)	1.60***	1.43***	1.10***	1.12***	1.55***	1.07**
	(0.35)	(0.35)	(0.36)	(0.37)	(0.45)	(0.52)
Constant	-9.60***	-9.02***	-7.45***	-7.22***	-8.89***	-6.46***
	(1.28)	(1.33)	(1.41)	(1.52)	(1.83)	(2.15)
Observations	9129	9058	9039	8041	7004	5962
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.92	0.92
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 34
Fixed Effects Regression of the Neighborhood Factor on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(PCPI)	-0.05	-0.65	-0.21
	(0.54)	(0.58)	(0.50)
ln(HPI)	0.16	0.21	-0.15
	(0.27)	(0.29)	(0.23)
ln(Bachelor Degree)	0.04	-0.001	-0.01
	(0.08)	(0.21)	(0.22)
ln(Commute Time)	0.35	0.03	-0.13
	(0.22)	(0.06)	(0.15)
ln(Life Expectancy)	-5.06	-1.01	-1.62
	(4.31)	(4.38)	(5.07)
Constant	20.62	7.98	6.79
	(16.00)	(16.75)	(19.82)
Observations	438	430	427
# of HEIs	61	60	61
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

The Effects of the Neighborhood Factor on Graduation Rates

The relationship between significant variables and the 100% and 150% time to graduation rates were as expected for four-year HEIs. The results were encouraging, suggesting that the neighborhood factor does have an effect on the graduation rate at four-year HEIs at varying rates. The larger coefficient of the life expectancy variable for each of the graduation rates could signify that this variable is capturing a factor that has a significant impact on students attending HEIs. The significance of the PCPI variable in the neighborhood factor analysis for HEIs may indicate a link with taxes and governmental expenditures allocated to HEIs.

Surprisingly, no relationships were found among the neighborhood factor and graduation rates at two-year HEIs. These variables behaved in an opposite direction than what was expected in the separate analyses, however in the neighborhood factor analysis the relationships became insignificant. It is difficult to completely explain why no relationships exist, except that the behavior of students at two-year HEIs differ from that of four-year HEI students. Students attending two-year HEIs may have many different motivations, including obtaining lower cost general education credits to transfer later to four-year HEIs. Some student who obtain these credits could 'drop-out' of the two-year HEI to attend a four-year HEI. These students could affect the graduation rates at two-year HEIs.

Implications

The relationships that exist between the neighborhood factor and graduation rates at four-year HEIs indicate that this variable should be considered by HEI governing boards and administrative leadership when making policy decisions. These relationships indicate that the neighborhood aspect of QoL has an impact on the development of human capital (Shapiro, 2006). Increases to regional PCPI, housing prices, educational attainment, and life expectancy indicates changes to the

surrounding region's economic development.

When an HEI's graduation rate increases, the number of qualified individuals in the regional labor market will increase. However, if HEIs operate in regions with little or no established businesses, there may be a deficit of individuals who will decide to stay living in the region due to lack of employment opportunities. HEIs do not operate in a vacuum and when making decisions they will need to consider how they will impact the economy that surrounds them. For example, HEIs, when adding degree programs or changing current curricula, should align themselves with the needs of the firms in their region. Using these firms as partners in strategic planning will benefit the institution, firm, and region for the better.

Implications for faculty/staff. The income of a region can be indirectly associated with the wages earned by faculty and staff of HEIs. It could be assumed that as regional income and wealth increases, the salaries earned by those faculty and staff would see an increase as well, the reverse would hold true as well. Faculty and staff who see their salaries increase over their career are possibly more motivated and productive (Blinder, 1990). This increased productivity at a HEI would mean increased production of degrees and higher graduation rates.

Increasing home prices could effect the ability to recruit new faculty and staff from out-of-region. Home prices that are above what could be afforded by qualified faculty and staff could lead them to make decisions to accept a position in a different region, leaving the HEI to recruit from their own region, which limits the applicant pool. On the other side, the increase of housing prices could also signal to current and future employees the increasing nature of the QoL of the region. The increased QoL would mean that current employees are able to live a more satisfying life and be more productive. It could also be a means of attracting higher qualified individuals to the HEI.

Faculty and staff who suffer from little to no health issues are more

productive in the workplace. When individuals are healthy they take less sick leave and are on the job more often. These individuals are also more productive as they have less to worry about regarding themselves and can focus more on students. Healthier faculty and staff mean more contact hours with students and more successful students.

Implications for students. Students who live in regions with increasing income and wealth and make the decision to attend a HEI within their region may have an increased success at graduating. This could place individuals in lower-income regions at a disadvantage, where they may not have the option of attending an institution in a higher-income region. These students may be facing two problem areas, first not having the financial ability to pay for a college education, and secondly their chosen HEI not performing at optimal levels. This leaves this individual with the choice of acquiring student loans with the future of possibility not graduating.

Most students while in college do not need to consider housing as an initial factor when attending an HEI; these students have the opportunity to live either at home or on-campus. The price of campus housing are controlled to some extent by the HEI to assure that their students can afford the cost of living. Students that elect to live with their parents during the educational period are not subjected to the price of housing.

The relationship between HPI and the economy may be a factor that motivates students to graduate on-time. As the economy improves at providing additional jobs and increasing the overall QOL for a region, the price of houses will increase. Due to the improved economy and price of housings increasing, students may become motivated to seek to graduate more quickly and secure one of the available jobs.

Students living in regions with a higher proportion of college educated

individuals may be better off in terms of attaining a degree. The neighborhood effects that could be attributed to the likelihood of college graduation could play a large part in the success of students at two- and four-year HEIs (Vartanian & Gleason, 1999).

Students benefit from similar effects that faculty and staff do. Healthier students are more capable of focusing on their studies when they are not ill. Students who are engaged in healthier lifestyles have habits that are more positively related to the ability to graduate on-time (Cook & Moore, 1993; J. Williams, Powell, & Wechsler, 2003). Regions with a higher health status should influence students to behavior in a similar manner to assimilate to the regional norm.

Implications for businesses. To be successful in today's changing world, private firms need to have relationships with the academic entities that are in close proximity to them. To be more competitive, the partnerships with existing HEIs can provide a link to newly trained graduates, access to new business practices and processes, and collaboration on research and development. These benefits from HEIs could aid businesses to being more productive and increasing their wealth, which in turn, trickles down to the employee. This increased wealth should impact the graduation rate at HEIs, producing additional graduates. Additional graduates equate to increased human capital and therefore increased productivity (Becker, 1964).

Increasing the number of educated individuals in the region that an organization operates within is beneficial to the organization. A higher number of higher education trained individuals creates a supply of skilled workers for the organization, and also increases the productivity of all workers (Gottlieb & Fogarty, 2003). If a business wants to grow their operation, it would be to their benefit to implement policies that promote educational attainment within their organization. This can be accomplished through offering tuition reimbursements to employees

who are attending a HEI to improve their knowledge, skills, and abilities. This provides an incentive to employees to spend the time to attend a college or university and thereby increases human capital.

Organizations can work with HEIs to create a pipeline for employment, where graduating students can be assured that when they graduate they will have a job regionally. This will provide an opportunity to retain more individuals in the region through the security of knowing that when a student graduates, they will not have to engage in a national search for a job that fits their degree and interests.

Private-Public partnerships. Increased private-public partnerships between HEIs and business is a mechanism that would increase regional wealth and personal income. The creation of human capital by HEIs increases the income and wealth within their region. This is related to the relationship between human capital and increase productivity at private firms. To increase the affect of human capital on a firm's productivity, HEIs will need to be sensitive to the needs of these firms. Partnerships with regional private firms could create new opportunities that would increase personal income and regional wealth.

HEIs will need to examine the degrees and training offered and assure that they are aligned and meet the immediate and future needs of firms within their region. Secondly, HEIs must recruit students that are interested in, and have the ability to enter the degrees offered by the HEI. And lastly, HEIs will need to influence their students to remain in their region and work for an organization within their region. If students attend a particular HEI and after graduation move to another region, that human capital will be lost and will be used to boost the income and wealth of the regions they migrate to.

HEI partnerships with private firms can realize benefits for both parties by increasing the graduation rates along with income and wealth (Googins & Rochlin, 2000). HEIs, through the creation of an educated workforce would provide a large

benefit in possible gains to private firms revenues. With specially trained individuals graduating from HEIs who would be able to easily interface with their new employer, private firms should be able to maximize their efficiency and be more productive. The higher level of productivity would increase the wealth of the organization and those employed for them, this would directly increase the income and wealth of the region.

In addition to providing an educated workforce, HEIs can partner with local firms and collaborate on research and development opportunities, such unique partnerships will provide organizations with potential innovative solutions to grow their organization. This provides HEIs an experiential environments where students can engage with employers. Faculty would also have the opportunity to apply their discipline in real world situations.

HEIs can aid in increasing the health status of their region through service related programs and activities. HEIs who offer academic programs in health related fields can provide clinical services and health education programs to their community. Through the use of faculty and students in the health professions, service to the community can aid in promoting healthy lifestyles to individuals of all SESs, regardless of their current ability to access health care.

Partnerships with established clinics and hospitals can also aid in raising the level of health care in a region. These partnerships provide highly educated faculty that are able to provide services to raise the level of health in their region. HEIs should work with existing medical facilities to provide outreach opportunities for their faculty. The partnerships could be used to increase overall health awareness in the region. Increased collaborative relationships between HEIs and medical facilities will strengthen the focus of health awareness in the community.

Implications for governments. Federal, state, and local governments have an interest in increasing graduation rates of the HEIs within their jurisdiction.

Having an understanding of the interplay between HEIs graduating students and the income and wealth of their jurisdiction is necessary when formulating policy. Development of any policy that is related to either HEIs or the economy should include an analysis of the effects of income and wealth on graduation rates.

Governmental agencies and policy-makers can set policy that will attract new organizations into the region while retaining existing organizations. Working with HEIs, government can utilize the specific educational offerings of each institution and the resulting human capital to target organizations to move to the region to capitalize on the specialized workforce. Also, with a workforce that is specially trained for existing organizations, these organizations may be less tempted to relocate to another region in order to find capable workers.

A major issue facing the United States is the student-loan debt problem, where the federal student-loan debt is more than one trillion dollars (Weinberg, 2014). This poses an enormous policy problem for the federal government, as these loans had been secured by the federal government. If large levels of defaults occur, major economic issues would arise. Student loans are the only type of debt in the United States that is not able to be discharged through bankruptcy, individuals must pay these loans back over their lifetime. Currently, the level of student-loan debt and the number of individuals defaulting on student-loans is causing the economy to grow more slowly then expected (Bidwell, 2014; Freedman, 2014). The enormity of student-loans in this nation affects the income and wealth of regions; as individuals who have acquired large sum of debt must repay this amount, reducing the amount of currency going back into the local economy. Policy makers must find ways to aid individuals in their repayment (Consumer Financial Protection Bureau, 2014) and create policy that won't allow future students to rack up similar levels of debt.

State and local governments should be aware of what may happen to college

graduates in a region with increasing housing prices after they graduate. There is a higher likelihood of graduates in regions with high levels of housing costs to migrate to regions with lower housing costs within their first five years after they graduate (Kodrzycki, 2001). To retain the produced human capital within their region(s), governments should establish polices or programs that encourages students to remain in the region.

This is a cyclical issue for governments, in which increases to graduation rates are related to HEIs' production of degrees. Governments will need to create an environment that will attract educated individuals, increasing the percentage of individuals with degrees in the region. But also, governments will need to determine mechanisms that will retain individuals who are graduating from HEIs in the region. If individuals are simply attending a HEI for the education and will be leaving the region immediately after graduation, the benefit of educational attainment in the region could be lost.

Governments should collaborate with HEIs in endeavors related to both health care and health related policy. HEIs can use the expertise that exists within the HEI to improve overall regional health. Governments will see benefits from the addition of individuals assisting the health needs of the community. In regards to health policy, utilizing resources within regional HEIs can provide policy-makers with more specific information related to health care in each region. Overall, governments can aid in the improvement of the overall health and wellbeing of individuals while potentially increasing the graduation rates within the region.

CHAPTER 5

ENVIRONMENTAL FACTOR

The second important factor that shapes regional QoL is its environment. This factor includes everything that can affect an individual's natural, built, or perceived environment (van Kamp et al., 2003). The way that individuals interact with and perceive their environment affect regional economic development and QoL (Portney, 2003). Increases to the regional environment has an affect on the graduation rates at HEIs.

This chapter examined the effect that the social indicators (i.e. Personal Security, Environmental Quality, Social Capital, and Jobs and Earnings) related to the environmental factor had on graduation rates at HEIs. The chapter begins with an exploration of the four social indicators and how these variables are related to graduation rates at two- and four-year HEIs. The chapter continues by looking at the interactions between the four social indicators and graduation rates. This chapter then concludes with a discussion on the implications to the stakeholders and what they should consider when making decisions that could affect graduation rates.

Personal Security

Individuals experience personal security when they feel safe from criminal activities conducted by other individuals. These activities can include violent crimes, drug trafficking, human rights violations, or any other act that puts an individual into personal jeopardy (Paris, 2001). When individuals do not feel safe in their environment, overall regional QoL decreases.

The real effect of crime on QoL is actually the fear of crime (Hale, 1988). As

individuals perceive regions to be unsafe, the overall QoL will decrease for that region, irrespective to the actual facts. Many items affect an individual's perception of crime: including actual crime occurring, the media sensationalizing local crime, and the individual's history in high-crime regions.

Personal security can also be a measure of the net migration into a region. In which regions with high crime rates will see the better off individuals decide to move to a more secure region, even further affecting the regional QoL. However, regions can turn around based upon the economic opportunities available. As more educated individuals live in a region, the demand for amenities such as police departments goes up, resulting in a reduction of crime (Shapiro, 2006).

Education provides a socializing effect on individuals, where educated individuals are less likely to commit crimes (Ehrlich, 1975). This effect is related to educated individuals having an increased ability to obtain employment in legitimate areas. Educated individuals also learn to obey the law and to be productive to society (Usher, 1997).

The perception of crime in a region can effect a HEI's ability to attract and recruit high quality faculty and staff. If a HEI cannot secure faculty and staff, there is a higher likelihood that the students who attend will not perform at the same level and may not succeed in college. In addition, if crime rates in a region increase, faculty and staff may decide to relocate to a position in a safer region.

The fear of crime can have an impact on students and influence them to drop out of college and not obtain a degree (Yorke, 1999). If students are worried about their safety getting to and from campus, they will be more likely to remain in an area where they have a lower perception of fear. These fears of crime can have an overall effect on the graduation rate of HEIs. It is hypothesized that as crime rates increase in regions a decrease in graduation rates will occur.

Social indicator of personal security. Crime statistics such as homicide rates, police per capita, and rates of rape have been used as a means to detect crime-related QoL (Diener & Suh, 1997). One of the more important statistics used in many QoL indexes is the homicide rate (Diener, 1995). The homicide rate represents one of the more violent and universally despised criminal activities. It can also be assumed that regions with high homicide rates also experience higher crime rates in other categories.

The social indicator of personal security was selected as the homicide rate of each particular CBSA. This variable is defined as the number of homicides per 100,000 residents (Federal Bureau of Investigation, 2014a). These data were collected from the Federal Bureau of Investigation's (FBI) Uniform Crime Reporting (UCR) data system (Federal Bureau of Investigation, 2014b). These data were linked with the IPEDS dataset using the CBSA identifiers by year.

Descriptive statistics of the regional homicide rates for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 35. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded from the analysis.

Table 35
Descriptive Statistics for Regional Homicide Rates (# of Murders per 100,000 Individuals) by year

Year	Median	Minimum	Maximum	Standard Dev.
2000	5.20	0.00	22.70	4.04
2001	5.60	0.00	20.90	5.25
2002	5.10	0.00	24.60	4.04
2003	5.30	0.00	25.50	3.99
2004	5.00	0.00	25.60	3.55
2005	5.30	0.00	25.40	3.75
2006	5.20	0.00	23.20	3.74
2007	5.30	0.00	28.20	3.99
2008	5.00	0.00	22.80	3.30
2009	4.80	0.00	21.40	3.06
2010	4.80	0.00	21.40	2.82

The median homicide rate for the year 2000 was 5.20 homicides per 100,000 individuals, decreasing to 4.80 homicides per 100,000 in 2010. In 2000, the lowest homicide rate was recorded in multiple metropolitan regions, where there were no reported homicides; the highest rate, 22.7 per 100,000 was recorded in the Greensboro–Winston-Salem–High Point, NC CBSA. In 2010, there were multiple locations with a homicide rate of 0, and the highest homicide rate was recorded in the New Orleans-Metairie-Kenner, LA CBSA at a rate of 21.4 homicides per 100,000 individuals.

Relationship between personal security and status attainment. Personal security, as measured by regional murder rates, did not have a strong relationship with graduation rates at any level. There was no relationship among two-year HEIs (Table 38, and among four-year HEIs the relationship was a 0.01% increase in graduation rates for every one percent decrease in the murder rate (Tables 36 & 37).

Table 36
Fixed Effects Regression of Murder Rate on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(Murder Rate)	-0.01**	-0.01*	-0.01**	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-7.23***	-7.04***	-6.99***	-7.02***
	(0.46)	(0.43)	(0.39)	(0.37)
Observations	9026	9016	8997	8018
# of HEIs	1092	1088	1088	1078
adjusted R-squared	0.91	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 37
Fixed Effects Regression of Murder Rate on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(Murder Rate)	-0.001	-0.001	-0.001	-0.01*	0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.00)	(0.001)	(0.001)
Constant	-3.23***	-3.14***	-3.23***	-3.08***	-2.95***	-2.53***
	(0.19)	(0.18)	(0.17)	(0.15)	(0.17)	(0.19)
Observations	9083	9070	9046	8069	7059	6044
# of HEIs	1100	1097	1096	1087	1086	1081
adjusted R-squared	0.91	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 38
Fixed Effects Regression of Murder Rate on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(Murder Rate)	-0.02	0.02	0.02
	(0.02)	(0.03)	(0.02)
Constant	1.48	0.60	-0.52
	(1.66)	(1.49)	(1.21)
Observations	431	427	424
# of HEIs	61	60	60
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Environmental Quality

Environmental quality is the measurement of the various aspects of the environment (e.g. natural environment, built environment, natural resources, etc.) and the perception individuals have regarding these aspects (van Kamp et al., 2003). This means that environmental quality is not only what is around us and

how we interact with the environment; it also includes how individuals perceive their environment.

Environmental quality has an effect on region QOL; as the perceived environmental quality increases, so does individual well-being and satisfaction (Marans, 2003). Because environmental quality is related to how individuals interact with their environment, their well-being is related to how they perceive that environment to be. If an individual lives in an environment made completely of concrete and steel, with little sun, and no greenery they will perceive a low environmental quality.

The environmental quality of a region can affect the level of migration into the region (Brasington & Hite, 2005). Areas with high environmental quality will tend to see more individuals moving to the regions to enjoy the various amenities that are associated with environmental quality. The lower the environmental quality the more apt it is for individuals to migrate from that region. Having individuals leave a region can have a negative impact on other aspects of QoL and economic growth (Shafik, 1994).

Environmental quality also has an effect on salaries, where increased environmental quality results in positive increases to wages (Hoch & Drake, 1974). This relates to the faculty and staff of HEIs, as individuals who earn higher wages tend to be happier with their job and will be more productive. Due to the increased productivity, more students will be able to graduate from the HEI within the defined graduation periods.

Students living in regions with better environmental quality also benefit. If environmental quality is associated with productivity among employees, an association with the student should also exist. Students living in an a region with good environmental quality would likely be more satisfied with their life and dedicate more time to completing their degree.

Social indicator of air quality. Environmental researchers have used air quality as a variable that is associated with the measurement of environmental quality (Gyourko, Kahn, & Tracy, 1999). Air quality is related to a number of factors, including: the type of region, population, transportation options, industrial operations, and the overall built environment. Micropolitan regions tend to have better air quality than metropolitan regions due to their smaller population. Regions with expansive public transportation systems will see reductions in air pollution from automobiles. Regions with large manufacturing and industrial plants with pollution output will have poorer air quality. The built environment can also effect air quality, a well designed region will encourage individuals to walk more to destinations and pursue activities that promote a healthier environment.

Environmental quality was measured using the annual median Air Quality Index (AQI). The AQI has been used in the past as a measure of QoL among individuals in a region (Ott, 1978). The AQI is a measure of the level of air pollution and was created by the U.S. Environmental Protection Agency. The AQI ranges from 0 to 500 where: 0-50 equals good air quality, 51-100 equals moderate air quality, 101-150 equals unhealthy for sensitive groups, 151-200 is unhealthy, 201-300 is very unhealthy, and 301-500 is hazardous. This variable was collected from the U.S. EPA Global Earth Observation System of Systems (GEOSS) Database (U.S. Environmental Protection Agency's Global Earth Observation System of Systems, 2013).

This researcher predicts that as the AQI increases, a decrease in the graduation rate will be observed. Decreases to the AQI would result in a region with higher QoL and increased graduation rates due to the effects on individuals and the institution.

Descriptive statistics of the regional medial AQI for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 39. These

descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded from the analysis.

Table 39
Descriptive Statistics for Regional Median AQI by Year

Year	Median	Minimum	Maximum	Standard Dev.
2000	55.25	9.00	103.00	19.30
2001	54.00	6.00	109.00	19.62
2002	52.00	4.00	111.00	18.53
2003	52.00	8.00	100.00	16.87
2004	52.00	11.00	99.50	16.50
2005	53.00	5.00	94.00	15.66
2006	52.00	5.00	132.00	16.84
2007	52.25	4.00	109.00	15.35
2008	51.00	5.00	104.00	14.73
2009	47.00	4.00	85.00	12.38
2010	48.00	6.00	86.00	12.23

The median AQI for among all CBSA regions for the year 2000 was 55.25, decreasing to 48.00 in 2010. In 2000, the Harrisburg–Lebanon–Carlisle, PA CBSA had the lowest median AQI at 9, whereas the Riverside–San Bernardino–Ontario, CA CBSA had a median AQI of 103. During 2010, the Evansville-Henderson, IN-KY CBSA had an median AQI of 6 and the Riverside–San Bernardino–Ontario, CA CBSA continued to have the highest AQI at 86.

Relationship between environmental quality and status attainment. Tables 40, 40, and 42 reports the relationships between the social indicator of regional environmental quality and graduation rates at two- and four-year HEIs. The relationships between air quality and four-year HEI graduation rates moved as expected, where an increase in the AQI is related to a decrease in the graduation rates. No statistically significant relationships were found at two-year HEIs.

The strongest relationship affects the 100% time to graduation rate at four-year HEIs, where a one percent increase in the AQI is related to between a 0.07% to a 0.10% decrease in the graduation rate. Indicating that there is some

relationship between the quality of the air in a region and the likelihood of students to graduate from HEIs in that region.

Table 40
Fixed Effects Regression of Air Quality on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(AQI)	-0.09***	-0.07***	-0.07***	-0.10***
	(0.02)	(0.02)	(0.02)	(0.02)
Constant	-6.95***	-6.78***	-6.77***	-6.74***
	(0.50)	(0.49)	(0.45)	(0.41)
Observations	8637	8640	8637	7713
# of HEIs	1040	1047	1045	1042
adjusted R-squared	0.91	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

This relationship decreases in magnitude at the 150% time to graduation rate, where there is only a 0.02% to 0.03% change in the graduation rates for time periods t=0 to t=-4. Students who elect to graduate in a longer time period may be less sensitive to changes in the environment than those who graduate in four years.

Table 41
Fixed Effects Regression of Air Quality on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(AQI)	-0.02**	-0.02**	-0.03***	-0.03***	-0.02**	-0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-3.26***	-3.11***	-3.12***	-2.99***	-2.92***	-2.51***
	(0.22)	(0.21)	(0.19)	(0.16)	(0.18)	(0.21)
Observations	8698	8696	8684	7763	6804	5832
# of HEIs	1047	1053	1051	1051	1050	1044
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 42
Fixed Effects Regression of Air Quality on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(AQI)	0.12	0.10	0.06
	(0.10)	(0.09)	(0.07)
Constant	0.92	0.26	-0.86
	(1.47)	(1.32)	(1.22)
Observations	408	404	402
# of HEIs	59	58	58
adjusted R-squared	0.91	0.91	0.90
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Social Capital

Ingrained in the human psyche is the need to belong to something larger, to have those emotional, cognitive and behavioral relationships with other individuals. Individuals strive to be part of something larger; they have a need to be involved in social institutions where they can have close connections with one another

(Baumeister & Leary, 1995; Maslow, 1962). Social institutions compel individuals to comply with predefined (socially agreed upon) roles, norms, and values (Turner, 1997). These socially agreed upon roles, norms, and values encourages individuals to cooperate with one another (Fukuyama, 2001).

Being associated with a social institution has a positive effect on an individual's well-being (Myers, 1999). Social institutions allow for the creation of a safe, stable environment for individuals to interact within. Social institutions do not have to be large organizations and can include families, religious organizations, universities, hospitals, businesses, or any other organization that individuals behave in an agreed upon manner. Social institutions give individuals this opportunity to have relationships with other like-minded individuals; attracting these individuals to regions which support their interests, norms, and values. Individuals will migrate among regions based upon the quality of the social life (Hsieh & Liu, 1983).

Individuals who are not part of a social institution or who cannot satisfy their need to belong, may begin to display negative behaviors, including decreases in self-control, cooperation and intelligent thought (Baumeister, 2012; Leary, 1990; K. D. Williams, Shore, & Grahe, 1998). These negative behaviors can have impact on society with regional increases to mental health issues and crime (Maalouf, 2001). If there are tendencies for a region to be more susceptible to individuals with mental health issues and increases to crime, a region's QoL will be affected.

These individual interactions all extend to affect society overall. Social connections and social institutions contribute to the social capital of a region. Social capital is the combined amount of social connections, institutions, and networks that contributes to a society's economic well-being (Putnam, 2004). Increases to the number of individuals actively involved with social institutions has a positive effect on social capital (Putnam, 1995, 2000). Social capital can simply be defined as the number and quality of interpersonal relationships. Overall, increases in social

capital of a region will result in a positive increase in regional QoL (Kahn, 2010; K. Mulder, Costanza, & Erickson, 2006).

A positive relationship exists between the level of social capital and employee productivity (Knack & Keefer, 1997). Higher levels of trust and norms that is associated with social capital has an effect on the performance of the faculty and staff of an HEI. In regions with higher social capital, faculty and staff should be able to benefit from the increased well-being and cooperation to allow them to be more productive at their jobs. This increase in employee performance should have a direct effect on the likelihood of students graduating within the predefined graduation periods.

Social indicator of social capital. The social indicator of social capital for this analysis was selected as the percent of individuals who are married in each regions. Marriage has been selected as a social indicator because it is a social institution that is related to having a positive effect on individual well-being. Regions with a higher proportion of married individuals will tend to have a higher rate of individuals interacting socially with one another or a higher level of social capital (Putnam, 1995; Winter, 2000). The existence of this social structure creates an environment of individuals who are more likely to follow social norms and values. These norms and values could be conducive to individuals staying in college and finishing their degree. Also, prior studies have suggested that individuals who are married have higher well-being than those who are single or divorced (Cacioppo et al., 2008; Frey, 2008; Stack & Eshleman, 1998). Regions with a higher percentage of married individuals would enjoy stronger levels of social capital.

It is assumed that the marriage rate among undergraduate students is typically lower than the regional average. This social indicator is not measuring the effect of being married on student graduation, but the overall atmosphere of having meaningful social connections in a region, and that effect on students graduating

from an HEI.

Data regarding the marriage rates of CBSAs were collected from the U.S. Census American Community Survey (ACS) (U.S. Census Bureau, 2014). The marriage rate is calculated using all individuals who are 15 years or older who are currently married and not separated. These data were merged with the IPEDS data and linked using CBSA identifiers.

The researcher hypothesizes that as the marriage rate of a CBSA increases over time, the graduation rate of the HEIs in that CBSA will also increase. This positive relationship is assumed based upon the positive effects that social capital has on the well-being of individuals and regional QoL.

Descriptive statistics of the percent of married individuals in a region for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 43. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded from the analysis.

Table 43
Descriptive Statistics for Percent of Population Married in a Region by Year

Year	Median	Minimum	Maximum	Standard Dev.
2000	53.40%	40.60%	62.00%	2.75%
2001	54.67%	44.70%	64.97%	4.03%
2002	51.20%	44.65%	59.83%	3.30%
2003	39.48%	34.04%	55.02%	4.25%
2004	51.09%	30.69%	61.32%	4.82%
2005	53.03%	39.94%	65.75%	3.17%
2006	50.01%	37.74%	65.98%	3.42%
2007	49.54%	36.99%	61.80%	3.41%
2008	49.27%	33.34%	62.61%	3.49%
2009	48.76%	32.11%	65.97%	3.58%
2010	48.22%	35.56%	63.63%	3.47%

The median percentage of individuals who are married in 2000 was 53.40% dropping to 48.22% in 2010. In 2000, the Bloomington, IN CBSA had the lowest married rate at 40.60% and the Naples–Marco Island, FL CBSA had the highest

rate at 62.00%. In 2010, the lowest rate was 35.56% in the Ithaca, NY CBSA and the Provo–Orem, UT CBSA had the highest rate at 63.63%.

Relationship of social capital on graduation rates. Statistically significant results were found between regional marriage rates and the 100% and 150% time to graduation rate for four-year HEIs (Tables 44 & 45). However, this relationship was opposite of what was predicted, which is surprising since this means that a increase in the regional marriage rate is related to a decrease in the graduation rate.

Table 44
Fixed Effects Regression of Marriage Rate on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(Married)	0.03	-0.01	-0.03	-0.06**
	(0.03)	(0.03)	(0.02)	(0.03)
Constant	-7.38***	-7.15***	-7.02***	-7.02***
	(0.45)	(0.44)	(0.40)	(0.38)
Observations	9072	9004	8994	7992
# of HEIs	1093	1091	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 45
Fixed Effects Regression of Marriage Rate on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(Married)	0.02	-0.01	-0.02*	-0.02*	0.001	-0.001
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-3.26***	-3.17***	-3.23***	-3.08***	-2.95***	-2.53***
	(0.18)	(0.18)	(0.17)	(0.15)	(0.17)	(0.19)
Observations	9129	9058	9039	8041	7004	5962
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

No statistically significant relationships were found for two-year HEIs (Table 46). Once again possible indicating that the population at two-year HEIs are different then what was initially predicted.

Table 46
Fixed Effects Regression of Marriage Rate on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(Married)	0.10	-0.09	0.09
	(0.11)	(0.12)	(0.10)
Constant	1.39	0.59	-0.67
	(1.69)	(1.51)	(1.20)
Observations	438	430	427
# of HEIs	61	60	61
adjusted R-squared	0.89	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Jobs and Earnings

Jobs and Earnings is related to the availability of employment that allow individuals to earn a salary (Michalos, 1997). If a region has a high income and wealth level (as measured by PCPI) along with opportunities to gain employment, a larger number of individuals would be able to enjoy the ability to earn a salary. Whereas, if a region has a high income and wealth level and a low level of available jobs, a smaller proportion of the population would be able to earn a salary.

Therefore, independent of income and wealth, jobs and earnings is an important factor to the approximation of QoL. The supply of jobs in a region is a determinate of being able to make a living. Regardless of the regional PCPI, if an individual is not able to secure a job, they are unable to earn a salary and make a living. The availability of jobs allow individuals to become financially well-off, build self-esteem through feeling that they are apart of something larger, and can the individuals are able to fulfill their ambitions (Durand & Smith, 2013).

Regional unemployment rates were selected as the social indicator for jobs and earnings. Unemployment rates have been used historically as a primary indicator of the supply of jobs (Office of Management and Budget, Statistical Policy Division, 1973). Low unemployment rates are related to higher levels of QoL and individual life satisfaction (Schneider, 1975).

Regions which have lower unemployment rates have a larger proportion of their population working, therefore these regions have a higher level of productivity and more individuals participating in society (Todaro, 1969). Increases to participation and productivity has a positive effect on the overall economy and a firm's environment (Levine, 1990). The positive affect on the economy, increases overall QoL for all entities.

It is typically assumed that as unemployment rates increase so do HEI enrollments, however there are no statistically significant relationships between

unemployment and HEI enrollment (Manski, 1983). There does exist a negative relationship between unemployment and degree attainment (Kahn, 2010). Since a lower unemployment rate is associated with a larger supply of jobs, individuals should have a higher level of motivation to graduate from college in the hope to obtain a job. Therefore, it is expected that when unemployment rates decrease in a region, HEIs in that region will experience higher graduation rates.

Data for unemployment rates were retrieved from the Bureau of Labor Statistics' (BLS), Local Area Unemployment Statistics (LAUS) Database (Bureau of Labor Statistics (BLS), 2014). Unemployment was calculated by the BLS by the number of individuals in a region who do not have a job and have searched for a job in the past four months, divided by the total number of individuals in the labor force. These data were linked to HEIs via the CBSA identifiers.

Descriptive statistics of the unemployment rate for all U.S. metropolitan and micropolitan regions for years 2000 to 2010 are displayed in Table 47. These descriptive statistics are only for regions in which one or more HEIs are located. Any regions that did not have a HEI were excluded.

Table 47
Descriptive Statistics of Regional Unemployment Rate by Year

Year	Mean	Minimum	Maximum	Standard Dev.
2000	3.89%	1.90%	17.70%	1.11%
2001	4.66%	2.20%	16.50%	1.15%
2002	5.66%	2.80%	16.80%	1.26%
2003	5.85%	3.10%	16.80%	1.29%
2004	5.45%	3.00%	17.10%	1.18%
2005	5.06%	2.60%	16.10%	1.15%
2006	4.59%	2.30%	15.40%	1.08%
2007	4.57%	2.10%	18.10%	1.10%
2008	5.67%	2.60%	22.40%	1.39%
2009	9.08%	3.70%	27.90%	2.15%
2010	9.40%	3.80%	29.90%	2.16%

The average unemployment among all metropolitan and micropolitan regions

increased between 2000 to 2010 from 3.89% to 9.40%. The lowest unemployment rate in 2000 was in the Harrisburg-Lebanon-Carlisle, PA CBSA, at 1.90%. The highest unemployment rate, in 2010, was 17.40%, in the Fresno, CA CBSA. In 2010, the lowest unemployment rate was in the Bismark, ND CBSA, at 3.80% and the highest unemployment rate remained in the Fresno, CA CBSA, at 29.90%.

Relationship of jobs and earnings on graduation rates. A positive relationship between unemployment rates and graduation rates exist for the two graduation rates at four-year HEIs (Tables 48 & 49). This relationship was not as expected where an increase in the regional unemployment rate is related to an increase in graduation rates. This inverse relationship could be explained for the 100% time to graduation rate, where a higher unemployment rate in the student's first year could provide motivation to get through school quicker. These results could be explained by the fact that as unemployment rates rise, individuals who lost their jobs may enter the education market to gain new and additional knowledge, skills, and abilities (Heller, 1999).

Table 48
Fixed Effects Regression of Unemployment Rate on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(Unemployment)	0.01	0.01	0.03	0.04*
	(0.01)	(0.02)	(0.02)	(0.02)
Constant	-7.15***	-7.02***	-6.85***	-6.91***
	(0.56)	(0.48)	(0.41)	(0.39)
Observations	9244	9236	9227	8228
# of HEIs	1093	1091	1090	1084
adjusted R-squared	0.91	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 49
Fixed Effects Regression of Unemployment Rate on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(Unemployment)	0.01*	0.01	0.02***	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-3.12***	-3.06***	-3.08***	-3.03***	-2.84***	-2.38***
	(0.23)	(0.19)	(0.17)	(0.15)	(0.18)	(0.23)
Observations	9300	9290	9274	8278	7242	6201
# of HEIs	1101	1100	1098	1093	1092	1087
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

The relationship between graduation rates and unemployment rates behaved as expected for two-year HEIs (Table 50). Increases in the regional unemployment rate was related to decreases in the graduation rate, showing that as there is a small labor market, two-year HEIs graduate fewer students.

Table 50
Fixed Effects Regression of Unemployment Rate on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(Unemployment)	-0.12**	0.02	0.14
	(0.06)	(0.05)	(0.10)
Constant	-0.92	0.95	0.65
	(1.67)	(1.62)	(1.45)
Observations	443	437	434
# of HEIs	62	61	61
adjusted R-squared	0.90	0.89	0.89
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** p < 0.10; ** p < 0.05; *** p < 0.01.*

Environmental Factor Results

Tables 51, 52, & 53 reports the results of the fixed effects analysis of the environmental factor on graduation rates at two- and four-year HEIs. Among four-year HEIs the relationships of murder rates and AQI to graduation rates behaved as expected, with no changes from the individual analyses.

Table 51
Fixed Effects Regression of the Environmental Factor on the 100% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3
ln(Murder Rate)	-0.01*	-0.01	-0.02**	-0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
ln(AQI)	-0.10***	-0.09***	-0.08***	-0.11***
	(0.02)	(0.02)	(0.02)	(0.03)
ln(Married)	0.05	0.00	-0.02	-0.05*
	(0.03)	(0.03)	(0.03)	(0.03)
ln(Unemployment)	0.01	0.00	0.02	0.02
	(0.01)	(0.02)	(0.02)	(0.02)
Constant	-6.58***	-6.54***	-6.49***	-6.45***
	(0.66)	(0.56)	(0.50)	(0.45)
Observations	8367	8311	8294	7378
# of HEIs	1039	1041	1045	1039
adjusted R-squared	0.91	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 52
Fixed Effects Regression of the Environmental Factor on the 150% Time to Graduation Rates at Four-year HEIs

	t=0	t=-1	t=-2	t=-3	t=-4	t=-5
ln(Murder Rate)	-0.003	-0.002	-0.002	-0.01*	0.004	0.001
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.01)
ln(AQI)	-0.03***	-0.03***	-0.04***	-0.04***	-0.03**	-0.03
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
ln(Married)	0.02	0.00	-0.01	-0.01	0.02	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln(Unemployment)	0.01	0.01	0.02***	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-3.02***	-2.95***	-2.97***	-2.91***	-2.87***	-2.42***
	(0.27)	(0.24)	(0.22)	(0.17)	(0.21)	(0.26)
Observations	8428	8367	8341	7428	6487	5527
# of HEIs	1046	1048	1050	1048	1047	1041
adjusted R-squared	0.90	0.90	0.90	0.91	0.91	0.91
Fixed Effects	✓	✓	✓	✓	✓	✓
HEI Control Variables	✓	✓	✓	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

At the two-year HEI level, the analysis found that unemployment rates have an effect on graduation rates. The direction of the relationship changes from being positive in t=-3 to being negative as expected in t=0.

Table 53
Fixed Effects Regression of the Environmental Factor on the 150% Time to Graduation Rates at Two-year HEIs

	t=0	t=-1	t=-2
ln(Murder Rate)	-0.02	0.01	0.03
	(0.03)	(0.03)	(0.02)
ln(AQI)	0.10	0.09	0.03
	(0.10)	(0.09)	(0.07)
ln(Married)	0.08	-0.04	0.16
	(0.11)	(0.13)	(0.11)
ln(Unemployment)	-0.10*	0.04	0.26***
	(0.06)	(0.05)	(0.09)
Constant	-0.77	0.52	1.23
	(1.81)	(1.56)	(1.45)
Observations	398	393	391
# of HEIs	58	57	58
adjusted R-squared	0.90	0.90	0.90
Fixed Effects	✓	✓	✓
HEI Control Variables	✓	✓	✓

Standard errors in parentheses
** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

The Effects of the Environmental Factor on Graduation Rates

Social indicators in the four-year models were found to be statistically significant in the analysis of the effect of the environmental factor on graduation rates. The strongest variables that affect graduation rates at four-year HEIs were the social indicator for environmental quality and personal security. These relationships indicate that the surrounding community's environment has an effect on the graduation rates at these institutions. Among public two-year HEIs, the only significant social indicator was for jobs and earnings, the direction of this variable flipped over the three years.

Implications

Overall, HEIs should be concerned with the personal security of the individuals in their region, as their employees and students have to interact with the world outside of the campus. HEIs have direct control of the security that exists on their campuses and are mandated by the federal government to report any criminal activity on or adjacent to their campus. HEIs and related degree programs (criminal justice, sociology, political science, etc) could work with police departments in their region, especially those within close proximity to campus, on safety campaigns that would increase the awareness of public safety issues in the area.

There is not too much that HEIs can do to have much of an impact on the environmental quality of their region, as the growth that occurs around the HEI is outside of their control. However, HEIs are able to provide educational and service programs to the community which encourage the campus community to engage in activities that would reduce the carbon footprint of individuals and organizations in the region. The HEI can also engage in activities to become more environmental (i.e. reduce paper use, recycle, compost, etc.) in their day-to-day operations that would also aid in the reduction of pollution.

Most traditional HEIs will provide opportunities for students that will create social connections. On-campus activities engage students into feeling involved in their community and they will in turn be more likely to graduate on time (Astin, 1984). However, the results indicate that there may be a relationship with the social capital that exists outside of campus and graduation rates. HEIs can attempt to increase the amount of social capital that exists in their community through engaging their faculty/staff/students into service activities. These activities would increase the level of community engagement between the HEI, those associated with the HEI, and the outside community. Interactions with the community could provide needed services to under served populations and provide a bridge between

the HEI and those who live in the region. These activities will not only improve social capital, but could provide meaningful interactions with the larger community.

HEIs should monitor the job supply within their region and nationally. Responsible HEIs will align their enrollment and guidance counseling with the availability of jobs for each degree program. Increasing the number of students who graduate may be beneficial to the institution in the short-run, however if jobs do not exist for particular academic programs, a long-run decrease in the number of graduates will occur as students may have to stay in school longer. If jobs do not exist, fewer students will enter the degree program which could have an effect on either overall enrollment or on the graduation rate. Guiding students towards degrees which have little or no opportunity is also unethical. HEIs should have the responsibility of serving the greater good and aligning their production to the needs of society.

As stated above in the neighborhood factor chapter, HEIs will need to partner with local businesses to align their academic program enrollments with the needs of the private sector. Private-Public partnerships will allow for alignment between academic programs and the needs of regional businesses, creating a pipeline for graduates. This sort of partnership should also ensure that the correct quantity of each job will be produced, and create fewer individuals who are under-employed.

Implications for faculty/staff. Regional unemployment rates should not have an impact on the job security of faculty and staff at HEIs. Job security of these individuals are related to the enrollments at their HEI and the overall funding that the HEI receives from governmental expenditures or tuition. Increased unemployment rates may actually relate to an increase in the number of students enrolled at the HEI, requiring additional faculty and staff.

Implications for students. Students who graduate in times of higher unemployment should try to align their degree with the needs of the labor market.

If students do not do this they may be faced with being in a job that does not require a degree and earning a lower than expected wage. A decreasing unemployment rate should signal the student that the job market is opening up and do what is needed to graduate as soon as possible.

Implications for businesses. If environmental quality is related to increased human capital from HEIs in the region, businesses should see this area as being important to the increase of productivity. As businesses examine their operations, they should consider their practices and the impact on the environment. There are many actions large and small businesses can engage in, that will reduce their impact on the environment.

Organizations will need to be conscious of the relationship between unemployment rates and graduation rates. Organizations that require labor with Associates degrees or higher may see a benefit from the increased graduation rates, in the form or a larger applicant pool. Organizations that require less training may see an increase in the number of over qualified applicants as the number of graduates increase in a region. Granted, that the organizations that require the less qualified applicant do have an increasing pool of applicants as individuals attain high school degrees. Regions that are heavily dominated by organizations that require less training (i.e. manufacturing) could run into issues if HEIs in their region begin to graduate more individuals.

Implications for governments. Personal safety is a policy related social indicator in which governments can have an impact on the outcomes. As with environmental quality, policy makers should consider the relationship between personal safety and human capital with making decisions.

As environmental quality is a policy related social indicator, one in which governmental regulation can create major changes; The government is in a unique position to have an impact on changes to this aspect of QoL. Governments have

historically used regulations to control and limit the amount of pollution being placed in the environment, it will also be important for policy-makers to be aware of the relationship with human capital development when changing policy.

Governments have the capabilities to make larger improvement and changes to their jurisdictions; through the planning of neighborhoods and communities with a focus on infrastructures that promote the creation of social capital and the inclusion of the individuals who live locally (Putnam, 1995). These larger changes to the community can foster more social interaction among citizens and raise overall social capital.

Policymakers need to be conscious of this relationship between graduation rates and unemployment and should integrate education policy with labor market policies (Betts & McFarland, 1995). A decreasing unemployment rate is typically positive for the government, society, and the economy. Increasing graduation rates could have long-term consequences on the economy. If more college graduates increase the unemployment rate among organizations requiring less training and decrease the unemployment rate among organizations requiring a higher education degree, those graduating in the future may fall into a category of individuals who have college degrees and no available jobs (Carnevale, Cheah, & Strohl, 2013). This sort of occurrence could thereby increase the overall unemployment rate or increase the number of underemployed individuals, which both could lead to increase defaults on student loans.

Implications for the community. Community organizations (e.g. religious organizations, neighborhood associations, and non-profit organizations) are in a unique position to effect the level of social connections through their engagement with those living in the region. These community organizations should partner with governments and HEIs to strengthen their ties to the community and develop strategies that will increase social engagement. It will be important to

community organizations to engage with these other stakeholders, not just for the benefit of the community immediately, but an increase to human capital in the region will have an overall positive benefit to all.

CHAPTER 6

DISCUSSION

This study explored the effect of QoL on the production of degrees at two- and four-year HEIs over a ten year period. The literature indicates that education production does not occur in a vacuum, that there are many factors that affect not only the individuals who are part of the process, but also the institution overall. There had been a considerable amount of research that had occurred examining the individual, family, neighborhood, peer, and institutional effects as that relates to status attainment. Research had also been conducted to explore the relationship of the environment on the individual, and how QoL affects an individual in living the "good-life." However, there has not been any research conducted that explored the relationship of social indicators of QoL on the graduation rates at HEIs. This gap spurred the research question for this study, which was intended to determine if regional QoL had a negative or positive relationship on graduation rates at two- and four-year HEIs.

This study found mostly small but statistically significant relationships between the selected regional social indicators and graduation rates. These findings support the notion that neighborhood and environmental characteristics in a particular region have an impact on the status attainment of individuals. This illustrates that HEIs do not operate in a vacuum; the larger society that they exist within interacts with the organization, students, faculty, and staff of the HEI.

This chapter discusses the results of this study, first exploring the two QoL factors and possible reasons for their relationship with graduation rates. Discussion on what this may mean to appropriate stakeholders. This chapter will explore

overall, possible implication that these results may have on HEI governing boards, HEI administrative leadership, local, state and, national policy makers, organizations (e.g. for-profit businesses and non-profit organizations) educators, students, and parents.

Relationship of QoL on HEIs

The neighborhood and environmental factors of QoL indicate that most variables that loaded into these factors have a relationship with graduation rates at two- and four-year HEIs. In that as the regional QoL increases, there is a positive increase of the graduation rate at four-year HEIs. These variables are related to graduation rates at varying magnitudes by variable and by time period. In the neighborhood factor it was found that the social indicators for income and wealth and health status had the greatest relationship to graduation rates. The environmental factor indicated that environmental quality had the greatest impact on graduation rates.

The relationship of health status on graduation rates may have the greatest impact of any social indicators. Regions with greater life expectancies would also signify that individuals in these regions also live healthier overall lives (Breyer & Felder, 2006; Larson & Wilford, 1979; Lubitz et al., 2003). The healthier individuals in a region leads to HEI employees that are able to be more productive and contribute more to the production of degrees at their respective HEI. Students who lead healthier lifestyles tend to have healthier habits that are more conducive to being able to graduate on-time (Cook & Moore, 1993; J. Williams et al., 2003). HEIs working in partnership with public and private organizations can add to the health status of a region through providing service to their community in the form of working with the health professions to provide assistance to under-served communities and adding additional expertise to practice.

The next largest relationship is that of income and wealth on graduation rates. The social indicator for this aspect of QoL also indicated a larger relationship with graduation rates than most. the income of individuals in a region is linked to their life satisfaction (Schyns, 2002). This is partially due to the ability of individuals that have the financial means to satisfy their needs are able to have a higher QoL (Ferriss, 2000). The additional wealth of a region also has an impact on educational attainment through direct or indirect funding of educational institutions by the public (Vartanian & Gleason, 1999). HEI employees in regions with increasing income and wealth should also see increases in their own wages, therefore increasing their productivity over their careers (Blinder, 1990). An implication for students is the impact on lower SES students, if increasing income and wealth also drives the cost of attendance. These lower SES students may be priced out of the educational market. HEIs should be sensitive to the employment needs of the private organizations in their region, tailoring their degree programs to the needs. If done correctly, the increased, targeted human capital could further drive the increase of regional income and wealth.

The third largest relationship with graduation rates, is that of the social indicator for environmental quality. The results of the environmental factor indicated that this variable was the strongest, and may have drowned out the relationships of the other social indicators. As environmental quality increases, the individual well-being and life satisfaction of the individual increases (Marans, 2003). Businesses want to see increased human capital being produced by HEIs, for this to occur they many need to begin to consider their impact on the environment overall. Governments have been working on policy over the years to limit pollutants and increase environmental quality. Whereas, there may be small impacts that organizations can make on environmental quality, changes must occur not only to increase QoL, but to increase the production of human capital.

The social indicator for housing had an initial impact on graduation rates at four-year HEIs within the early time periods within the neighborhood factor models. A region's housing value is related to the choices individuals make when they decide to live in a particular region through the selection of a basket of good and services (Maliene et al., 2008). As demand for a particular region increases, the value of homes in the region increases along side. This fact could explain why the relationship of housing values are seen more at earlier time-periods. As students are choosing which HEI to attend, they are also selecting a basket of goods and services that are offered in the region. The more suitable the region is for the student the more likely they would be to graduate with in four and six years. The cost of housing would have an impact also on the employees of an HEI in similar means of that of students.

The social indicator for personal security only had an impact on the 100% time to graduation rate at four-year HEIs. The relationship was relatively small but noticeable. This social indicator has an effect on regional QoL due to the fear of crime in a region, if a student does not feel safe in their environment it may be difficult for them to concentrate on the goal of graduation (Hale, 1988; Maslow, Frager, & Fadiman, 1970; Yorke, 1999). Increased production of human capital by HEIs can have an affect on the personal security of a region, however if students feel unsafe it is difficult to increase the graduation rate (Ehrlich, 1975). HEIs can provide service activities in their communities to clean up the neighborhood and provide educational activities to the citizens that may aid in the reduction of crime (Kelling, 1996). Governments may play the largest role in decreasing crime through community policing and policy development related to human capital development.

Educational attainment was found to be related to the 100% time to graduation rate at four-year HEIs, no relationship was found for the two other models. The culture associated with living in a region with a larger proportion of

baccalaureate degrees or higher influences individuals to attend and graduate from HEIs (Bailey et al., 2010; Hahs-Vaughn, 2004; W. Sewell & Hauser, 1975). Business are interested in increasing human capital in their region, one way of doing this is providing opportunities to their current employees, wanting additional education, to attend a HEI with tuition reimbursements. The government can also play a role in increasing the educational attainment in a particular region through financial aid or institutional support. However, a policy change that would need to occur in the near future is to solve the student-loan debt problem. Policies needs to be put into place that allow graduates the opportunity to pay back their loans or be provided with more options for forgiveness programs.

The social indicator for work and life balance was found to be related to graduation rates at four-year HEIs during the middle time-periods. Presenting a region in which the perception of the amount of leisure time a individual may have is larger than other regions creates a view that can lead to higher performance and less burnout (Caproni, 2004; Hill et al., 2001; Shanafelt, 2012). If students also can lead balanced lives, where they are not spending all of their time engaging in work/school related activities there should be a relationship with increased graduation rates. This is why this social indicator is statistically significant in the middle years, as these are the years when students tend to drop out.

The social indicator for jobs and earnings is significant for the 150% time to graduation rates from two- and four-year HEIs. At four-year HEIs the relationship is in a direction opposite of what was expected, when students have three years left to graduate, that year tends to have a larger impact on graduation rates. At two-year HEIs, the relationship appears at the student's first and last year. The first year is in reverse direction as with the four-year HEI, however in t=0 the relationship is inverse, as was predicted. This possible signifies that in a student's final year at a two-year HEI, an increasing job market signals the student to

graduate. This variable is difficult to control as it is directly linked to the overall economy and policy changes can only affect jobs and earnings in the long run.

Social capital presented a surprising result, only being statistically significant in one model, in the first year, and was a negative relationship. It was thought that the availability of social institutions in a region would provide options for students to be connected to their community increasing the HEI ability to graduate. This social indicator may not be significant for either the fact that HEIs tend to create their own social institutions therefore negating the effect of region social capital or the selection of regional marriage rate as the social indicator was not the correct variable.

Implications

One of the biggest implications that emerged from this study is that HEIs do not exist in a vacuum; the typical view of the ivory tower of the academy does not hold true in today's society. As the theoretical framework indicated, there are many inputs to the HEI that are not commonly considered. The effects of regional QOL directly on the HEI and on the student and faculty/staff can influence the direction and decisions that an institution should make to produce human capital and be competitive in the marketplace.

Also, the actions of an HEI can and do have an impact on the surrounding environment. HEIs need to be aware of the surrounding region, as they are a part of the community and should be engaged in improving the QoL for all residents. Being involved in the community can lead to increased graduation rates for the HEI and strong ties to the community, among other benefits. Graduation rates at HEIs are not simple functions of who a HEI admits and what processes that HEI has in place to ensure education and subsequently graduation. HEIs operate within a larger context of their region and environment, where the effects of QoL has an effect on

the institution and those individuals associated.

The reverse also holds true for entities not associated with an HEI. Businesses should be aware of how their actions in the community can effect the environment and lead to changes in human capital production. Policy-makers should be concerned about the unintended consequences that changes in policy and regulation may have on not only QoL but the effect on HEIs. The production process of the HEI is closely woven with many other processes that exist in the market and isolation will only lead to market failure, where the production of goods and services in the region are produced at a lesser efficiency.

Varying Relationships Between Two- and Four-year HEIs

The results among two-year HEIs differ drastically from that of what was initially predicted. The majority of the variables in the single social indicator regressions provided relationships that were opposite of what was expected. In the neighborhood and environmental factor analyses, there was almost no statistical significance among the social indicators. This was especially surprising as the four-year analyses behaved almost exactly as was expected.

A issue that could have caused these surprising results among two-year HEIs is most likely related to the types of students that attend two-year institutions, and the lack of ability to separate out these students from the overall graduation rates. Students who attend two-year HEIs are motivated differently from that of four-year HEI students (Lin, McKeachie, & Kim, 2001). Some students who attend two-year HEIs have no intention of obtaining an associates degree, they are enrolled in lower-tuition general education credits that can be transfered to a four-year institution. There are other students who may be enrolled in a handful of credits to increase their knowledge, skills, and abilities in a particular field for job purposes. Overall, these students even without the intention of graduating are included in the

calculation of the 150% time to graduation rate.

Limitations of this Study

Three limitations were found with this study. The first being that the social indicators may not be completely capturing the effect of QoL on HEIs' graduation rates. Because each of the social indicators are only a fraction of each factor of QoL there may exist a differing effect of each of these indicators on the graduation rates. It can only be assumed that the social indicators selected for this study were accurate proxies for each factor of regional QoL.

Because this study used aggregate data of percent graduated from an HEI or social indicators at a regional level, it is impossible to measure effects at an individual level. There is no way, in this study, of determining the precise reason why any one individual behaves in a particular fashion from another individual. This study was only able to determine average effects that QoL has on HEI graduation rates and by no means are casual in nature.

Another issue with measuring the graduation rates at two-year HEIs is that the number of students who enter a two-year HEI, in order to obtain lower-cost general education credits, tend to transfer to a four-year HEI at a later point. When these students transfer to a four-year HEI, it appears that they have dropped out of the two-year HEI, and are counted against the graduation rate at the two-year HEI. The results from the two-year models may not be accurate due to this occurrence.

Conclusion

This study had found statistically and economically significant relationships between both the neighborhood and environmental factors of QoL and graduation rates at two- and four-year HEIs. Several key results have been found in this study. First, HEIs are affected by their environment and are not ivory towers, existing separate from the world. Secondly, collaboration between HEIs, business,

government, and the community can lead to the increased productivity of the institution through higher production levels of human capital. Finally, factors of QoL are interdependent, changes to one factor of QoL typically have an effect on other factors of QoL.

Understanding that HEIs are influenced by their surrounding environment is extremely important to understand when determining policy levers that may be implemented. Knowing that there are influences from the surrounding environment can lead to increased understanding of the potential impact that a policy may have on the HEI or on the surrounding region. This is important when determining if there may be unintended consequences on other aspects of the region that was not previously considered.

Many opportunities exist where HEIs are able to partner with private and public organizations. Knowing that the health status of a region has a relationship to graduation rates, it is conceivable that HEIs form partnerships with outside organizations in an attempt to improve the overall health status of the region. The creation of partnerships that are designed to improve the health status, or other conditions, of individuals undeserved individuals can begin to improve the region overall. These partnerships can provide faculty with service opportunity to practice and improve their profession. Many of these opportunities can provide students with much needed real world experience that can be directly translated to their future careers.

The relationship between the factors of QoL would indicate that by influencing and impacting one aspect of QoL, there could be an effect on other aspects of QoL. Increasing the environmental quality of a region could have influence on improving the overall health of a region. The reduction of pollutants in the air would cause a decrease in respiratory-related diseases. Increasing housing prices could be related to the increase of individuals' socioeconomic status. When

considering policy levers that could effect QoL and graduation rates, policymakers need to be aware of the interactions that QoL factors have on one another and how these factors may effect HEIs.

Future research will need to be conducted to disentangle the effects of the student from the institutional graduation rates. Use of individual student observations, over time, in a similar analysis might provide more precise results.

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Appendix

Appendix A - Combined Statistical Areas of the United States and Puerto Rico