

# Cities, Economic Development and the Role of Place Based Policies: Lessons for Appalachia<sup>1</sup>

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## **Abstract**

This paper surveys economic research on the association between economic development and urban areas, links this summary to some important trends in economic outcomes in Appalachia in recent decades, highlights areas in need of future research on the role of urban areas as engines of economic development in Appalachia, and discusses what types of place-based policies might be effective to promote economic growth and development in the Appalachian region.

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## **Introduction**

Cities are the key engine of economic growth because they economize on the transportation cost of goods, workers and ideas (Glaeser 1998). Cities facilitate learning, and accelerate the diffusion of new ideas (Duranton and Puga 2001). Through encouraging specialization and trade, cities raise our per-capita income (Glaeser and Mare 2000).

In a similar spirit as the enormous cross-country empirical growth literature, urban economists have estimated countless cross-city growth regressions to uncover the correlates of urban growth (Glaeser et. al. 1992, Glaeser et. al. 1995). While legitimate concerns can and should be raised about such regressions (Durlauf, Kourtellos & Tan 2008), this research program has identified a series of robust facts. A second generation urban econometrics literature has used more sophisticated econometric strategies ranging from credible instrumental variables to regression discontinuity designs to attempt to identify the causal effects of human capital stocks and state policies on local growth and wages (Moretti 2004, Holmes 1999).

This paper surveys the key economic research findings on the associations between economic development and urban areas. What types of cities have boomed over the last 35 years? The fundamental challenge that Appalachia faces is that it does not embody the “time tested” formula for achieving ongoing urban growth. This region does not feature any mega-cities. Its location is far from the coast and many of its counties feature cold winters. Relative to the rest of the nation its educational attainment is low and its local economies have not specialized in the “Google” sector. Instead, much of this region has focused on dirty, natural resource extraction. Half of the states in this region are pro-union and this deflects manufacturing away (Holmes 1999).

Given the challenges that Appalachia faces in recruiting and retaining the skilled and the businesses that hire them, are there cost effective place based investments that the region could make? This paper will focus on strategies for encouraging the growth of Appalachia's medium sized cities that emphasize improving household quality of life. Valuable lessons can be learned from cities such as Pittsburgh that were dirty, manufacturing cities and have reinvented themselves as high skill, consumer cities.

We know that neither policy makers nor economists are good at "picking industrial winners". Cities that offer a high quality of life can be more confident that regardless of what sector of the economy booms next that their city will adapt to changing market conditions.

### **Thriving Cities**

Today, major cities such as San Francisco, Los Angeles, New York City, Chicago and Boston feature high wages, high home prices and are widely viewed as having high quality of life. None of these cities appear to have an inherent exogenous productivity advantage over other cities such as Houston, Atlanta, Detroit, or St. Louis. Skilled people want to locate near other skilled people and the firms that hire them. Such thick local labor markets are an important determinant of industrial agglomeration (Dumais, Ellison and Glaeser 2005). But, where will these clusters emerge? Initial accidents of history can have cumulative effects but a first mover advantage is not sufficient. Philadelphia was the nation's capital but nobody ranks it as a "Superstar City". Detroit boomed as domestic car production increased but its early industrial edge has not offered long run advantages.

## **Skill**

Cities with more base year skill experience greater subsequent population growth, housing price growth and wage growth (Glaeser and Saiz, 2004). Rauch (1993) and Moretti (2004) show that, conditional on observable worker characteristics, wages are higher in high human capital cities. A one-point increase in the percent of a local economy's population that is college educated increases local population growth over a 10-year period by one-half point (Glaeser and Saiz 2004) and increases real wages of non-college-educated local residents by 1.4 percent, and real wages of local college graduates by 0.3 percent (Moretti 2004). Shapiro (2006) concludes that the presence of college graduates increases a city's employment growth rate and the channel is almost evenly split between productivity growth and quality of life upgrades. From 1940 to 1990, a 10 percent increase in a metropolitan area's concentration of college-educated residents was associated with a .8 percent increase in subsequent employment growth (Shapiro 2006).

## **Quality of Life**

In this footloose age, a company such as Google wants to locate in a high quality of life area, where its high skilled work force will be happy to live and work. Common sense and hedonic pricing research pinpoints the "best cities in America". These tend to be coastal cities in attractive, temperate climates featuring sophisticated cultural opportunities. Albouy's (2009) top nine amenity cities include: San Francisco, Santa Barbara, Monterey, Honolulu, San Diego, New York City, Los Angeles, San Luis Obispo and Boston. Seattle ranks 12<sup>th</sup>, Portland ranks 19<sup>th</sup> and Houston ranks 74<sup>th</sup>. Hedonic researchers identify such cities using revealed preference

logic. If a city features relatively high home prices and offers relatively low wages and still suffers little out migration then it must have high quality of life.

Today, major cities such as Los Angeles and New York City compete to be “Green Cities”.<sup>2</sup> Such cities seek to enhance their environmental quality to improve public health and to retain the footloose skilled. Today’s mega-cities do not represent “Faustian bargains” of economic opportunity but cruddy quality of life. In fact, these cities offer both opportunity and quality of life. Marx and Engels would not recognize such cities. They expected that the ravenous capitalist growth engine would make productive cities such as Manchester, England worse and worse places to live and work. Instead, major cities in the developed world ranging from New York City to London have reinvented themselves as “consumer cities” where the skilled want to live.

A virtuous cycle is set off as footloose employers (i.e Google, Microsoft) locate in areas where the skilled want to live. This further attracts more skilled workers and high end commercial restaurants and retail stores to cater to this niche market (Waldfogel 2008). In such thriving cities, the market potential that the scale and per-capita income of the residents attracts upscale stores and restaurants that further increase the city’s quality of life. These Superstar Cities attract international tourists and rich international people buy second homes in these cities.

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<sup>2</sup> For example see New York City’s Plan (<http://www.nyc.gov/html/planyc2030/html/greenyc/greenyc.shtml>), and Los Angeles’ plan [http://www.lacity.org/ead/EADWeb-AQD/GreenLA\\_CAP\\_2007.pdf](http://www.lacity.org/ead/EADWeb-AQD/GreenLA_CAP_2007.pdf)

In a nation of 300 million people, not all of us can afford to or want to live in these Superstar Cities. Limits to housing supply in these cities both due to man made regulations (Glaeser, Gyourko and Saks 2005) and due to mountains (see Saiz 2009) raise the cost of new construction. In the “Superstar Cities” of Los Angeles, New York City, San Francisco and Boston, an inelastic supply of housing combines with rising demand (due to the skewing of the nation’s income distribution) to lead to very high home prices (Gyourko, Mayer and Sinai 2006). Facing this price gradient, millions of people have moved to warm winter, easy to build cities such as Dallas, Houston, Phoenix, and Las Vegas. People are drawn to these cities due to their cheap, spacious housing and warm winters. Labor wages and housing rents adjust across cities to reflect spatially tied compensating differentials (Berger, Blomquist and Hoehn 1988).

### **The Challenge for Appalachia’s Small Cities within the System of Cities**

Appalachia does not have many cities and its cities are relatively small and not located near the desired coasts. There are relatively few research universities within the region. Many of the states within the Appalachian Region are pro-union states and this retards manufacturing’s interest in locating within such business “unfriendly” environment. The long lived dirty legacy of mining both in terms of air pollution, water pollution and scars to the region’s mountains diminishes the prospects of harnessing the region’s natural beauty for embracing a tourist/consumer city recovery.

Appalachia is a low wage, low rent region. Cheap housing acts as a poverty magnet (Glaeser and Gyourko 2005). Given that the skilled want to live in affluent areas (both for peer effects and shopping opportunities), this will act as another force that discourages them from moving to the region.

Relative to bigger cities, small cities feature a less diversified local economy (Henderson 1996). They tend to specialize in specific industries. When these industries are booming, these towns boom (think of coal towns) but when the world price of the goods that these towns specialize in decline, the town experiences a sharp recession (see Black, McKinnish and Sanders 2005). These cities feature a larger share of their workforce as working in manufacturing. As world trade has taken place, such cities face increased international competition from areas featuring much lower wages. This lack of diversification creates high unemployment risk for workers who do not want to switch local labor markets. Small cities lack thick local labor markets and do not feature a diverse set of industries. This creates co-location problems for couples where both spouses work (Costa and Kahn 2000, Goldin 2006).

To provide some facts about how Appalachia's biggest cities compare within the national rankings and relative to each other, in Table One I list the names of the 25 largest cities in Appalachia and provide some basic quality of life and socio-demographic information. For the 428 counties that comprise Appalachia, I rank them by population and identify the major city within each of these counties. Pittsburgh is the only city with national name recognition thanks to the Steelers winning Super Bowls, the legacy of steel production and its universities. The table highlights that Appalachia's cities are small. The aggregate population living in these 428 counties is roughly equal to the total population living in the New York City Consolidated Metropolitan Statistical Area. As shown in Table One, only three counties located within Appalachia have more than 500,000 people living there.

Table One also reports where these cities rank relative to Albouy's (2009) overall ranking of 288 cities in the United States. Albouy ranks the cities with respect to a quality of life index and a productivity index generated by revealed preference hedonic regressions. Intuitively, in a

compensating differentials equilibrium, a city paying low wages and charging high rents must have high quality of life. Otherwise, why would anyone live there? A highly productive city features high rents and high wages. Otherwise, why would any firm locate there when factor input costs are lower in other locations? Based on this logic, Albouy's (2009) rankings confirm the fundamental challenge that Appalachia's cities face. Appalachia's cities consistently rank in the bottom half of both the quality of life and the productivity national distribution.

At the bottom of Table One, I provide some county information for four Appalachian counties featuring research universities that include: Boone, North Carolina, Richmond Kentucky, and Morgantown, West Virginia.<sup>3</sup> These cities stand out within the region with respect to their share of adults who are college graduates. But, relative to the U.S average for counties with more than 100,000 people the Appalachian cities are below average in terms of their share of college graduates.<sup>4</sup>

Migration data provide clear evidence that the skilled are "voting with their feet" to leave Appalachia if they originally lived there and to choose not to move there if they originally lived outside of the region. To document this point, I use micro data from the 5% IPUMS Census of Population and Housing sample from the year 2000. I restrict the sample to men ages 25 to 50. For each man, I observe his age, education, and geographical location (based on MIGPUMS and

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<sup>3</sup> Cornell University and Penn State University both lie within Appalachia's borders. Their respective counties feature high shares of college graduates.

<sup>4</sup> For the 556 counties in the United States with more than 100,000 people in 2002, the share of college graduates is 24.4% with a standard deviation of .091.

PUMAs) in 1995 and 2000. I use the geocorr geography engine to determine whether each man lived in the Appalachian region in 1995 and 2000. As reported in Table Two, I estimate two separate logit models. In model #1, I estimate the probability that a man who lived in the Appalachia region in 1995 also lived there in 2000. I use the estimates from this linear probability model to predict the probability that a man remains in Appalachia as a function of his age and education. In Figure One, I graph the predicted probabilities as a function of age and education. Relative to less educated men, college graduates are much more likely to leave and men with professional degrees are even more likely to migrate out of the region.

The Appalachian region is not recruiting new skilled individuals to replace the departed. In a second logit, I estimate the probability of migrating to Appalachia in 2000 for men who lived outside of the region in 1995 (see Table Two). Figure Two presents the predicted probability of entering the Appalachia region for men who lived outside of the region in 1995. The bottom line is that more educated men are less likely to enter the region. These reduced form regressions cannot answer why such men are not moving into the region nor can they answer whether men would move in if Appalachia's cities offered higher wages. As a descriptive exercise, they highlight the challenge that Appalachia faces in deciding how it can cost effectively compete for the skilled. Figures One and Two highlight the brain drain the region faces. The skilled are leaving and skilled outsiders are not moving in.

These migration results are consistent with findings on the returns to skill in Appalachia relative to the rest of the nation. Bollinger, Ziliak and Troske (2009) estimate Mincer style wage regressions while controlling for Roy model self-selection and document the low economic returns to working in Appalachia's cities. "Indeed, the wage gap between rural Appalachia and

the rest of rural America is virtually nonexistent—the wage gap is driven by weakness in the urban areas (Bollinger, Ziliak, and Troske (2009).” Given Albouy’s (2009) results and this documented wage gap, investment in place based programs in Appalachia can only be effective if they raise the region’s cities’ quality of life or if they boost productivity.

### **The Case for Place Based Investment within Appalachia**

Place based investments are costly, irreversible, and risky. Billions of dollars have been spent on place based infrastructure ranging from new rail transit systems, highways, airports to bidding to attract industrial facilities. Such investments are irreversible. From the public’s point of view it also risky. Before the “experiment” of sinking the investment is tried, its impact is a random variable whose expected impact can only be imprecisely predicted based on other city’s experiences.

Given the inherent deadweight loss introduced by taxing one group of citizens to transfer resources to another group, the efficiency criteria demands that such place based investment must either help to reduce pigouvian externalities of congestion and pollution or encourage positive agglomeration externalities that no one firm will internalize (Glaeser and Gottlieb 2008). Based on year 2000 population data, 23.3 million people lived in the 428 counties that comprise the Appalachia Region. This region is too small to use “congestion effects” as a justification for place based programs intended to keep people in Appalachia. If everyone in Appalachia moved to the 280 other metropolitan areas in the United States there would be no detectable increase in negative pigouvian externalities.

A more convincing justification for place based policies is that Appalachia needs to retain and attract the high skilled. Moretti (2004) has documented the broad variety of external benefits of an area having higher educational attainment. A skeptic might wonder whether attracting the skilled is a zero sum game. If place based subsidies encourage people in Houston to migrate to Appalachia, does Appalachia gain at Houston's expense? The answer hinges on the nature of such externalities and the distributions of skill in the respective cities. Imagine if Houston's average educational attainment is much higher than Appalachia's and that Appalachia's place based subsidies attract the left tail of Houston's skill distribution to move to Appalachia. In this case, such migration could *raise* the average educational attainment in both cities and hence offer social benefits to both!<sup>5</sup>

A second rationale for place based investments focuses on migration costs across local labor markets and the scarring effects of unemployment. Suppose that Appalachian households do not want to leave the region because of non-market factors such as social networks, and a specific taste for the amenities their birth region offers. Also assume that there is significant duration dependence with regards to unemployment. Intuitively, if one is unemployed today then this has a causal effect on increasing your subsequent risk of unemployment. In this case, declining local labor demand in Appalachia (perhaps caused by a declining world coal price) could have long run effects on poverty and the next generation's child development. Under these assumptions, a Keynesian style local stimulus policy is more likely to be cost effective.

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<sup>5</sup> Starting with Rauch's (1993) study, urban economists have assumed that the average human capital stock in a city is the right empirical measure for proxying for external human capital effects.

If people who live outside Appalachia do not want to move in and if Appalachians would prefer to stay (all else equal), then investments that stimulate local labor demand are likely to offer increased wages and opportunities for the region's unemployed and out of the labor force. Ironically, outsiders' perceptions of Appalachia may actually help it to benefit from place based investments. Appalachia's boosters have acknowledged that their region faces a fundamental perception issue for outsiders who might be considering moving to the region.<sup>6</sup>

Based on national evidence, urban and regional economists are skeptical concerning whether local efforts to stimulate the economy offer benefits to the locals. The work of Bartik (1991) and Blanchard and Katz (1992) and Bound and Holzer (2000) have convinced many economists that in-migration in response to local labor demand increases is the dominant mechanism for how the labor market responds to local shocks. In this case, the major beneficiaries of local employment growth are not the local unemployed nor are they incumbent residents who are out of the labor force.

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<sup>6</sup> I always chuckle at some of the crazy stereotypes of Appalachian people. Below is a listing of some comments that I have heard characterize Appalachian people. Some of which I have heard personally by "well meaning" outsiders.

- Appalachian people do not have shoes, indoor plumbing or electricity
- Appalachian people cannot read a book and understand what they have read
- Appalachian people live in homes with dirt floors.

I could go on and on with the stereotypes, but you get the point. Those outside the Appalachian culture have a warped view of the Appalachian people. These stereotypes apply to a few at best and are downright lies at worst". (<http://appalachianview.blogspot.com/2007/04/new-appalachian-stereotype.html>)

Research exploiting the natural experiment of sharp swings in coal prices has documented this asymmetry. Appalachians leave the area when the region is in decline but people who live outside Appalachia do not enter the region when it is booming.

“We do find evidence that the coal boom reduced out-migration of prime-aged men and generated return-migration of prime-aged men that had previously left the region. We also find that the boom increased wages, and reduced both the level and rate of poverty in coal areas, suggesting that the existing residents did benefit from the coal boom.” (Black, McKinnish, Sanders 2005)

If this finding generalizes, then Appalachia must focus on a “grow your own” strategy of educating its own young and then encouraging a large fraction of this group to remain in the region through economic opportunity, social networks, family and a taste for living in one’s region of birth.

If Appalachia could convince more of young to remain, would this bid up housing prices? Unlike more liberal cities such as New York City and San Francisco, it is relatively easy to build in Appalachia. Such an elastic housing supply means that increased local labor demand will translate into increased home construction and new job creation rather than simply bidding up the prices of scarce homes. Gyourko, Saiz and Summers (2008) have constructed a local housing regulation index for 2221 places in the United States. I take their measure of regulatory severity that has a mean of zero and a standard deviation of 1. Positive values for this index indicate more regulated areas and I regress this on an Appalachia dummy that equals one if the place is located in one of Appalachia’s 428 counties.

$WRLURI = -.30 - .20 * \text{Appalachia}$  , n = 2221, R2 = .005

Both coefficient estimates are significant at the 1% level. This simple regression has important incidence implications. If Appalachia could identify effective treatments that increase

the demand to live there then this would trigger an increase in population rather than increasing home prices. While housing supply is relatively elastic in this region,

### **The Case Against Place Based Investments**

From the national perspective, are such irreversible investments a “good use” of funds? As emphasized by Gyourko and Tracy (1991) in an open system of cities featuring zero migration costs, if a local government spends a dollar in taxes on services that the public does not desire then rents will fall by a dollar to compensate the marginal household for facing this tax burden. In this case, local land owners bear the incidence of government spending. Conversely, if the federal government funds place based investments such as is the case with subsidies for rail transit systems that can be as large as 80% of total cost, then local areas will gain access to improved local public goods that will be paid for by all tax payers. These examples highlight the importance of keeping straight not just what specific place based investments are being considered but also how they will be financed.

If we as a nation want to help the people in this region, person based subsidies represent an alternative strategy to place based subsidies. Edward Glaeser has eloquently argued against place based subsidies as a tool for propping up declining areas. Whether discussing the future of Buffalo, Detroit or the fate of New Orleans post-Hurricane Katrina, Glaeser has consistently stated his support for helping poor people rather than poor places. Since the poor can migrate, the two are not synonymous.

“For too long, America’s declining cities have tried to find magic bullets that would bring them back to their former glory. Eighteen months ago, I suggested that Buffalo wasn’t about to come back any time soon. I argued that would be far wiser to accept the reality of decline and focus on investing in human capital that can move out, not fixed physical capital. After all, the job of

government is to enrich and empower the lives of its citizens, not to chase the chimera of population growth targets. Just once, I want to hear a Rust Belt mayor say with pride “my city lost 200,000 people during my term, but we’ve given them the education they need to find a better life elsewhere.” Urban decline is a reality in much of older, colder America.”<sup>7</sup>

The Appalachian region has received billions of dollars in past federal transfers. The Harvard Kennedy School’s 1999 Fiscal Year Report; [The Federal Budget and the States](#) (Leonard and Walder 1999) documents that West Virginia was in the top six states between 1991 and 1999 with respect to Federal Spending per-capita exceeding Federal Revenue per-capita. The 1999 differential was \$2,808 in 1999 dollars.<sup>8</sup> Kentucky was ranked 14<sup>th</sup> in terms of “net-surplus” receiving \$1,595 per-capita above what it paid in federal per-capita taxes. In contrast, California was ranked 39<sup>th</sup> in 1999 paying in \$685 per-capita more than it received in federal spending. Has this past investment in Appalachia been spent effectively? Isserman and Rephann (1995) conclude that it has raised the Appalachian region’s population and per-capita income growth.<sup>9</sup> Glaeser and Gottlieb (2008) use a slightly different methodology in matching Appalachian counties to “twin” control counties and they find little evidence that federal investment has helped the Appalachian region to grow. “A more supportable conclusion is that it

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<sup>7</sup> <http://economix.blogs.nytimes.com/2009/06/16/bulldozing-americas-shrinking-cities/>

<sup>8</sup> States that were net-importers of federal dollars in 1999 include Montana, New Mexico, Virginia, North Dakota and Mississippi.

<sup>9</sup> Isserman and Rephann (1995) use a technique that resembles a propensity score to identify a nearby “twin” county for every county in Appalachia. By studying economic outcome dynamics for these “twin” counties relative to the outcomes for the Appalachian counties, the authors claim to be able to test for the role of the \$13 billion that was invested by the Appalachia Regional Commission since 1965. Isserman and Rephann (1995) conclude that the Appalachia counties did grow faster than their “twins” based on both population and per-capita income growth.

is unlikely that the effects of a \$13 billion program spread over a giant swath of America over three decades can be accurately evaluated. Far too many things were affecting regional growth at the same time for a relatively modest government program to have had clear positive effects.” (Glaeser and Gottlieb 2008).

### **What Place Based Urban Investments Might be Effective in Appalachia?**

At any point in time, cities are building highways, rail transit systems, airports, constructing sports stadiums, bidding for million dollar plants, creating enterprise zones, initiating new anti-crime measures, cleaning up Superfund sites and engaging in more general “city greening” activities. Per dollar spent, which of these activities enhances local productivity and create public goods that people actually value?

The fundamental challenge is that there are two sets of parameters to estimate here. To judge the value of investing in any of these activities such as fighting crime, we need to know how much crime will decline by if we invest one more dollar and we need to know how much heterogeneous households value a small reduction in this specific non-market local public bad.

Careful econometric analyses have sought to evaluate the causal effects of various treatments tried in different cities around the United States. For example, the causal effect of highways on urban population growth has been estimated by Baum-Snow (2007). But, if a specific “treatment” works in Houston can we be confident that it can be exported to Appalachia? There is a fundamental selection issue here. Taking the public finance rule as

given, cities will only pursue projects whose expected PDV is positive.<sup>10</sup> The average gains for a random city in Appalachia from taking this treatment is likely to be less than the average gain observed for the self select sample of cities who choose to take this treatment.

Recent empirical research has focused on credible research designs that provide new insights about the average treatment effects of various place based programs. To organize this discussion, I divide these into investments into treatments intended to improve urban quality of life and those that raise urban productivity. In my discussion below, I take as given that we seek to enhance Appalachia's productivity and quality of life. But, tax payers in other regions will ask why their tax dollars are being used to bolster a competitor region.

### **Productivity Investments**

Recent empirical research has documented the productivity effects associated with investing in luring "million dollar plants" (see Greenstone and Moretti 2006, Greenstone, Hornbeck and Moretti 2008). Relative to comparable counties who just missed attracting such new manufacturing facilities, these "treated" counties enjoy improved public finances and spillover gains for other manufacturing industries. Greenstone and Moretti identify 82 Million Dollar Plants that opened between 1982 and 1993. Twelve of these plants opened in one of

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<sup>10</sup> To simplify the exposition, consider a two period model. At time  $t$ , a city  $j$  must invest  $\$C$  and at time  $t+1$  it expects to receive  $\$B_j$  in benefits. The interest rate is  $r$  and there is no uncertainty. The federal government is willing to pay  $\alpha$  percent of the cost. Given the notation, the city's participation rule is; do the project if  $B_j/(1+r) - (1-\alpha)*C > 0$ . The city's choice of whether to take the treatment hinges on its expected benefits from participation. If cities differ with respect to the program's treatment effect and the cities are aware of their benefits from participating, then we only observe the project take place and the subsequent gain if  $B_j > (1-\alpha)*C/(1+r)$ .

Appalachia's counties.<sup>11</sup> Nine of these twelve plant openings took place in anti-union (Right to Work states). But, seven of the thirteen states that comprise Appalachia are pro-union states. These facts are consistent with Holmes' (1999) finding based on a regression discontinuity framework where he documented the "coincidence" that manufacturing clusters on the Right to Work side of the border. Given that most of Appalachia's Northern states are pro-union, attempts to lure new industrial plants to such areas are unlikely to be an effective development strategy.

Another research literature has documented the productivity spillover effects of investments in research universities. Quigley and co-authors (2008) use a natural experiment provided by the Swedish government's decision to decentralize post-secondary education throughout the country. This policy created a series of new universities in geographical areas that did not previously have universities. Using a double-difference framework, Quigley et. al. (2009) document that the introduction of universities raised local productivity levels and local patent counts.

Investing in local universities offers several possible complementary benefits. By improving the quality of research universities, this will attract and retain high skilled faculty and students. A base of skilled faculty will attract private consulting firms to locate nearby. Such firms will hire the students and the faculty for consulting work. This job growth will encourage

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<sup>11</sup> Future research might investigate whether these twelve "treated counties" have outperformed comparable Appalachian counties over the same time period. Greenstone and Moretti's (2006) control group are counties who just lost out on attracting these new plants. Many of these "loser counties" are located outside of Appalachia. The twelve winning counties include; Clark KY, Chambers AL, Allegany NY, Bartow GA, Gwinnett GA, Washington TN, Sullivan TN, Spartanburg SC, Jefferson AL, Berkeley WV, Cherokee GA, and Tuscaloosa AL.

more students to remain in the area upon graduation and will attract other startup firms. Small cities such as Ann Arbor, Michigan have successfully pursued this growth strategy. The net effect is a highly skilled, “green city”. This strategy is likely to increase within Appalachia inequality.

A possible complementary investment strategy would simultaneously invest in new highway infrastructure near these university cities. Research empirical work has convincingly demonstrated the growth consequences of new roads (Baum-Snow 2007, Duranton and Turner (2007), Chandra and Thompson 2000). Such investments are distinct from urban rail transit systems. Since 1970, at least sixteen major cities ranging from Buffalo to Los Angeles have invested billions of dollars in rail transit systems intended to help people commute downtown. But, Baum-Snow and Kahn (2005) document that if people do not work downtown such investments have not proven to be cost effective. In a series of Economix blog entries, on the costs and benefits of high speed rail, Edward Glaeser reaches the conclusion that such investments are unlikely to be cost effective.<sup>12</sup>

### **Quality of Life Investments**

Appalachia’s cities could capitalize on the ongoing industrial transition away from mining and focus on the significant public health and aesthetic gains from “green cities”.<sup>13</sup> Pittsburgh’s transition from steel to services and high tech offers a salient case study. In 1951,

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<sup>12</sup> <http://economix.blogs.nytimes.com/2009/07/28/is-high-speed-rail-a-good-public-investment/>

<sup>13</sup> For a recent expose on the hidden environmental costs from water pollution associated with industrial activity see [http://www.nytimes.com/2009/09/13/us/13water.html?\\_r=1&ref=us](http://www.nytimes.com/2009/09/13/us/13water.html?_r=1&ref=us).

47% , of Pittsburgh's workforce was employed in manufacturing. By the year 2000, only 7.8% of this city's workforce worked in manufacturing. Between 1969 and 2000, Pittsburgh's count of manufacturing jobs declined from 188,000 to 68,000 while service jobs grew from 169,000 to 356,000. Feyrer et. al. (2007) provide a detailed examination of the Rust Belt's industrial decline. This industrial transition has imposed costs. Research has documented that displaced workers can earn \$10 less per hour in the service economy relative to in relatively high paying manufacturing jobs (Neal 1995). Service based cities are much cleaner and greener than manufacturing cities (Kahn 1999, 2006). Urban air and water pollution problems recede when highly polluting industries such as steel and chemicals contract. Chay and Greenstone (2005) and Currie and Neidell (2005) document the large infant mortality reduction gains associated with reducing urban air pollution.

Developing a reputation for affordable, high quality of life would spur on Appalachia's small cities to attract "bargain hunters". Appalachia's cheap land and scenic vistas may offer the opportunity to seize a share of the growing market for retirement communities. This market will grow as the Baby Boomer cohort reaches retirement age. Berger, Blomquist and Hoehn (1996) document that seniors, who are retired, migrate to areas where their amenities are capitalized into wages. Several parts of Appalachia offer plentiful cheap land that is currently not being used for highly productive purposes. New service jobs could be created offering value added to these senior citizen consumers.

### **Credible Climate Change Mitigation Legislation and the Price of Coal**

Appalachia is known for its concentration of manufacturing and mining activity. Appalachia has 7.4% of the nation's employment in 2000 and 12.2% of the nation's mining jobs

with 81,400 mining jobs in Appalachia. In the year 2000, 16% of Appalachia was employed in manufacturing as opposed to 11% for the nation.

Today, the U.S Congress continues to debate enacting the American Clean Energy and Security Act. The House passed this anti-carbon legislation in June 2009. While carbon emissions regulation is not an explicit place based policy, this regulation will have specific geographical effects (Cragg and Kahn 2009). The demand for hiring coal miners declines as the price of coal declines. Carbon regulation (such as a new cap and trade carbon market) will decrease coal use as a source of power for electric utilities. According to the EIA, emissions per ton of coal range from 1.4 tons of carbon dioxide to 2.84 tons ([en.wikipedia.org/wiki/Carbon\\_tax](http://en.wikipedia.org/wiki/Carbon_tax)). Assume that each ton of coal creates two tons of carbon dioxide and that the equilibrium price of \$40 per ton. Under these assumptions if coal is inelastically supplied, then the full incidence of the carbon tax will be borne by coal suppliers and the price of coal will decline by \$80 per ton. As of October 31<sup>st</sup> 2008, the price per short ton was \$111.50. While this thought experiment's assumptions are extreme, it highlights the huge impact that carbon pricing could have on Appalachia's mining sector. In the short run, this will cause dislocation as the mining sector will contract. In the medium term, there will be environmental benefits.

Counties in Appalachia with heavy mining presence have worse ambient air pollution. Table Three reports three air pollution regressions at the county/year level. Controlling for year fixed effects and a county's population, I test for whether Appalachian counties and Appalachian counties with heavy mining presence (defined as counties where more than 15% of the workers are employed in mining) have worse ambient air pollution levels relative to counties of the size

population size outside of Appalachia.<sup>14</sup> Controlling for county population size, air pollution is worse in Appalachia and even worse in these heavy mining areas.

## **Conclusion**

In an open system of cities, skilled footloose workers seek out high paying jobs in high quality of life cities. Firms seek out locations that are “business friendly” featuring low input costs and in areas of the country where their prospective workforce wants to live. Appalachia’s cities face an uphill fight as they compete for talent and try to lure firms on the national market. Appalachia’s cities are relatively small, located far from the high amenity coasts and endowed with relatively few major universities. Appalachian states located in pro-union states will have a difficult time attracting new manufacturing plants. While Appalachia covers many areas of spectacular beauty, the legacy of mining has created a perception and a reality of significant environmental degradation. The region, especially in areas such as Eastern Kentucky and West Virginia, suffers from extremely high rates of poverty.

While during the coal boom, parts of this region has prospered and low skilled workers received high wages, it is risky for the region to continue to rely on such natural resource price cycles. The spectre of a credible cap on national carbon emissions suggests that coal regions will bear a large part of the incidence of climate change mitigation efforts.

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<sup>14</sup> The fips codes for these counties are: 21119 , 21131 , 21159 , 42059 , 51027 , 54005, 54013 , 54015 , 54059 , 54087.

Facing these realities, what is a promising growth strategy for the Appalachian region? Urban economists agree that cities that can attract and retain the skilled will have a bright future. Appalachia's universities must train and retain more graduates because "outsiders" especially those with college degrees are unlikely to migrate into the region. This paper has advocated a place based set of investments focused on bolstering Appalachia's university cities and in enhancing the region's quality of life. In addition to investing in the region's university cities, Appalachia should also seek to carve out a market niche in developing small "consumer cities" that cater to tourism and building up retirement communities.

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Table One: Quality of Life and Human Capital in Appalachia's Cities: Evidence from 2000

City	State	out of 238	Albouy	Fips	County	% College	Household	Average Temperature	
		Albouy	QOL					Population	Income
Pittsburgh	PA	87	188	42003	1286857	0.29	54747.61	27.85	72.62
Birmingham	AL	65	173	1073	685860	0.24	51849.98	42.44	80.32
Lawrenceville	GA			13135	613526	0.34	72579.16	40.65	78.00
Greenville	SC	98	135	45045	396050	0.26	55880.31	39.65	77.28
Knoxville	TN	171	91	47093	389285	0.29	53063.55	36.54	76.66
Greensburg	PA			42129	371652	0.20	48504.64	26.78	71.03
Wilkes-Barre	PA	168	160	42079	320655	0.16	44283.75	25.52	71.47
Winston-Salem	NC	88	127	37067	315714	0.28	56044.09	37.49	76.90
Chattanooga	TN	144	140	47065	313741	0.24	53406.50	38.54	78.81
Erie	PA	167	183	42049	282078	0.21	46484.30	24.55	69.84
Huntsville	AL	94	215	1089	279559	0.34	58135.64	39.04	78.83
Youngstown	OH	136	213	39099	258321	0.17	46440.12	25.47	70.98
Spartanburg	SC	98	135	45083	253795	0.18	47706.75	39.84	77.51
Warren	OH	136	213	39155	226467	0.14	48092.43	24.86	70.61
Scranton	PA	168	160	42069	214234	0.20	46368.24	25.03	71.11
Asheville	NC	193	23	37021	213272	0.25	48057.68	36.68	74.37
Washington	PA			42125	204206	0.19	50276.88	27.27	71.68
Binghamton	NY	77	203	36007	201606	0.23	47791.12	22.02	69.07
Charleston	WV			54039	199878	0.21	47392.71	32.51	74.70
Aliquippa	PA			42007	181476	0.16	45862.00	27.46	72.22
Milford	OH			39025	177234	0.21	60336.09	28.75	75.17
Butler	PA			42019	174849	0.24	54419.41	25.47	70.37
Anderson	SC	98	135	45007	169708	0.16	46269.62	41.52	79.29
Tuscaloosa	AL	146	111	1125	166141	0.24	47264.58	43.13	81.04
Kingsport	TN			47163	158670	0.18	45822.73	35.30	75.17
Morgantown	WV			54061	81573	0.35	40500.25	29.88	72.58
Richmond	KY			21151	71768	0.22	42141.19	32.50	75.83
Boone	NC			37189	44217	0.37	42304.48	32.96	70.32
national mean						0.17	44976.50	31.82	75.82
national sd						0.08	10545.56	11.60	5.04

Table Two: Logit Migration Models

	Remain in Appalachia		Enter Appalachia	
	beta	s.e	beta	s.e
Age	0.094	0.004	0.061	0.001
Age Squared	-0.001	0.000	0.000	0.000
College Graduate	-6.260	0.116	0.171	0.053
College Graduate*Age	0.257	0.007	-0.032	0.003
College Graduate* Age Squared	-0.003	0.000	0.000	0.000
Graduate Degree	1.340	0.185	1.914	0.096
Graduate Degree*Age	-0.111	0.010	-0.099	0.005
Graduate Degree*Age Squared	0.002	0.000	0.001	0.000
Constant	-0.085	0.063	-4.451	0.021
Observations	1877414		48823807	
Pseudo R2	0.068		0.010	

Figure One: Predicted Migration Probabilities

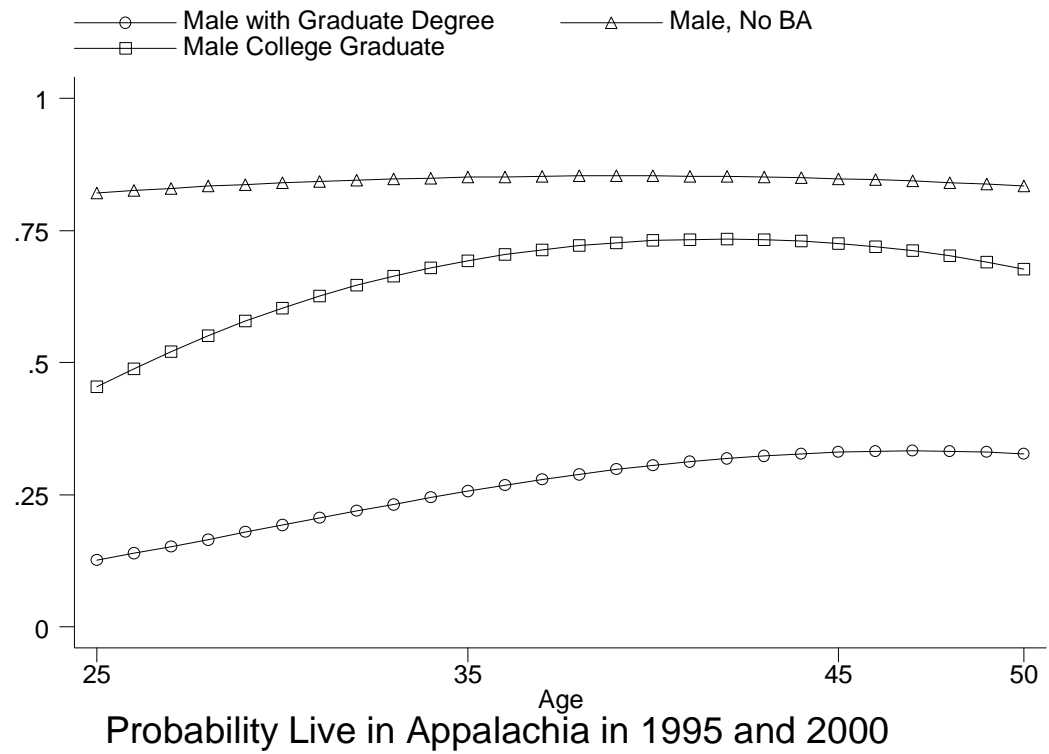


Figure Two: Predicted Migration Probabilities

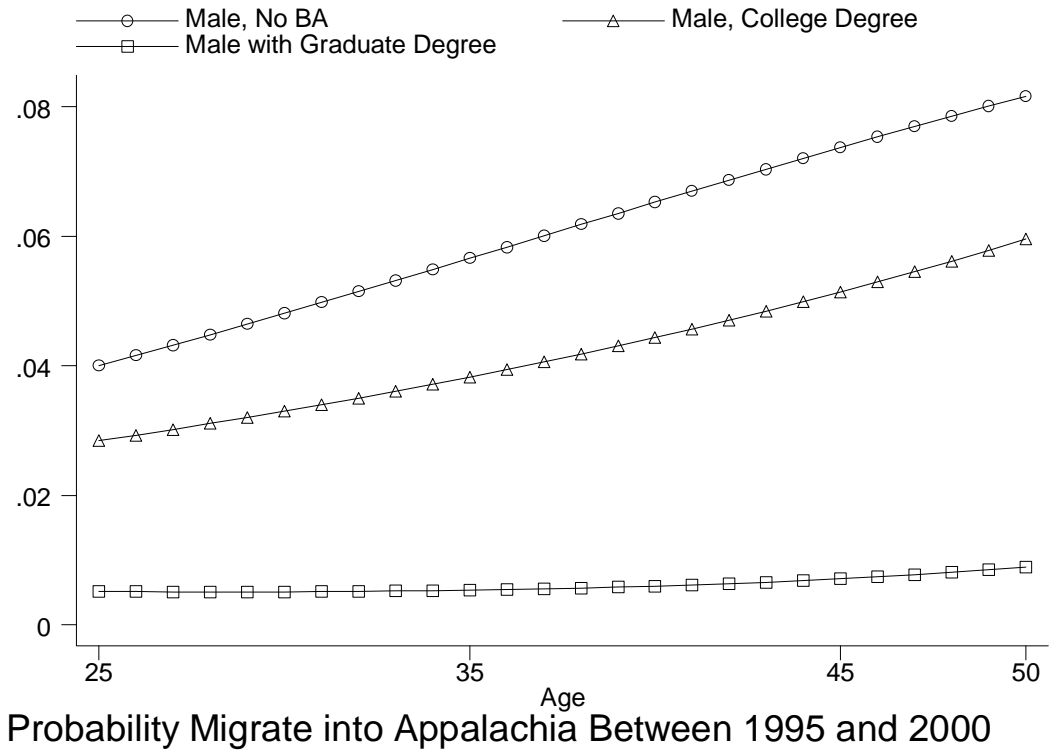


Table Three: Ambient Pollution Regressions Using Data From 1972 to 2000

	Log(TSP)		Log(PM10)		log(SO2)	
	beta	s.e	beta	s.e	beta	s.e
log(County Population)	0.075	0.001	0.070	0.001	0.114	0.003
Appalachia Dummy	0.073	0.004	0.105	0.007	0.444	0.014
Appalachia Mining County Dummy	0.369	0.155	0.182	0.109	0.152	0.300
Constant	3.094	0.012	2.389	0.017	-6.589	0.037
Year Fixed effects	Yes		Yes		Yes	
Observations	71586		28840		35036	
R2	0.176		0.181		0.084	