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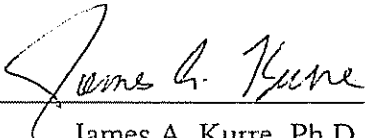
SAM AND IRENE BLACK SCHOOL OF BUSINESS

**SOCIAL AND CULTURAL CAPITAL FOR
"CREATIVE" ECONOMIC DEVELOPMENT**

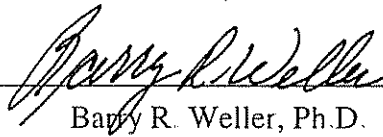
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SOCIAL AND CULTURAL CAPITAL FOR “CREATIVE” ECONOMIC DEVELOPMENT

ABSTRACT

Many of America's cities are struggling to revitalize themselves. A seemingly viable strategy is to focus on arts, entertainment, and recreation to build social and cultural capital. But does this strategy work? This paper presents a cross-sectional analysis of several hundred American Metropolitan Statistical Areas, examining the relationship that arts, entertainment, and recreation activity (measured as establishments and employment in selected arts, entertainment, and recreation industries) has to growth and development. Regression analysis is used to measure the impact of arts, entertainment, and recreation on growth (population change) and development (increases in personal income per capita), holding constant the effects of other possible determinants such as unemployment, human capital, innovation, climate, crime, age, and the impact of other selected industries. This approach should allow determination of the contribution of arts, entertainment, and recreation to the growth and development of Metropolitan Statistical Areas, above and beyond the effects of the other variables. The basic question of the model is about how arts, entertainment, and recreation affect growth and development. Do cities with a strong cultural, artistic, and social base have a higher degree of economic strength? The findings measure the degree to which increased arts, entertainment, and recreation activity is consistent with greater growth or development, leading to policy recommendations that city planners can use as an aid in revitalization. Finally, Erie, PA is reviewed as a metropolitan area pursuing economic policy that fosters this emergent strategy.

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I. INTRODUCTION

The American city is a living entity rich in culture, diversity, and intelligence. Built with diligence and determination, the cities of our nation stand as signals of strength and power. Cities are attempting to grow and develop by attracting residents and firms. For example, many cities on the Great Lakes that were once centers of manufacturing are struggling to attract more high-tech firms and young, well-educated, skilled, and innovative inhabitants. The arts, entertainment, and recreation industry could be a catalyst to create growth and development in America's cities.

This paper attempts to determine whether arts, entertainment, and recreation promote growth and development in a city. Can a city focus growth and development strategies on increasing social and cultural capital in order to attract population and increase income? The city is a place where people live, work, and play. It is a place where firms locate and operate. The city is a place where each interaction among its inhabitants builds upon the next, producing economic, cultural and social vitality. Dense locations, such as cities, facilitate the quick exchange of information from person to person and firm to firm. According to Carlino (2001), this exchange of ideas fuels innovation, growth, and development. A study done by The Perryman Group on the “Role of Cultural Arts in The Texas Economy” found that “arts benefits are somewhat more prevalent in the urban centers than other segments of the economy” (Perryman 2000).

Logically arts, entertainment, and recreation would cluster in the economic core of the Metropolitan Statistical Area where its location would be most useful. A smaller area of study may capture the benefit firms receive from locating close to one another. This clustering of firms into districts may also reflect the amount of recreation and residential capital in the proximity. Data used to specify the growth and development models in this study are not all available at the optimum geographic unit, the city, therefore Metropolitan Statistical Area (MSA) and Primary Metropolitan Statistical Area (PMSA) data are used and will be collectively referred to as MSAs. MSAs and PMSAs reflect the extent of the local labor

markets, and thus provide an appropriate geographic unit of analysis. Using MSA data will give us comparable measures of variables, the latest available data, and the largest number of data observations. Identifying and then controlling for variables that contribute to growth and development will allow the effect of arts, entertainment, and recreation to be captured. Arts, entertainment, and recreation is the prime measure of social and cultural capital. However, additional variables are explicitly identified in the model to capture any residual social and cultural aspects not included in arts, entertainment, and recreation. These added industries are information and food service and drinking places. According to the industry definition from The U.S. Census Bureau's *1997 Economic Census Bridge Between NAICS and SIC Menu of NAICS Sectors*, information accounts for cultural activities, and food service and drinking places captures social networks.

The U.S. Census Bureau's *1997 Economic Census Bridge Between NAICS and SIC Menu of NAICS Sectors* identifies arts, entertainment, and recreation as a separate, measurable industry. "The arts, entertainment, and recreation sector includes establishments that meet the cultural, entertainment, and recreational interests of the patrons". This includes: "(1) Establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing; (2) Establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; (3) Establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure time interests" (U.S. Census Bureau's *1997 Economic Census Bridge Between NAICS and SIC Menu of NAICS Sectors*). Some examples of arts, entertainment, and recreation are: performing arts, theaters, dance companies, musical groups and artists, spectator sports, promoters of events, independent artists, writers, and performers; museums, historical sites, zoos, botanical gardens, nature parks, arcades, gambling, marinas, golf courses and country clubs, and fitness and recreational sports centers.

II. LITERATURE REVIEW

Cultural and social assets, including arts, entertainment, and recreation have been heralded as an emergent economic revitalization strategy. Arts, entertainment, and recreation (AER) produce growth and development in a city by attracting firms and residents. AER should promote growth through an increase in population by the in-migration of residents and firms. Economic development includes increases in the standard of living and overall well being of the population (Ellen and Schwartz 2000). Increasing AER should lead to an improvement in the quality of life of the MSA, income per capita for existing residents, and the unemployment rate. Development occurs because of an increase in the standard of living of the residents. How can cultural and social capital, explicitly AER, increase growth and development in an MSA?

Direct involvement in the arts, audience participation, and the presences of artists, organizations, and institutions has an economic, cultural, and social effect on a community. The economic effect is through wages paid to employees, local spending on a night out at an AER venue, increased attractiveness of the area to tourists, businesses, and people, increased investment and revitalization, and the increase of economic growth in creative industries. The cultural effect is seen as increases in the collective identity, pride, image, and status of the community, also the positive attitudes, diversity, and free expression that can be realized. The social effect manifests itself as getting people involved and working together that may otherwise not come in contact, promoting neighborhood diversity, may reducing crime, and giving people a way to mingle and exchange in a stimulating environment. (Guetzkow 2002) Again, the presence of AER may cause an area to have a better image and be more appealing to firms, residents, and investors.

“In the new economy regional advantage comes to places that can quickly mobilize the best people, resources, and capabilities required to turn innovations into new business ideas and commercial products” (Florida 2000). According to Richard Florida, talent is now a key component among the traditional factors of production. Cities must attract, retain, and maintain talent. Since AER aids in the appeal of a city, Florida’s findings support the notion that high-skilled, knowledgeable workers prefer cities that are rich in outdoor recreation and water based activities, music, nightlife, live performance, and a diverse cultural and demographic population. In order for a city to establish and maintain a competitive

advantage. it must be attractive for migrants as a location destination. In a study done by Terry Nichols Clark (2002), he concludes that the population does move toward amenities. He controlled for up to 20 variables in multiple regressions for 3,111 U.S. counties. The findings indicate that there are more college graduates in areas with constructed amenities like opera, juice bars, museums, and coffee shops. The elderly prefer natural amenities like moderate temperature and water. (Clark 2002)

Preferences of workers and firms are captured in location decisions. Workers (firms) move to the place that best suits their needs and interests; a place that maximizes their quality of life. Leichenko (2001) cites Steinnes and Fisher (1974) in presenting the idea that households and firms are both mobile. Household decisions reveal preference for utility or satisfaction. Household utility derives from consumption of private goods and non-market amenities that can change by location. Competitive, profit-maximizing firms search for a place that lowers their cost of production. The evidence of this theory is also presented by Duffy-Deno (1998) who cites Carlino and Mills (1970) and Clark and Murphy (1996), and elaborates by stating that, "Firms (households) enter and leave regions until profits (utility) are equalized across regions." In the post-industrial era, technology has greatly reduced many costs associated with migration across areas. The decrease in costs of migration means that other factors such as amenities, become more significant in firm and household location ((Blomquist and Granger 1999), (Dziembowska-Kowalska and Funck 1999)).

Cost decreases for firms and households also occur when firms decide to cluster and carry out economic activity at one place (Blair 1995). The clustering of firms is termed agglomeration. AER may be formed into districts within a city. An example of an AER district is the Flats in Cleveland, Ohio. The related industry of accommodation and food services also clusters around AER, since the two industries benefit from each other's business. Consumers are able to compare different offerings and choose the form of AER that most appeals to their individual taste, for instance, a theater district. Forms of AER may also be complements of one another; a patron may want to see a play and then go to dinner. A patron may want to visit a museum and botanical gardens. The time that the customer spends deciding on a form of AER is reduced if those firms cluster together. Firms group together with the intention of creating increased demand for their products. The benefit the firms receive is that total sales, as a whole, may increase because of an increased number of buyers who appreciate the variety offered by a larger number of sellers.

Cost associated with advertising may also decrease. If a business, such as a coffee house, is located next to a very popular theater, the need for advertising may be minimal because the patrons are attracted to the location of the theater. A drawback is that the increased demand for firms in such a district increases rent (Blair 1995). The overall hope is that patrons will be attracted to certain cultural, social, or AER amenities and then linger in the area to patronize other businesses also.

In order to satisfy the consumption-oriented resident or firm, cities “have moved from a model of *selling*, where one tries to persuade the buyer to purchase what one has, to *marketing*, where one tries to have what the buyer wants” (Strom 2002: 7). Cities are trying to have what the buyer wants by developing sustainable, livable, green, recreation rich areas, with a 24/7 pulse, cultural and social meeting places, and visually aesthetic historical and current architecture and spaces. According to Zukin (1998), “Strategies of urban redevelopment based on consumption focus on visual attractions that make people spend money. They include an array of consumption spaces from restaurants and tourist zones to museums of art and other cultural fields, gambling casinos, sports stadium, and other specialized stores.” Clark (2002), also states that a residential population of young professionals who have more education and fewer children creates a social profile that is aimed to recreation and consumption. In order to become a place rich in ideas and talent, physical and cultural amenities must be present.

The location of AER in a city produces positive and negative effects called externalities. Externalities are the spillover effects from an activity taking place that is not captured by the market. An example of a positive externality is the benefit residents of a city receive from the education of other citizens. A community as a whole experiences the benefits of education. The city may have a higher voting record, or increased innovation because the residents are educated. The results of education are something each individual can benefit from despite their own education level, and without any effort. An example of a negative externality is the effects of pollution from a nearby plant. The pollution can cause health problems or deterioration of homes. When left to private market forces more negative externalities than positive are produced. Perryman (2000) states, “The cultural arts clearly exhibit positive characteristics far exceeding those reflected in the private market. They enhance the quality-of-life and economic competitiveness of an area; they encourage creativity and innovation; they improve educational performance at all levels; and they define and enrich our cultural heritage and experience.” AER also

causes some negative externalities such as traffic congestion, deterioration of natural resources, noise, and overcrowding within the district. A net positive effect from AER would attract people. In order to measure the effect of AER on growth and development other factors that lead to growth and development must also be examined.

III. MODEL SPECIFICATION

A. Theoretical Model

The objective of this research is to measure the impact that AER has on the dependent variables—growth and development. The hypothesis is that if an MSA has a larger amount of AER then it will have greater growth and development. Separate models are used for each dependent variable. Growth is a measure of the actual increase in the number of inhabitants of a city, and development is concerned with the standard of living of those residents. Growth is measured using population change and development is measured using change in personal income per capita. The initial hypothesis is that AER, including social and cultural capital, influences the growth and development of an area. This hypothesis can be measured using three estimated sets of determinants that explain the dependent variables of growth as measured by increases in population and development as measured by increases in personal income per capita.

The first estimation of the hypothesis, that AER impacts growth and development, is that the dependent variables are determined by the independent variables: AER, as measured using establishment data, unemployment, climate, human capital, innovation, and fast growth industries. The second estimation of the hypothesis, that AER impacts growth and development, is that the dependent variables are determined by the independent variables: the industries of AER, food service and drinking places, and information as measured using employment data and establishment data, unemployment, climate, human capital, innovation, and age demographics. The third estimation of the hypothesis uses the same independent variables as the second, but also includes data on crime. The models are tested first by jointly determining the effects that the independent variables produce on the dependent variable. In order to measure the possible influence of AER on growth and development each independent variable is held constant and the effective magnitude of AER is found. The objective is to determine the relevance of each

independent variable in relation to the dependent variable. For example, if two MSAs were identical in every aspect except one of them had more AER, it should have higher growth and development.

The dependent and independent variables are measured using MSA data. MSA data capture the local labor market but may not capture the agglomeration effects of AER that a smaller geographic unit of analysis would. MSA data are the only data readily available to fit our model and offer useful measures for growth, development, and the impact of AER. An MSA is defined as a core area with a large population nucleus consisting of either a city with 50,000 or more inhabitants, or a Census Bureau defined urbanized area. Surrounding areas are included in the MSA when they are visibly economically integrated with the nucleus. According to the U.S. Census Bureau's *About Metropolitan and Micropolitan Statistical Areas*, Metropolitan areas (MAs) are defined according to the United States Office of Management and Budget (OMB). The Census Bureau data uses the most current definitions (as of June 30, 1999) and so does this study. This paper estimates cross-sectional models where growth and development measured by population change; and increases in personal income per capita are regressed on several measures thought to affect growth and development at the MSA level. Specifically we estimate the following equations:

First estimation

$$(1) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER} - \beta_2 \text{UNEMP} + \beta_3 \text{JAN} - \beta_4 \text{ANNPREC} + \beta_5 \text{HUMCAP} + \beta_6 \text{INNOVATE} + \beta_7 \text{FASTGROW}$$

$$(2) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER} - \beta_2 \text{UNEMP} + \beta_3 \text{JAN} - \beta_4 \text{ANNPREC} + \beta_5 \text{HUMCAP} + \beta_6 \text{INNOVATE} + \beta_7 \text{FASTGROW}$$

Second estimation

$$(5) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP}$$

$$(6) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP}$$

$$(7) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64}$$

$$(8) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64}$$

Third estimation

$$(9) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{CRIME}$$

$$(10) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{CRIME}$$

$$(11) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64} + \beta_{11} \text{CRIME}$$

$$(12) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64} + \beta_{11} \text{CRIME}$$

Table 1: Variable Description

<i>AER_EST</i>	percent of total establishments in 1999 in an MSA from the arts, entertainment, and recreation industry in an MSA; measured by total establishments in 1999
<i>AER_EMP</i>	percent of total employment in 1999 in an MSA from the arts, entertainment, and recreation industry in an MSA; measured by total employment in 1999
<i>INFO_EST</i>	percent of total establishments in 1999 in an MSA from the information industry in an MSA; measured by total establishments in 1999
<i>INFO_EMP</i>	percent of total employment in 1999 in an MSA from the information industry in an MSA; measured by total employment in 1999
<i>FOOD_EST</i>	percent of total establishments in 1999 in an MSA from the food services and drinking places industry in an MSA; measured by total establishments in 1999
<i>FOOD_EMP</i>	percent of total employment in 1999 in an MSA from the food services and drinking places industry in an MSA; measured by total employment in 1999
<i>POPCHG</i>	percentage change in population from 1999-2000
<i>CHGPIPC</i>	percentage change in personal income per capita from 1999-2000
<i>UNEMP</i>	unemployment rate in 1999
<i>JAN</i>	Mean January temperature (in degrees Fahrenheit) in 1992
<i>ANNPREC</i>	average annual rainfall (in inches) in 1992
<i>HUMCAP</i>	human capital: age 25 or older with a college bachelor's degree or higher in 2000 (in percent)
<i>INNOVATE</i>	utility patent grants (in number of patents) in 1999, measured by the number of utility patents granted per 1000 residents (total number of persons in 1999)
<i>CRIME</i>	index of crime by MSA in 1999; which is the number of offenses both violent and property per 100,000 inhabitants
<i>AGE_25_44</i>	percent of total population in an MSA between the ages 25 and 44 in 2000
<i>AGE_45_64</i>	percent of total population in an MSA between the ages 45 and 64 in 2000
<i>FASTGROW</i>	percent of total establishments in 1999 in an MSA from the combined industries of Professional, Scientific, and Technical Services industry in an MSA; and Information Industry in an area; measured by total establishments in 1999

A. Dependent Variables

1. Growth

Population change is a proxy for growth. Movement into a city shows the preference of the migrants. People make choices in order to maximize their utility or happiness. If migration into a city were high, the rationale would be that those people have revealed a preference for that city. Population change is a proxy for growth because it captures the number of inhabitants who have decided to relocate. Population change is expected to increase with AER.

2. Development

Change in personal income per capita is a proxy for development because it measures the well-being of the residents in the city. Personal income per capita is used to evaluate the standard of living of the population in the city.

C. Independent Variables

1. Arts, Entertainment, and Recreation (AER)

AER is important to growth of an area. Young professionals that commute to work may be attracted to the social and cultural amenities of the city and choose to move closer. Potential job applicants from out of the area may choose an employer in one area over another because of the attractiveness of the location. AER would make a city more attractive to firms who are making the decision to locate or relocate. AER provides civic, social, and cultural activities for residents. AER is also important to the development of an area. During the early stages in a firm's existence highly skilled workers are needed. As time passes, the firm matures and skill needs decrease due to the specialization of internal processes. The firm also needs more space for expanding operations. Competition enters and the need for cheaper operation occurs; and the product is almost fully standardized so there is virtually no need for skill. The life of a firm begins in the downtown and gradually moves out to the surrounding areas. Many firms stay located in the city because their need for skill does not diminish. These firms include lawyers, doctors,

finance, high-tech, insurance, etc. The problem is that many lower skilled workers remain downtown in older, low-priced housing, and are unemployed. If AER jobs were available downtown where the lower skilled workers are located then unemployment would decrease. Those who once had no income would then increase the city's income per capita, providing there is not an increase in population of the same magnitude or greater. Those who had no skill will now be trained to perform various jobs in the new establishments. This training of workers raises the value of the worker to the community.

2. Information

The information industry is included because it has social and cultural properties that may not be wholly captured by the industry of AER. The greater the amount of the information industry in an area the more attractive it would be to relocating firms and residents; and thus increase the population of the area. The information industry is important for development because it provides jobs that would increase personal income per capita of the area. According to the U.S. Census Bureau's *1997 Economic Census Bridge Between NAICS and SICs Menu of NAICS Sectors*,

"The Information sector groups three types of establishments: (1) those engaged in producing and distributing information and cultural products; (2) those that provide the means to transmit or distribute these products as well as data or communications; and (3) those that process data. Cultural products are those that directly express attitudes, opinions, ideas, values, and artistic creativity; provide entertainment; or offer information and analysis concerning the past and present."

Some examples of establishments in this industry are publishing, motion picture and sound recording, broadcasting and telecommunications, and information services and data processing.

3. Food Service and Drinking Places

The industry of food service and drinking places is also important to the social capital of an area, and may not be captured alone by AER. For example, according to the U.S. Census Bureau's *1997 Economic Census Bridge Between NAICS and SICs Menu of NAICS Sectors*, this industry includes restaurants, coffee shops, bagel shops, alcoholic and non-alcoholic beverage drinking places. The greater the amount of the industry an area has in food service and drinking places the more attractive it would be to relocating firms and residents; and thus increase the population of the area. Also, the food service and

drinking places industry is important to development because it provides jobs that would increase the personal income per capita of an area

4 Unemployment

It is hypothesized, that migrants will search for a city where the unemployment rate is low. A city with a strong labor market will have low unemployment (Glaeser and Shapiro 2000). Firms that are willing and able to provide jobs need a supply of workers to fill the positions. Consequently, those seeking employment will see that a demand for workers is present and will make available their talent. Likewise, if unemployment is high the reverse of the above argument applies. An increase in unemployment should lead to a decrease in personal income per capita. If more residents were unemployed personal income would decline.

5. Climate

Preference is also revealed when deciding on the type of climate in which to reside. Glaeser and Shapiro (2001) and Leichenko (2001) produce evidence that dry, hot places grew faster possibly because of the appeal of that kind of climate to consumers. The variables used in the study by Glaeser and Shapiro (2001) are mean July temperature, average annual precipitation, and mean January temperature. In the Glaeser and Shapiro study, mean July temperature provided a strong predictor of growth, average annual rainfall was a weaker predictor of growth, and mean January temperature showed no impact on growth after control for region. Leichenko used similar variables: number of heating degree days, annual precipitation, and number of cooling degree days. The growth model in this study uses mean January temperature and average annual precipitation.

6 Human Capital

The skill base of the city is measured using human capital. Glaeser and Shapiro (2001) and Leichenko (2001), both hypothesize that the level of education in a city can be representative of the amount of human capital or skill level of the city. Cities that have a higher skill level are most likely to attract and retain firms and residents. Skill level may be more important in the technology and "idea-oriented"

economy of the twenty-first century because of changes in production, innovation, or consumption. Human capital is measured using an adaptation of Glaeser and Shapiro's model: percent of population in the MSA age 25+ with college bachelor's degree or higher. Those with a higher skill level would be expected to earn a higher wage. An increase in human capital and/or innovation should lead to an increase in population. These variables may indicate the health of the area's labor market and a more robust labor market is more attractive to migrants. An increase in personal income per capita, as a measure of the standard of living, would also be attractive to migrants. Firms would be more likely to locate in an area that has a high skill level as measured by education and innovation, as well as an area that has a high standard of living.

7. Innovation

Region Wise (2000) discusses the fact that "economic development is not simply an increase in the material output or consumption; it is a qualitative change in the lives of people." Innovation aids in economic development through the generation of ideas that can lead to "marketable products or processes." The number of patents granted measures the amount of invention and therefore innovation in a city.

8. Crime

The greater the amount of crime an area has, both violent and property offense, the less attractive it is to relocating firms and residents. Current inhabitants of the area may also be likely to move away, thus decreasing the population of the area. Development is also affected by the level of crime in an area. Firms may decide to leave because of high crime rates. This flight of firms leaves residents unemployed and decreases the personal income per capita of the area.

9. Age

The age of the residents in an MSA is an important for the development of the area. Age is used as a determinant of change in personal income per capita because it is theorized that a greater share of the population in the 25 to 44 and 45 to 64 age category, prime earning years, would contribute positively to the income base of the MSA.

10 Fast Growth Industry

In addition to AER, other industries may contribute to the growth and development of an area and must be accounted for. The effect of industry mix should be considered in order to more precisely evaluate the degree of influence of AER. The challenging question is what industries should be included in this evaluation. What industry variables are relevant and will they assert significant influence on the dependent variable? If the concentration of fast growth industry in an area increases then both growth and development should increase. For this project, fast growth industries are determined to be the information sector and the professional, scientific, and technical sector. These industries were chosen because at the national level between 1999 and 2000 they grew the most by total number of establishments and employees (U.S. Census Bureau's 1999 *Metropolitan Business Patterns*). This was then applied at the local level. The aggregate or total number of establishments was taken for the information and professional, scientific, and technical sectors was then measured as the percent of total establishments in each MSA.

It is hypothesized that population would increase with an increase in growth industries because a higher demand for labor would be present, and thus: a higher supply of potential workers would migrate into the area. Industries that are growing faster relative to others would need a larger supply of workers to fill additional positions. Personal income per capita would increase because an increase in the availability of jobs, due to faster growing industries need for additional employees, would result in more of the area's residents working who previously were unemployed. Wage rates may even be bid up depending on the tightness of the labor market.

IV. DATA

A. Data Discussion

Data for the dependent and independent variables are gathered from a number of sources. The data are collected over the time period of the year 1999 to 2000. The overall macro economy, as measured by Gross Domestic Product, peaked in March of 2001 and hit a trough in November of 2001. The time frame of the last business cycle indicates that when the data were collected the macro economy was in an expansion and had been since 1991. The data used in this project should not have any abnormalities due to their timing relative to the business cycle. (National Bureau of Economic Research, *Business Cycle Expansions and Contractions*)

Industry data, including AER, information, and food service and drinking places, are gathered from the U.S. Census Bureau's 1999 *Metropolitan Business Patterns*. "Metro Business Patterns provides data on the total number of establishments, mid-March employment, first quarter and annual payroll, and number of establishments by employment-size classes by detailed industry for all Metropolitan Statistical Areas (MSAs) and New England County Metropolitan Areas (NECMAs)." Conceivably, AER could be measured using any or all of the data provided by the *Metropolitan Business Patterns*. Data used to measure the effect of the industries in the first estimation are the number of AER establishments in the area. Total establishments data are the most complete data provided for the most MSAs for each industry. The payroll database has unreported numbers for some areas for some industries, for example, unreported payroll numbers in Atlanta, GA with a 1st quarter and annual payroll of \$0 for the industry of AER. The employment database also sometimes reports ranges rather than the actual number. For example, the data for AER in Atlanta, GA reports the number of employees as 500-999. Total establishments data are the most complete data available since they provide an actual number for the most MSAs for each industry. A correlation among annual payroll, employment, and total establishments reveals that the three variables are highly positively correlated, however for the year 1999, the correlation between AER annual payroll and number of employees is 0.924, the correlation between total establishments and payroll is 0.980, and the correlation between total establishments and number of employees is 0.875. The correlation results for the industry of AER for the year 2000 reports the same highly positive coefficients. This indicates that the

variables capture industry effects in the same way so they should give similar results. Employment data is preferred because it would better approximate the overall measure of AER in an area, giving a more accurate measure of the amount of AER activity. For example, an MSA may have 2,500 employees working in its AER sector yet only have 5 establishments. For the second and third estimation the number of employees data was used and compared to the establishments data. By using the number of employees data, the sample size was decreased; but we hypothesized that a better approximation of AER would be achieved.

Each industry is measured as an aggregate; it is not split up into sub classifications of the broader industry measure. The industries are identified using North America Industry Classification codes (NAICS), in which AER is classified as NAICS 71. Professional, scientific, and technical services is classified as NAICS 54, Food service and drinking places is classified as NAICS 722, and Information is classified as NAICS 51.

Data on population and personal income per capita for MSAs are taken from the Bureau of Economic Analysis's Regional Economic Information System for 1999 and 2000. The Bureau of Economic Analysis (BEA) uses the "U.S. Census Bureau-midyear population estimates; estimates for 1990-2000 reflect county population estimates available as of April 2002."

The 1999 unemployment rate data are obtained from the Bureau of Labor Statistics. These data, as well as other labor force estimates, can be accessed through the *Local Area Unemployment Statistics* (LAUS) program.

Climate data are taken from the U.S. Census Bureau's *2000 County and City Data Book*. The U.S. Census Bureau received the information from the U.S. National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), *Climatology of the United States*, Number 81, published January 1992. The data are arranged by city; therefore the city corresponding to the metropolitan area included in the study is used to measure the effect of climate for that metropolitan area. The only available data are from 1992 but the year should not matter much because climates do not vary much over time, holding everything else constant. The measurements used in this model are average annual precipitation, and mean January temperature.

Human capital is measured using education data. The latest education data available are for the year 2000. Educational attainment is measured using the Decennial Census data from the year 2000 reported in the U.S. Census Bureau's *American Fact Finder* summary sample geographic data. Innovation is measured using patent data. Patent data are from the U.S. Patent and Trademark Office utility patent grants by metropolitan area for 1999. Crime data is measured using the FBI's Crime Index data, from the *Uniform Crime Reports*, for the year 1999. According to the U.S. Department of Justice, Federal Bureau of Investigation's *Uniform Crime Reports*, "The offenses selected to make up the Crime Index were the Part I crimes—the violent crimes of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault and the property crimes of burglary, larceny-theft, and motor vehicle theft." The number used is the reported rate per 100,000 inhabitants. Age data is the percent of the population in each MSA that is 25 to 44, and the percent of the population in each MSA that is 45 to 64. Age data is measured using the Decennial Census data from the year 2000 reported in the U.S. Census Bureau's *American Fact Finder* summary sample geographic data.

B. Descriptive Statistics

For each of the three estimations, summary statistics and correlations are presented. This is done in order to review the averages, variations, and relationships among the variables.

First estimation

Table 2: Summary Statistics for Growth and Development Model

Variable	Unit of Measure	Mean	Standard Deviation	Minimum	Maximum
<i>AER</i>	Percent	1.40	0.35	0.75	3.48
<i>POPCHG</i>	Percent	0.93	1.02	-3.10	5.30
<i>CHGPIPC</i>	Percent	5.15	1.98	-0.01	20.09
<i>UNEMP</i>	Percent	4.32	2.58	1.20	29.80
<i>JAN</i>	Degrees Fahrenheit	34.85	13.02	4.30	71.40
<i>ANNPREC</i>	Inches	36.63	13.89	3.17	65.71
<i>HUMCAP</i>	Percent	23.41	7.24	11.00	52.40
<i>INNOVATE</i>	Percent	0.35	0.41	0.00	3.39
<i>FASTGROW</i>	Percent	10.34	2.66	5.70	21.38
Number of Observations = 299					

The variables have a great deal of variation between the minimum and maximum values. For example, Yuma, AZ reported an unemployment rate of 29.8 for the time period studied while Columbia,

MO reported the lowest rate of 1.2. Standard deviation measures the spread of the variables around their respective means. Standard deviation is high for the climate variables, which is expected given the different regions of the country. HUMCAP also has a higher standard deviation revealing that some MSAs have a higher education level than others. Most variables in this study are measured in percent. Absolute measures tend to overstate (understate) the growth of larger (smaller) markets. Relative percentage measures overstate (understate) the growth of smaller (larger) markets. Statistical measures provide a broader look at the data. A correlation analysis provides insight into the interaction among variables being tested in the models. Correlation results reveal whether certain variables should be excluded from the model. A correlation coefficient of 1 or -1 means that the variables move perfectly together, respectively, in a positive or negative relationship. The closer the coefficient is to zero the less the variables capture the same effects.

Table 3: Correlation among Growth and Development Variables

	<i>AER</i>	<i>POPCHG</i>	<i>CHGPIPC</i>	<i>UNEMP</i>	<i>JAN</i>	<i>ANNPREC</i>	<i>HUMCAP</i>	<i>PATPERCAP</i>	<i>FASTGROW</i>
<i>AER</i>	1.00								
<i>POPCHG</i>	-0.03	1.00							
<i>CHGPIPC</i>	-0.07	-0.07	1.00						
<i>UNEMP</i>	-0.08	0.02	-0.13	1.00					
<i>JAN</i>	-0.28	0.30	0.03	0.30	1.00				
<i>ANNPREC</i>	-0.14	-0.24	-0.16	-0.25	0.19	1.00			
<i>HUMCAP</i>	0.15	0.25	0.32	-0.47	-0.13	-0.09	1.00		
<i>INNOVATE</i>	0.08	0.18	0.32	-0.24	-0.17	-0.15	0.48	1.00	
<i>FASTGROW</i>	0.01	0.34	0.35	-0.29	0.23	-0.04	0.75	0.37	1.00
Number of Observations = 299									

Analysis of the correlation among the variables indicates that human capital and fast growth industries are highly positively correlated ($r = 0.75$), meaning that both variables are roughly measuring the same thing. If both variables were placed in the same model, they would compete with one another to best explain the dependent variable and the results would be misestimated. In order to correct for the high positive correlation the equations can be examined against the dependent variable first including fast growth industries, and excluding human capital; then including human capital and excluding fast growth industries. The other variables are not highly correlated so they can be included in the model together.

Second estimation

Table 4: Summary Statistics for Growth and Development Model

Variable	Unit of Measure	Mean	Standard Deviation	Minimum	Maximum
<i>AER_EMP</i>	Percent	1.47	1.33	0.43	17.65
<i>AER_EST</i>	Percent	1.41	0.36	0.59	3.48
<i>INFO_EMP</i>	Percent	2.46	1.11	0.49	6.37
<i>INFO_EST</i>	Percent	1.81	3.21	0.04	45.39
<i>FOOD_EMP</i>	Percent	8.17	1.82	3.30	15.47
<i>FOOD_EST</i>	Percent	7.11	1.06	2.74	9.99
<i>POPCHG</i>	Percent	0.96	1.04	-3.10	5.00
<i>CHGPIPC</i>	Percent	5.24	2.15	-0.01	20.09
<i>UNEMP</i>	Percent	4.57	2.93	1.20	29.80
<i>JAN</i>	Degrees Fahrenheit	35.28	14.13	4.30	71.40
<i>ANNPREC</i>	Inches	34.33	14.34	3.17	65.06
<i>HUMCAP</i>	Percent	23.38	7.42	11.00	52.40
<i>INNOVATE</i>	Percent	0.36	0.44	0.00	3.39
<i>AGE_25.44</i>	Percent	29.24	2.23	23.00	36.10
<i>AGE_45.64</i>	Percent	21.59	2.20	12.70	25.60
Number of Observations = 204					

The number of observations in the second estimation is 204 because the number of employees is used to measure the industry data. Establishment data is also included for comparison. Age data is added in this estimation. None of the correlation coefficients are high enough to cause misestimating; therefore can all be included in the testing of the model.

Table 5: Correlation among Growth and Development Variables

	AER_EMP	AER_EST	INFO_EMP	INFO_EST	FOOD_EMP	FOOD_EST	POP_CHG	CHG_PIPC	UN_EMP	JAN	ANN_PREC	HUM_CAP	INNOVATE	AGE_25-44	AGE_45-64
AER_EMP	1.00														
AER_EST	0.29	1.00													
INFO_EMP	0.01	0.03	1.00												
INFO_EST	0.01	-0.01	0.30	1.00											
FOOD_EMP	0.08	0.13	0.03	0.07	1.00										
FOOD_EST	0.14	0.32	-0.08	-0.04	0.32	1.00									
POP_CHG	0.10	-0.09	0.08	-0.03	-0.03	-0.27	1.00								
CHG_PIPC	-0.06	-0.09	0.36	0.04	-0.10	-0.05	-0.05	1.00							
UNEMP	-0.01	-0.12	-0.21	-0.06	0.17	0.15	0.10	-0.18	1.00						
JAN	0.11	-0.28	0.03	0.03	0.25	-0.26	0.32	0.04	0.30	1.00					
ANN_PREC	0.00	-0.04	-0.17	-0.08	-0.12	-0.17	-0.26	-0.19	-0.29	0.12	1.00				
HUM_CAP	0.07	0.13	0.59	0.04	0.04	-0.12	0.17	0.39	-0.49	-0.12	-0.07	1.00			
INNOVATE	0.03	0.01	0.25	-0.04	-0.15	0.03	0.20	0.38	-0.26	-0.14	-0.11	0.52	1.00		
AGE_25-44	0.03	-0.01	0.34	-0.05	-0.25	-0.03	0.21	0.38	-0.24	-0.08	-0.12	0.41	0.32	1.00	
AGE_45-64	0.14	0.20	-0.10	-0.02	-0.23	-0.03	-0.29	0.03	-0.17	-0.10	0.31	-0.10	-0.03	-0.10	1.00
Number of Observations = 204															

Third estimation

Table 6: Summary Statistics for Growth and Development Model

Variable	Unit of Measure	Mean	Standard Deviation	Minimum	Maximum
<i>AER_EMP</i>	Percent	1.54	1.47	0.47	17.65
<i>AER_EST</i>	Percent	1.40	0.37	0.75	3.48
<i>INFO_EMP</i>	Percent	2.50	1.09	0.73	6.37
<i>INFO_EST</i>	Percent	1.90	3.61	0.04	45.39
<i>FOOD_EMP</i>	Percent	8.17	1.80	3.99	15.47
<i>FOOD_EST</i>	Percent	7.13	1.03	5.02	9.99
<i>POPCHG</i>	Percent	1.01	1.02	-1.55	5.00
<i>CHGPIPC</i>	Percent	5.34	2.32	2.41	20.09
<i>UNEMP</i>	Percent	4.55	2.45	1.20	16.50
<i>JAN</i>	Degrees Fahrenheit	36.72	14.73	4.30	71.40
<i>ANNPREC</i>	Inches	33.73	14.71	5.72	65.06
<i>HUMCAP</i>	Percent	23.13	7.17	11.00	47.60
<i>INNOVATE</i>	Percent	0.37	0.45	0.00	3.39
<i>CRIME</i>	Percent	4563.40	1370.84	1662.20	8744.70
<i>AGE_25:44</i>	Percent	29.22	2.33	23.00	36.10
<i>AGE_45:64</i>	Percent	21.58	2.27	12.70	25.60
Number of Observations = 160					

The number of observations in the third estimation is 160 because crime data are not available for all MSAs; therefore the sample is reduced. The third estimation also uses the number of employees to measure industry data. However, establishment data is again included for comparison. Age data is also included in this estimation. None of the correlation coefficients are high enough to cause misestimating; therefore can all be included in the testing of the model.

Table 7: Correlation among Growth and Development Variables

	AER_EMP	AER_EST	INFO_EMP	INFO_EST	FOOD_EMP	FOOD_EST	POP_CHG	CHG_PIPC	UN_EMP	JAN	ANN_PREC	HUM_CAP	INNOVATE	CRIME	AGE_25-44	AGE_45-64
AER_EMP	1.00															
AER_EST	0.27	1.00														
INFO_EMP	-0.01	0.00	1.00													
INFO_EST	0.00	-0.02	0.31	1.00												
FOOD_EMP	0.06	0.12	-0.04	0.06	1.00											
FOOD_EST	0.14	0.30	-0.11	-0.06	0.31	1.00										
POP_CHG	0.08	-0.16	0.04	-0.05	-0.06	-0.32	1.00									
CHG_PIPC	-0.08	-0.11	0.36	0.03	-0.10	-0.04	-0.09	1.00								
UNEMP	-0.05	-0.21	-0.23	-0.06	0.11	0.15	0.04	-0.09	1.00							
JAN	0.10	-0.28	0.03	0.04	0.25	-0.29	0.33	0.06	0.29	1.00						
ANN_PREC	0.04	0.03	-0.17	-0.08	-0.06	-0.18	-0.24	-0.22	-0.24	0.14	1.00					
HUM_CAP	0.08	0.13	0.58	0.02	0.00	-0.13	0.14	0.38	-0.54	-0.09	-0.05	1.00				
INNOVATE	0.02	0.01	0.24	-0.06	-0.19	0.00	0.19	0.38	-0.28	-0.14	-0.11	0.52	1.00			
CRIME	-0.05	-0.27	-0.01	-0.03	0.09	-0.37	0.21	-0.19	0.12	0.44	0.14	-0.06	-0.19	1.00		
AGE_25-44	0.03	-0.03	0.34	-0.06	-0.28	-0.01	0.17	0.37	-0.19	-0.09	-0.18	0.41	0.33	-0.03	1.00	
AGE_45-64	0.15	0.22	-0.11	-0.01	-0.19	-0.03	-0.27	0.03	-0.19	-0.09	0.35	-0.08	-0.03	-0.16	-0.14	1.00

Number of Observations = 160

V. RESULTS

The significance and impact of each independent variable on the dependent variable are quantified using multiple regression analysis. Output is presented for each individual variable as well as the joint equation. AER's contributed significance to growth and/or development is determined. Various estimated equations are tested in order to arrive at a final model that is based on economic theory and has the best statistical fit. All regressions show the dependent variables of growth as measured by POPCHG and development as measured by CHGPIPC. Independent variables change with each estimation in an attempt to better capture the effects of AER, social, and cultural influences on the dependent variables.

A. First Estimation

The first estimation uses the determinants: AER as measured by establishment data, UNEMP, JAN, ANNPRES, INNOVATE, FASTGROW, and HUMCAP. Regression equations (1) and (2) present growth as measured by POPCHG as the dependent variable. Because of the high correlation between HUMCAP and FASTGROW, these two variables cannot be included together in the same regression equation so they are tested separately. Equation (1) includes FASTGROW but does not include HUMCAP; and equation (2) includes HUMCAP but does not include FASTGROW. Regression equations (3) and (4) present development as measured by CHGPIPC as the dependent variable. Again, because of the high correlation between HUMCAP and FASTGROW, the variables cannot be included together in the same equation so they are tested separately. Equation (3) includes FASTGROW but does not include HUMCAP; and equation (4) includes HUMCAP but does not include FASTGROW. Regression results for growth as measured by the dependent variable POPCHG are reported in Table 8 and the regression results for development as measured by the dependent variable CHGPIPC are reported in Table 9.

First Estimation of Regression Equations:

$$(1) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER} - \beta_2 \text{UNEMP} + \beta_3 \text{JAN} - \beta_4 \text{ANNPREC} + \beta_5 \text{INNOVATE} + \beta_6 \text{FASTGROW}$$

$$(2) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER} - \beta_2 \text{UNEMP} + \beta_3 \text{JAN} - \beta_4 \text{ANNPREC} + \beta_5 \text{INNOVATE} + \beta_6 \text{HUMCAP}$$

$$(3) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER} - \beta_2 \text{UNEMP} + \beta_3 \text{JAN} - \beta_4 \text{ANNPREC} + \beta_5 \text{INNOVATE} + \beta_6 \text{FASTGROW}$$

$$(4) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER} - \beta_2 \text{UNEMP} + \beta_3 \text{JAN} - \beta_4 \text{ANNPREC} + \beta_5 \text{INNOVATE} + \beta_6 \text{HUMCAP}$$

Table 8: First Estimation Determinants of Growth

	Equation (1)	Equation (2)
Dependent Variable	POPCHG (%)	POPCHG (%)
<i>Constant</i>	0.085 (0.207)	-0.011 (-0.026)
<i>AER</i>	0.042 (0.274)	0.010 (0.067)
<i>UNEMP</i>	-0.035 (-1.443)	-0.026 (-1.037)
<i>JAN</i>	0.028 (5.812)*	0.032 (7.311)*
<i>ANNPREC</i>	-0.022 (-5.469)*	-0.022 (-5.450)*
<i>INNOVATE</i>	0.275 (1.949)	0.237 (1.645)
<i>HUMCAP</i>	--	0.027 (3.032)*
<i>FASTGROW</i>	0.065 (2.762)*	--
Observations (n)	299	299
Adjusted R-Squared	0.244	0.248

Note: The quantities in parentheses below the estimates are the t statistics. An asterisk indicates statistical significance at a 5% level.

These equations confirm that the variables JAN, ANNPRES, HUMCAP, and FASTGROW are significant; and the actual sign on the coefficients are consistent with the expected results. Climate as measured by mean January temperature and average annual rainfall is significant. The positive sign on JAN means warmer places grew faster, and the negative sign on ANNPRES means that drier places grew faster. The relationship in equation (1) states that a 1-degree increase in the average January mean temperature produces an increase of 0.028 percent points in the population growth rate and an increase in average annual rainfall by 1 inch produces a decrease in the population growth rate by 0.022 percentage points. INNOVATE is not statistically significant at the 5 percent level, but is quite close and would be at the 10 percent level of significance. MSAs with a greater percent of establishments in fast growth industries grew faster than those with less fast growth industries. Equation (1) states that a 1 percent increase in the share of fast growth industries relative to the total number of establishments in an MSA leads to a 0.065 percentage point increase in the population growth rate. The amount of human capital an MSA has is also significant to growth. The relationship in equation (2) states that a 1 percent increase in

the number of residents age 25 or older with at least a college bachelor's degree leads to a 0.027 percentage point increase in the population growth rate

The key focus of this research is the impact of AER on growth and development. Surprisingly, AER is not statistically significant in either equation (1) or (2), although the results show that a positive relationship between AER and growth appears to exist. The adjusted R-squared reveals that about 24 percent of the variation in the growth rate from place to place can be explained using the 6 or 7 variables of this model.

Table 9: First Estimation Determinants of Development

	Equation (3)	Equation (4)
Dependent Variable	CHGPIPC (%)	CHGPIPC (%)
<i>Constant</i>	4.731 (5.704)	4.857 (5.723)
<i>AER</i>	-0.622 (-2.004)*	-0.674 (2.146)*
<i>UNEMP</i>	-0.048 (-0.969)	-0.044 (-0.843)
<i>JAN</i>	0.004 (0.412)	0.016 (1.75)
<i>ANNPREC</i>	-0.022 (-2.639)*	-0.023 (-2.729)*
<i>INNOVATE</i>	1.004 (3.505)*	1.001 (3.400)*
<i>HUMCAP</i>	--	0.058 (3.135)*
<i>FASTGROW</i>	0.176 (3.657)*	--
Observations (n)	299	299
Adjusted R-Squared	0.175	0.165

Note: The quantities in parentheses below the estimates are the t statistics. An asterisk indicates statistical significance at a 5% level.

The development model equations, presented in Table 9, confirm that the variables AER, ANNPREC, HUMCAP, INNOVATE and FASTGROW are significant. Compared to the results from the growth model the variables that are significant in both instances are ANNPREC, HUMCAP, and FASTGROW, while UNEMP is insignificant in both instances. Differences in significance between the growth model and the development model are the absence of JAN in the development model and the

inclusion of AER. However, the expected effect sign on the coefficients are not all consistent with the actual results.

AER is statistically significant in this model but the results surprisingly are a negative relationship between AER and development, the opposite of the hypothesized relationship. A possible explanation for this could be that AER offers lower paying jobs compared to the other sectors of the MSA's economy. Therefore, adding additional AER jobs results in lower income for an MSA. The adjusted R-squared states that about 17 percent of the variation in development from place to place can be explained using the variables of this model.

Given the unexpected results in the first estimation, we considered alternative approaches. These included adding additional variables that may be important determinants of growth and development. Also, some variables are measured in other ways. The second estimation attempts to capture these alternatives.

B. Second Estimation

The second set estimation uses the determinants: AER, INFO, and FOOD as measured by both establishment and employment data, UNEMP, JAN, ANNPREC, INNOVATE, HUMCAP, and the age related variables in the development model of AGE_25:44 and AGE_45:64. Employment data for the industry variables is now considered in the second estimation because employment data could be preferred because it would better approximate the overall measure of AER in an area, giving a more accurate measure of the amount of AER activity. For example, an MSA may have 2,500 employees working in its AER sector yet only have 2 establishments. Establishment data is also regressed in order to make a comparison of data results. The total regression sample for all equations in the second estimation is set to, 204, the number of MSAs that have employment data.

Regression equations (5) and (6) present growth as measured by POPCHG as the dependent variable. Regression equations (7) and (8) present development as measured by CHGPIPC as the dependent variable and use the age variables as determinants. Equations (5) and (7) use employment data to measure the industry variables, and equations (6) and (8) use establishment data to measure the industry variables. Again, age is used as a determinant of CHGPIPC because it is theorized that a greater share of the population in the 25 to 44 and 45 to 64 age category, prime earning years, would contribute positively

to the income base of the MSA. Regression results for growth as measured by the dependent variable POPCHG are reported in Table 10 and the regression results for development as measured by the dependent variable CHGPIPC are reported in Table 11.

Second Estimation Regression Equations:

$$(5) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP}$$

$$(6) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP}$$

$$(7) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64}$$

$$(8) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64}$$

Table 10: Second Estimation Determinants of Growth

	Equation (5) (Employment)	Equation (6) (Establishment)
Dependent Variable	POPCHG (%)	POPCHG (%)
<i>Constant</i>	0.787 (1.674)	2.004 (3.015)
<i>AER_EMP</i>	0.036 (0.762)	--
<i>AER_EST</i>	--	0.185 (0.972)
<i>INFO_EMP</i>	-0.099 (-2.682)*	--
<i>INFO_EST</i>	--	-0.255 (-3.873)*
<i>FOOD_EMP</i>	-0.142 (-1.973)*	--
<i>FOOD_EST</i>	--	-0.022 (-1.145)
<i>UNEMP</i>	0.008 (0.291)	0.013 (0.446)
<i>JAN</i>	0.032 (6.453)*	0.024 (4.840)*
<i>ANNPREC</i>	-0.023 (-4.696)*	-0.022 (-4.617)*
<i>INNOVATE</i>	0.284 (1.646)*	0.458 (2.716)*
<i>HUMCAP</i>	0.034 (2.559)*	0.010 (0.892)
Observations (n)	204	204
Adjusted R-Squared	.262	.279

Note: The quantities in parentheses below the estimates are the t statistics. An asterisk indicates statistical significance at a 5% level.

Equation (5) confirms that the variables *INFO_EMP*, *FOOD_EMP*, *JAN*, *ANNPREC*, *INNOVATE*, and *HUMCAP* are significant. *JAN*, *ANNPREC*, *INNOVATE*, and *HUMCAP* have actual signs on their coefficients consistent with the expected results, but the actual sign on the coefficients of *INFO_EMP*, and *FOOD_EMP* are opposite of the expected results. A 1 percent increase in employment in the industry of information as a percent of total employment in an MSA leads to a 0.099 percentage point decrease in the population growth rate. A 1 percent increase in employment in the industry of food services and drinking places as a percent of total employment in an MSA leads to a 0.142 percentage point decrease in the population growth rate.

Using establishment data, equation (6) confirms that the variables *INFO_EST*, *JAN*, *ANNPREC*, and *INNOVATE* are significant. *JAN*, *ANNPREC*, and *INNOVATE* have actual signs on their coefficients consistent with the expected results. The actual sign on the coefficient of *INFO_EST* is

opposite of the expected results. A 1 percent increase in the number of establishments in the industry of information as a percent of total establishments in an MSA leads to a 0.255 percentage point decrease in the population growth rate.

AER is not statistically significant in either equation (5) or (6), but the results suggest that a positive relationship between AER and growth does exist. The adjusted R-squared in (5) equation, using employment data, reveals that about 26 percent variation in the growth rate from place to place can be explained using this model. The adjusted R-squared in equation (6), using establishment data, reveals that about 28 percent of variation in the growth rate from place to place can be explained using this model.

Table 11: Second Estimation Determinants of Development

	Equation (7) (Employment)	Equation (8) (Establishment)
Dependent Variable	CHGPIPC (%)	CHGPIPC (%)
<i>Constant</i>	-4.667 (-1.639)	-5.379 (-1.959)
<i>AER_EMP</i>	-0.203 (-2.051)*	--
<i>AER_EST</i>	--	-0.848 (-2.077)**
<i>INFO_EMP</i>	-0.043 (-0.543)	--
<i>INFO_EST</i>	--	0.085 (0.441)
<i>FOOD_EMP</i>	0.240 (1.619)	--
<i>FOOD_EST</i>	--	0.018 (0.616)
<i>UNEMP</i>	-0.050 (-0.859)	-0.050 (-0.842)
<i>JAN</i>	0.028 (2.733)*	0.022 (2.115)**
<i>ANNPREC</i>	-0.031 (-2.953)*	-0.032 (-3.067)**
<i>INNOVATE</i>	1.009 (2.854)*	0.907 (2.559)**
<i>HUMCAP</i>	0.039 (1.389)	0.063 (2.581)**
<i>AGE_25.44</i>	0.191 (2.822)*	0.210 (3.248)**
<i>AGE_45.64</i>	0.158 (2.441)*	0.175 (2.711)**
Observations (n)	204	204
Adjusted R-Squared	.289	.277

Note: The quantities in parentheses below the estimates are the t statistics. An asterisk indicates statistical significance at a 5% level.

Equation (7) and (8) use the same independent variables, but equation (6) uses subject data from employment measures and equation (7) uses establishment data. These equations also use age data to help estimate development. Equation (7) of the development model confirms the statistical significance of AER_EMP, JAN, ANNPREC, INNOVATE, AGE_25:44, and AGE_45:64. JAN, ANNPREC, INNOVATE, AGE_25:44 and AGE_45:64 have the actual sign on their coefficients consistent with the expected results. AER_EMP is statistically significant in the model but the results are again a negative relationship between AER_EMP and development, the opposite of the hypothesized relationship. A 1 percent increase in the number of employees in the industry of AER as a percent of total employees in an MSA leads to a 0.203 percentage point decrease in the growth rate of personal income per capita. Again, a possible explanation for this could be that AER offers lower paying jobs as compared to the other sectors of the MSA's economy. Therefore, adding additional AER jobs results in lower income. The adjusted R-squared in equation (7), using employment data, states that about 29 percent of the variation in development from place to place can be explained with this model.

Using establishment data, equation (8) of the development model confirms the statistical significance of AER_EST, JAN, ANNPREC, HUMCAP, INNOVATE, AGE_25:44, and AGE_45:64. JAN, ANNPREC, HUMCAP, INNOVATE, AGE_25:44 and AGE_45:64 have the actual sign on their coefficients consistent with the expected results. AER_EST is statistically significant in the model but as with equation (7), the results show a negative relationship between AER_EST and development, again the opposite of the hypothesized result. A 1 percent increase in the number of establishments in the industry of AER as a percent of total establishments in an MSA leads to a 0.848 percentage point decrease in the growth rate of personal income per capita. The explanation would be the same as above. The adjusted R-squared in equation (8), using establishment data, states that about 28 percent of the variation in development from place to place can be explained using this model.

Given the unexpected results in the first estimation and second estimation, the final variable to be included that could have an influence on the growth and development of an area, and thus better approximate the equations is the amount of crime an MSA has. The third estimation includes the same independent variables as the second estimation with the exception of the CRIME variable. The reason that a third estimation was performed for the inclusion of the variable, instead of adding it to the second

estimation. is that crime data is not available for all MSAs and the number of observations decreases to 160

C. Third Estimations

The third estimation uses the determinants: AER, INFO, and FOOD as measured by both establishment and employment data, UNEMP, JAN, ANNPREC, INNOVATE, HUMCAP, CRIME, and the age related variables in the development model of AGE_25:44 and AGE_45:64. Employment and establishment data are also regressed in order to make a comparison of data results, as explained in the second estimation. Again, in addition to the previous determinants CRIME has been added in order to better approximate the dependent variables of growth and development; and CRIME has an estimation set of its own because it reduces the sample size by 44 MSAs. This reduction in sample size could change the correlations, descriptive statistics, and regression results. Regression equations (9) and (10) present growth as measured by POPCHG as the dependent variable. Regression equations (11) and (12) present development as measured by CHGPIPC as the dependent variable and use age as a determinant. Equations (9) and (11) use employment data to measure the industry variables. Equations (10) and (12) use establishment data to measure the industry variables. Regression results for growth as measured by the dependent variable POPCHG are reported in Table 12 and the regression results for development as measured by the dependent variable CHGPIPC are reported in Table 13.

Third Estimation Regression Equations:

$$(9) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{CRIME}$$

$$(10) \text{ POPCHG (GROWTH)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{CRIME}$$

$$(11) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EMP} + \beta_2 \text{INFO_EMP} + \beta_3 \text{FOOD_EMP} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64} + \beta_{11} \text{CRIME}$$

$$(12) \text{ CHGPIPC (DEVELOPMENT)} = \beta_0 + \beta_1 \text{AER_EST} + \beta_2 \text{INFO_EST} + \beta_3 \text{FOOD_EST} - \beta_4 \text{UNEMP} + \beta_5 \text{JAN} - \beta_6 \text{ANNPREC} \\ + \beta_7 \text{INNOVATE} + \beta_8 \text{HUMCAP} + \beta_9 \text{AGE_25_44} + \beta_{10} \text{AGE_45_64} + \beta_{11} \text{CRIME}$$

Table 12: Third Estimation Determinants of Growth

	Equation (9) (Employment)	Equation (10) (Establishment)
Dependent Variable	POPCHG (%)	POPCHG (%)
<i>Constant</i>	1.000 (1.707)	2.677 (3.116)
<i>AER_EMP</i>	0.035 (0.729)	--
<i>AER_EST</i>	--	0.058 (0.278)
<i>INFO_EMP</i>	-0.156 (-1.912)	--
<i>INFO_EST</i>	--	-0.025 (-1.292)
<i>FOOD_EMP</i>	-0.095 (-2.292)*	--
<i>FOOD_EST</i>	--	-0.271 (-3.431)*
<i>UNEMP</i>	-0.033 (-0.877)	-0.023 (-0.595)
<i>JAN</i>	0.029 (4.894)*	0.022 (3.900)*
<i>ANNPREC</i>	-0.024 (-4.597)*	-0.024 (-4.572)*
<i>INNOVATE</i>	0.341 (1.797)	0.447 (2.442)*
<i>HUMCAP</i>	0.020 (1.237)	-0.002 (-0.174)
<i>CRIME</i>	0.0001 (1.792)	0.00004 (0.785)
Observations (n)	160	160
Adjusted R-Squared	.259	.280

Note: The quantities in parentheses below the estimates are the t statistics. An asterisk indicates statistical significance at a 5% level.

Using employment data, equation (9) confirms that the variables *FOOD_EMP*, *JAN*, and *ANNPREC* are significant. *JAN* and *ANNPREC* have actual signs on their coefficients consistent with the expected results. The actual sign on the coefficient of *FOOD_EMP* is opposite of the expected results. A 1 percent increase in employment in the industry of food services and drinking places as a percent of total employment in an MSA leads to a 0.095 percentage point decrease in population growth rate.

Using establishment data, equation (10) confirms that the variables *FOOD_EST*, *JAN*, *ANNPREC*, and *INNOVATE* are significant. *JAN*, *ANNPREC*, and *INNOVATE* have actual signs on their coefficients consistent with the expected results. The actual sign on the coefficient of *FOOD_EST* is opposite of the expected results. A 1 percent increase in the number of establishments in the industry of

food services and drinking places as a percent of total establishments in an MSA leads to a 0.271 percentage point decrease in population growth rate.

AER is not statistically significant in either equation (9) or (10), but the results suggest that a positive relationship between AER and growth does exist. The adjusted R-squared in equation (9), using employment data, reveals that about 26 percent of variation in the growth rate from place to place can be explained using this model. The adjusted R-squared in equation (10), using establishment data, reveals that about 28 percent of variation in the growth rate from place to place can be explained using this model.

Table 13: Third Estimation Determinants of Development

	Equation (11) (Employment)	Equation (12) (Establishment)
Dependent Variable	CHGPIPC (%)	CHGPIPC (%)
<i>Constant</i>	-5.786 (-1.711)	-4.444 (-1.319)
<i>AER_EMP</i>	-0.236 (-2.222)*	--
<i>AER_EST</i>	--	-1.005 (-2.112)*
<i>INFO_EMP</i>	0.285 (1.605)	--
<i>INFO_EST</i>	--	0.015 (0.356)
<i>FOOD_EMP</i>	-0.030 (-0.315)	--
<i>FOOD_EST</i>	--	-0.050 (-0.284)
<i>UNEMP</i>	0.079 (0.952)	0.081 (0.940)
<i>JAN</i>	0.038 (2.998)*	0.030 (2.352)*
<i>ANNPREC</i>	-0.027 (-2.239)*	-0.029 (-2.407)*
<i>INNOVATE</i>	0.911 (2.215)*	0.787 (1.924)
<i>HUMCAP</i>	0.064 (1.841)	0.092 (3.005)*
<i>AGE_25.44</i>	0.205 (2.643)*	0.215 (2.894)*
<i>AGE_45.64</i>	0.184 (2.407)*	0.191 (2.494)*
<i>CRIME</i>	-0.0003 (-2.772)*	-0.0003 (-2.888)*
Observations (n)	160	160
Adjusted R-Squared	0.325	0.312

Note: The quantities in parentheses below the estimates are the t statistics. An asterisk indicates statistical significance at a 5% level.

Using employment data, equation (11) confirms that the variables AER_EMP, JAN, ANNPREC, INNOVATE, AGE_25:44, AGE_45:64 and CRIME are significant. JAN, ANNPREC, INNOVATE, AGE_25:44, AGE_45:64, and CRIME have actual signs on their coefficients consistent with the expected results. The actual sign on the coefficient of AER_EMP is opposite of the expected results, negative and statistically significant. A 1 percent increase in employment in the industry of AER as a percent of total employment in an MSA leads to a 0.236 percentage point decrease in the growth rate of personal income per capita.

Using establishment data, equation (12) confirms that the variables AER_EMP, JAN, ANNPREC, HUMCAP, and AGE_25:44, AGE_45:64 and CRIME are significant. JAN, ANNPREC, HUMCAP, and AGE_25:44, AGE_45:64, and CRIME have actual signs on their coefficients consistent with the expected results. The actual sign on the coefficient of AER_EST is opposite of the expected results. A 1 percent increase in the number of establishments in the industry of AER as a percent of total establishments in an MSA leads to a 1.005 percentage point decrease in the growth rate of personal income per capita.

AER is statistically significant in equations (11) or (12), but the results show that a negative relationship between AER and development again exists. The adjusted R-squared in equation (11), using employment data, reveals that about 33 percent variation in the growth rate from place to place can be explained using this model. The adjusted R-squared in equation (12), using establishment data, reveals that about 31 percent variation in the growth rate from place to place can be explained using this model.

D. Summary of AER Results

Table 14: Summary of AER Results

	Dependent Variables	
	POPCHG (%)	CHGPIPC (%)
Equation Employment or Establishment Adjusted R ² Number of Observations AER Coefficient AER t-statistic	Equation 1 Establishment Adjusted R ² = 0.244 n = 299 0.042 0.274	Equation 3 Establishment Adjusted R ² = 0.175 n=299 -0.622 -2.004*
Equation Employment or Establishment Adjusted R ² Number of Observations AER Coefficient AER t-statistic	Equation 2 Establishment Adjusted R ² = 0.248 n=299 0.10 0.067	Equation 4 Establishment Adjusted R ² = 0.165 n=299 -0.674 2.146*
Equation Employment or Establishment Adjusted R ² Number of Observations AER Coefficient AER t-statistic	Equation 5 Employment Adjusted R ² = 0.262 n=204 0.036 0.762	Equation 7 Employment Adjusted R ² = 0.289 n=204 -0.203 -2.051*
Equation Employment or Establishment Adjusted R ² Number of Observations AER Coefficient AER t-statistic	Equation 6 Establishment Adjusted R ² = 0.279 n=204 0.815 0.972	Equation 8 Establishment Adjusted R ² = 0.277 n=204 -0.848 -2.077*
Equation Employment or Establishment Adjusted R ² Number of Observations AER Coefficient AER t-statistic	Equation 9 Employment Adjusted R ² = 0.259 n=160 0.035 0.729	Equation 11 Employment Adjusted R ² = 0.325 n=160 -0.236 -2.222*
Equation Employment or Establishment Adjusted R ² Number of Observations AER Coefficient AER t-statistic	Equation 10 Establishment Adjusted R ² = 0.280 160 0.058 0.278	Equation 12 Establishment Adjusted R ² = 0.312 n=160 -1.005 -2.112*

The overwhelming trend presented by AER's actual impact on growth and development is opposite of what was to be expected. AER is not statistically significant in relation to growth. Concerning AER's relationship to development, it is significant in each instance. However, its affect is the opposite of what was expected. A potential reason for the statistical insignificant relationship between growth and AER is that AER and social and cultural capital are unimportant to the quality of life associated with the existing population of a metropolitan area, and not a factor in relocation decisions of migrants. The result that as AER increases personal income per capita decreases could be the result of jobs in the industry of

AER being low-paid service jobs. Also a reason could be that when measuring the aggregate industry of AER, jobs in one section of the industry could be declining while employment in another sector could be increasing. The possible diversification in the industry may be identified by disaggregating component parts of the industry. This finding that AER and social and cultural capital is not important in the determination of growth and that it is a negating factor in the determination of development is the complete antithesis of the initial hypothesis.

E Summary of Erie, PA Results

In order to better understand our local economy, Erie, PA has been removed from the overall model and the data summarized. Erie, PA has attempted to use AER and social and cultural capital to revitalize a metropolitan area that has long been a center of manufacturing. The number reported for Erie, PA for each variable is compared to the mean for all MSAs for which data are available.

Variable	Erie	Mean
Percent Change in Personal Income per Capita	4.70	5.15
Percent Change in Population	-0.21	0.93
Percent of Employment in AER	1.39	1.47
Percent of Establishments in AER	1.52	1.40
Percent of Employment in Information	1.33	2.46
Percent of Establishments in Information	1.52	1.81
Percent of Employment in Food Service and Drinking Places	7.28	8.17
Percent Establishments in Food Service and Drinking Places	7.93	7.11
Percent of Establishments in Fast Growth Industries	7.61	10.34
Unemployment Rate	5.00	4.32
Mean January Temperature	25.40	34.85
Average Annual Precipitation	41.50	36.63
Innovation (number of utility patents granted per 1000 residents)	0.93	0.35
Human Capital (percent of population age 25 and older with at least a college bachelor's degree)	20.90	23.41
Crime (number of offenses both violent and property per 100,000 residents)	2744.50	4563.40
Percent of Population ages 25-44	27.70	29.24
Percent of Population ages 45-64	22.20	21.59

Erie had an increase in personal income per capita from 1999 to 2000, and a decrease in population. The largest percent of employment and establishments for Erie and the collection of MSAs are in the industry of food service and drinking places. This industry promotes social interaction among residents. The unemployment rate in 1999 is roughly in line with national rates at the time. The climate variables indicate a rather colder and wetter area than the average. Innovation in 1999 is below one patent granted per 1000 residents, but greater than the mean. The human capital measure reveals that only 20 percent of

the population age 25 and older had at least a bachelor's degree in 2000. Erie has less crime than the reported MSAs and finally, almost half of the population in Erie is between 25 and 64. In terms of the hypothesized effects on growth and development, these values should indicate that higher levels of AER coincide with increases in population and personal income per capita. Erie has a low personal income per capita, decreasing population, and less social and cultural capital.

Local economic development initiatives in Erie have sought to increase social and cultural capital. In 2002, current Erie Mayor, Rick Filippi, set up the new city hall office of Community and Cultural Development in order to upgrade and promote the city's arts, entertainment, and cultural assets. A broader goal of the newly developed office is to market the city as an attractive destination and a place where young people will want to stay and live, in addition to increasing the quality of life for all current and potential residents. Filippi has also employed the Civic Coordinating Committee to create a marketing plan for Erie. The marketing plan is just one of the mayor's goals to make Erie an entertainment and cultural hub. He also has outlined the goals of attracting new businesses and retaining existing ones downtown and bringing more retail shops and smaller restaurants downtown. Establishing a downtown cultural and entertainment district, with green space and recreation services, including all proposed improvements, should cost almost \$53.4 million to \$63.1 million. Erie's position on Lake Erie is an exploitable natural amenity, with a convention center already planned (Erwin 2002).

VI. CONCLUSIONS

The basic question in this project has been how AER affects growth and development. The answer is that AER does not appear to affect growth, and does appear to affect development. However, as AER increases the growth rate of personal income per capita decreases, the opposite of expectations. The initial thesis of this paper has been refuted, but a number of variables have been identified that do lead to growth and development in an MSA. Among the important factors identified in this study are innovation, human capital, fast growth industries, and climate.

This particular model has not yet captured the effect of AER on growth and development. Many local governments are using AER as a viable strategy for economic development, therefore additional research would be useful in an attempt to quantify and solidify the strategy. Further study should include

other possible variables to help explain growth and development in addition to the ones in this study. Other variables may include an extended list of industries that could be considered AER, additional sectors of an MSA that contribute to growth and development, and differences in cost of living from place to place. Another approach may be to try to measure AER differently. This project used measures of employment and establishments in AER—but these may be considered input measures. A different approach would be to use some type of output measure—perhaps counts of AER activities or participation in various AER events. Clearly this would present a much more challenging problem to data collection. Possible problems in the estimation of the regression models could be because the dependent variables were only measured as growth over a single year; this can be remedied by examining AER again using the same model when the latest *Economic Census* is released, or in a few years using more data from the same source used in this project, *Metropolitan Business Patterns*.

This study leaves a few interesting questions, such as: 1) can individual preferences be empirically measured collectively and efficiently, and 2) can local government officials please all the people all the time, or is utility too much of a personal preference? How can we measure the intangible, ephemeral, aesthetic, social and cultural “guts” of a place? This paper does not argue that the quality of life of current residents in an MSA does not improve with increases in AER, social, and cultural capital but those increases have not been proven to cause growth and do appear to cause the incomes of the residents to decline. According to this model, AER cannot stand alone for economic development, but based on literature and direct use in many American cities local governments still find this strategy an important part of a broader approach. The success of social, cultural, and AER policies should not be measured purely by the growth and development effects they can have on an area.

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