VIRTUES UNFULFILLED: THE EFFECTS OF LAND VALUE TAXATION IN THREE PENNSYLVANIAN CITIES

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To Mom, Dad, family, and friends for their support and encouragement

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LIST OF ABBREVIATIONS

ACS American Community Survey

BLS U.S. Department of Labor, Bureau of Labor Statistics

MSA Metropolitan Statistical Area

NY New York

PA Pennsylvania

US United States

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In most municipalities across the country, property tax is a prominent direct source of public finance. Generally speaking, it combines a few attributes of property; land, improvements to land and, in some cases personal property.

Detractors of the traditional property tax scheme argue that it can encourage land speculation, induce vacant lots in urban cores, and can discourage property owners from improving their properties. A reform to such an entrenched institution is land value taxation, where land is taxed at a higher rate than improvements. Land speculation is thus discouraged as property owners face a tax regardless of how they improve their property. Landowners are encouraged to seek to create the most utility out of their property or sell the property to someone who will because their taxes do not increase based on improvements.

By ascertaining the viability of such a tax structure, economic development planners and politicians will be better able to decide if implementation of land value taxation policy is a worthwhile endeavor.

In this research, before-and-after analysis was conducted utilizing 1990 and 2000 U.S. Decennial Census data as well as 2005-2009 American Community Survey (ACS) to determine how the theoretical effects of the land value taxation on income and housing characteristics manifest themselves in three Pennsylvanian cities. These cities are Altoona, Pennsylvania, a city that adopted a land value taxation policy in 2002; Pittsburgh, Pennsylvania, a city that adopted land value taxation in 1913 but rescinded it in 2001; and Wilkes-Barre, Pennsylvania, a city that has never adopted land value taxation.

Theoretical expectations of the effects of land value taxation were directly compared to the observations in each study area. It was expected that the results of the study would show that the theoretical effects of the policy were reflected in observed data from the case study areas.

However, a categorical examination of the ten variables revealed that the theoretical expectations matched observations in only one instance. Therefore, it cannot be determined that in this examination the theoretical effects of land value taxation manifested themselves in U.S. Census and ACS data. As a result, the virtues extolled about the policy were left unfulfilled.

CHAPTER 1
INTRODUCTION

Problem Statement

While people across the United States may have differing opinions on politics, the best football teams, or the best picture at the Oscars, one thing just about everyone can agree on is their dislike of taxes. No matter the manner in which taxes support government services, they seem to be universally panned. Nonetheless, while jeered by many a taxpayer, property taxes are unique. According to Nobel Laureate Economist William Vickrey, "The property tax combines one of the best and one of the worst taxes we have. The portion of the tax that falls on sites or land values is the only major tax that is reasonably free of distortionary effects and is not intolerably regressive. The taxes on improvements and personal property are more difficult to assess properly. They impose excess burdens through undue discouragement of such investment" (Vickrey, 1999 [as cited in Dye & England, 2009]). Land value taxation captures the virtuous side of the dichotomous nature of property tax. Its ability to place the entire burden of the tax squarely on the landowner and its lack of distortionary effects on economic choices are two characteristics of the policy that lead to its appeal (Oates & Schwab, 2009).

Today, property taxes are an ever-present issue as the United States pursues economic recovery in the wake of recession. For example, in June 2011, the State of New York, for example, passed legislation in support of a cap on property tax, traditional property tax in this particular instance, as a way to remove a government-imposed impediment to economic development and consumer spending. As an alternative, land

value taxation may provide the desired economic stimulus without some of the negative side effects caused by traditional property taxation.

In order to assess the virtues of land value taxation as an alternative to traditional property tax, they must be compared with real world observations to consider the policy's actual impact. This thesis will consider how theoretical effects of land value taxation on selected income and housing characteristics manifest themselves in U.S. Census and American Community Survey figures.

Definition of Land Value Taxation

In the majority of municipalities nationwide, property tax is a prominent direct source of public finance (England, 2007). Generally speaking, it combines a few attributes of property: land, improvements to land, and - in some cases - personal property. A tax appraiser determines the value of the real property to be taxed by the municipality. The appraiser does this by using a variety of market and cost-based valuation methods, analyzing all three attributes.

Despite its prominence, traditional property tax is not without its problems. In some cases this property tax scheme can encourage land speculation and, in turn, allow for the persistence vacant lots in urban cores. It also can discourage property owners from improving their properties as it will increase the tax levied upon them. As a result, property owners are not always encouraged to generate the most utility out of their land and production moves to where the tax scheme allows for the least costs, ceteris paribus. This traditional form of property taxation has been in place in much of the county for over a century and, in many cases, has become part of legislative inertia.

A reform to such an entrenched institution is land value taxation, where land value, if not the only element of real property taxed, is taxed more than improvement value

(Dye & England, 2009). Within such a tax system, land speculation is theoretically discouraged as property owners face a sizable tax regardless of how they improve their property. Therefore, landowners are encouraged to develop their parcels in a way that generates the most utility because their taxes are fixed to land value and do not increase based on improvements they make to the property. The land value tax is also theoretically a more economically efficient tax scheme than property tax because demand for the taxable item is not reduced. For example, demand for construction services and materials are reduced when those improvements to land are taxed in a traditional property tax system. As a result, a switch from a traditional property tax to a land value tax should, theoretically, lead to reduced urban blight, increased wealth generation, and increased economic efficiency.

Case Study Logic

While, techniques for property tax reform and redistribution have been implemented in Pennsylvania (PA), nationwide utilization of this redevelopment strategy has yet to come to fruition (Bourassa, 2009). As a result, this thesis will examine a trio of case study cities in the Keystone State: Altoona, Wilkes-Barre, and Pittsburgh.

The City of Altoona is located in central Pennsylvania with a population of 46,320 (2010 U.S. Census). A former railroad hub between Philadelphia and Pittsburgh, Altoona has experienced overall economic and population decline since peaks in the mid-20th century. Recently, resurgence in employment has taken place over the last 20 years. The city adopted a land value taxation policy in 2002.

The City of Wilkes-Barre is located in northeastern Pennsylvania with a population of 41,498 (2010 U.S. Census). Another “rust belt,” industrially-driven city, Wilkes-Barre is of similar size and economic base to Altoona with the notable exception of its

proximity to Scranton, a 75,000-resident city. Wilkes-Barre has never implemented land value taxation.

The City of Pittsburgh is located in western Pennsylvania with a population of 305,704 (2010 U.S. Census). A former powerhouse in the steel industry until the latter 20th century, Pittsburgh shares the industrial heritages of Altoona and Wilkes-Barre albeit at a much larger scale. The "Steel City" adopted a land value taxation policy in 1913 but reverted to a traditional property tax in 2001.

Examining these three case studies, in particular, will enable capture of externalities associated with state and federal property tax regulation as well as mitigating demographic differences. As already mentioned, before-and-after case study analysis of changes in income, housing development, and economic trends will be conducted using 1990, 2000, and 2009 data. Concurrently, this data will be scrutinized while keeping in mind land value taxation adoption and removal dates in the selected case study municipalities. As a result, this analysis will provide insights into the immediate effects of the tax policy over the past decade.

Summary

Chapter 2 reviews relevant literature, including background information on land value taxation, along with the development impacts of property tax policy in general. Chapter 3 describes the methodology used to answer the research questions and discusses the limitations of this approach. Chapter 4 presents the analysis of how land value taxation, or the lack thereof, affected selected income and housing characteristics in the three aforementioned case study municipalities. To do this, the expected theoretical effects of the implementation of land value taxation will be categorically compared with actual observed results. Finally, Chapter 5 offers guidance and

suggestions to planners and planning scholars for future research in understanding the influences of land value taxation in municipalities in Pennsylvania and potentially across the United States.

CHAPTER 2
LITERATURE REVIEW

Land Value Taxation: An Alternative to the Traditional Property Tax

In this chapter, relevant literature pertaining to the effects of land value taxation on housing and income characteristics will be discussed. It is important to understand the arguments and theoretical debate surrounding land value taxation because it is difficult to conduct experimental scientific research on the subject within a laboratory as Arlo Woolery wrote in Pollakowski's 1982 paper (Anderson, 2009). Additionally to this point, opportunities for new study of real-world instances of land value taxation adoption are limited, especially in the United States (U. S.) where the practice is essentially confined to municipalities in Pennsylvania and formerly in Hawaii (Bourassa, 2009). Regrettably for research purposes, Pittsburgh, the sole major metropolitan area under a land value tax regime rescinded the system in 2001. Anderson (2009) concludes that this left a void in turns of opportunities to study large markets currently under land value taxation but on the bright side also opened the ability to conduct before and after analysis on the Steel City, an opportunity which this paper will later delve into.

In examining this literature, a general description of land value taxation will be covered along with debates shedding light upon the tax policy's effects on markets, the incidence of the tax, the timing of development and ultimately on housing and income characteristics. It will also describe previous studies on the impact of land value taxation on housing and income characteristics and the relevance to planning of such studies including this paper.

Land Taxation

In order to better grasp land value taxation, it is helpful to be able to compare it with traditional property tax as a baseline. Traditionally, property tax is a form of municipal income generation in which millage rates are attached to raw land value and improvements value. These two rates are traditionally set as equal. Sum of the raw land value and the value of improvements to the property multiplied by the millage rate results in the property tax paid by a landowner (Dye & England, 2009). Simply put, the difference between traditional property tax and land value tax is that the latter places a majority, if not all, of the millage rate on the value of land. That said, the following section will cover economic theory pertaining to land taxation in general will be discussed followed by a synopsis of land value taxation economic theory and discussion of land value taxation implementation in the United States (U. S.) and abroad.

The Uniqueness of Taxing Land: An Economic Perspective

A change from a traditional property tax where land and improvements are taxed at an equal rate to a split rate tax produces some interesting effects. Oates and Schwab eloquently outline these effects in *Land Value Taxation: Theory, Evidence and Practice* (2009). This section will draw considerably upon their article, "The Simple Analytics of Land Value Taxation."

Before examining the 2009 Oates & Schwab section, where tax incidence, neutrality, speculation, and land development patterns will be discussed, the idea of "land intensity" will be briefly touched upon.

Land Intensity

Central to analysis of land value taxation is the idea of land intensity. Land intensity is calculated as the ratio of land value to total property value (Plummer, 2009).

For instance, using what is known as the residual land value method for example, if a parcel is valued at $100,000 and improvements to the parcel amount to $60,000, the parcel's land value would be $40,000, the total property value subtracted by the improvement value. In the case of this parcel, its land intensity would be a ratio of 40,000/100,000, or .4.

When land value taxation policies are implemented, or any change in how land value or improvements are taxed, land intensity plays a pivotal role in determining the policy's effect on the tax bill. If traditional property tax is replaced with land value taxation, a heavier tax on land value versus improvements, owners with an above average land intensity will experience a tax increase. Conversely, owners with below average land intensity will experience a tax decrease as the brunt of the tax rate falls on land value while they hold most of their value in improvements. Also of note is that land intensity is the ratio land value, not land size, to total property value. While land size may often be correlated with land value, large parcel size does not always translate to high land value as land value is impacted by many factors aside from area such as location, use or physical features (Plummer, 2009).

Keeping the notion of land intensity will be helpful in grasping several of the other tangible effects of land value taxation. Broadly categorized, these impacts fall under tax incidence, neutrality, speculation and land development patterns.

Incidence

The question that we will consider will be that of "who pays the tax?" While it may seem straight-forward, the question belies its complexity as the burden of a tax may not fall upon whom it is levied. For instance, an excise tax on any specified commodity may not be borne entirely by the producer, onto whom the tax is levied. Oftentimes, the tax

may be passed on from producers to consumers in the form of higher prices (Oates & Schwab, 2009).

A tax on land acts differently than a tax on standard commodities. Most commodities have an upward sloping supply curve whereas the supply of total land is fixed in quantity and therefore has a vertical supply curve. The same reasoning does not hold true pertaining to “urbanized” or “developable” land as such categories of land do not have a fixed supply.

Figure 2-1 shows the tax effects on an upward sloping supply. In this instance, if a tax equal to the distance between A and C is levied on purchases of a good, the demand curve will shift down by the amount AB to Demand 2. The new equilibrium at point B shows that lower quantity supplied resulted from lower demand resulting from the higher price induced by the tax. As a result, the burden of the tax is shared by the consumer, who sees prices rise to P3 for the good which includes the tax, and by the producer, who sees net price received fall to P2 (Oates & Schwab, 2009).

A tax on total land, however, behaves like Figure 2-2 with a fixed supply. While you can theoretical “create” land as they have in the Netherlands, New Orleans, and in Boston’s Back Bay, these are unique cases and the supply of land is generally fixed and perfectly inelastic. As the graph shows, a tax on land is not passed on to the consumer and is borne entirely by the landowner (Oates & Schwab, 2009).

Neutrality

In the larger scheme, researchers and policy makers share an underlying concern when considering tax policies. According to Oates & Schwab (2009), they wonder "will the particular tax raise sufficient revenue without distorting economic activities by producing negative side effects?" That is to say if economists ground their faith in the free market system, how will the tax policy generate revenue to cover gaps left by the free market, without interfering with the free market in a significant way?

For example, as was mentioned earlier, an excise tax drives up the cost of production to a producer. The producer then passes this cost to consumers to help share this burden and maintain a higher profit margin. This increased price leads to lower consumption of the commodity, leading to less wealth generation for society as a whole (Oates & Schwab, 2009).

The loss in societal economic welfare resulting from a tax is known as "deadweight loss." As seen in the example from the previous paragraph, deadweight loss has occurred because the tax has induced a higher price, lowering consumption below an economically efficient level.

As was shown in the discussion on tax incidence, land value taxation is also unique in regards to tax neutrality. In Figures 2-1, a tax on a commodity in which supply is not fixed results in a price to consumers of P3 yet yields a return to producers of just P2. The tax has lowered the quantity produced from Q1 to Q2 creating a deadweight loss to the economic system and meaning this tax is non-neutral.

The impact of a tax on land value is again shown in Figure 2-2. Because supply of land is virtually fixed, the quantity produced does not shift and the burden of the tax cannot be shifted to consumers. Thus the land market is not distorted by an increase in

consumer prices and a reduction in supply. Therefore, land taxation in its purest form is a “neutral tax” that generates revenue in an economically efficient way by not inducing deadweight loss (Oates & Schwab, 2009).

Speculation

One of the central tenants for support of land value taxation is its ability to curb land speculation, thus encouraging infill development rather than vacant lots in downtowns or other developing areas. In 2004, the Congress for New Urbanism president and CEO and mayor of Milwaukee from 1988-2003, John Norquist, raved about this function in Pittsburgh. “It's been great for Pittsburgh. You almost can't find an empty lot in downtown Pittsburgh” (Huhne, 2004). On the other hand, it has already been stated that land taxation is a neutral tax and does not distort economic choices. What can explain these contradictory points?

Theoretically, land value taxation’s neutrality regarding land speculation holds true. Assuming that the “highest and best use,” not actual use, of land is being taxed a conversion to land value taxation policy will not hasten development (Tideman, 1982). Cost-benefit analysis shows that both traditional property tax and land value tax subtract the same from the present value of both the choice to develop now and the choice to postpone development.

However, one caveat arises in this issue. If the landowner does not have the funds to pay the tax currently, the neutrality of the tax with regards to timing of development comes into question. Liquidity problems may force landowners to either sell the land or develop a revenue stream from it sooner than otherwise in order to pay the land value tax (Oates & Schwab, 2009). This effect was explored by Bourassa (1990) as will be discussed later.

Land Development Pattern Implications

With concern always growing over the human footprint on our natural environment, concern about urban sprawl is always in the rise as well. Its significance is also part of the debate over the virtues of land value taxation. Would an additional tax on land value cause rural land owners on the urban fringe to develop their properties?

In considering the relationship between land value taxation and sprawl, Oates & Schwab (2009) maintain that, theoretically, it does not. Returning to the discussion on tax neutrality, assuming the tax is placed according to highest and best use and assuming the liquidity is not an issue for the landowner, land value taxation is neutral with regards to timing of development. It is also important to note that "highest and best use" is defined in relation to demand, not in relation to current use limitations. In this way, land value taxation does not induce sprawl.

From a different angle, Brueckner and Kim (2003) studied the effects on urban expansion of the traditional property tax, where tax rates on improvement value and land value are equal. They noted two effects that run in opposite directions. First, a higher tax rate on improvements discourages the production of improvements and lowers density. Lower densities mean that more land is required for the housing of the fixed population, meaning that the traditional property tax increases sprawl. Second, a higher tax rate on improvements raises the price of improvements, such as housing. If less housing is consumed as a result of the higher total price of improvements, then less land area is required for housing consumption, assuming a fixed population. This would mean that the traditional property tax reduces sprawl. Ultimately, because these two effects are the most direct in terms of changing the size of the urban area and push in opposite directions, a myriad of other factors determine which effect is the stronger in

a particular area. The breadth of these factors is too cumbersome to be delved into here.

Extending the Brueckner and Kim analysis, land value taxation is an extreme version of traditional property tax. By placing increased tax rate burden on land value and reducing it on improvement value, land value taxation result in the maximum force on the consumption of land effect, significantly reducing it, and the minimum force on the price of improvements effect, by significantly reducing it as well. As a result, the two counter-acting forces described by Brueckner and Kim (2003) would be dominated by a force reducing the urban land area. Theoretically, land value taxation should reduce sprawl.

E. Mills (1998) offers a counter-perspective to the Brueckner & Kim study along the lines of curbing sprawl and encouraging infill development. Examining business improvement, Mills produces a two-fold answer concerning land value taxation. He holds that replacing the property tax with a land tax would increase structure-to-land ratios. Additionally, the land tax would increase employment-to-land ratios. This means that the density of buildings and jobs would increase if the traditional property tax is replaced by a land value tax. However, that increase in employment and business activity per unit area will subsequently cause cities to enlarge and sprawl as more workers move to the city faster than building height increases. According to Mills, land value taxation will cause densification of cities in the short term and the enlargement of cities in the long term.

State University of New York at Albany Professor Thomas L. Daniels shares Mills opinion on sprawl but offers a different take in that cities today have changed since

George's era. "The suburbs have better access to amenities, transportation, and public investment in schools and sewer and water. Access is value. Land value taxation alone will not limit the spread of suburbs, because public investment in roads, schools, and sewer and water is causing the un-earned increments on nearby land to rise. Land value taxation applies to those rising land values, thus creating an incentive for the land to be developed" (Daniels, 2001). This conclusion is also reached by Turnbull (1988.) Daniels therefore suggests that land value taxation must be combined with urban growth boundaries or transfer of development rights to achieve in-fill development.

In sum, the conclusions of these studies differ because of the frameworks used in each. Brueckner and Kim (2003) studied the housing market as their framework for understanding the impact of land value taxation on sprawl and concluded that it reduces urban land area. E. Mills (1998) used business improvements as the backdrop for his study and found that land value taxation increases density in the short term but increases urban area in the long term. Daniels (2001) and Turnbull (1988) reached a similar conclusion to Mills (1998) but did so under different frameworks as well.

Consequences to Landowners

While the previous sections covering land intensity, tax incidence, neutrality, speculation, and land development patterns focused on large-scale economic concerns, this section will cover both the big picture and impacts on landowners, those who are directly impacted by a change in property tax policy and those would likely be voting for or against such a change in tax regime.

Brueckner's 1986 study is the key contributor to this discussion in land value taxation literature (Oates & Schwab, 2009). Testing whether a revenue-neutral tax shift,

in which the tax rate on land was increased, required a reduction in the rate on improvements, Brueckner uncovered some significant findings.

Intuitively, one would think that the tax rate on improvements must be reduced in order to keep total tax revenue unchanged. Brueckner concluded that this it is not necessarily so. He reasoned that in a scenario in which the tax rate on land value was increased, developers would substitute improvements for land. The potential and likelihood exists that developers may build so many additional buildings that total taxes collected on improvements may even rise despite a lowered tax rate. As a result, a revenue-neutral shift from a traditional property tax to land value taxation does not necessarily require a reduction in the tax rate on improvements.

In this reasoning, he found that the sensitivity of the supply of improvements to changes in its tax rate to be a key factor in determining whether a reduction in the tax rate on improvements would be necessary to maintain revenue neutrality. Finally, Brueckner examined this elasticity and concluded that the city would likely be required to lower the tax rate on improvements despite his hypothesis (Brueckner, 1986).

Brueckner would also address the impact of a switch to a split-rate property tax system on individual landowners. Despite experiencing a higher tax rate on land, landowners may find reason to favor land value taxation in the form of increased land rents. Land rents are residual profits left over after labor and capital have been attributed their appropriate shares of profit (Oates & Schwab, 2009). He reasoned that, as previously discussed, the shift from traditional property tax to land value taxation will theoretically result in a reduction in deadweight loss. In turn, this reduction in deadweight loss should yield a more efficient economic system producing higher land

rents. In other words, what was wealth that was lost due to an inefficient economic system becomes surplus value captured by the landowner. In sum, Brueckner found that in the case of a single community, the impact of reduced deadweight loss more than makes up for the higher tax on land resulting in increased land values. In the case of an entire market, land values would likely decrease (Brueckner, 1986). More on this discussion of Brueckner (1986) will be explored later in this thesis in "Previous Studies of Land Value Taxation."

Summary

In this section we have seen that a shift from traditional property tax to a split-rate tax in which a higher rate is place on land value than improvement value produces many effects. First off, the concept of land intensity has great bearing over these effects. Unlike excise taxes on a particular commodity, the burden of a tax on land value falls directly on the producer upon whom it is levied and cannot be passed on to final demand. The land value tax is a neutral tax and reduces deadweight loss by avoiding economic distortions of higher prices for consumers and reduced supply. A higher tax on land value does not, theoretically, distort economic decisions. Therefore, it does not affect speculation and timing of development. In addition, land value taxation should not, theoretically, induce sprawl land development patterns. Lastly, while landowners with low land intensity stand to gain from a switch to land value taxation, landowners of high land intensity parcels do not universally stand to lose. Due to increased land rents as the result of gains in economic efficiency, property owners can stand to benefit regardless of land intensity. Depending on the scope of the policy's implementation, the increased land rents may make up for the higher tax on land.

Generally speaking, the implementation of land value taxation should result in a more efficient economic system.

With that brief discussion of the theoretical effects of land value taxation we now turn to a synopsis of its implementation in the United States and globally.

What is Land Value Taxation?

Now that the anomalies of taxing land have been explored, we now turn our attention to what exactly land value taxation is. While confusion about this term often abounds, land value taxation exists in our everyday lives in the vast majority of America. Property tax is typically levied equally on land and improvements. As Vickrey iterated, in general land value taxation captures the virtuous element of property tax's dichotomous nature. Its ability to place the entire burden of the tax squarely on the landowner and its aforementioned lack of distortionary effect on economic choices are two characteristics of the policy lead to its appeal (Oates & Schwab, 2009).

From an equity standpoint, it captures economic surplus produced from the effects of urbanization, not specifically from the efforts of the landowner. This means that the tax captures the effects of efforts from the community as a whole. Thus, it merely returns the collateral publicly-generated benefits back to the public. Plummer (2009) illustrates this argument succinctly. "Land values increase over time because of population growth and community improvements made by the government or private sector (e.g., utility infrastructure, transportation). Taxing land value generates revenue that can benefit the community that provided the individual landowners with their unearned increases in land value."

Historically, theories of land value taxation and its virtues began to be explored over the last 150 years. Henry George, with his work *Progress and Poverty (1879)*, was

responsible for bringing land value taxation to public attention in the late 19th century. To George, land markets behaved like oligopolistic cartels pushing labor and capital to lands of low quality. As with any cartel behavior, this operation decreased production, jobs, wages, and interest rates but raised profits for land owners. George's answer to this was to tax land value to break the cartel. In turn, this would increase production, create jobs, and raise the wage rate, production levels, and living standards (Gaffney, 2008). Additionally, taxing land value would return speculative surplus back to the public domain where it can be to further the aforementioned positive economic indicators.

International Implementation

Today, although its usage is not as ubiquitous as Henry George would've hoped, land value taxation policies persist around the world. Forms of land taxation can be found from Great Britain to New Zealand and from Japan to Jamaica. In Australia's infancy as a nation, generating accurate land-only values for tax assessment was simpler as most of the territory was undeveloped. In time, however, densely developed territories such as Victoria have moved away from tax schemes based on unimproved value to site value and ultimately toward capital improvement or total value tax policies. Site value taxation is an intermediary policy between unimproved value and capital improvements taxation. It considers "invisible improvements," such as the value of clearing, leveling, or draining, as merged with the land (Franzsen, 2009).

Former Soviet territory Estonia has employed land value taxation in rebuilding its economy since its independence in the early 1990s. Intended as an interim tax policy, land value taxation was implemented here before both land and capital markets had sufficiently established themselves in the post-Communist regime (Franzsen, 2009).

According to Tiits (2008), as referenced in Franzsen (2009), due to the underpriced land values produced by the immature land markets at the policies adoption, revenue from the tax could be substantially higher.

Implementation in the United States

In the United States, land value taxation has appeared in three states (New York, Hawaii, and Pennsylvania) but maintains a significant presence only in Pennsylvania. The State of New York's lone participant in land value taxation, the City of Amsterdam, adopted the policy from 1995-1996 after the state passed legislation in 1993. Hawaii adopted land value taxation statewide in 1963. In 1913, legislation was passed in Pennsylvania to allow the states two second-tier cities, Pittsburgh and Scranton, to tax buildings and improvement at a lower rate than land. Subsequently, further legislation was passed by the mid 20th century to allow other municipalities and taxing districts to adopt forms of land value taxation. Among the localities to take advantage of this legislation were Harrisburg (1975), Allentown (1997), and Altoona (2002). Steven Bourassa thoroughly details the land value taxation experience in the United States in *Land Value Taxation, Theory, Evidence and Practice* (2009) and this section borrows heavily from it.

New York

Beginning with the New York State (NY) experience, Amsterdam's trial of land value taxation was the shortest in lifespan. According to Reeb (1998), as cited in Bourassa (2009), the complexities of the state's numerous property tax exemptions coupled with an overdue property assessment doomed the policy. The 1995-1996 assessment caused drastic changes in the tax bills and caused public opinion to suggest that land was not being assessed accurately. As we will see later, this would

not be the only time land value taxation was used as the scapegoat for insufficient assessment practices.

Hawaii

In Hawaii, land value taxation policy achieved its goal of spurring development. However, it achieved this goal all too well in the eyes of much of the public who saw a hotel building boom as overdevelopment, particularly in Waikiki. Through a variety of legislature machinations from the mid-1970s to the early 2000s, property tax powers devolved to local levels and in many locales, rates on improvements actually were set higher than on land.

In the cases of New York and Hawaii, we have seen land value taxation policies rescinded for failing to generate economic development by seemingly drastically changing tax bills (Amsterdam) and for succeeding in generating economic development too well, thus seemingly drastically changing the character of a place (Waikiki) (Bourassa, 2009). The following description of Pennsylvania's land value taxation experiment will detail why land value taxation persists in some areas of this state and why it has been rescinded in others.

Pennsylvania

Turning to the Commonwealth of Pennsylvania, we will now examine the trajectory of land value taxation policies in the Commonwealth which contains the three case study municipalities to be compared later: Altoona, Pittsburgh, and Wilkes-Barre. Understanding the history of property tax policy at the Commonwealth level will provide a baseline perspective from which to analyze the three case study municipalities.

Pittsburgh was, from the beginning, at the center of the land value taxation movement. As the Gilded Age pushed the Steel City into economic boom times, land

values within the city increased drastically. These increases were largely attributable to the speculation of wealthy landowners keeping large amounts of land out of productive use. This situation was ripe for the followers of Henry George to seek legislative action, which they would receive in 1913. As per legislation, tax rates on land would gradually increase while tax rates on improvements would decrease over a twelve year span. By 1925, this would culminate in a 1.95 tax rate on land and a 0.98 rate on improvements, a 2-1 ratio. Later on, a 1968 amendment would allow the city to change the 2-1 ratio, which Pittsburgh and other municipalities would ultimately take advantage of (Bourassa, 2009).

1951 Pennsylvania legislation permitted two-rate property tax in the Commonwealth's third tier cities as well with Harrisburg, the Capital of the Commonwealth, being the first to adopt the policy in 1975. By this time, fervor for land value taxation policies in Pittsburgh and other municipalities around the Commonwealth had switched gears from discouraging speculation of large land holdings to promoting urban core revitalization. Legislation from 1993 and 1998 would open split rate property tax policies to school districts and boroughs, resulting in a total of 23 Pennsylvania taxing districts adopting the policy at some point as of 2008, including Altoona in 2002 (Bourassa, 2009).

By 2001, the 88-year run of the two rate property tax in Pittsburgh would see its demise. As was seen in Amsterdam, NY in 1995, a long overdue assessment cause tax bills to change drastically. In conjunction with a mayoral election year, the overdue assessment resulted in the two rate system becoming the scapegoat for tax bill complaints. The city does however still maintain an indirect split rate property tax

system. A myriad of tax abatements on new construction and renovations have been put in place resulting in a reduced effective tax rate on improvements relative to land. Additionally, Pittsburgh's downtown core established a special assessment district known as the Downtown Pittsburgh Business Improvement District, financed by a land-based tax (Bourassa, 2009).

Aside from Amsterdam, NY and Pittsburgh, PA, six other districts have rescinded the split rate tax system, all the result of perceived injustices caused by overdue assessments. In Hazelton, PA, the policy never garnered broad support and was quickly overturned. In Coatesville, an overdue assessment dramatically shifted the tax burden onto residential property owners and away from businesses and industries. Oil City abolished the split rate system after faulty valuing of land and improvements in a 2003 assessment, adding to the perceived ineffectiveness of the policy in promoting economic revitalization.

Bourassa (2009) provides a wealth of information on the status of land value taxes in both Pennsylvania and New York. In the article, Bourassa provides details about the year the particular land value tax policy was adopted, the year it may have been rescinded, current rates on land, current rates on improvements, and the land-to-improvements tax rate ratios for each tax district. As of 2008, sixteen districts maintain a split rate tax system. These municipalities and school districts have continued to employ the policy because it is believed that it encourages, or at least does not impede, economic development, that it is viewed as a more stable tax base, or that it is a more equitable and just tax.

Of particular note in the article, Altoona's current tax rate on land of 230.32 is strikingly high. This, along with several of the other higher rates on land is the result of the use of land values from assessments that were not performed recently. As opposed to reassessing land values, Altoona has simply raised the tax rate on land values (Bourassa, 2009).

Previous Studies of Land Value Taxation

While the universe of data for land value taxation research is limited, researchers have developed theoretical, general equilibrium, and regression models to help better understand the impact of the tax regime. This section of the paper will draw upon John E. Anderson in Lincoln Institute of Land Policy's *Land Value Taxation, Theory, Evidence and Practice (2009)*, edited by Richard F. Dye and Richard W. England to discuss the relevant literature surrounding the effects of land value taxation.

Theoretical Models

First, theoretical models help establish a basis for analyzing real-world empirical data that is found in general equilibrium and regression model that will be discussed shortly. Of particular note in this category of studies is Jan Brueckner's aforementioned 1986 study that laid much of the ground work for modern analysis of land value taxation (Anderson, 2009). His study found that the move from a traditional property tax to a split rate tax in which land is taxed at a higher rate than improvements generally increases land intensity. He also made the important observation that as a tax on improvements is lowered, land values increase. Conversely, as a tax on land is increased, land values decrease. These opposing forces and their magnitudes are crucial to understand the potential ramifications of a split rate tax (Brueckner, 1986).

Additionally, Brueckner produced another vital caveat of knowledge in “A Modern Analysis of the Effects of Site Value Taxation” (1986). In the case of a tax zone raising tax rates on land values and reducing tax rates on improvements to maintain equal yield to the previous regime, Brueckner found that the overall impact on land values depends on the relative size of the tax zone to which the tax regime applies. If the said zone is a small share of the market area, then housing prices would be exogenous and remain constant. This is because the area in which the tax regime applies is negligible compared to the market area in determining housing prices. While improvements per acre rise as a result of the lower tax rate on improvements, Brueckner also notes that land value increases as well. This latter effect is the result of the reduction in deadweight loss associated with the reduced improvement tax rate and increased land tax rate. A reduction in deadweight loss presents itself in the form of higher land rents, a residual of what revenue is left over after other factors of production earn their returns. The higher land rents are captured by landowners. Deadweight loss under the old tax regime has become surplus value. Therefore, this surplus value is reflected in higher land values. In this case, Brueckner concludes that the impact of these increased land rents would be stronger than the impact of the direct tax on land.

On the other hand, if the zone of the equal yield tax regime change encompasses the entire market area, then the value of land would likely decrease. According to Brueckner’s model, the likely decrease in land prices is the result of the elasticity of housing demand, the lack of locational advantage, and the resulting reduction in the profitability of development. In this case, the tax regime change does impact the price and supply of housing. The lowered tax rate on improvements means that

improvements per acre are likely to increase. In turn, this is likely to lead to an increase in the supply of housing and a decrease in price. Additionally, the increased taxes on land cannot be passed on to final demand as was described earlier in this chapter. Any attempt of the landowner to raise the price or rent of land would lead to less land being demanded, subsequently causing an excess supply of land and downward pressure on price (Oates & Schwab, 2009). While the lower tax rate on improvements would still likely cause an increase in improvements per acre and deadweight loss would still be reduced, these effects would be marginalized by the drop in housing prices, leading to an overall reduction in land values. For more on Brueckner's analysis, please see the "Consequences to Landowners" section earlier in this chapter.

From Brueckner's groundbreaking modern analysis, theoretical models moved toward a discussion of land value taxation's impact on the time of development. Anderson (1999) posits that a move from a traditional tax regime to a split rate system hastens timing of development and increases capital intensity, which means the amount of investment devoted to improving a land parcel.

In line with J. E. Anderson's 1999 work, a number of other studies including D. Mills (1981a, 1981b, 1983) and Anderson (1986, 1993) conclude that property tax can alter the timing and capital intensity of development. However, Tideman (1982) offers an important grounding to the discussion. He clarifies that pure land value taxation is neutral with respects to timing of development. The aforementioned research modeled land value related to current land use, not the highest and best use. If land value is determined in a way that is unrelated to current land use, neutrality with respects to timing of development holds true. This is because cost-benefit analysis shows that both

traditional property tax and land value tax subtract the same from the present value of both the choice to develop now and the choice to postpone development, assuming highest and best use is used to determine taxable value.

Discrepancy over land value taxation's effect on timing of development in this case is the result of differing assumptions and frameworks. Anderson (1999) assumes a significant liquidity effect in his analysis, the result of increased costs associated with holding land whereas Tideman (1982) neglects this effect in his analysis in addition to focusing on the valuation process of land. As a result, different conclusions about land value taxation's effect on timing of development were reached.

Furthering the discussion of the impact of land value taxation on the timing of development, Arnott (2005) conducts research distinguishing between "residual land value," post-development property value minus improvement value, and "raw land value," the value of land without any structures on it or improvements to it. He found that a tax on the raw value of land, similar to its highest and best use, is neutral in regards to timing of development. A residual land value tax, he finds, is non-neutral in this respect as it is related to current land use, as was also pointed out by Tideman (1982). Arnott also concludes that there is a trade-off here in attaining neutrality in timing of development. Post-development raw land value would be highly complex and difficult to determine, likely resulting in unfair and arbitrary assessments.

General Equilibrium Models

General equilibrium models are more ambitious in terms of the scope of assumptions made by the researcher. As Anderson (2009) describes, models of this vein attempt to provide description of the equilibrium conditions in all markets at the same time. These markets include but are not limited to land, buildings and other

improvements, labor and output. Such models are often made to replicate the initial conditions of an economy and then used to calculate changes that occur in the aftermath of an intervention.

Grosskopf begins the examination of land value taxation through general equilibrium models through her 1981 study. In the study she uses Harberger's (1962) tax incidence framework to find that a tax regime change from traditional property tax to a split rate scheme would result in increased equilibrium land prices (Grosskopf, 1981). This was significant in establishing land value taxation as a tax policy switch that could potentially pay for itself. (Anderson, 2009) DiMasi (1987) developed a model of the City of Boston, MA and concluded that a switch to a land value tax policy would decrease land rents, increase improvements per acre, decrease housing prices, increase population density, reduce the area covered by urbanization, and increase wages.

More modern analysis in this realm has been relatively scarce, although Nechyba (1998) and Haughwout (2004) are of note. Nechyba examined the effects of an increase in land tax and a decrease in capital tax with his model, which was set up to represent U. S. state and local governments. He concluded that this intervention would increase capital stock and decrease land values. Haughwout (2004) developed a model of the New York City economy, but removed the city's sales, income, property, and general corporate taxes while only retaining the tax on land at its current rate. This Henry Georgian study concluded that private output would increase, land values would increase, private capital stock would increase, and population would increase but the provision of public goods and per capita tax revenue would decrease by over 50%.

Ultimately, the differing conclusions reached in each of the general equilibrium studies are the result of differing model frameworks and assumptions. Grosskopf (1981) and Nechyba (1998) set up less location-specific models and incorporated differing assumptions in building their general equilibrium models. DiMasi (1987) and Haughwout (2004) chose to develop models of specific cities; Boston and New York City, respectively. Inherently, the selection of different jurisdictions will likely mean the selection of different assumptions when building general equilibrium models.

Regression Models

An even more quantitative approach to examining the effects of a switch to land value taxation is regression analysis. By using this method, impact of the policy intervention on key factors of interest, known as dependent variables, can be isolated by the researcher. At the same time, the research can control for a number of other factors, known as independent or control variables, which may also affect the dependent variable. (Anderson, 2009) In this way, the research can quantitatively examine the significance of one variable in relation to another.

Studies by Mathis and Zech in 1982 and 1983 formed the groundwork for the regression analysis of land value taxation. In these papers, they studied the value of construction in 27 Pennsylvania cities, towns, and boroughs over the period 1976-1978. They computed two tax measures to make data in each municipality compatible and fit into single-equation models. These measures were the ratio of the city tax rate on land to the city tax rate on improvements in 1977 and the same land-to-improvements ratio but from the combined city and county tax rates. They concluded that neither tax measure had significant impact on median or mean value of construction across the Pennsylvania municipalities (Mathis & Zech, 1982, 1983). Also of note however, was

the fact that only three of the 27 Pennsylvania municipalities studied by Mathis and Zech had implemented land tax rates that exceeded improvement tax rates at the time. Thus, there was not much variation among the tax measures across municipalities, possibly accounting for the lack of significance (Anderson, 2009).

Bourassa (1990) was the first to use regression analysis to analyze the value of new residential building permits in the broader scope of the effects of land value taxation. To do this, he examined housing development in Pittsburgh, McKeesport, and New Castle, PA. He tested for liquidity effect (i.e. the hastening of development as a result of a higher land tax rate) and for incentive effect (i.e. the encouragement of further housing development as a result of lower relative tax rates on improvements.) He quantitatively found that land value taxation may have impacted residential housing permits in Pittsburgh, but not in McKeesport or New Castle. More specifically, Pittsburgh housing development exhibited incentive effect but no liquidity effect.

Oates and Schwab (1997) explored new building activity in 15 cities in the multistate region of the Pittsburgh metropolitan area using time series data. Conducting before-and-after analysis, they conclude that after 1979-1980, the period when land-to-improvement tax ratios shifted in Pittsburgh, something dramatic happened to building activity in Pittsburgh compared to the other cities in the region. The increased building activity, and therefore increased value of building permits, was caused by both the change in tax regime and the occupancy rate, results indicated. Additionally, the effects attributable to the tax regime change are muddled by the influence of the property tax abatements associated with Pittsburgh's economic development program. Schwab would go on to write, "It appears that a land tax did not cause a building boom in

Pittsburgh, but it did allow the city government to avoid policies that might have undercut that boom" (Schwab & Harris, 1997 [as cited in Anderson, 2009]).

Staying in the Steel City, Pollakowski (1982) examined property transactions in Pittsburgh from 1977-1981. As previously mentioned, this was a period of great change in Pittsburgh's property tax policies. From 1925 to 1978, Pittsburgh's land-to-improvement tax ratio was 2:1. In 1979 it was increased to 4:1 and then increased to 5:1 in 1980. Pollakowski's dependent variable in his study was the probability of a parcel being transacted. He would go on to find a positive and discernable effect of the land tax rate. Of the 6812 properties transacted in 1979, Pollakowski estimated that 60 were attributable to the land tax increase. Thus, although the effect of the change in land tax rate was discernible and significant, its overall magnitude was very modest.

Furthering Pollakowski's study, Plassmann and Tideman (2000) examined building permit data in Pennsylvania cities from 1980-1994 to determine impact on building activity. Their dependent variable was defined as the number of building permits per person per month in each city. They then developed an independent variable which calculated the difference between the city's tax rate on land and its rate on improvements then divided that difference by the average ratio of assessed value to sales value in the city. In this way, they would eliminate variation based on differences in assessment ratios across cities. They found that an increase in this differential equated to a significant increase in building permits.

Similarly but broader in research scope, Tideman and Johnson (1995) studied building permit data in Pennsylvania cities over the period 1980-1992 to determine if a

shift of taxes from improvements to land produced economic growth. However, they went on to find that available data are insufficient to identify any effect adequately.

Comparison Approach

Finally, after numerous of other studies of his own, Cord (1987) used a comparison method to examine construction activity in Pennsylvania cities that shifted to split-rate taxes. In this study, Cord compared such cities to neighboring cities that continued to employ traditional property tax. While the study found that cities with the split rate tax experienced more construction activity, the method did not control for other factors that may have impacted building activity nor did it account for selection bias (Anderson, 2009).

Summary of Previous Studies

This section has elaborated on previous studies conducted on land value taxation using varying models. Overall, it appears clear that a shift from traditional property tax to land value taxation should lead to increases in improvements per acre and land intensity. Expectations about the effect on timing of development and land values are less clear, however. Studies illustrated in this chapter used different frameworks in their models and in some cases made different assumptions about such things as the elasticity of housing demand and the significance of the liquidity and incentive effects. As a result, definitive expectations about the effects of land value taxation on timing of development, land value, and other variables remain elusive.

Relevance to Planning

Economists rave about the prospects of economic efficiency emanating from land value taxation. As far back as David Ricardo, they have long considered a tax on land to be the most ideal tax because the return on holding land is nothing but economic surplus, not the consequences of economic actions by landowners (Netzer, 1998). However, there is more to this notion than just economic efficiency. As Tideman (1998) writes, "Land value taxation can be generalized to the principle that people should pay for all of their appropriations of natural opportunities according to the opportunity costs of those appropriations, and that the resulting revenue should be shared equally. There are important applications of this principle to questions of environmental protection, relieving congestion, efficiency resource use, population growth and general economic growth."

Tideman is correct and planners know this as well. Much of what the field of urban planning consists of is about the efficiency of cities and regions to enhance the lives of citizens. Planning goes beyond economic development. While economic concerns are often at the crux of land value taxation discussion, let us not forget the very title of Henry George's seminal work, *Progress and Poverty*. George's goals were more comprehensive than mere economic development. He set out to address the paradox of persistent poverty and inequality in a world of constant technological advance that should enrich the happiness and welfare of all members of society, improving the overall human condition (American Journal of Economics and Sociology, 2005).

Property tax policy influences the physical, economic, and societal structure of settlements everywhere. Planners must be aware of the ramifications of such policy. Not only is property tax a primary source of revenue for local governments and thus of

municipal planning departments, but it also influences development patterns, which effect everything from traffic patterns to infrastructure layout to public services provision to growth management. It also has an impact on income and wealth distribution and environmental protection by way of urban sprawl development. As a result, land value taxation and property tax policy in general should not be taken lightly or dismissed as merely an economic development tool by planners.

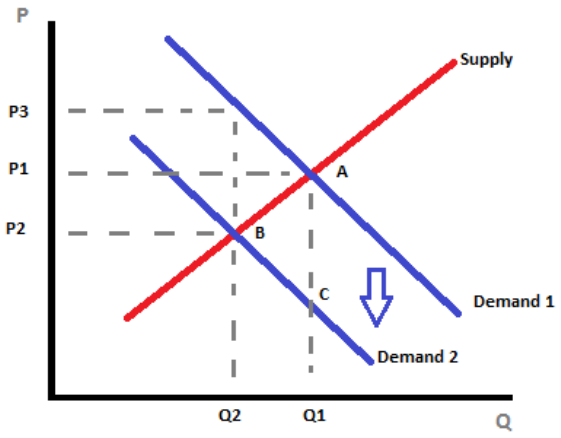

Figure 2-1. Tax effects on an upward sloping supply [Recreated by author from Oates, W. E. & Schwab, R. M. 2009. “The Simple Analytics of Land Value Taxation.” In *Land Value Taxation, Theory, Evidence and Practice*. Eds. Richard F. Dye and Richard W. England. Cambridge, MA: Lincoln Institute of Land Policy: 51–71.]

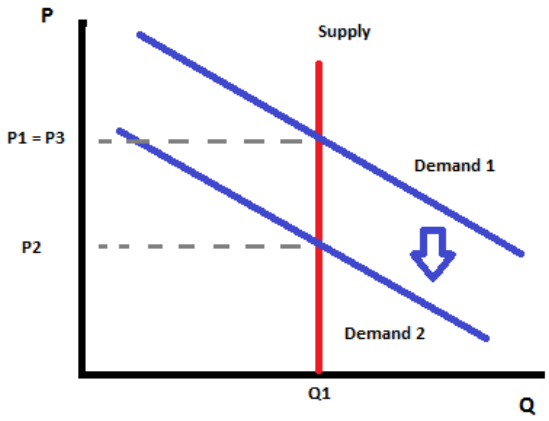

Figure 2-2. Tax effects on a fixed supply [Recreated by author from Oates, W. E. & Schwab, R. M. 2009. “The Simple Analytics of Land Value Taxation.” In *Land Value Taxation, Theory, Evidence and Practice*. Eds. Richard F. Dye and Richard W. England. Cambridge, MA: Lincoln Institute of Land Policy: 51–71.]

CHAPTER 3
METHODOLOGY

In this chapter, the process from which the analysis presented in this paper is derived will be explained. In particular, the examination of the methodology used will include the study approach, study areas, data collection and limitations. The chapter will conclude with a summary that will encapsulate the research's methodology in preparation for the analysis, findings, and discussion of Chapters 4 & 5.

Study Approach

The literature review from the previous chapter provided background information concerning the debates around land value taxation and its relationship to various aspects to housing, development, and income. Based on the arguments made previously, the presence of land value taxation should raise income to a higher level than in places without it, all other things being held equal. The reason for this is simply that it allows the market to behave in a more economically efficient way, reducing deadweight loss (Brueckner, 1986). Arguments also indicate that a switch to split rate tax in which the millage rate on land is higher than that on improvements leads to increase in improvements per area (Anderson, 2009). From these two hypotheses, theoretical expectations for a set of income and housing variables can be derived, which is what this thesis sets out to examine.

This research seeks to understand the differences between the theoretical effects of land value taxation and tangible observations from United States (U.S.) Census and American Community Survey (ACS) data. The work encompasses three case studies, all from the Commonwealth of Pennsylvania: Altoona, Pittsburgh, and Wilkes-Barre. Using an analytical approach, cross-sectional before-an-after analysis will be conducted

on the three cases study areas to better understand how income and housing characteristics were changed by the policy intervention of land value taxation. Originally, the goal of the research was examine changes in property values following the adoption of a split rate tax in which land was taxed at a higher rate than improvements as a property tax policy. This would provide insight into the viability of a property tax regime by indicating changes in demand for property within the tax jurisdiction. However, as researched progressed it became clear that the objective would need to be adjusted because of data collection limitations. These changes in methodology as well as data collection and limitations are illustrated in the rest of this chapter.

Case Studies

Beginning with an eye toward assessing the effectiveness of land value taxation, research began by looking at instances of adopted land value taxation policies. These instances in the United States are described in Chapter 2. Attempting to grasp the effects of the tax regime in the most contemporary of contexts, the case of Altoona was first to be studied, due to its recent adoption of the heavier tax rate on land than on improvements. Additionally, research would expand to cover two other municipalities for the purpose of comparison, both in Pennsylvania. Pittsburgh was chosen due to its recent rescinding of city-wide land value taxation. Wilkes-Barre was chosen as a control case study, similar in demographics and industrial makeup to both Altoona and Pittsburgh but never having adopted land value taxation.

The three case study methodology was very important to this research. Using three case studies allows the research to account for many extraneous influences that would not be covered with only one study area. For example, a reduction in income

growth observed for one case study may indicate different conclusions if compared to multiple case studies. Individually, a reduction in income growth for a study area may seem like a negative outcome. However, if paired with other case studies that show greater reductions in income growth, suddenly the outcome from the original case study does not appear as negative. More specifically, case studies can be chosen to cover the recent removal of the policy intervention and its effects as well as a control case study, which can yield effects in the event of non-implementation of the intervention. In this research, alternative case studies were selected to allow the examination of a recent removal of land value taxation policy and examination of an area that has never adopted land value taxation.

In particular, case studies of the City of Pittsburgh, PA and the City of Wilkes-Barre, PA were chosen as alternatives to the City of Altoona, PA for reasons listed above. First, utilizing case studies from within the same country and within the same state or, in this case, commonwealth, was crucial to mitigating variation produced by differing federal and state or commonwealth legislation. Because Pittsburgh and Wilkes-Barre are, like Altoona, within the United States and within Pennsylvania, all three jurisdictions would likely fall under the same federal and state or commonwealth law. As a result, observed differences in income or housing characteristics would not be induced by differences in federal or commonwealth legislation.

In an effort to further mitigate the effects of extraneous circumstances, the three selected case studies share similar demographics and industrial profiles. Like much of Pennsylvania, Altoona, Pittsburgh, and Wilkes-Barre are all cities that rose to significance by way of the manufacturing industry. Manufacturing was the abundant

source of economic might for the factories of the Commonwealth (Stevens, 1955). Altoona and Wilkes-Barre have been similar in economic reliance on manufacturing, with both cities employing roughly 19% of its workforce in the sector in 2000, according to Table A-1 Employment Figures by Industry. Pittsburgh is also similar in industrial makeup to the other two cities, albeit at a larger scale. Additionally, while Altoona recently adopted a land value taxation policy in 2002, Pittsburgh rescinded its policy after employing it since 1913. By examining the case of Pittsburgh, the effects of removing a land value taxation policy can be studied in contrast to the Altoona case.

Study Areas

The following are brief descriptions of the case study areas of Altoona, Pittsburgh, and Wilkes-Barre. Additionally, Table A-1 Employment Figures by Industry in Appendix A will be referenced to reflect each area's reliance upon manufacturing and overall industrial diversity.

Altoona

The City of Altoona is located in central Pennsylvania with a population of 46,320 (2010 U.S. Census). A former railroad hub between Philadelphia and Pittsburgh, Altoona has seen economic and population decline since their heights in the mid-20th century but has seen resurgences over the last 20 years. The city adopted a land value taxation policy in 2002.

2010 Bureau of Labor Statistics data reveals that Altoona is reliant on the manufacturing, retail trade, and health care and social services industries for over 53% of its employment. These sectors are also the three most prevalent sectors in the national economy, only amounting to roughly 40% of total employment nationally, however.

Between 2001 and 2010 Altoona gained over 1250 jobs relative to its share of national employment despite losing 143 total jobs overall. This means that the economy of Altoona shrank over the period but not as much as that of the national economy. Competitive shift figures show that Altoona was a highly competitive environment for the manufacturing, retail trade, and administrative and waste services industries. Each of these industries grew more rapidly in the local area than nationwide. Altoona also remains strong in the transportation and warehousing sector. Historically a railroad town, Altoona may capitalize on rising fuel costs and once again utilize this industry to catalyze future growth across a myriad of industries within the metropolitan area.

Pittsburgh

The City of Pittsburgh is located in western Pennsylvania with a population of 305,704 (2010 U.S. Census). A former powerhouse in the steel industry until the latter 20th century, Pittsburgh shares the industrial heritages of Altoona and Wilkes-Barre albeit at a much larger scale. The Steel City adopted a land value taxation policy in 1913 but reverted to a traditional property tax in 2001.

Universally known as a “rust-belt” stalwart, Pittsburgh’s percentage of manufacturing employment in 2010 was less than the national average. Manufacturing, retail trade, and health care and social assistance are also the most significant in Pittsburgh, but account for just below 42% of employment.

The industrial mix of Pittsburgh was a positive factor in job growth, by itself creating approximately 24,000 jobs. Industries such as health care, education, and accommodation and food services, in fact growing significantly in Pittsburgh, grew nationally. Additionally, between 2001 and 2010, shift-share analysis shows that

competitive shift was extraordinarily negative resulting in a loss of over 45,000 jobs in total. This was particularly the case in the health care and social assistance sector, whose competitive shift amounted to over -14,000 alone. Evidently, that sector in Pittsburgh was significantly outperformed nationally.

Wilkes-Barre

The City of Wilkes-Barre is located in northeastern Pennsylvania with a population of 41,498 (2010 U.S. Census). Another "rust belt," industrially-driven city, Wilkes-Barre is of similar size and economic base to Altoona with the notable exception of its proximity to a 75,000-resident city in Scranton. Wilkes-Barre has never implemented land value taxation.

Wilkes-Barre's 2010 Bureau of Labor Statistics figures indicate that it falls between Altoona and Pittsburgh in terms of reliance on manufacturing and industrial diversity. Manufacturing accounts for just under 13% of employment in Wilkes-Barre and manufacturing, retail trade, and health care and social assistance constitute just below 47% of the total.

Like Altoona and Pittsburgh, Wilkes-Barre has a strong mix component according to shift-share analysis. By itself, the mix contributed a gain of 250 jobs over the period. Health care, education, and accommodation and food services were all sectors that showed high growth nationally and also held significant employment in Wilkes-Barre. Competitive shift analysis shows local strengths particularly in transportation and warehousing, management of companies and enterprises, administrative and waste services, and arts, entertainment, and recreation. However, several other industries such as manufacturing, health care, and educational services, performed below national

standards, resulting in significant local jobs losses amounting to nearly 2400 due to lack of local competitiveness.

Cross-Sectional Study

Cross-sectional analysis will be used in this research. By examining data from a specific point in time in all three study areas, an overall picture can be obtained (Kumar, 2005). The focus of the cross-section for this study was originally property value but was adjusted to selected income and housing characteristics over time. The research first attempted to gather assessed property values for the three case study areas from a central data clearinghouse at the state level. However, when contacted, the Commonwealth of Pennsylvania indicated that such data was kept at the local level. From there, gathering comparable data became increasingly difficult as local municipalities kept their property tax rolls in various locations and with various subcontracted firms. In the end, time and financial constraints terminated the effort to focus cross-sectional analysis on property values. Research focus then turned to the readily available housing and income characteristic data in U.S. Census and American Community Survey datasets. Cross-sectional analysis remained the method used for this research. This type of data analysis was chosen because of its simplicity of design and as a component of before-and-after analysis.

Before-And-After Study Design

In order to ascertain the effects of land value taxation over the study areas, this research will be developed with before-and-after analysis. Utilizing two sets of cross-sectional data collection points from the same case study areas, before-and after analysis allows the research to determine changes in phenomenon or variables between two points in time (Kumar, 2005). Figure 3-1 Before-and-After Study Design

and Figure 3-2 – Measurement of Change Through a Before-and-After Design depict how this methodology works. In Figure 3-1, the general conceptual framework of before-and-after design is portrayed with two measurements of the same population surrounding a program or intervention on a timeline. Figure 3-2 illustrates the potential measurements of change in the before-and-after study design.

The before-and-after study design ideally fits this research. Altoona adopted land value taxation in 2002, Pittsburgh rescinded it in 2001, and Wilkes-Barre has never adopted it. Data for decennial censuses is produced each decade, which was originally thought to be ideal for this research. The cross-sections of time were to be 2000 and 2010, both surrounding the interventions of policy adoption in Altoona and policy removal in Pittsburgh. While cross-sections were ultimately adjusted to 1990, 2000, and 2009, the before-and-after study design remains the method of choice for this research.

This method is not unheard-of in planning research. Specifically pertaining to the research land value taxation, Oates & Schwab's 1997 study used before-and-after design to examine new building activity in Pittsburgh and surrounding municipalities before and after the shift in Pittsburgh's property tax policy. For more on the Oates & Schwab (1997) article, please refer to "A Review of the Literature" in Chapter 2 of this thesis.

Data Collection

U.S. Census of Population and Housing and American Community Survey

The original intent in collecting data for this research was to use county property assessor tax rolls from years before and after the policy interventions to examine changes in assessed property value. As previously mentioned, the research was

unable to incorporate property assessor tax rolls from a statewide database or other centralized location. In attempting to obtain the tax rolls from individual counties, the author was either redirected to private consultants contracted for assessment services or told that archived data from previous years could not be found. Additionally, the current tax rolls that were available from county assessors carried with them usage fees that were beyond the budget of the research.

Undeterred, the study was adjusted to incorporate more readily available U.S. Decennial Census and American Community Survey (ACS) data. The U.S. Census of Population and Housing produces data on a decennial basis. Ideally, this research would have used data from the 1990, 2000, and 2010 U.S. Censuses of Population and Housing. However, at the writing of this thesis, housing and income characteristic data for Census-defined "places," such as the Cities of Altoona, Pittsburgh, and Wilkes-Barre, had not been released for the 2010 Census. As a result, utilization of the 2010 data was unavailable as well.

This research then sought out ACS data. While containing higher margins of error than data from decennial censuses, data from the ACS uses the same geographic boundaries as decennial censuses and, most importantly, is produced annually. Accordingly, the study was adjusted to examine income and housing characteristic data sets from the 1990 and 2000 U.S. Censuses on Population and Housing in conjunction with like data sets from the 2005-2009 ACS.

The research examines a total of ten variables from the data sets, three income characteristics and seven housing characteristics. While analysis of the various housing

and income characteristics of the three study areas may yield overall impacts of land value taxation, the variables are related to the tax at varying levels.

Generally, housing characteristics are more closely related to land value taxation than income variables. Features of housing are directly impacted by the policy's lower tax rate on improvements relative to land, which theoretically incentivizes construction versus the purchase of land. Income characteristics, meanwhile, are somewhat removed from the direct impact of land value taxation. Income figures face influence from many sources, making land value taxation's impact less acute. Additionally, the switch to a land value tax would necessarily affect housing and other markets as intermediaries between the policy and income. In this way, housing characteristics have more of a primarily relationship to land value taxation whereas the relationship to income characteristics can be considered secondary.

Individually, housing figures also vary in their relation to land value taxation. In theory, density measures and units in structure bear the closest interaction with the tax policy, as the tax simultaneously raises the appeal of improvements and diminishes the appeal of land. Variables such as occupancy status, property value and gross rent are further removed from direct relation to land value tax. Total housing units and the age of housing stock (year structure built) may be directly impacted by the tax policy depending on existing supply and demand conditions for housing.

These variables are listed in Table 3-1. List of Variables Tested in Before-and-After Model. Hypotheses of expected results for each variable are dependent upon both the date of the cross-section and the particular study area. Theoretical expectations of each variable will be detailed in Chapter 4 – Results and Analysis.

Bureau of Labor Statistics Data

In order to better address extraneous influences to the U.S. Census and ACS data, data sets from the Bureau of Labor Statistics (BLS) were brought into the research to better describe the economic landscapes of the three case study areas. Due to data availability constraints, BLS data sets from the years of 2001 and 2010 for each study area were used. The results of this research were used as economic context enhancements to supplement the variable analysis in Chapter 4. The economic profiles of the three case study areas produced by this BLS research can be found in Appendix A Data Review & Economic Profiles.

Utilizing these data sets, a trio of analytical techniques was composed. The descriptive analysis of location quotients offers a snapshot of the states of each economy at particular cross-sections of time. From a more dynamic and predictive perspective, shift-share analysis and Esteban-Marquillas Extension attempt to illustrate changes in the industrial makeup of each economy over time (Blakely & Leigh, 2009).

A location quotient is the ratio of the percentage regional employment in a particular industry to the comparable percentage in a benchmark area. A location quotient equal to 1 indicates that the area has the same percentage of employment in that industry as does the nation. Location quotients greater than 1 mean that the area a higher concentration of employment in that industry than does the nation and they the sector likely an export industry locally. By extension, a location quotient of less than 1 likely belongs to a local import industry and that the area has a less than proportionate share of employment in the industry (Blair & Carroll, 2009) (Blakely & Leigh, 2009).

Shift-share analysis allows for the conducting of dynamic analysis to inform decision-makers of changes in the local economy. This type of analysis disaggregates

growth into economic growth, mix component and competitive component. Economic growth is an indication of how the local economy has grown or shrunk with growth or shrinkage in the overall economy. Mix component depicts how well the diversity and mix of industries locally is performing relative to the mix of industries in the overall economy. Competitive component measures how the performance of a particular local industry relative to how the particular industry is performing in the overall (Blair & Carroll, 2009) (Blakely & Leigh, 2009) (Edwards, 2007).

As its name suggests, Esteban-Marquillas Extension merely expands, upon Shift-share analysis. This technique more clearly identifies a local economy's competitive component by redefining competitive shift and adding a fourth effect known as allocation effect (Edwards, 2007). The allocation effect creates a method for properly distributing credit for local economic growth (or decline) in an industry among overall economic growth, industrial mix, and competitive effects. These alterations allow for a more accurate portrayal of the attractiveness of a particular local economy (McDonough & Sihag, 1991).

This research employs these analysis techniques in order to better illustrate where the economies of the three study areas have been and where they are potentially being driven. With this analysis in mind, the research is in better position to determine what changes are the results of the effects of land value taxation and what changes are from extraneous origins, such as unassociated changes in the local or national economy.

Limitations

Several facets of this work have their limitations. These limitations begin with time and access concerns then also cover the before-and-after study design, case and

variable selection bias, data collection processes and decisions, the general qualitative approach and conclusions, and even the attempts to mitigate pre-existing limitations.

Time and access were constraints that hampered this research from the beginning. With more time and access, either through increased scope of research time or increased financial wherewithal, the original intent of this research may have been realized. Property assessor tax rolls are available to the public under Right-to-Know legislation and are surely archived somewhere, either digitally or in physical form. Eventually, the research would've been able to locate and incorporate such sources were more time and financial resources allotted.

Despite the advantages of the before-and-after study design, limitations to it exist and inhibit this research. First, before-and-after design only measures total change in variables and does not separate the effects of extraneous variables (Kumar, 2005). The research attempts to mitigate this limitation by selecting case study locations that avoid differences in state and federal legislation and differences in economic composition. Economic differences between case study areas are further mitigated by the incorporation of Bureau of Labor Statistics data in location quotient, shift-share analysis, and Esteban-Marquillas Extension tables. Secondly, before-and-after analysis is also limited by potential regression to the mean. This means that the design does not account for the tendency of extreme observations in the data before the policy intervention return to the average, with or without the effects of the intervention (Kumar, 2005). The research attempts to control this limitation by including variable data from the 1990 U.S. Census of Population and Housing. This data was collected ten years

prior to the observations of the year 2000 and should therefore indicate the presence of extremes in the data.

The possibility of selection bias in case and variable selection also limits the research. Attempts to reduce case selection bias included choosing all study areas from the same state or, as is the instance in this research, commonwealth. All three study areas fall under similar state and federal legislation. The implementation of a control case, the City of Wilkes-Barre which has never adopted land value taxation, was also conducted with the goal of reducing case selection bias. Variables were selected by the author as indicators that are significant to land value taxation. These selections were based on land value taxation literature but still may not include all significant characteristics of municipalities that are affected by a change in property tax regime.

Data collection processes also were performed with limitations. As previously mentioned, the inconsistency of comparing 1990 to 2000 data with 2000 to 2009 data was an unfortunate byproduct of time constraints. If housing and income characteristic data for Census-defined “places” from the 2010 U.S. Census of Population and Housing were available during this research, it would have been included and would’ve removed the limitations imposed by this inconsistency. Furthermore, the usage of ACS data also contains greater margin of error than decennial U.S. Census data, introducing limitations in drawing conclusions and determinations from changes in data between 2000 and 2009.

While informative as this qualitative research method is, it is nevertheless limited by its lack of quantitative analysis and conclusions. In order to mitigate this, a simple ordinary least squares statistical regression was attempted. However, time and data

constrained this portion of the research as shape file geographies from the U.S. Census data clearinghouse did not correlate to 2005-2009 ACS data for Census-defined "Places" in Pennsylvania. As a result, manual editing was required to correct the mismatch and time to do so was unavailable to the research.

Additionally and ironically, attempts to mitigate the previously stated limitations by incorporating BLS data analysis were limited by a few factors. First, labor statistics for each individual study area were unavailable. Instead, the research was faced with using metropolitan statistical area (MSA) or county level data which encompass each study area. MSA level data was chosen because such areas are generally focused around central cities such as Altoona, Pittsburgh, and Wilkes-Barre[1]. Therefore, MSA level data was selected for its ability to more closely resemble the local economies of each study area. Despite the similarity of the MSAs with their respective study areas, this analysis is still limited because the BLS data includes observations from across the MSAs, not just the study areas in question. For instance, labor statistics for the Scranton-Wilkes-Barre MSA were used as a proxy for labor statistics in the City of Wilkes-Barre. Secondly, archived data from before 2001 was not immediately available from the BLS. As a result, data sets from 1990 and 2000 which could have corresponded with the U.S. Census data sets was not used. Instead, 2001 and 2010 data sets from the BLS were used in an effort to maintain cross-sections before and after policy interventions and over approximately a ten-year span.

[1] Central city designation in Wilkes-Barre's MSA is shared with the City of Scranton, PA.

Summary

This work analyzed changes in income and housing characteristics that occurred as results of the adoption, removal, or neglect of land value taxation policy by using before-and-after study design. Before-and-after study design uses two sets of cross-sectional data collection points, each surrounding a policy intervention in time, to determine changes in a phenomenon or variables between two points in time. The City of Altoona was chosen to depict changes after the adoption of land value taxation policy while Pittsburgh was chosen to show changes after the removal of the policy and Wilkes-Barre was selected as a control case study because it has never implemented the policy. The three study areas were analyzed to determine how theoretical effects of land value taxation on selected income and housing characteristics manifest themselves in U.S. Census and ACS data.

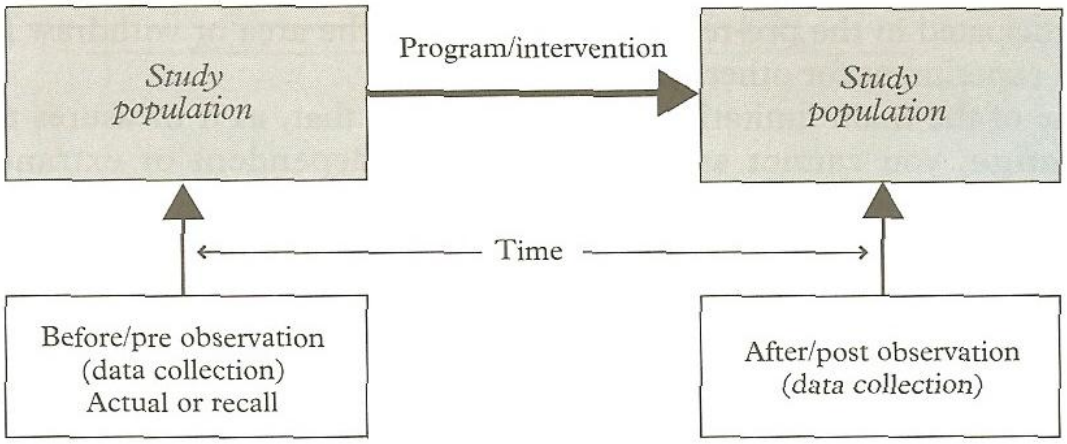

Figure 3-1. Before-and-after study design [Source: Kumar, R. (2005). Research Methodology: A Step-by-Step Guide for Beginners. Second Edition. Thousand Oaks, CA: Sage Publications.]

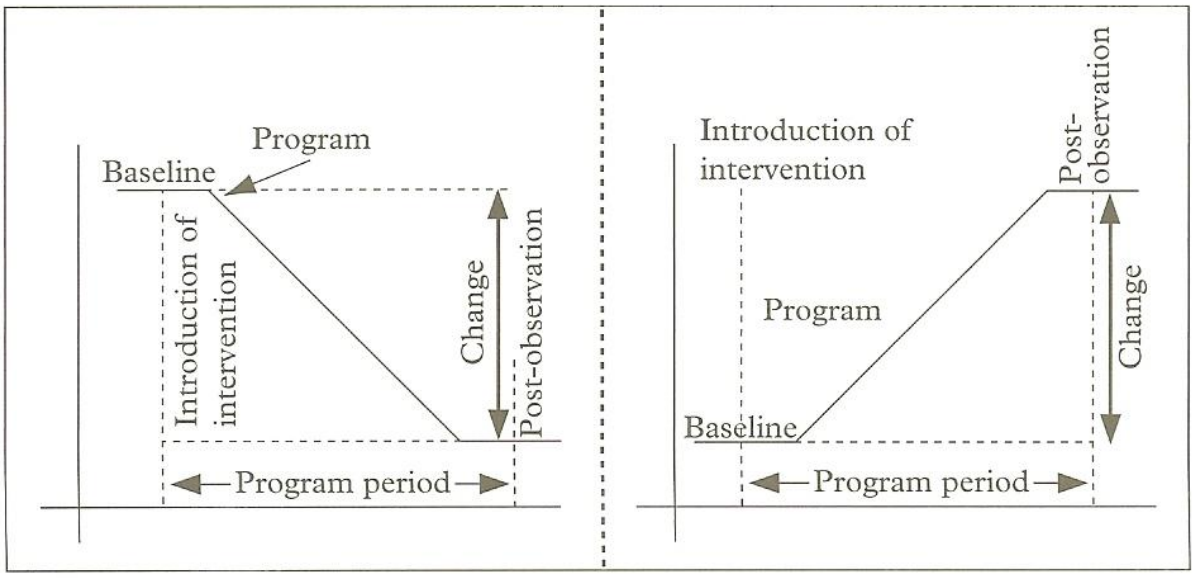

Figure 3-2. Measurement of change through a before-and-after design [Source: Kumar, R. (2005). Research Methodology: A Step-by-Step Guide for Beginners. Second Edition. Thousand Oaks, CA: Sage Publications.]

Table 3-1. List of variables tested in before-and-after model

Variable	Category
Household Income	Income
Per Capita Income	Income
Income to Poverty Ratio	Income
Housing Units	Housing
Occupancy Status	Housing
Units in Structure	Housing
Gross Rents	Housing
Value of Owner-Occupied Housing Units	Housing
Year Built	Housing
Densities of Housing Units and Population	Housing

CHAPTER 4
RESULTS AND ANALYSIS

Overview

Having now described data from selected income and housing variables and analyzed industry profiles of the three case study areas, observations provided by the United States (U.S.) Census and American Community Survey (ACS) data tables will be directly compared to land value taxation theory. Beginning with housing variables and continuing with income variables, expectations of each variable based on theory will be discussed followed by observed data and conclusions derived from the two in a determination section. This categorical analysis will provide a clear synopsis of the presence of land value taxation in U.S. Census and ACS data.

Housing Variables

This section will compare theoretically expectations with observed results for housing variables. There are a total of seven housing variables in this study.

Variable – Total Housing Units

Expectations based on theory

Land value taxation theory pertaining to housing unit construction is more pertinent to density measures. A change to this type of property tax would likely produce a higher density of housing unit construction. Because the tax on land would result in higher costs for land and the relative reduction in the price of improvements, urban areas would be expected to experience increased floor-to-area ratio. For instance, detached single family units may become less affordable of a housing option than townhouses based on land total land coverage. Pertaining to total housing units, supply and demand would have a much greater impact than the property tax policy. Land value

taxation would merely guide the concentration of such units, likely toward increased density.

However, because the three urban areas in this study are essentially built-out older cities, the decreased costs for improvements may prompt an increase in overall units where land value taxation is in place. The combination of higher costs for single-unit, detached homes and reduced costs for multi-unit housing could increase the overall amount of units.

Additionally, according to Bourassa (1990), land value taxation increases the holding costs of vacant parcels and reduces the costs to develop improvements on parcels, which Bourassa calls the liquidity effect and the incentive effect, respectively. Both of these effects should theoretically increase overall unit development in municipalities using land value taxation.

It would be expected that in 2000, Pittsburgh would've experience the greatest degree of housing unit growth in all three cases due to its status as the sole employer of land value taxation at the time. In 2009, we would expect Altoona to have the greatest percentage gain in overall housing units of the three case studies as a result of its adoption of land value taxation and since Pittsburgh rescinded it in 2002.

Observed

Data from Table 4-1 Total Housing Units indicates that in 2000, all three cases studies had experienced a decrease in total housing units over the previous ten years. Wilkes-Barre lost 2.12% of total units, Pittsburgh lost 3.99%, and Altoona lost 4.48%.

During the 2000-2009 period, Pittsburgh's housing stock increased by 1.18%, Wilkes-Barre's remained roughly constant dropping by only 0.24%, and Altoona's housing unit total again fell by 1.53%

Determination

In the case of this variable, theoretical results were not evident in observations from either 2000 or 2009. The only evidence possibly pointing to the significance of land value taxation is that while total units continued to fall in Altoona, reduction slowed from 4.48% in 2000 to 1.53% in 2009.

Pittsburgh continued decline in its amount of total housing stock during the 1990s is likely due to the declining role of its economy in regional and national markets. Its rebound during the first decade of the 20th century could be attributable to growing employment in the health care industry, implementation of property tax abatements on new construction, and a national housing construction boom in the first half of the decade. The property tax abatements are of particular interest in that they have essentially replaced the results of land value taxation by reducing the effective tax rate on improvements relative to the land tax rate (Bourassa, 2009).

In examining Altoona continued reduction in housing units, it becomes difficult to understand why the pattern continued from 1990 through 2009. First, the adoption of land value taxation should increase the development of housing units. Second, the national housing boom of the early 2000s should have impacted Altoona like it did Pittsburgh. Third, Altoona retained more employment between 2001 and 2010 than Pittsburgh or Wilkes-Barre. Yet still, Altoona experienced a decrease in housing units. A possible explanation for this is the move from blue collar to white collar employment in the Altoona economy in conjunction with the city's relative small land area. White collar employment generally leads to less dense housing development patterns. Unable to find housing of sufficient acreage within the city limits, new white collar employees may

have chosen to reside outside the city thus decreasing the demand for housing units within the city.

Variable – Occupancy Status

Expectations based on theory

Much of the theory pertaining to total housing unit construction also applies to occupancy status. Pertaining to occupancy status, again supply and demand would have a much greater impact than the property tax policy. If Bourassa (1990)'s liquidity and incentive effect hypotheses hold true, excess units may be produced in the pursuit of revenue to pay for holding costs, leading to decreased occupancy rate.

Assuming there is an impact from liquidity and incentive effects; by 2009 we would expect occupancy rate decreases in Altoona, increases in Pittsburgh, and a constant rate in Wilkes-Barre.

Observed

According to Table 4-2 Occupancy Status, occupancy increase by 1.39% in the 1990s, and fell in Pittsburgh and Wilkes-Barre by 2.21% and 5.31%, respectively. Between 2000 and 2009, the occupied-to-total unit ratio fell in all three study areas. The number fell by just over 2% in Altoona, by 2.35% in Wilkes-Barre, and by just over 4% in Pittsburgh.

Determination

2009 figures may reflect land value taxation theory, assuming impact from liquidity and incentive effects and other assumptions about the ability of white collar workers to find palatable housing within city limits. Altoona experienced a decrease in occupancy rate over the 2000s after an increase during the 1990s. Pittsburgh saw its occupancy

status decline at an increasing rate. These are both changes that could indicate the presence of land value taxation.

The decline in occupancy figures could be explained in a similar way as Altoona's drop in total housing units. As manufacturing and other blue collar jobs continue to decline while health care, education, and other white collar employment continue to grow, units that were the former residences of lower income workers may remain vacant. New higher wage workers locate beyond the city limits and can afford to commute into the city for work. Thus, as the liquidity and incentive effects induce landowners to maintain more units within the jurisdiction of the land value tax regime, fewer workers might seek housing within the jurisdiction leading to a decline in occupancy figures.

Variable – Units in Structure

Expectations based on theory

Land value taxation's impact on units in structure composition is clear. Land value taxation shifts the burden of property tax from an equal distribution on both land and improvements to an increased burden on land versus improvements. As a result we would expect an increase in improvements per area of land. Thus an increase of the amount of units in structures is likely to occur in municipalities adopting land value taxation.

Accordingly, by 2009 we would expect to see an increase in units in structure composition in Altoona, a decrease in Pittsburgh, and no change in Wilkes-Barre. At the very least, it would be expected that units in structure composition should decrease more in Pittsburgh than Altoona.

Observed

Between 1990 and 2000, Altoona saw little change in its units-per-structure makeup with the exceptions of the 50-unit or more structures category which increased by 2.17%. Pittsburgh remained unchanged except that single-unit detached structures increased by 2.64% and single-unit attached structures decreased by 1.45%. Wilkes-Barre also experienced an increase in single-unit detached structures and a decrease in single-unit attached structures in addition to an increase in two-unit structures.

Between 2000 and 2009, Altoona remained virtually unchanged with a slight increase in the amount of single-unit detached homes. Pittsburgh also essentially maintained its housing unit makeup with only an increase in the amount of single-unit attached structures. Wilkes-Barre's housing unit composition experienced more volatility with an increase in single-unit attached structures of nearly 5% and decreases in "3 or 4", "5 to 9", and "20 to 49" unit structures.

Determination

Little evidence suggesting an impact from land value taxation can be found in Table 4-3 Units in Structure. In fact, Altoona's slight increase in the amount of single-unit detach homes is the opposite of what would be expected theoretically.

Reasoning for this lack of the expected effects of land value taxation on units in structure may also be tied to the shifting economies of Altoona and Pittsburgh. Higher wage earners tend to demand single-unit housing, resulting in lower concentrations of units in structures. Also of note, Pittsburgh's tax abatement policies seemed to have little effect on units in structure composition. Despite the removal of official land value taxation policy in 2001, Pittsburgh's property tax abatement policies have filled the void of the tax regime by effectively reducing the tax rate on improvements relative to the tax

rate on land. The abatements should theoretically encourage more improvements to be consumed and less land, causing increases in the viability of multi-unit structures. Therefore, it would have been expected that the abatements might've prompted increased unit-to-structure ratios, assuming all other factors remained unchanged.

Variable – Property Value

Expectations based on theory

The relationship between land value taxation and property values is complicated. According to Brueckner (1986), if adoption occurs in a relatively small portion of the market area, housing prices are likely to remain constant with the greater market at-large. Combining constant housing prices with increased improvements per area and the reduction in deadweight loss caused by the shifted to land value taxation will produce an increase in property value. In this case, the benefits of the reduction in deadweight loss will outweigh the value depressing effect of the increased land tax rate.

In the case of an entire market area raising the tax rate on land and decreasing the tax rate on improvements, housing prices are likely to fall due to lack of locational advantage in the market and a reduction in the profitability of development. Additionally, the increased tax rate on land cannot be passed on to final demand. Therefore, in this scenario land values should fall. For more on Brueckner (1986), see "A Review of the Literature" in Chapter 2 of this thesis.

Therefore, if theory stays true to form, by 2009 Altoona should experience a decrease in property values as it adopted land value taxation in 2002. While small in land area compared other cities, Altoona represents the largest portion of its market area. Therefore, a change in property tax regime within the City of Altoona would have a significant effect on the housing market. Pittsburgh should experience an increase as

it also represents the largest portion of its market area and rescinded land value taxation in 2001. Wilkes-Barre should experience no change.

Observed

Between 1990 and 2000, owner-occupied housing unit market composition in the three study areas moved similarly. The housing unit market shifted as values for units rose from a predominantly below $35,000 to the $50,000 to $150,000 range. In particular, Altoona saw a drastic reduction in the amount of units valued at $25,000 or less.

While all markets continued to move in the same increased-price direction between 2000 and 2009, increased variation was also observed. Pittsburgh's owner-occupied housing unit market was clearly dichotomous with increases in high end units and decreases in low end categories. Altoona also saw decreases in low end units and Increases in middle to high end units but growth in higher-valued units was less vigorous than in Pittsburgh. The market for owner-occupied housing units in Wilkes-Barre shifted less than in Pittsburgh and Altoona.

Determination

Data from Table 4-4 Value of Owner Occupied Housing Units for the year 2000 does not reflect theoretical effects of land value taxation. Differences between Altoona, which adopted land value taxation in 2002, and Pittsburgh, which rescinded the tax regime in 2001, were slight at best. Theoretically, the two municipalities would have experienced differences in the opposite direction.

Again, Pittsburgh's tax abatement policies come into play in explaining changes in property values. Because the tax abatements effectively reduced the tax rate on improvements relative to that of land value, the Pittsburgh housing market witnessed a

departure from land value taxation policy in name only. As a result, changes in property values in Pittsburgh are likely to be extraneous from the presence or absence of land value taxation policy.

In Altoona, the lack of theoretical effects on property values manifesting themselves could be attributable to the stable economy of Altoona relative to the region and the nation between 2001 and 2010. By increasing its share of employment relative to the nation and attracting higher wage employment, property investment may be likely to also increase relative to the region and nation, especially considering the city's recently-introduced lower relative tax rate on improvements. Increased property investment could spell increased property values, thus negating the theoretical effects of property tax regime change. Additionally, the assumption that the City of Altoona's share of the regional housing market was large enough to impact housing prices may have been incorrect. If so, locational advantage and gains in land rents associated with deadweight loss reduction may have been enough to lead to increased property levels.

Variable – Gross Rent

Expectations based on theory

The theoretical impact of land value taxation on gross rents is also complex. Assuming land value is a proxy for gross rents, theoretical effects of land value taxation on gross rents should mimic its effects on land value. The effect of the adoption of land value taxation on gross rents is likely to depend on the geographic and market scope of adoption.

Accordingly, we would expect to see an increase in Pittsburgh's gross rent despite rescinding land value taxation in 2001, as the Steel City represents a significant portion of the market area. With Altoona adopting the policy in 2002, that city would likely see a

decrease in gross rents as it also represents the most significant portion of its market area. Wilkes-Barre should experience no change with regards to land value taxation.

Observed

Over the past 20 years, rents in Altoona, Wilkes-Barre, and Pittsburgh have all moved in the same direction in terms of gross rents in renter-occupied housing units rising, as shown in Table 4-5 Gross Rents. Renting in Pittsburgh has been most expensive among the three study areas, with Altoona maintaining a slightly more affordable renters market than Wilkes-Barre. Between 2000 and 2009, Pittsburgh also saw a sharp increase of 13% in $1000/month gross rent units, compared to just below 4% in Altoona and Wilkes-Barre.

Determination

Gross rents have not produced evidence of the theoretical effects of land value taxation. While Pittsburgh experienced gross rent increases as predicted by theory, Altoona did as well. The theory pertaining to land value taxation's effect on gross rents is complex and while the tax policy may have had in impact on gross rents it is not overtly clear in the U.S. Census and ASC data.

Again considering Pittsburgh's tax abatement policies, it is surprising that gross rents increased in the 2001-2009 period. As a result of the abatements effectively replacing the land value tax, we would not expect gross rents in Pittsburgh to rebound like they did. It is possible that Pittsburgh's downtown revitalization centered on higher wage employment like health care and education have caused increases in the most expensive categories of gross rent. While failing to explain the entire city, this emergence of high wage employment, particularly downtown, may be responsible for increases in the amount of high end units.

It is possible that Pittsburgh's downtown revitalization centered on higher wage employment like health care and education have caused increases in the most expensive categories of gross rent. While failing to explain the entire city, this emergence of high wage employment, particularly downtown, may be responsible for increases in the amount of high end units.

Altoona's more widespread increased gross rents could potentially be explained by growth in higher wage industries as well, despite more modest gains in very high wage employment in the city compared to Pittsburgh. Wilkes-Barre's gross rents shifted in a similar way to Altoona during the 2001-2009 period and both markets experienced decline in the once-dominant manufacturing industry and growth in the health care and education industries.

Variable - Year Built

Expectations based on theory

Land value taxation's impact on the age of housing stock is unclear. It is clear that the adoption of land value taxation should lead to an increase in improvements per area. However, it is unclear how that increase is to occur. Assuming the housing stock is ill-equipped to handle the increase in improvements per acre as additions to already existing structures, the adoption of land value taxation is likely to result in the demolition of structures of few units in favor of multi-unit new construction. This effect would make housing stock younger. However, if housing stock can absorb the increase in improvements per acre as additions to pre-existing structures, the adoption of the policy is likely to prolong the life of such buildings and increases the age of structures.

As a result, should current housing stock be unsuitable to the addition of new units, Altoona should expect to see a younger housing stock by 2009. Pittsburgh

should expect to see an older housing stock and Wilkes-Barre should expect no change in the age of its housing stock as a result of land value taxation.

Observed

By 2009, data from Table 4-6 Year Structure Built indicates that housing stock in Altoona became slightly younger than in Pittsburgh and Wilkes-Barre. Pre-1940 housing units in Altoona decreased over the period while such units increased in Pittsburgh and Wilkes-Barre. There was slightly more new construction in Pittsburgh than Altoona and nearly zero new construction in Wilkes-Barre.

Determination

Despite Altoona's housing stock becoming slightly younger than that of Pittsburgh, it is difficult to conclude that land value taxation's theoretical impact on the age of housing stock has been realized. As stated in the theoretical analysis of the variable, theory alone cannot accurately describe the tax policy's impact on age of housing stock. The varied and numerous characteristics of housing stock and local housing markets are of too large of scope to be covered in this paper.

The fact that both Pittsburgh and Wilkes-Barre experienced percentage increases in their pre-1940s housing may be an indication that such housing was well built, perhaps constructed better than in Altoona.

Another possible explanation may lie in Altoona's evenly distributed age of housing stock relative to Pittsburgh and Wilkes-Barre. Pittsburgh saw a boom in housing unit construction during the 1950s and Wilkes-Barre saw the same in the 1970s. These booms are still evident in 2009 ACS data with a higher percentage of 1950s housing than from any other decade since 1940 in Pittsburgh and a greater share of housing from the 1970s than any other decade since 1940. A pre-1940s housing

boom may have occurred in Altoona that may have been removed from the market between 2001 and 2009.

A third possible explanation of Altoona's younger housing stock lies in its aforementioned economic growth relative to the region and the nation. Altoona's economy grew faster in terms of employment than the economies of Pittsburgh and Wilkes-Barre. Older housing is often suited to fit the needs of lower income households by way of filtering. Despite new (2000-2009) housing construction being greatest in Pittsburgh, older housing in Pittsburgh and Wilkes-Barre may have remained in the market while similar housing in Altoona dropped out.

Variable – Density Measures

Expectations based on theory

One of the central tenets of land value taxation is its ability to increase density. This theory is supported by Oates & Schwab (2009) and Brueckner & Kim (2003). With the relative tax rate reduced on improvements and increased on land, more improvements will be consumed and less land will be consumed. Thus, density will increase.

However, E. Mills (1998) argues the opposite, stating a city's adoption of land value taxation will lead to increased employment per area ratios and, in turn, will cause more workers to move to the area faster than building high can increase. As a result, land value taxation will lead to increases in density in the short term and enlargement of cities in the long term. For more on this debate, see "Land Development Pattern Implications" in Chapter 2.

Should the former theory hold true, we would expect Altoona to have increased density and Pittsburgh to have decreased density by 2009. Density in Wilkes-Barre

would have not been expected to change. If the latter theory should hold true, Altoona would expect to experience a decrease in density by 2009 with Pittsburgh experiencing an increase in density. Again, Wilkes-Barre would not be expected to see a change in density as a result of land value taxation.

For the sake of this experiment one of these theories will be chosen as the hypothesis. It will be assumed that the reduced tax rate on improvements relative to the tax rate on land will encourage more improvements to be consumed and less land. Thus, density will increase.

Observed

According to Table 4-7 Density Measures, between 2000 and 2009, all three cities experienced different changes in density measures. Altoona's unit and population densities fell by 1.54% and 6.01%, respectively. It was the only area to experience a substantial drop in unit density. Overall, Altoona saw its density fall the most over the 20 year period. Pittsburgh appeared to recapture unit density growth during the 2000s. All three study areas continue to experience population density decline, however that rate of density decline between in 2000 and 2009 increased only in Altoona.

Determination

Altoona's density measures decreased over the 7 years after its adoption of land value taxation while Pittsburgh actually experienced a unit density increase over the 8 years following its termination. Therefore, density measures of the three case study areas do not offer evidence that the adoption of land value taxation increases density.

Additionally, even if the Mills (1998) theory that land value taxation increases density in the short term and decreases it in the long term is assumed true, it would not be clear that it has manifested itself in this data. Altoona had only put in place land

value taxation policy for seven years by 2009 and differentiation from short and long term would be difficult to discern. Population and unit density are some of the variables most directly related to the property tax scheme. This deviation from theoretically expected effects makes it even more difficult to argue that the presence of land value taxation has significantly impacted the U.S. Census and ASC data of Altoona or of Pittsburgh.

For an explanation of why theoretical effects on density were not presented in Pittsburgh, the tax abatement policies may again offer solutions. As previously mentioned, despite the removal of official land value taxation policy in 2001, Pittsburgh's property tax abatement policies have filled the void of the tax regime by effectively reducing the tax rate on improvements relative to the tax rate on land. As a result, the abatements encourage more improvements to be consumed and less land, perpetuating increased density.

Altoona's continued drop in density despite adoption of land value taxation in 2002 could be the result of economy-related issues. First, Altoona's relatively successful local economy has replaced generally lower wage employment with higher wage employment. As income increases, demand for larger properties and more privacy tend to increase as well. As a result, the change in demographics away from low wage earners may have impacted the decline in density.

Income Variables

This section will compare theoretically expectations with observed results for income variables. There are a total of three income variables in this study.

Variable – Household Income

Expectations based on theory

The theoretical relationship between household income and land value taxation is not overtly clear. Land value taxation is directly related to improvement (i.e. housing, etc.) and land markets. However, reduction in deadweight loss in economic systems is an impact that land value taxation makes that can be correlated to income. This reduction in deadweight loss improves the efficiency of economic systems, increasing wealth generation and likely median income. For more information on deadweight loss, see the "Neutrality" of Chapter 2 of this thesis.

Accordingly, in 2000, Pittsburgh would be expected to have the highest median household income. At that time, Pittsburgh had implemented land value taxation while Altoona and Wilkes-Barre hadn't. Thus, Pittsburgh would be expected to theoretically have the most efficient local economy.

By 2009, higher median income would be expected to grow in Altoona than in Pittsburgh. At that time, Altoona had adopted land value taxation while Pittsburgh had rescinded it. Altoona should also have a higher median income than Wilkes-Barre based on property tax scheme alone. The increases in market efficiency should result from less deadweight loss. Therefore, higher profits and higher incomes should be expected in areas using land value taxation.

Observed

According to 2000 data from Table 4-8 Household Income, all three case study areas experienced roughly the same rate of median household income growth during the 1990s. Pittsburgh experienced more growth in households with incomes of

$100,000 or more than Altoona or Wilkes-Barre and had the highest median household income at $28,588.

Table 4-8 Household Income also shows that the median household income in Pittsburgh and Altoona grew from 2000 to 2009, but at slower rates than during the 1990s. Pittsburgh's median household income grew by 24.99% while Altoona's grew by only 19.03%. Wilkes-Barre's median household income stayed nearly the same as it grew by a mere 7.44% between 2000 and 2009.

Determination

Data from Table 4-8 Household Income matches the theoretical expectation in the year 2000 as Pittsburgh has the highest median income of the three study areas and also grew the most during the preceding decade. However, 2009 data from Table 4-9 Median Household Income is not congruent with theory as Altoona has actually fallen further behind Pittsburgh in terms of median household income and median household income growth. Altoona did outperform Wilkes-Barre in this regard over the period, however, which theory would likely predict.

Again, the impact of Pittsburgh's tax abatement policies likely presents itself here. Essentially acting like land value taxation, the tax abatements also remove deadweight loss from the economic system and increase economic efficiency. Pittsburgh failed to relinquish its ability to reduce deadweight loss and therefore, its maintenance of relatively high median household income is unsurprising.

In Altoona, strong increases in median household income were likely tempered by its relatively small and less diverse economy in comparison with Pittsburgh. Both cities experienced increases in median household income. Pittsburgh's median household income increased more than Altoona's. On the other hand, Altoona experienced gains

in its share of national employment while Pittsburgh did not. Therefore, it may be concluded that while Altoona experienced rises in its share of national employment, employment in high wage sectors, and median household income, it did not attract the amount of very high wage employment that Pittsburgh did. Thus, Pittsburgh's growth in median household income was stronger than Altoona's.

Over the study period, Altoona also maintained a residual presence of low wage and low growth industries despite increased significance in the health care and administrative support and waste services industries. According to shift-share analysis, Altoona's economy continues to be somewhat reliant upon the manufacturing and construction sectors that experienced slow growth over the period. While a shift to from blue to white collar work continued to occur in Altoona, the remaining presence of low wage employment may have dampened median income growth.

Variable – Per Capita Income

Expectations based on theory

The same theoretical argument associated with the impact of land value taxation for household income holds true for per capita income. Assuming that reducing deadweight loss improves the efficiency of economic systems and therefore increases wealth and income generation, municipalities with land value taxation in place should experience higher per capita income than those municipalities without it.

As in household income, in 2000, Pittsburgh would be expected to have the highest median per capita income as it was the only one of the case studies implementing land value taxation at that time.

By 2009, higher per capita income would be expected in Altoona than in Pittsburgh. Altoona should also have a higher per capita income than Wilkes-Barre

based on property tax scheme alone. The increases in market efficiency should result in higher profits and higher incomes in areas using land value taxation.

Observed

According to 2000 data from Table 4-10 Per Capita Income, Pittsburgh had the highest overall per capita income and highest per capita income growth rate, followed in both respects by Altoona and then Wilkes-Barre.

By 2009, Table 4-10 shows that Pittsburgh continued to have the highest per capita income and highest per capita income growth rate from 2000 to 2009 of the three case study areas. Again this was followed by Altoona then Wilkes-Barre. Also of note, all three study areas experienced decreased per capita income growth rates.

Determination

Just as in the examination of household income data, observations in the year 2000 matched expectations but failed to do so in 2009. Altoona's adoption of land value taxation and Pittsburgh's termination of it should have theoretically resulted in different outcomes for the two municipalities.

Also just as in the examination of household income data, the impact of Pittsburgh's tax abatements may have been apparent. Continued deadweight loss reduction should spell continued high income levels. The observations in Altoona could also be explained by the lingering presence of relatively low wage employment and lack of very high wage employment. These factors may have arisen from the relatively small size and industrial homogeneity of the market in Altoona.

Variable – Income to Poverty Ratio

Expectations based on theory

Income to poverty ratio is calculated by dividing a family's or person's income by their poverty threshold. Values for the ratio of income to poverty level measure an area's breadth and depth of poverty. Ratios below 1.0 indicate poverty, with ratios between 1.25 and 1.0 representing "near poverty" and ratios below 0.5 indicating "severe poverty" (U.S. Census Bureau). Table 4-11 Ratio of Income to Poverty Level shows the amount of individuals within particular ratio ranges from the three case study areas.

The same income arguments pertain to this theoretical expectation. As previously stated, economic efficiency gains should be the tide that raises all incomes on one side of this ratio. A more efficient economy should lead to more efficient wealth distribution. Henry George's seminal land value taxation work, *Progress and Poverty*, had as much to do with economic efficiency as with wealth distribution and poverty reduction.

Therefore, in 2000, we would expect that Pittsburgh would have the highest income to poverty ratios. Altoona should be expected to experience improvements in this ratio by 2009 after policy intervention. Pittsburgh should theoretically drop off in this ratio as they reduce economic efficiency and reduce the ability of low income residents to compete for housing based on size. The income to poverty ratio in Wilkes-Barre should not be affected by land value taxation.

Observed

Pittsburgh had the least healthy income to poverty ratio figures during the 1990s according to Table 4-11 Income to Poverty Ratio. The city had the highest rates indicating poverty (ratios below 1) and severe poverty (ratios below .5).

By 2009, all three study areas showed worsening income-to-poverty ratios. However, Altoona faired the best of the three over the first decade of the 21st century where ratios indicating severe poverty fell by 1.98%. Pittsburgh saw small increases in ratios indicating poverty and severe poverty but figures were worst in Wilkes-Barre where ratios indicating poverty increased by 6% and severe poverty by over 4%.

Determination

Data for this variable from 2000 does not match theory as Pittsburgh, which should have performed best, performed worst. Income to poverty ratios in Altoona and Wilkes-Barre were similar which was anticipated by theory.

Data from 2000 to 2009 correlated better with theory. While income to poverty ratios declined across the board, Altoona performed better than Pittsburgh and far better than Wilkes-Barre.

The fact that income to poverty ratios performed better in Altoona and Pittsburgh than in Wilkes-Barre between 2000 and 2009 is an encouraging sign for the prospects of land value taxation. This data may show that the reduction in deadweight loss, emanating from Altoona's adoption of the tax regime in 2002 and Pittsburgh's lateral shift from the regime to tax abatement policies, allowed the two cities to outperform Wilkes-Barre.

Summary

In this chapter, we have examined expected theoretical results of land value taxation and their observed counterparts from Altoona, Pittsburgh and Wilkes-Barre, PA. Data for selected housing and income characteristics from the 1990 and 2000 U.S. Census and the 2005-2009 ACS was compiled to examine land value taxation as a policy intervention on affecting important variables. Comparing the theoretical effects

with cross-sectional observations, conclusions and determinations have been drawn as to whether the impact of land value taxation has been made evident in U.S. Census and ACS data.

The next and final chapter, Chapter 5 Findings and Conclusions, will discuss the significance of the results obtained in this chapter. Amassing this chapter's data and results holistically, final conclusions will be drawn interpreting the effects of land value taxation on U.S. Census and ACS data in the three case study areas.

Table 4-1. Total housing units

	1990	2000	Change %	2009	Change %
Altoona city, Pennsylvania	22,698	21,682	-4.48	21,348	-1.54
Pittsburgh city, Pennsylvania	170,159	163,366	-3.99	165,294	1.18
Wilkes-Barre city, Pennsylvania	20,734	20,294	-2.12	20,245	-0.24

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-2. Occupancy status

Altoona city, Pennsylvania	1990	2000	Change %	2009	Change %
Occupied	20,684	20,060	1.39	19,316	-2.04
Vacant	2,014	1,622	-1.39	2,032	2.04
Total	22,698	21,682	-4.48	21,348	-1.54
Pittsburgh city, Pennsylvania	1990	2000	Change %	2009	Change %
Occupied	153,483	143,739	-2.21	138,739	-4.05
Vacant	16,676	19,627	2.21	26,555	4.05
Total	170,159	163,366	-3.99	165,294	1.18
Wilkes-Barre city, Pennsylvania	1990	2000	Change %	2009	Change %
Occupied	19,435	17,961	-5.23	17,442	-2.35
Vacant	1,299	2,333	5.23	2,803	2.35
Total	20,734	20,294	-2.12	20,245	-0.24

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-3. Units in structure

Altoona city, Pennsylvania	1990	2000	Change %	2009	Change %
1, detached	15,818	15,028	-0.38	15,009	1.00
1, attached	1,141	941	-0.69	938	0.05
2	2,104	1,871	-0.64	1,826	-0.08
3 or 4	1,131	1,219	0.64	1,127	-0.34
5 to 9	798	866	0.48	684	-0.79
10 to 19	553	469	-0.27	653	0.90
20 to 49	302	265	-0.11	180	-0.38
50 or more	549	996	2.17	870	-0.52
Mobile home or trailer	35	27	-0.03	61	0.16
Other	267	0	-1.18	0	0.00
Total	22,698	21,682	-4.48	21,348	-1.54

Pittsburgh city, Pennsylvania	1990	2000	Change %	2009	Change %
1, detached	70,048	71,570	2.64	73,751	0.81
1, attached	27,756	24,277	-1.45	26,736	1.31
2	15,965	15,894	0.35	14,512	-0.95
3 or 4	13,302	12,749	-0.01	12,369	-0.32
5 to 9	12,235	10,818	-0.57	10,723	-0.13
10 to 19	8,496	7,794	-0.22	6,992	-0.54
20 to 49	6,616	5,499	-0.52	6,347	0.47
50 or more	13,725	14,382	0.74	13,186	-0.83
Mobile home or trailer	422	354	-0.03	668	0.19
Other	1,594	29	-0.92	10	-0.01
Total	170,159	163,366	-3.99	165,294	1.18

Table 4-3. Continued

Wilkes-Barre city, Pennsylvania	1990	2000	Change %	2009	Change %
1, detached	9,018	9,395	2.80	9,515	0.70
1, attached	3,147	2,573	-2.50	3,507	4.64
2	2,111	2,295	1.13	2,257	-0.16
3 or 4	1,860	2,008	0.92	1,395	-3.00
5 to 9	1,208	1,175	-0.04	906	-1.31
10 to 19	495	454	-0.15	501	0.24
20 to 49	883	693	-0.84	446	-1.21
50 or more	1,612	1,689	0.55	1,672	-0.06
Mobile home or trailer	14	12	-0.01	46	0.17
Other	386	0	-1.86	0	0.00
Total	20,734	20,294	-2.12	20,245	-0.24

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-4. Value of specified owner-occupied housing units

Altoona city, Pennsylvania	1990	2000	Change %	2009	Change %
Less than $15,000	1,760	358	-10.78	231	-1.02
$15,000 to $19,999	1,597	306	-9.93	138	-1.34
$20,000 to $24,999	1,505	421	-8.30	278	-1.15
$25,000 to $29,999	1,440	696	-5.61	199	-3.97
$30,000 to $34,999	1,257	751	-3.75	399	-2.82
$35,000 to $39,999	919	878	-0.12	430	-3.59
$40,000 to $49,999	1,624	1,604	0.21	1,050	-4.45
$50,000 to $59,999	1,068	1,572	4.27	1,316	-2.09
$60,000 to $69,999		1,563		1,304	-2.11
$60,000 to $74,999	945	2157.5	9.89	1973	-1.54
$70,000 to $79,999		1,189		1,338	1.14
$80,000 to $89,999		946		1,330	3.02
$90,000 to $99,999		720		1,126	3.20
$75,000 to $99,999	504	2260.5	14.13	3125	6.79
$100,000 to $124,999	128	795	5.35	1,233	3.45
$125,000 to $149,999	69	385	2.54	978	4.70
$150,000 to $174,999	80	122	0.35	540	3.32
$175,000 to $199,999	0	100	0.80	286	1.47
$200,000 to $249,999	0	68	0.54	150	0.65
$250,000 to $299,999	9	21	0.10	115	0.75
$300,000 to $399,999	0	33	0.26	112	0.63
$400,000 to $499,999	0	0	0.00	15	0.12
$500,000 or more	0	7	0.06	20	0.10
Total:	12,905	12,535	-2.87	12,588	0.42

Table 4-4. Continued

Pittsburgh city, Pennsylvania	1990	2000	Change %	2009	Change %
Less than $15,000	5,033	1,909	-4.31	1155	-1.27
$15,000 to $19,999	4,786	1,894	-3.98	886	-1.62
$20,000 to $24,999	5,008	2,260	-3.75	1,437	-1.41
$25,000 to $29,999	5,920	2,876	-4.13	2,105	-1.41
$30,000 to $34,999	6,715	3,741	-3.96	1,829	-3.09
$35,000 to $39,999	6,970	4,542	-3.12	2,487	-3.38
$40,000 to $49,999	11,817	8,253	-4.46	4,941	-5.56
$50,000 to $59,999	7,924	8,050	0.79	6,037	-3.74
$60,000 to $69,999		7,693		6,570	-2.47
$60,000 to $74,999	6,600	10839.5	6.87	9924.5	-2.55
$70,000 to $79,999		6,293		6,709	-0.17
$80,000 to $89,999		4,684		6,436	1.87
$90,000 to $99,999		2,989		4,243	1.38
$75,000 to $99,999	3,962	10819.5	10.60	14033.5	3.16
$100,000 to $124,999	1,187	3,495	3.56	6,813	4.17
$125,000 to $149,999	941	2,060	1.75	4,136	2.63
$150,000 to $174,999	604	1,047	0.71	3,663	3.49
$175,000 to $199,999	596	976	0.62	2,018	1.33
$200,000 to $249,999	674	1,012	0.56	2,957	2.57
$250,000 to $299,999	406	803	0.63	1,906	1.43
$300,000 to $399,999	398	840	0.69	2,771	2.57
$400,000 to $499,999	222	450	0.36	1,275	1.09
$500,000 or more	320	701	0.60	1,912	1.59
Total:	70,083	66,568	-5.02	72,286	8.59

Table 4-4. Continued

Wilkes-Barre city, Pennsylvania	1990	2000	Change %	2009	Change %
Less than $15,000	253	62	-2.12	78	0.14
$15,000 to $19,999	381	83	-3.31	16	-0.78
$20,000 to $24,999	433	124	-3.42	99	-0.34
$25,000 to $29,999	729	163	-6.29	95	-0.83
$30,000 to $34,999	903	192	-7.90	281	0.88
$35,000 to $39,999	934	402	-5.83	284	-1.50
$40,000 to $49,999	1,970	1,149	-8.83	553	-7.14
$50,000 to $59,999	1,195	1,461	3.43	933	-6.56
$60,000 to $69,999		1,495		1,661	1.05
$60,000 to $74,999	1,086	2,039	11.30	2,240	1.16
$70,000 to $79,999		1,087		1,158	0.22
$80,000 to $89,999		854		922	0.31
$90,000 to $99,999		617		831	2.03
$75,000 to $99,999	665	2,015	15.73	2,332	2.45
$100,000 to $124,999	165	496	3.86	967	4.92
$125,000 to $149,999	105	218	1.33	451	2.45
$150,000 to $174,999	26	106	0.93	360	2.74
$175,000 to $199,999	38	55	0.21	132	0.82
$200,000 to $249,999	37	92	0.64	97	0.01
$250,000 to $299,999	12	26	0.16	113	0.94
$300,000 to $399,999	0	4	0.05	43	0.43
$400,000 to $499,999	0	5	0.06	11	0.06
$500,000 or more	0	0	0.00	14	0.15
Total:	8,932	8,691	-2.70	9,099	4.69

Table 4-5. Gross rent

Altoona city, Pennsylvania With cash rent:	1990	2000	Change %	2009	Change %
Less than $100	191	200	0.20	58	-2.06
$100 to $149	582	305	-3.85	69	-3.44
$150 to $199	639	511	-1.65	478	-0.37
$200 to $249	956	417	-7.56	353	-0.85
$250 to $299	1,382	555	-11.63	326	-3.27
$300 to $349	993	693	-4.05	256	-6.33
$350 to $399	605	900	4.52	426	-6.84
$400 to $449	564	738	2.74	576	-2.24
$450 to $499	337	558	3.35	789	3.56
$500 to $549	176	496	4.74	612	1.84
$550 to $599	95	305	3.10	280	-0.30
$600 to $649	48	322	4.03	449	1.96
$650 to $699	28	186	2.32	323	2.08
$700 to $749	7	87	1.17	240	2.29
$750 to $999	15	115	1.47	856	11.04
$1,000 or more	42	94	0.78	346	3.77
No cash rent	339	353	0.32	291	-0.84
Total:	6,999	6,835		6728	

Table 4-5. Continued

Pittsburgh city, Pennsylvania With cash rent:	1990	2000	Change %	2009	Change %
Less than $100	3,223	1,764	-1.85	524	-1.78
$100 to $149	5,645	2,346	-4.32	1,002	-1.91
$150 to $199	4,068	3,155	-0.98	1,889	-1.75
$200 to $249	4,340	2,527	-2.27	2,047	-0.60
$250 to $299	6,145	2,359	-4.99	1,732	-0.83
$300 to $349	8,471	3,760	-6.14	1,558	-3.13
$350 to $399	9,598	4,470	-6.65	1,469	-4.30
$400 to $449	7,671	6,250	-1.41	2,414	-5.47
$450 to $499	6,106	6,440	1.01	3,052	-4.78
$500 to $549	4,640	6,294	2.80	3,906	-3.28
$550 to $599	2,999	5,208	3.47	4,085	-1.43
$600 to $649	2,389	4,649	3.49	4,833	0.50
$650 to $699	1,546	3,753	3.34	4,315	1.03
$700 to $749	997	2,866	2.81	3,940	1.76
$750 to $999	2,266	7,063	7.18	15,017	12.32
$1,000 or more	662	3,141	3.67	11,690	13.02
No cash rent	2,203	2,647	0.83	2,980	0.63
Total:	72,969	68,692		66,453	

Table 4-5. Continued

Wilkes-Barre city, Pennsylvania With cash rent:	1990	2000	Change %	2009	Change %
Less than $100	302	208	-0.80	210	0.02
$100 to $149	744	307	-4.42	75	-2.78
$150 to $199	789	521	-2.35	355	-1.99
$200 to $249	923	444	-4.73	303	-1.69
$250 to $299	1,201	461	-7.56	355	-1.27
$300 to $349	1,273	826	-3.97	266	-6.71
$350 to $399	1,407	1,003	-3.30	266	-8.83
$400 to $449	719	913	3.11	506	-4.88
$450 to $499	478	860	5.10	524	-4.03
$500 to $549	379	536	2.30	663	1.52
$550 to $599	230	555	4.15	726	2.05
$600 to $649	124	332	2.63	667	4.02
$650 to $699	63	327	3.23	457	1.56
$700 to $749	50	214	2.02	666	5.42
$750 to $999	70	297	2.80	1,254	11.47
$1,000 or more	37	137	1.24	460	3.87
No cash rent	392	403	0.56	590	2.24
Total:	9,181	8,344		8343	

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-6. Year structure built

Altoona city, Pennsylvania	1990	%	2000	%	% Change	2009	%	% Change
2005 or later	0	0.00	0	0.00	0.00	25	0.12	0.12
2000 to 2004	0	0.00	0	0.00	0.00	296	1.39	1.39
1990 to 1999	0	0.00	729	3.36	3.36	753	3.53	0.17
1980 to 1989	827	3.64	642	2.96	-0.68	663	3.11	0.14
1970 to 1979	2,108	9.29	1,779	8.20	-1.08	1,721	8.06	-0.14
1960 to 1969	1,647	7.26	1,508	6.96	-0.30	1,765	8.27	1.31
1950 to 1959	1,796	7.91	2,249	10.37	2.46	2,375	11.13	0.75
1940 to 1949	2,254	9.93	2,702	12.46	2.53	2,581	12.09	-0.37
1939 or earlier	14,066	61.97	12,073	55.68	-6.29	11,169	52.32	-3.36
Total	22,698	100	21,682	100	-4.48	21,348	100.00	-1.54

Table 4-6. Continued

Pittsburgh city, Pennsylvania	1990	%	2000	%	% Change	2009	%	% Change
2005 or later	0	0.00	0	0.00	0.00	1,181	0.71	0.71
2000 to 2004	0	0.00	0	0.00	0.00	2,994	1.81	1.81
1990 to 1999	0	0.00	3,834	2.35	2.35	4,227	2.56	0.21
1980 to 1989	8,015	4.71	5,925	3.63	-1.08	6,753	4.09	0.46
1970 to 1979	9,919	5.83	10,275	6.29	0.46	10,949	6.62	0.33
1960 to 1969	15,627	9.18	15,513	9.50	0.31	12,046	7.29	-2.21
1950 to 1959	21,276	12.50	22,896	14.02	1.51	22,437	13.57	-0.44
1940 to 1949	21,269	12.50	22,152	13.56	1.06	17,066	10.32	-3.24
1939 or earlier	94,053	55.27	82,771	50.67	-4.61	87,641	53.02	2.36
Total	170,159	100	163,366	100	-3.99	165,294	100	1.18

Table 4-6. Continued

Wilkes-Barre city, Pennsylvania	1990	%	2000	%	% Change	2009	%	% Change
2005 or later	0	0.00	0	0.00	0.00	20	0.10	0.10
2000 to 2004	0	0.00	0	0.00	0.00	61	0.30	0.30
1990 to 1999	0	0.00	252	1.24	1.24	276	1.36	0.12
1980 to 1989	391	1.89	515	2.54	0.65	760	3.75	1.22
1970 to 1979	3,408	16.44	2,877	14.18	-2.26	2,089	10.32	-3.86
1960 to 1969	1,098	5.30	1,292	6.37	1.07	1,102	5.44	-0.92
1950 to 1959	1,001	4.83	1,136	5.60	0.77	1,321	6.53	0.93
1940 to 1949	1,515	7.31	1,993	9.82	2.51	1,561	7.71	-2.11
1939 or earlier	13,321	64.25	12,229	60.26	-3.99	13,055	64.49	4.23
Total	20,734	100	20,294	100	-2.12	20,245	100	-0.24

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-7. Density measurements

Altoona city, Pennsylvania					
Year	1990	2000	% Change	2009	% Change
Unit Density	2,323.62	2,219.61	-4.48	2,185.42	-1.54
Population Density	5,311.12	5,069.93	-4.54	4,765.48	-6.01
Pittsburgh city, Pennsylvania					
Year	1990	2000	% Change	2009	% Change
Unit Density	3,061.27	2,939.06	-3.99	2,973.75	1.18
Population Density	6,654.36	6,019.01	-9.55	5,633.20	-6.41
Wilkes-Barre city, Pennsylvania					
Year	1990	2000	% Change	2009	% Change
Unit Density	3,027.33	2,963.09	-2.12	2,955.94	-0.24
Population Density	6,938.75	6,296.31	-9.26	5,998.60	-4.73
US					
Year	1990	2000	% Change	2009	% Change
Unit Density	70.31	79.56	13.15	85.22	7.12
Population Density	28.91	32.77	13.34	36.10	10.18

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-8. Household income

	Altoona city, Pennsylvania				
	1990	2000	Change %	2009	Change %
Less than $5,000	1,646				
$5,000 to $9,999	3,311				
Less than $10,000	4,957	2,990	-9.15	2,250	-3.23
$10,000 to $12,499	1,568				
$12,500 to $14,999	1,178				
$10,000 to $14,999	2,746	2,280	-1.97	1,781	-2.13
$15,000 to $17,499	1,241				
$17,500 to $19,999	1,046				
$15,000 to $19,999	2,287	1,920	-1.53	1,825	-0.11
$20,000 to $22,499	1,157				
$22,500 to $24,999	924				
$20,000 to $24,999	2,081	1,723	-1.51	1,285	-1.92
$25,000 to $27,499	863				
$27,500 to $29,999	957				
$25,000 to $29,999	1,820	1,602	-0.85	1,563	0.12
$30,000 to $32,499	1,024				
$32,500 to $34,999	762				
$30,000 to $34,999	1,786	1,342	-1.98	1,356	0.34
$35,000 to $37,499	711				
$37,500 to $39,999	491				
$35,000 to $39,999	1,202	1,362	0.95	927	-1.98
$40,000 to $42,499	520				
$42,500 to $44,999	463				
$40,000 to $44,999	983	1,207	1.24	815	-1.79
$45,000 to $47,499	435				
$47,500 to $49,999	312				
$45,000 to $49,999	747	926	0.99	1,048	0.82
$50,000 to $54,999	496				

Table 4-8. Continued

Altoona city, Pennsylvania

	1990	2000	Change %	2009	Change %
$55,000 to $59,999	342				
$50,000 to $59,999	838	1,608	3.94	1,637	0.47
$60,000 to $74,999	687	1,375	3.51	1,845	2.71
$75,000 to $99,999	252	1,071	4.11	1,785	3.91
$100,000 to $124,999	104	390	1.44	706	1.71
$125,000 to $149,999	27	119	0.46	322	1.07
$150,000 or more	106	176	0.36	171	0.01
Total:	20,623	20,091	-2.58	19,316	-3.86

Table 4-8. Continued

	Pittsburgh city, Pennsylvania				
	1990	2000	Change %	2009	Change %
Less than $5,000	16,714				
$5,000 to $9,999	24,399				
Less than $10,000	41,113	25,927	-8.73	19,523	-3.96
$10,000 to $12,499	9,858				
$12,500 to $14,999	7,825				
$10,000 to $14,999	17,683	13,668	-2.00	11,561	-1.18
$15,000 to $17,499	8,367				
$17,500 to $19,999	7,365				
$15,000 to $19,999	15,732	12,657	-1.44	10,372	-1.33
$20,000 to $22,499	7,619				
$22,500 to $24,999	6,143				
$20,000 to $24,999	13,762	11,949	-0.65	10,008	-1.10
$25,000 to $27,499	6,654				
$27,500 to $29,999	5,604				
$25,000 to $29,999	12,258	10,074	-0.97	8,711	-0.73
$30,000 to $32,499	5,995				
$32,500 to $34,999	4,471				
$30,000 to $34,999	10,466	9,154	-0.45	8,123	-0.51
$35,000 to $37,499	4,846				
$37,500 to $39,999	3,662				
$35,000 to $39,999	8,508	8,065	0.07	6,998	-0.57
$40,000 to $42,499	3,804				
$42,500 to $44,999	2,935				
$40,000 to $44,999	6,739	7,163	0.60	6,863	-0.04
$45,000 to $47,499	3,133				
$47,500 to $49,999	2,020				
$45,000 to $49,999	5,153	6,213	0.97	6,266	0.19
$50,000 to $54,999	4,218				

Table 4-8. Continued

	Pittsburgh city, Pennsylvania				
	1990	2000	Change %	2009	Change %
$55,000 to $59,999	3,214				
$50,000 to $59,999	7,432	9,788	1.97	10,126	0.49
$60,000 to $74,999	6,285	10,694	3.35	11,404	0.78
$75,000 to $99,999	3,972	8,366	3.23	12,176	2.96
$100,000 to $124,999	1,673	4,084	1.75	6,472	1.82
$125,000 to $149,999	805	1,759	0.70	3,235	1.11
$150,000 or more	2,026	4,191	1.60	6,901	2.06
Total:	153,607	143,752	-6.42	138,739	-3.49

Table 4-8. Continued

	Wilkes-Barre city, Pennsylvania				
	1990	2000	Change %	2009	Change %
Less than $5,000	1,612				
$5,000 to $9,999	3,367				
Less than $10,000	4,979	3,070	-8.69	2,786	-1.16
$10,000 to $12,499	1,500				
$12,500 to $14,999	1,163				
$10,000 to $14,999	2,663	2,150	-1.81	1,908	-1.06
$15,000 to $17,499	1,228				
$17,500 to $19,999	953				
$15,000 to $19,999	2,181	1,803	-1.25	1,559	-1.12
$20,000 to $22,499	976				
$22,500 to $24,999	753				
$20,000 to $24,999	1,729	1,458	-0.83	1,480	0.35
$25,000 to $27,499	968				
$27,500 to $29,999	700				
$25,000 to $29,999	1,668	1,446	-0.58	1,308	-0.57
$30,000 to $32,499	866				
$32,500 to $34,999	543				
$30,000 to $34,999	1,409	1,216	-0.52	1,113	-0.40
$35,000 to $37,499	673				
$37,500 to $39,999	505				
$35,000 to $39,999	1,178	1,090	-0.03	766	-1.69
$40,000 to $42,499	548				
$42,500 to $44,999	398				
$40,000 to $44,999	946	968	0.50	715	-1.30
$45,000 to $47,499	343				
$47,500 to $49,999	359				
$45,000 to $49,999	702	796	0.80	470	-1.75
$50,000 to $54,999	455				

Table 4-8. Continued

	Wilkes-Barre city, Pennsylvania				
	1990	2000	Change %	2009	Change %
$55,000 to $59,999	334				
$50,000 to $59,999	789	1,165	2.41	1,524	2.24
$60,000 to $74,999	550	1,156	3.60	1,320	1.12
$75,000 to $99,999	290	1,011	4.14	1,487	2.88
$100,000 to $124,999	119	324	1.19	520	1.17
$125,000 to $149,999	7	95	0.49	325	1.33
$150,000 or more	74	171	0.57	161	-0.03
Total:	19,284	17919	-7.08	17442	-2.66

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-9. Median household income

	1990	2000	Change %	2009	Change %
Altoona city, Pennsylvania	20,695	28,248	36.50	33,623	19.03
Pittsburgh city, Pennsylvania	20,747	28,588	37.79	35,732	24.99
Wilkes-Barre city, Pennsylvania	19,525	26,711	36.80	28,699	7.44

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-10. Per capita income

	1990	2000	Change %	2009	Change %
Altoona city, Pennsylvania	10,398	15,213	46.31	18,272	20.11
Pittsburgh city, Pennsylvania	12,580	18,816	49.57	24,616	30.82
Wilkes-Barre city, Pennsylvania	10,513	15,050	43.16	17,171	14.09

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

Table 4-11. Ratio of income to poverty level

	Altoona city, Pennsylvania							
	1990	%	2000	%	Change %	2009	%	Change %
Under .50	3,899	7.62	3,522	7.34	-0.29	2,386	5.36	-1.98
.50 to .74	2,532	4.95	2,340	4.87			0.00	
.75 to .99	2,787	5.45	2,634	5.49			0.00	
.50 to .99	5,319	10.40	4,974	10.36	-0.04	6,050	13.58	3.22
Under 1.00	9,218	18.03	8,496	17.69	-0.33	8,436	18.94	1.25
1.00 to 1.24	2,695	5.27	2,917	6.08	0.81	3,135	7.04	0.96
1.25 to 1.49	3,343	6.54	3,157	6.58	0.04	2,636	5.92	-0.66
1.50 to 1.74	2,888	5.65	2,633	5.48			0.00	
1.75 to 1.84	1,226	2.40	1,223	2.55			0.00	
1.50 to 1.84	4,114	8.04	3,856	8.03	-0.01	3,681	8.26	0.23
1.85 to 1.99	1,932	3.78	1,533	3.19	-0.59	1,034	2.32	-0.87
2.00 and over	29,837	58.34	28,056	58.43	0.09	25,619	57.52	-0.91
1.00 and over	41,921	81.97	39,519	82.31	0.33	36,105	81.06	-1.25
Total Pop.	51,139		48,015		-6.11	44,541		-7.24

Table 4-11. Continued

	Pittsburgh city, Pennsylvania							
	1990	%	2000	%	Change %	2009	%	Change %
Under .50	39,589	11.28	32,551	10.39	-0.89	30,889	10.56	0.18
.50 to .74	17,006	4.85	15,865	5.06			0.00	
.75 to .99	18,577	5.29	15,450	4.93			0.00	
.50 to .99	35,583	10.14	31,315	9.99	-0.15	32,453	11.10	1.11
Under 1.00	75,172	21.42	63,866	20.38	-1.04	63,342	21.66	1.28
1.00 to 1.24	18,438	5.25	16,121	5.14	-0.11	14,791	5.06	-0.09
1.25 to 1.49	17,064	4.86	16,542	5.28	0.42	14,628	5.00	-0.28
1.50 to 1.74	17,895	5.10	15,848	5.06			0.00	
1.75 to 1.84	7,021	2.00	6,734	2.15			0.00	
1.50 to 1.84	24,916	7.10	22,582	7.21	0.11	20,139	6.89	-0.32
1.85 to 1.99	10,971	3.13	9,525	3.04	-0.09	9,409	3.22	0.18
2.00 and over	204,379	58.24	184,747	58.95	0.71	170,090	58.17	-0.78
1.00 and over	275,768	78.58	249,517	79.62	1.04	229,057	78.34	-1.28
Total Pop.	350,940		313,383		-10.70	292,399		-6.70

Table 4-11. Continued

	Wilkes-Barre city, Pennsylvania							
	1990	%	2000	%	Change %	2009	%	Change %
Under .50	2,949	6.54	2,617	6.59	0.05	4,070	10.74	4.15
.50 to .74	1,662	3.69	2,396	6.04			0.00	
.75 to .99	2,313	5.13	2,038	5.13			0.00	
.50 to .99	3,975	8.82	4,434	11.17	2.35	4,942	13.05	1.88
Under 1.00	6,924	15.36	7,051	17.76	2.41	9,012	23.79	6.03
1.00 to 1.24	2,502	5.55	2,237	5.64	0.09	2,302	6.08	0.44
1.25 to 1.49	2,408	5.34	2,522	6.35	1.01	2,345	6.19	-0.16
1.50 to 1.74	2,627	5.83	2,228	5.61			0.00	
1.75 to 1.84	1,063	2.36	961	2.42			0.00	
1.50 to 1.84	3,690	8.19	3,189	8.03	-0.15	3,072	8.11	0.08
1.85 to 1.99	2,067	4.59	1,384	3.49	-1.10	1,088	2.87	-0.61
2.00 and over	27,490	60.98	23,309	58.72	-2.25	20,060	52.96	-5.77
1.00 and over	38,157	84.64	32,641	82.24	-2.41	28,867	76.21	-6.03
Total Pop.	45,081		39,692		-11.95	37,879		-4.57

Source: U.S. Bureau of the Census
1990 Census of Population and Housing
2000 Census of Population and Housing
2005-2009 American Community Survey

CHAPTER 5
FINDINGS AND CONCLUSIONS

As concerns over taxes on personal property constantly grow, alternatives to traditional property tax must be explored. With this in mind, this research aims to show how the expected theoretical effects of land value taxation are reflected in actual observations before, during, and after implementation. The study here does not concern itself with the accuracy of theories such as those proffered by the likes of Mr. Vickrey in Chapter 1, but it is concerned with how well theory is manifested in reality.

In order to assess the virtues of land value taxation as an alternative to traditional property tax, varying metrics of analysis must be considered. This thesis considered how the effects of land value taxation manifest themselves in United States (U.S.) Census and American Community Survey (ACS) data. As a result, the hypothesis of this research was as follows:

The theoretical effects of land value taxation on income and housing characteristic data are evident in U.S. Census and American Community Survey figures.

When laying out theoretically expected results of the effect of land value taxation for selected income and housing characteristics and comparing them to observed values from Altoona, Pittsburgh, and Wilkes-Barre, PA, it is not overtly evident that land value taxation has left an impact. Observing data from 1990 to 2009, of the ten variables examined only in occupancy status do theoretical effects present themselves.

Despite occupancy status displaying the theoretically expected effects of the policy between 2000 and 2009, it is unclear whether or not the policy prompted those observations. The theoretical expectations took into account assumptions about the strength of Bourassa (1990)'s liquidity and incentive effect. It is also likely that

extraneous factors such as local legislation and local housing market characteristics may have played a role in occupancy status observations. Such factors will be further discussed momentarily.

Evidence of theoretical effects on several of the variables was unclear, especially for examination of data from 1990 to 2000. This was due to a lack of land value taxation policy intervention between 1990 and 2000.

The result of this research is not surprising. Housing and income variables such as these with data from United States (U.S.) Censuses and American Community Survey (ACS) are impacted by a myriad of factors in additional to the presence of land value taxation. Among these extraneous factors were scope of the variables, local legislation, local housing market characteristics, national housing market trends, and shifting employment and population bases.

First, time, access, and funding limitations prevented the research from incorporating data more narrow in scope. The examination of income and housing characteristics from U.S. Census and ACS data was susceptible to numerous extraneous factors. For theoretical results to manifest themselves in variables so broad in scope, the magnitude of land value taxation's impact would necessarily need to be tremendously significant. Even the variables most likely to be affected by the presence of land value taxation, density measures and units in structure, failed to display evidence of theoretical expectations.

As was seen in Chapter 4, local legislation, such as the tax abatement policies in Pittsburgh, likely played a significant role between land value taxation policy and the housing and income observations. The local housing market characteristics of each

study area influenced housing characteristic data as well. Local housing unit booms in Pittsburgh during the 1950s and in Wilkes-Barre during the 1970s likely made the effects of land value taxation difficult to discern.

Broader economic trends also played a role in the assessment of the effects of the tax policy. National trends in the housing market, such as the housing construction boom of the early to 2000s likely prompted an increase in single-family units throughout the study areas. More recently, the resulting housing crisis may have also impacted occupancy rates. Shifting population and employment bases at the national level likely played a role in both housing and income characteristics. The Pennsylvania region continued to bleed manufacturing and other labor-intensive jobs and experienced growth in white collar employment sectors. With many, lower-skilled jobs being replaced with fewer, higher-skills jobs, housing and income characteristics of all three study areas were subjected to market forces that were unassociated with the presence of land value taxation.

With the results of this before-and-after analysis failing to match theoretically expected results, it is clear that problems exist with the theory, the case studies, or the analysis itself. Much of the theory surrounding land value taxation is grounded in logical economic analysis. Therefore, this research considers the theory presented in the literature review beyond reproach. As was discussed in the methodology, ideal case study selection was thought to have been achieved. However, the prevalence of Pittsburgh's property tax obscured the impact of the city's removal of official land value taxation policy. Lastly, it is in analysis method that this research could have been improved. As a result of already described limitations, ideal data for the case study

areas pertaining to theory was unavailable for this research. The distant relationship of several of the variables to the theoretical effects of land value taxation provided avenues for extraneous circumstances to interfere with the prescribed virtues of the tax policy.

Under ideal circumstances, a study of the effects of land value taxation would be slightly different from this research. First, as was just mentioned, Pittsburgh would need to be removed as a case study area due to the prevalence its property tax abatement policy. Potential replacements for Pittsburgh as a case study include Coatesville, Connellsville, and Oil City, PA as all three rescinded land value taxation between 2000 and 2009. Secondly, selection of variables closely related to land value taxation would help eliminate some of the influence of extraneous variables such as shifting market and demographic trends. The methodology chapter mentions that the original intention of this research of to analyze the effect of land value taxation on property values. Were such data available, the limitations of this research would have been reduced, allowing a better way to prove the effects of land value taxation.

As was discussed in Chapter 2, the lofty hopes and alleged benefits of land value taxation have been enough to persuade several municipalities in the United States and around the world to adopt such policy. While it has not been a fruitful endeavor in all attempts, several municipalities and governments both domestically and abroad continue to implement the policy and swear by its virtues. However, the results of this research show that those virtues can sometimes go unfulfilled.

Implications for Planning

Netzer (1998c) states that land value taxation is especially applicable in certain municipalities. These municipalities have local governments that are responsible for the

provision of infrastructure projects and public services. Such local governments in which land value taxation may be of particular interest are also those that must generate revenue for the aforementioned infrastructure projects and public services on their own.

Depending on your level of faith in the theoretical effects of land value taxation, Netzer's assessment of its relevance can be extended to a much larger scope of municipalities. In general, property tax policy influences the physical, economic, and societal structure of settlements everywhere. Planners must be aware of the ramifications of such policy. Not only is property tax a primary source of revenue for local governments and thus of municipal planning departments, but it also influences development patterns, which effect everything from traffic patterns to infrastructure layout to public services provision to growth management. It also has an impact on income and wealth distribution as well as environmental protection in the way that such policy affects urban sprawl development. As a result, land value taxation and property tax policy in general should not be taken lightly or dismissed as merely an economic development tool by planners.

As planners and public officials look for ways to stimulate economic development and facilitate the efficient functioning of human settlement, land value taxation is a course to be considered. Lauded for its ability to increase wealth, fairly distribute wealth, spur investment, preserve the natural environment, and allow for the efficient provision of public goods and infrastructure, land value taxation's virtues are not without merit. However, it is also important to note that, as with any complex issue, there is no 'silver bullet' to solve the ailments poorly functioning economies or cities. As this

research shows, the lauded virtues of any economic theory do not always manifest themselves in reality.

Future Research

Anderson (2009) notes that the opportunities for future research of land value taxation are limited by the relative small amount of communities implementing it in the United States. The City of Pittsburgh, PA was the one major-metropolitan area implementing land value taxation before rescinding it in 2001. While leaving the opportunity for before-and-after intervention study, post-land value taxation data in Pittsburgh is muddled by a vast array of property tax abatements that have replaced the policy. Perhaps examining how well the tax abatements have effectively replaced land value taxation in Pittsburgh could be a route of study in the future.

Another opportunity to extend this research lies in regression analysis. With proper data and a proper model, a more quantitative study could be performed to examine the statistical significance of the effects land value taxation on housing and income characteristics in the study areas.

Geographically, it may be advantageous to study international cases. While studies domestically have dealt with a transition from a pre-existing property tax policy to one of land value taxation, burgeoning third world nations may be implementing property tax for the first time (Anderson, 2009). Research on the observed or anticipated effects of land value taxation in these geographies may provide insight into the policy's effects on a clean property tax slate.

Another dimension of future research to consider is the aspect of land value taxation's effects over time. An example of this type of research can be found in Lusht (1992) which examines a number of municipalities in the Melbourne, Australia area that

have employed the land value tax for varying numbers of years and determines that while espoused advantages of land value taxation persist, they may diminish with time. Such methodology could be applied to instances of the policy in the United States as well.

From a depth of analysis perspective, land value taxation research has often focused on the variables most directly impacted by the policy, such as construction activity, land intensity, and timing of development. However, with advent of more statistically sophisticated computer software, regression models can be used to provide researchers with opportunities to examine impact on other variables less directly related to property tax such as environmental and quality of life measures.

Despite the limited amount of cases to examine, research of this topic can still easily be more fully developed as a dissertation or as government research. While a more comprehensive study of land value taxation will likely demand more precise measures, U.S. Census and ACS data are still useful in depicting large scale ramifications of policy interventions at the municipal scale. As a result, within this vein there are plenty of research opportunities to be had that would enhance the literature of land value taxation.

APPENDIX
DATA REVIEW & ECONOMIC PROFILES

This appendix will detail analysis of income, housing and general economic data pertaining to the three case study areas. From there, conclusions about the impact and effectiveness of land value taxation will be found.

The section will begin with analysis of 1990 and 2000 United States (U.S.) Census data and 2005-2009 American Communities Survey (ACS) data. This data will be categorized into income characteristic data and housing characteristic data. The U.S. Census and ACS data section is focused on the characteristics with changes exhibited by each study area discussed within. Next, discussion will move to Bureau of Labor Statistics (BLS) data, covering total employment figures, location quotients, shift-share analysis, Esteban-Marquillas Extension analysis, and market forecasts of Altoona, Pittsburgh, and Wilkes-Barre. The BLS data section focuses on the metropolitan statistical areas (MSAs) of the three study areas individually, deriving analysis from the tables on a case basis.

Finally, the section will conclude with a summary of the data from each of the aforementioned sources. This synopsis of data will make synthesizing the analysis more eloquent during the paper's conclusion.

U.S. Census and American Community Survey Analysis

The first part of this section's analysis deals with U.S. Census data from the 1990 and 2000 U.S. Censuses and the 2005-2009 American Communities Survey. This data provides sufficient cross-sectional insight into the changes in income and housing characteristics in the three case study areas at three points over the last two decades.

With knowledge of tax policy adoption and removal dates in hand, potential correlations between policy intervention and characteristic changes can be determined.

Housing Figures

Land and construction markets are the first to be impacted by shifts in property tax rates. Together, these markets yield figures pertaining to housing characteristics. The following tables and narratives provide insight into what changes have taken place in seven housing –related categories at time cross-sections of 1990, 2000, and 2009.

Total housing units

Total housing units decreased in all three study areas between 1990 and 2000. Altoona saw the most decrease followed by Pittsburgh then Wilkes-Barre. Between 2000 and 2009, Pittsburgh saw an increase in total housing units by just over 1% while Wilkes-Barre remained unchanged and Altoona's total fell by 1.5%. Refer to Table 4-1 Total Housing Units for data.

Occupancy status

In Altoona, the amount of occupied housing units per total housing units increased by nearly 1.4% between 1990 and 2000 while it fell by over 5% in Pittsburgh and over 2% in Wilkes-Barre. Between 2000 and 2009, the occupied-to-total unit ratio fell in all three study areas. The number fell by just over 2% in Altoona, by 2.35% in Wilkes-Barre, and by just over 4% in Pittsburgh. See Table 4-2 Occupancy Status for figures.

Units in structure

Between 1990 and 2000, Altoona saw little change in its units-per-structure makeup with the exceptions of the 50-unit or more structures category which increased by 2.17% and the "other" unit structure category which decreased by 1.18%. Pittsburgh remained unchanged except that single-unit detached structures increased by 2.64%

and single-unit attached structures decreased by 1.45%. Wilkes-Barre also experienced an increase in single-unit detached structures and a decrease in single-unit attached structures in addition to an increase in two-unit structures and a decrease in the "other" unit structure category.

Between 2000 and 2009, Altoona remained virtually unchanged with a slight increase in the amount of single-unit detached homes. Pittsburgh also essentially maintained its housing unit makeup with only an increase in the amount of single-unit attached structures. Wilkes-Barre's housing unit composition experienced more volatility with an increase in single-unit attached structures of nearly 5% and decreases in "3 or 4", "5 to 9", and "20 to 49" unit structures. Refer to Table 4-3 Units in Structure for data.

Value of owner-occupied housing units

Between 1990 and 2000, owner-occupied housing unit market composition in the three study areas moved similarly. The housing unit market shifted as values for units rose from a predominantly below $35,000 to the $50,000 to $150,000 range. In particular, Altoona saw a drastic reduction in the amount of units valued at $25,000 or less.

While all markets continued to move in the same increased-price direction between 2000 and 2009, increased variation was also observed. Pittsburgh's owner-occupied housing unit market was clearly dichotomous with increases observed in every category $80,000 and above and decreases observed in every category $70,000 and below. Altoona also saw decreases in every category $70,000 and below. Increases in the amount of units between $70,000 and $200,000 were observed but growth in higher-valued units was less vigorous than in Pittsburgh. The market for owner-

occupied housing units in Wilkes-Barre shifted less than in Pittsburgh and Altoona. However, decreases in units were observed between $35,000 and $60,000 in Wilkes-Barre while units valued between $90,000 and $175,000 saw increases. For more data, see Table 4-4 Value of Owner-Occupied Housing Units.

Gross rents

Over the past 20 years, rents in Altoona, Wilkes-Barre, and Pittsburgh have all moved in the same direction in terms of gross rents in renter-occupied housing units rising. Renting in Pittsburgh has been most expensive among the three study areas, with Altoona maintaining a slightly more affordable renters market than Wilkes-Barre. Between 2000 and 2009, Pittsburgh also saw a sharp increase of 13% in $1000/month gross rent units, compared to just below 4% in Altoona and Wilkes-Barre. Please see Table 4-5 Gross Rents for data.

Year built

During the 1990s, Altoona saw a sharper drop in the amount of pre-1940 housing units than the other two case studies, falling by about 6.3% versus 4.6% in Pittsburgh and 4% in Wilkes-Barre. New unit construction was also the most vigorous in Altoona with 2000 U.S. Census data showing that 3.36% of units in the city were constructed within the previous decade, compared to 2.35% in Pittsburgh and 1.24% in Wilkes-Barre. Units constructed from 1940 to 1970 saw increases in their shares of each city's total housing during the 1990s. Altoona and Wilkes-Barre also witnessed decreases in 1970s era housing while Pittsburgh saw a decrease in 1980s housing.

The first decade of the 21st century produced significantly reduced new construction growth in Altoona and almost no growth in Wilkes-Barre, while Pittsburgh growth was approximately equal to that of the previous decade. The percentage of

units built in Altoona between 2000 and 2009 consisted of 1.51% of the total versus 2.52% in Pittsburgh and only 0.40% in Wilkes-Barre. Altoona experienced continued decline in pre-1940s housing while the other two study areas had increased their percentages of pre-1940s housing, although it did not drop as significantly as it did during the previous decade. Age of housing stock was also less volatile in Altoona versus the other 2 case studies, with only 1960s and pre-1940 era housing changing its share by more than 1%. Pittsburgh saw a 2.36% increase in pre-1940 housing and decreases in 1940s and 1960s era housing by 3.24% and 2.21%, respectively. Wilkes-Barre experienced increases in pre-1940s and 1980s era housing of 4.23% and 1.22%, respectively. It also saw decreases in 1940s and 1970s era housing of 2.11% and 3.86% respectively.

Overall, the age makeup of housing stock in Altoona is more evenly distributed than in Pittsburgh or Wilkes-Barre. Pittsburgh saw a boom in housing unit construction during the 1950s and Wilkes-Barre saw the same in the 1970s. These booms are still evident in 2009 ACS data with a higher percentage of 1950s housing than from any other decade since 1940 in Pittsburgh and a greater share of housing from the 1970s than any other decade since 1940. Altoona's housing age has become more uniform and less volatile. Despite a building boom in the 1970s, similar to Wilkes-Barre, 2009 data shows precipitous growth in share of housing stock looking further back in time. This is unique among the three case studies. Also unique to Altoona is the continued drop in the share pre-1940s housing stock. During the troubled economic times of the 2000s, Pittsburgh and Wilkes-Barre experienced increases in this category. Refer to Table 4-6 Year Structure Built for data.

Density measures

During the 1990s, all three study areas experienced drops in both unit and population density. Pittsburgh and Wilkes-Barre saw their population densities fall by over 9% compared Altoona's at 4.5%. Unit density in Pittsburgh and Altoona fell by about 4% compared to just over 2% in Wilkes-Barre.

Between 2000 and 2009, all three cities experienced different changes in density measures. Altoona's unit and population densities fell by 1.54% and 6.01%, respectively. It was the only area to experience a substantial drop in unit density. Pittsburgh also saw a decrease in population density of around 6%, but had an increase of 1.18% in unit density. Pittsburgh was the only study area to have an increase in unit density over the decade. Wilkes-Barre remained relatively stable over the decade, experiencing a loss in population density of 4.73% and remaining constant in unit density, falling by only 0.24%.

Overall, Altoona saw its density fall the most over the 20 year period. Pittsburgh appeared to recapture unit density growth during the 2000s while unit density in Wilkes-Barre appears to have stabilized. All three study areas continue to experience population density decline, however that rate of density decline between in 2000 and 2009 increased only in Altoona. For data associated with the previously mentioned density measures, please see Table 4-7 Density Measures.

Income Figures

"Money isn't everything," so goes the cliché. However, in evaluating public policy changes, money is a significant factor. In considering land value taxation, effects on income are somewhat removed from direct intervention. Effects on land and

improvements more directly related to the shift from traditional property tax. It is for this reason that data analysis begins with income characteristics.

Household Income

All three study areas saw roughly the same growth in median household income between 1990 and 2000. However, between 2000 and 2009, Pittsburgh maintained a 25% rate of growth, Altoona held a 19% rate, and Wilkes-Barre's growth fell to 7.5%. See Table 4-8 Household Incomes and Table 4-9 Median Household Income for figures.

Per Capita Income

Per capita income tells a similar story, with all three study areas having growth rates between 43% and 50% during the 1990s but with Pittsburgh maintaining the highest rate during the past decade at 30%, followed by Altoona at 20%, and Wilkes-Barre at 14%. See Table 4-10 Per Capita Income for data.

Ratio of Income to Poverty Level

Values for the ratio of income to poverty level measure an area's breadth and depth of poverty. Ratios below 1.0 indicate poverty, with ratios between 1.25 and 1.0 representing "near poverty" and ratios below 0.5 indicating "severe poverty."

Between 1990 and 2000, Altoona saw little change in its income to poverty ratios. Pittsburgh's figures improved slightly as ratios below 1.0 fell. Wilkes-Barre saw the opposite as ratios below 1.0 increased by nearly 2.5%. All three study areas saw little change in its near poverty and severe poverty figures.

Between 2000 and 2009, Altoona and Pittsburgh saw their below poverty ratios increase by about 1.25%, but Wilkes-Barre's below 1.0 ratios increased by over 6%. Near poverty ratios remained virtually unchanged in all three study areas. However,

Altoona saw its severe poverty ratios fall by nearly 2% while Pittsburgh's remained constant and Wilkes-Barre's increased by over 4%. See Table 4-11 Ratio of Income to Poverty Level for figures.

Bureau of Labor Statistics Data Analysis

For part two of this cross-sectional case study analysis, Bureau of Labor Statistics data will be analyzed to better understand changes in the local economy of the MSAs of the case studies between 2001 and 2010. Data from the Altoona, PA MSA, Pittsburgh, PA MSA, and Scranton-Wilkes-Barre, PA MSA will be used in this analysis. From this data, tables describing employment changes by industry, location quotients, Shift-Share analysis, and Esteban-Marquillas Extension have been developed to assist in developing a narrative. These tables can be found immediately following the narrative of the three case study areas.

Altoona, PA MSA:

Between 2001 and 2010 Altoona gained over 1250 jobs relative to its share of national employment despite losing 143 total jobs overall. This means that the economy of Altoona shrank over the period but not as much as that of the national economy. By itself, Altoona's industrial mix would have resulted in an increase of approximately 32 jobs. The health care and social assistance sector was a rapidly growing industry nationally and Altoona had a very sizable amount of employment there. Accommodation and food services and professional and technical services were other industries of significant employment in Altoona that experienced growth nationally. However, Altoona's economy is also reliant upon the manufacturing and construction sectors that experienced slow growth over the period. As a result, these slow growth sectors negated much of the gains of the high growth sectors.

Competitive shift figures show that Altoona was a highly competitive environment for the manufacturing, transportation and warehousing, retail trade, and administrative and waste services industries. Each of these industries grew more rapidly in the local area than nationwide. These locally high-performing industries helped to offset some of the losses related to Altoona's share of the national economy.

The shift-share figures also show that Altoona remains strong in the transportation and warehousing sector. Historically a railroad town, Altoona may capitalize on rising fuel costs and once again utilize this industry to catalyze future growth across a myriad of industries within the metropolitan area.

Sectors of future growth in the Altoona, PA MSA:

Heath care and social assistance:

Despite having a less than proportional share of employment within it here than in the rest of the country, health care and social assistance is a sector with potential for growth due to the area's aging population and inevitable need for more health care. Competitive shift for the sector was positive and Esteban-Marquillas Extension showed it was highly competitive in the area and containing comparative advantage, making it an industry worth intervening upon. Like education services, health care also utilizes a large proportion of local inputs and is an export industry.

Transportation and warehousing:

Shift-share analysis shows that this sector is very competitive in the local marketplace. Esteban-Marquillas Extension illustrates that the industry is specialized locally, but lacks comparative advantage, opening the possibility for future intervention to this end. Located between the Commonwealth's two largest population centers, Philadelphia and Pittsburgh, Altoona has long been a focal point for transportation and

logistics in Pennsylvania. Traditionally a pillar of the local economy, transportation and warehousing employment increased from 2001 to 2010 but still has less of a share of the local market than nationwide according to location quotient figures. As a result, local expansion of this industry would seem likely.

Administration, support and waste management services:

Local employment in this sector grew by over 30% over the period and exhibited a high competitive component in Shift-Share Analysis. A decline in the location quotient however means that the industry's share of the local economy did not keep pace with its share nationally. The sector shows comparative advantage but a lack of specialization locally according to Esteban-Marquillas Extension data, pointing toward a possible intervention in policy to help spur this industry. Policy makers in Altoona may find it fruitful to expand this well-performing industry by reaching out to larger markets in Pittsburgh, Philadelphia and beyond. Utilizing the market's physical connections to all corners of the Commonwealth made possible by a strong transportation and warehousing sector, Altoona's administration, support and waste management services may help ease the office and facility management burden of companies from around the region.

Pittsburgh, PA MSA:

Despite economic revival efforts, Pittsburgh lost a total of 33,000 jobs during the period and lost nearly 5500 jobs relative to its share of the national market. The Steel City MSA saw substantial growth in health care and education over the period, yet experienced losses in the information, transportation and warehousing, and construction sectors along with continued significant decline in the manufacturing industry.

The industrial mix of Pittsburgh, on the other hand, was a positive factor in job growth, by itself creating approximately 24,000 jobs. Industries such as health care, education, and accommodation and food services, in fact growing significantly in Pittsburgh, grew nationally. The city benefited from having concentrated employment in these sectors. Conversely, continued reliance on manufacturing resulted in tremendous overall job losses as this sector continues to decline nationally.

However, competitive shift was extraordinarily negative resulting in a loss of over 45,000 jobs in total. This was particularly the case in the health care and social assistance sector, whose competitive shift amounted to over -14,000 alone. Evidently, that sector in Pittsburgh was significantly outperformed nationally. Esteban-Marquillas Extension shows a pair of efficiently-functioning sectors: finance and insurance and arts, entertainment, and recreation. These industries exhibited both specialization and comparative advantage over the period.

Sectors of future growth for the Pittsburgh, PA MSA:

Construction:

This sector was locally competitive over the period as it outpaced the national construction industry according to competitive shift figures. It also exhibited comparative advantage but not specialization, creating the possibility for effective policy intervention. Capitalizing on the construction multipliers of its reemerging downtown will be important to this industry's future in the area.

Manufacturing:

Among the principal "rust belt" cities, Pittsburgh rose and fell with the manufacturing industry. Today, it maintains a high location quotient in the area as well as strong competitive shift numbers over the period according to shift-share analysis. A

lack of specialization or comparative advantage according to Esteban-Marquillas Extension points away from policy intervention as the industry may be unsustainable. However, the city is already invested in the sector and, in conjunction with burgeoning construction and education sectors, it may be settling into an appropriate share of the local economy.

Education:

Despite having two renowned universities in the University of Pittsburgh and the Carnegie Mellon Institute, Pittsburgh maintains a low location quotient in education. Shift-share analysis shows that this sector suffered in competitive shift over the period. Esteban-Marquillas Extension reveals that the sector exhibits specialization but lacks comparative advantage. Policy intervention to stimulate the education industry will have the collateral effects of augmenting the already well-functioning arts and entertainment and finance and insurance sectors as well as other skill-intensive industries such as health care and professional, technical, and scientific services.

Health care and social assistance:

The Steel City also has a below national share location quotient in this industry. While exhibiting specialization according to the Esteban-Marquillas Extension, health care lacks comparative advantage, something that could potentially be improved with more focus on the educational services sector.

Scranton-Wilkes-Barre, PA MSA:

Over the period, Wilkes-Barre lost over 7300 jobs and lost over 1000 jobs relative to its share of national employment. The area saw gains in the business management, transportation and warehousing, arts and entertainment, and health care sectors, but continued to experience a mass exodus of manufacturing jobs. The sector has now

been replaced as the sector of highest employment in Wilkes-Barre by another industry that showed decline over the period in retail trade.

Like Altoona and Pittsburgh, Wilkes-Barre has a strong mix component according to shift-share analysis. By itself, the mix contributed a gain of 250 jobs over the period. Health care, education, and accommodation and food services were all sectors that showed high growth nationally and also held significant employment in Wilkes-Barre. However, local commitment to sectors that grew slowly over the period such as manufacturing, construction and information counteracted many of those gains.

Competitive shift analysis shows local strengths particularly in transportation and warehousing, management of companies and enterprises, administrative and waste services, and arts, entertainment, and recreation. Locally, these sectors grew more rapidly than at the national level. However, several other industries such as manufacturing, health care, and educational services, performed below national standards, resulting in significant local jobs losses amounting to nearly 2400 due to lack of local competitiveness.

Sectors of future growth in the Scranton-Wilkes-Barre, PA MSA:

Transportation and warehousing:

According to Esteban-Marquillas Extension, the Scranton-Wilkes-Barre MSA exhibited only one well-functioning industry over the period: transportation and warehousing. Locally, the industry was specialized and offered comparative advantage. However, location quotient figures show that the sector maintained less of a presence in the area than would be expected from national averages. In fact, the location quotient for transportation and warehousing in Scranton-Wilkes-Barre actually fell from 0.8 in

2001 to 0.56 in 2010. For this reason, policy interventions could increase the presence of this successful and efficient local industry.

Management of companies and enterprises:

Over the period, employment in the management of companies and enterprises sector more than doubled. Perhaps it was the draw of the scenic Pocono Mountains, but the Scranton-Wilkes-Barre area seemed to attract executives more than it ever had before. Shift-share analysis shows that the sector was quite strong locally, exhibiting a positive competitive shift figure. Esteban-Marquillas Extension also shows that the industry has had comparative advantage, but has lacked specialization. This market flaw could potentially be remedied with policy intervention and could make the business management sector even more prevalent.

Accommodation and food services:

The accommodation and food services sector experienced modest gains over the period, increasing employment by about 5% and exhibit a strong location quotient for the area. Shift-share analysis also shows this sector to yield positive competitive shift figures, revealing a locally efficient market in this industry. While Esteban-Marquillas Extension does not show policy intervention to be advisable, capitalization on the Poconos tourism industry could prove fruitful. The Scranton-Wilkes-Barre area's position in the Poconos and adjacent to the megalopolis of the northeastern United States in conjunction with growing transportation and warehousing and business management industries could demand more from this industry in the future.

BLS Analysis Conclusions

In evaluating the case study economic profiles developed from the BLS data sets, differences and similarities between the study areas become evident. However, the similarities outweigh the differences in all three cases.

The MSAs representing each case study area produced their own employment idiosyncrasies. Altoona was the only study area to maintain a strong competitive shift according to shift-share analysis, which led to it being the only study area to experience growth in national employment share. Altoona's retail sector also performed better than the other two cases over the period, growing by a modest 3.48% compared to -10.06% and -4.16% in Pittsburgh and Wilkes-Barre, respectively. Pittsburgh and Wilkes-Barre had weak competitive shift leading to a reduction in their shares of national employment. Table A-1 Employment Figures by Industry, shows that Pittsburgh's economy was a more diverse workplace as it had the lowest percent of employment in manufacturing, retail, and health care of the three study areas. This diversity likely is associated with the sheer size of Pittsburgh in comparison to the two other cases. While Wilkes-Barre has experienced massive overall job loss, the management of enterprises and companies sector was a high-performer, producing positive indicators in competitive shift and overall job growth. The significance of these differences among the economies of the study areas show that while quite similar, the individual metropolitan economies of Pennsylvania cannot be painted with a wide brush.

Despite the aforementioned unique changes to the economies of the three case studies, several shifts in all three show how closely related the three economies are. First, all three areas experience job loss between 2001 and 2010. Altoona faired best, only losing 0.29% of its 2001 job total. According to shift-share analysis, all three study

areas maintained a strong industrial mix component meaning that the three areas had significant employment in sectors that experienced high growth nationally, thus spelling growth locally. All three areas have had and continue to have a persistent reliance on the manufacturing sector, a staple of the rust belt economy. However, this reliance diminished across the study areas between 2001 and 2010. All three areas experienced increased employment in health care and education over the period. Conversely, however, all three areas also experienced a weak health care and social assistance sector competitive shift component of job growth over the period, meaning that the industry locally performed below the national average. With an eye toward the future, the economies of all three areas will likely depend on increasing local competitiveness in this sector. Additional sectors to take note of for future growth in all three areas are transportation and warehousing, accommodations and food services, and even an evolving manufacturing sector.

As a result, extraneous circumstances emanating from economic growth that may have affected income and housing characteristics are less than likely to have impacted figures in a substantial way. With the sole exception of retail trade, significant sectors of employment in the three study areas shifted in a synchronized fashion. Were employment in an already-significant industry to suddenly sky-rocket, one would expect such economic growth to have an impact on several metrics of income and housing. However, as it stands, there is little to suggest that any abrupt shifts occurred in the local economies of the study areas that could have conclusively affected income and housing characteristics in Altoona, Pittsburgh, or Wilkes-Barre.

Summary

In this section, U.S. Census and ACS data from 1990, 2000, and 2009 has been used to produce a cross-sectional study of income and housing characteristics in Altoona, Pittsburgh and Wilkes-Barre, PA. Additionally, BLS data from 2001 and 2010 was used to depict economic conditions in the MSAs of Altoona, Pittsburgh, and Scranton-Wilkes-Barre, PA. Together, this triumvirate of analysis summarizes changes in each market's attributes that may be impacted by a property tax policy intervention.

Altoona experienced a decrease in severe poverty between 2000 and 2009 according to income-to-poverty ratio figures. Units in structure composition remained largely unchanged in the city and cheap, affordable housing and unit and population density declined. Altoona improved its share of employment relative to the national economy and has witnessed a renewed significance of the transportation and warehousing industry related to the local economy.

Pittsburgh maintained the highest rates of income growth over the 20 year period, but also left poverty levels unchanged. Occupancy rates fell continuously throughout the period while the construction of new units became the most vigorous of the study areas between 2000 and 2009. In particular, high-end renter-occupied and owner-occupied units experienced significant increases during the first decade of the 21st century in the Steel City. Units in structure composition maintained its 1990 levels while population density fell but at a decreasing rate. Curiously, unit density increased from 2000-2009 while population density decreased. The economic climate in Pittsburgh has been muddled over the past 10 years, with employment in the health care and education sectors increasing despite negative competitive shift. Also complicating

matters is the continued decline in manufacturing employment despite strong competitive shift figures.

Wilkes-Barre has generally struggled across all three categories of data analysis. Income growth fell the most drastically between 2000 and 2009 and both poverty and severe poverty increased. In housing analysis, occupancy rates fell over the 20-year period. As units in structure makeup shifted to less dense housing, overall units in structure makeup experienced increased volatility. Conversely, the value of owner-occupied housing experienced the least volatility of the three study areas. Growth in new unit construction slowed to near non-existence between 2000 and 2009, prompting a sharp increase in the percentage of pre-1940 housing. Population density fell throughout the period but at a lesser rate over the final ten years, the least of the three study areas. Data indicates that population and unit densities may be stabilizing. Lastly, the Scranton-Wilkes-Barre MSA's share of national employment fell between 2001 and 2010 thanks, in part, to its reliance on a declining manufacturing sector. However, growth and positively competitive shift in the sectors of transportation and warehousing and management of companies and enterprises may lead to future growth in employment.

Table A-1. Employment figures by industry

	Altoona, PA MSA				
Industry	2001	%	2010	%	% Change
NAICS 11 Agriculture, forestry, fishing and hunting	ND	NC	ND	NC	NC
NAICS 21 Mining, quarrying, and oil and gas extraction	ND	NC	ND	NC	NC
NAICS 22 Utilities	213	0.43	144	0.29	-32.39
NAICS 23 Construction	2,611	5.26	2,271	4.59	-13.02
NAICS 31-33 Manufacturing	9,504	19.16	7,413	14.99	-22.00
NAICS 42 Wholesale trade	2,988	6.02	2,362	4.78	-20.95
NAICS 44-45 Retail trade	8,275	16.68	8,563	17.31	3.48
NAICS 48-49 Transportation and warehousing	2,095	4.22	2,865	5.79	36.75
NAICS 51 Information	1,347	2.72	851	1.72	-36.82
NAICS 52 Finance and insurance	1,468	2.96	1,326	2.68	-9.67
NAICS 53 Real estate and rental and leasing	389	0.78	325	0.66	-16.45
NAICS 54 Professional and technical services	1,896	3.82	1,957	3.96	3.22
NAICS 55 Management of companies and enterprises	640	1.29	467	0.94	-27.03
NAICS 56 Administrative and waste services	1,591	3.21	2,110	4.27	32.62
NAICS 61 Educational services	370	0.75	446	0.90	20.54
NAICS 62 Health care and social assistance	8,825	17.79	10,513	21.26	19.13
NAICS 71 Arts, entertainment, and recreation	758	1.53	822	1.66	8.44
NAICS 72 Accommodation and food services	4,386	8.84	4,590	9.28	4.65
NAICS 81 Other services, except public administration	1,843	3.72	1,971	3.99	6.95
NAICS 99 Unclassified	2	0.00	NC	NC	NC
Base Industry: Total, all industries	49,599	100.00	49,456	100.00	-0.29

Table A-1. Continued

Industry	Pittsburgh, PA MSA 2001	%	2010	%	% Change
NAICS 11 Agriculture, forestry, fishing and hunting	ND	NC	ND	NC	NC
NAICS 21 Mining, quarrying, and oil and gas extraction	ND	NC	ND	NC	NC
NAICS 22 Utilities	8,998	0.92	5,626	0.60	-37.47
NAICS 23 Construction	57,111	5.84	46,764	4.95	-18.12
NAICS 31-33 Manufacturing	124,016	12.68	87,477	9.26	-29.46
NAICS 42 Wholesale trade	42,349	4.33	39,829	4.22	-5.95
NAICS 44-45 Retail trade	139,899	14.31	125,829	13.32	-10.06
NAICS 48-49 Transportation and warehousing	42,906	4.39	33,709	3.57	-21.44
NAICS 51 Information	26,145	2.67	17,534	1.86	-32.94
NAICS 52 Finance and insurance	52,803	5.40	53,704	5.68	1.71
NAICS 53 Real estate and rental and leasing	13,742	1.41	12,783	1.35	-6.98
NAICS 54 Professional and technical services	63,692	6.51	65,845	6.97	3.38
NAICS 55 Management of companies and enterprises	14,488	1.48	ND	NC	NC
NAICS 56 Administrative and waste services	53,914	5.51	ND	NC	NC
NAICS 61 Educational services	34,503	3.53	40,313	4.27	16.84
NAICS 62 Health care and social assistance	155,209	15.87	179,485	19.00	15.64
NAICS 71 Arts, entertainment, and recreation	16,376	1.67	18,886	2.00	15.33
NAICS 72 Accommodation and food services	82,845	8.47	88,027	9.32	6.26
NAICS 81 Other services, except public administration	42,028	4.30	38,733	4.10	-7.84
NAICS 99 Unclassified	178	0.02	NC	NC	NC
Base Industry: Total, all industries	977,906	100.00	944,813	100.00	-3.38

Table A-1. Continued

Industry	Scranton--Wilkes-Barre, PA MSA 2001	%	2010	%	% Change
NAICS 11 Agriculture, forestry, fishing and hunting	ND	NC	ND	NC	NC
NAICS 21 Mining, quarrying, and oil and gas extraction	ND	NC	ND	NC	NC
NAICS 22 Utilities	2,785	1.27	ND	NC	NC
NAICS 23 Construction	9,592	4.36	8,272	3.89	-13.76
NAICS 31-33 Manufacturing	42,879	19.50	27,603	12.98	-35.63
NAICS 42 Wholesale trade	8,593	3.91	ND	NC	NC
NAICS 44-45 Retail trade	33,125	15.06	31,747	14.93	-4.16
NAICS 48-49 Transportation and warehousing	10,397	4.73	14,133	6.65	35.93
NAICS 51 Information	6,719	3.06	4,945	2.33	-26.40
NAICS 52 Finance and insurance	11,115	5.05	10,185	4.79	-8.37
NAICS 53 Real estate and rental and leasing	2,394	1.09	1,814	0.85	-24.23
NAICS 54 Professional and technical services	7,798	3.55	7,183	3.38	-7.89
NAICS 55 Management of companies and enterprises	1,490	0.68	3,349	1.58	124.77
NAICS 56 Administrative and waste services	12,331	5.61	12,944	6.09	4.97
NAICS 61 Educational services	7,134	3.24	7,617	3.58	6.77
NAICS 62 Health care and social assistance	35,578	16.18	41,832	19.68	17.58
NAICS 71 Arts, entertainment, and recreation	2,047	0.93	3,364	1.58	64.34
NAICS 72 Accommodation and food services	17,321	7.88	18,238	8.58	5.29
NAICS 81 Other services, except public administration	7,744	3.52	6,696	3.15	-13.53
NAICS 99 Unclassified	33	0.02	NC	NC	NC
Base Industry: Total, all industries	219,915	100.00	212,608	100.00	-3.32

Table A-1. Continued

Industry	U.S. TOTAL 2001	%	2010	%	% Change
NAICS 11 Agriculture, forestry, fishing and hunting	ND	NC	ND	NC	NC
NAICS 21 Mining, quarrying, and oil and gas extraction	ND	NC	ND	NC	NC
NAICS 22 Utilities	599,899	0.55	551,195	0.52	-8.12
NAICS 23 Construction	6,773,512	6.20	5,489,076	5.17	-18.96
NAICS 31-33 Manufacturing	16,386,001	14.99	11,487,828	10.82	-29.89
NAICS 42 Wholesale trade	5,730,294	5.24	5,465,985	5.15	-4.61
NAICS 44-45 Retail trade	15,179,753	13.89	14,479,851	13.63	-4.61
NAICS 48-49 Transportation and warehousing	4,138,146	3.79	3,942,399	3.71	-4.73
NAICS 51 Information	3,591,995	3.29	2,704,037	2.55	-24.72
NAICS 52 Finance and insurance	5,642,689	5.16	5,486,175	5.17	-2.77
NAICS 53 Real estate and rental and leasing	2,036,285	1.86	1,915,361	1.80	-5.94
NAICS 54 Professional and technical services	6,871,441	6.29	7,456,791	7.02	8.52
NAICS 55 Management of companies and enterprises	1,716,130	1.57	1,855,073	1.75	8.10
NAICS 56 Administrative and waste services	7,737,320	7.08	7,395,915	6.96	-4.41
NAICS 61 Educational services	1,883,564	1.72	2,464,132	2.32	30.82
NAICS 62 Health care and social assistance	12,966,103	11.86	16,194,487	15.25	24.90
NAICS 71 Arts, entertainment, and recreation	1,784,330	1.63	1,903,525	1.79	6.68
NAICS 72 Accommodation and food services	10,100,636	9.24	11,101,250	10.45	9.91
NAICS 81 Other services, except public administration	4,206,345	3.85	4,349,437	4.10	3.40
NAICS 99 Unclassified	254,603	0.23	NC	NC	NC
Base Industry: Total, all industries	109,304,802	100.00	106,198,248	100.00	-2.84

Table A-2. Location quotients in study area MSAs

	Altoona, PA MSA			Pittsburgh, PA MSA			Scranton-Wilkes-Barre, PA MSA		
Industry	2001	2010	Change	2001	2010	Change	2001	2010	Change
Base Industry: Total, all industries	1	1	0	1	1	0	1	1	0
NAICS 11 Agriculture, forestry, fishing and hunting	ND	ND	NC	ND	9.50	NC	6.54	6.91	+
NAICS 21 Mining, quarrying, and oil and gas extraction	ND	ND	NC	ND	0.95	NC	2.23	2.18	-
NAICS 22 Utilities	1.28	1.78	+	0.6	0.87	+	0.43	ND	NC
NAICS 23 Construction	1.18	1.13	-	1.06	1.04	-	1.42	1.33	-
NAICS 31-33 Manufacturing	0.78	0.72	-	1.18	1.17	-	0.77	0.83	+
NAICS 42 Wholesale trade	0.87	1.08	+	1.21	1.22	+	1.34	ND	NC
NAICS 44-45 Retail trade	0.83	0.79	-	0.97	1.02	+	0.92	0.91	-
NAICS 48-49 Transportation and warehousing	0.90	0.64	-	0.86	1.04	+	0.80	0.56	-
NAICS 51 Information	1.21	1.48	+	1.23	1.37	+	1.08	1.09	+
NAICS 52 Finance and insurance	1.74	1.93	+	0.96	0.91	-	1.02	1.08	+
NAICS 53 Real estate and rental and leasing	2.38	2.74	+	1.33	1.33	0	1.71	2.11	+
NAICS 54 Professional and technical services	1.64	1.77	+	0.97	1.01	+	1.77	2.08	+
NAICS 55 Management of companies and enterprises	1.22	1.85	+	1.06	ND	NC	2.32	1.11	-
NAICS 56 Administrative and waste services	2.21	1.63	-	1.28	ND	NC	1.26	1.14	-
NAICS 61 Educational services	2.31	2.57	+	0.49	0.54	+	0.53	0.65	+
NAICS 62 Health care and social assistance	0.67	0.72	+	0.75	0.80	+	0.73	0.78	+
NAICS 71 Arts, entertainment, and recreation	1.07	1.08	+	0.97	0.90	-	1.75	1.13	-
NAICS 72 Accommodation and food services	1.04	1.13	+	1.09	1.12	+	1.17	1.22	+
NAICS 81 Other services, except public administration	1.04	1.03	-	0.9	1	+	1.09	1.30	+
NAICS 99 Unclassified	57.77	NC	NC	12.8	703.14	+	15.52	NC	NC

Source: U.S. Department of Labor, Bureau of Labor Statistics

Table A-3. Shift-share analysis

NAICS 2 digit code	Industry	Altoona, PA MSA			Pittsburgh, PA MSA		
		Economic Share	Mix Component	Competitive Component	Economic Share	Mix Component	Competitive Component
11	Agriculture, Forestry, Fishing, and Hunting	0.00	0.00	0.00	0.00	0.00	0.00
21	Mining	0.00	0.00	0.00	0.00	0.00	0.00
22	Utilities	-6.05	-11.24	-51.71	-255.73	-474.79	-2,641.48
23	Construction	-74.21	-420.91	155.11	-1,623.15	-9,206.59	482.75
31 – 33	Manufacturing	-270.11	-2,570.86	749.98	-3,524.66	-33,546.73	532.39
42	Wholesale Trade	-84.92	-52.90	-488.18	-1,203.60	-749.74	-566.66
44 – 45	Retail Trade	-235.18	-146.36	669.54	-3,976.07	-2,474.33	-7,619.59
48 – 49	Transportation and Warehousing	-59.54	-39.56	869.10	-1,219.43	-810.15	-7,167.41
51	Information	-38.28	-294.70	-163.02	-743.07	-5,720.10	-2,147.83
52	Finance and Insurance	-41.72	1.00	-101.28	-1,500.72	36.09	2,365.62
53	Real estate and rental and leasing	-11.06	-12.04	-40.90	-390.56	-425.50	-142.94
54	Professional and technical services	-53.89	215.40	-100.51	-1,810.19	7,235.85	-3,272.66
55	Management of Companies and enterprises	-18.19	70.01	-224.82	-411.76	1,584.76	0.00
56	Administrative and waste services	-45.22	-24.98	589.20	-1,532.29	-846.63	0.00
61	Educational Services	-10.52	124.56	-38.04	-980.61	11,615.42	-4,824.81
62	Health Care and Social Assistance	-250.82	2,448.12	-509.31	-4,411.20	43,056.14	-14,368.94
71	Arts, Entertainment and recreation	-21.54	72.18	13.36	-465.42	1,559.36	1,416.07
72	Accommodation and Food Services	-124.65	559.15	-230.50	-2,354.54	10,561.53	-3,024.99
81	Other Services	-52.38	115.08	65.30	-1,194.48	2,624.19	-4,724.71
99	Unclassified	-0.06	0.00	0.00	-5.06	0.00	0.00
Total	All Industries	-1,398.34	31.94	1,163.34	-27,602.55	24,018.76	-45,705.20

Source: U.S. Department of Labor, Bureau of Labor Statistics

Table A-3. Continued

		Scranton-Wilkes-Barre, PA MSA		
NAICS 2 digit code	Industry	Economic Share	Mix Component	Competitive Component
11	Agriculture, Forestry, Fishing, and Hunting	0.00	0.00	0.00
21	Mining	0.00	0.00	0.00
22	Utilities	-79.15	-146.95	0.00
23	Construction	-272.61	-1546.28	498.90
31 – 33	Manufacturing	-1,218.66	-11,598.91	-2,458.43
42	Wholesale Trade	-244.22	-152.13	0.00
44 – 45	Retail Trade	-941.45	-585.87	149.31
48 – 49	Transportation and Warehousing	-295.49	-196.32	4,227.81
51	Information	-190.96	-1,470.01	-113.03
52	Finance and Insurance	-315.90	7.60	-621.70
53	Real estate and rental and leasing	-68.04	-74.13	-437.83
54	Professional and technical services	-221.63	885.91	-1,279.28
55	Management of Companies and enterprises	-42.35	162.98	1,738.37
56	Administrative and waste services	-350.46	-193.64	1,157.10
61	Educational Services	-202.76	2,401.66	-1,715.90
62	Health Care and Social Assistance	-1,011.16	9,869.60	-2,604.44
71	Arts, Entertainment and recreation	-58.18	194.92	1,180.26
72	Accommodation and Food Services	-492.28	2,208.18	-798.90
81	Other Services	-220.09	483.53	-1,311.44
99	Unclassified	-0.94	0.00	0.00
Total	All Industries	-6226.34	250.14	-2,389.20

Source: U.S. Department of Labor, Bureau of Labor Statistics

Table A-4. Esteban-Marquillas extension

		Altoona, PA MSA			
NAICS 2 digit code	Industry	Homothetic Employment	Specialization Effect	Comparative Advantage	Allocation Effect
11	Agriculture, Forestry, Fishing, and Hunting	0.00	0.00	0.00	0.00
21	Mining	0.00	0.00	0.00	0.00
22	Utilities	272.21	-59.21	-0.24	14.37
23	Construction	3,073.60	-462.60	0.06	-27.48
31-33	Manufacturing	7,435.44	2,068.56	0.08	163.23
42	Wholesale Trade	2,600.22	387.78	-0.16	-63.35
44-45	Retail Trade	6,888.08	1,386.92	0.08	112.22
48-49	Transportation and Warehousing	1,877.76	217.24	0.41	90.12
51	Information	1,629.93	-282.93	-0.12	34.24
52	Finance and Insurance	2,560.47	-1,092.47	-0.07	75.37
53	Real Estate, Rental and Leasing	924.00	-535.00	-0.11	56.25
54	Professional, Scientific, and Technical Services	3,118.04	-1,222.04	-0.05	64.78
55	Management of Companies and Enterprises	778.72	-138.72	-0.35	48.73
56	Administrative, Support and Waste Management and Remediation Services	3,510.95	-1,919.95	0.37	-711.02
61	Educational Services	854.70	-484.70	-0.10	49.84
62	Health Care and Social Assistance	5,883.60	2,941.40	-0.06	-169.75
71	Arts, Entertainment and recreation	809.67	-51.67	0.02	-0.91
72	Accommodation and Food Services	4,583.34	-197.34	-0.05	10.37
81	Other Services	1,908.70	-65.70	0.04	-2.33
92	Public Administration	115.53	-113.53	0.00	0.00
99	Unclassified	49,599.00	0.00	0.03	0.00

Table A-4. Continued

		Pittsburgh, PA MSA			
NAICS 2 digit code	Industry	Homothetic Employment	Specialization Effect	Comparative Advantage	Allocation Effect
11	Agriculture, Forestry, Fishing, and Hunting	0.00	0.00	0.00	0.00
21	Mining	0.00	0.00	0.00	0.00
22	Utilities	5,367.05	3,630.95	-0.29	-1,065.91
23	Construction	60,599.88	-3,488.88	0.01	-29.49
31-33	Manufacturing	146,598.95	-22,582.95	0.00	-96.95
42	Wholesale Trade	51,266.63	-8,917.63	-0.01	119.32
44-45	Retail Trade	135,807.13	4,091.87	-0.05	-222.86
48-49	Transportation and Warehousing	37,022.32	5,883.68	-0.17	-982.86
51	Information	32,136.13	-5,991.13	-0.08	492.18
52	Finance and Insurance	50,482.86	2,320.14	0.04	103.94
53	Real Estate, Rental and Leasing	18,217.82	-4,475.82	-0.01	46.55
54	Professional, Scientific, and Technical Services	61,476.01	2,215.99	-0.05	-113.86
55	Management of Companies and Enterprises	15,353.52	-865.52	0.00	0.00
56	Administrative, Support and Waste Management and Remediation Services	69,222.68	-15,308.68	0.00	0.00
61	Educational Services	16,851.49	17,651.51	-0.14	-2,468.34
62	Health Care and Social Assistance	116,002.50	39,206.50	-0.09	-3,629.66
71	Arts, Entertainment and recreation	15,963.68	412.32	0.09	35.65
72	Accommodation and Food Services	90,366.32	-7,521.32	-0.04	274.63
81	Other Services	37,632.47	4,395.53	-0.11	-494.14
92	Public Administration	2,277.83	-2,099.83	0.00	0.00
99	Unclassified	977,906.00	0	-0.01	0.00

Table A-4. Continued

		Scranton-Wilkes-Barre, PA MSA			
NAICS 2 digit code	Industry	Homothetic Employment	Specialization Effect	Comparative Advantage	Allocation Effect
11	Agriculture, Forestry, Fishing, and Hunting	0.00	0.00	0.00	0.00
21	Mining	0.00	0.00	0.00	0.00
22	Utilities	1,206.96	1,578.04	0	0
23	Construction	13,627.92	-4,035.92	0.05	-209.91
31-33	Manufacturing	32,967.70	9,911.30	-0.06	-568.26
42	Wholesale Trade	11,529.02	-2,936.02	0.00	0.00
44-45	Retail Trade	30,540.79	2,584.21	0.00	11.65
48-49	Transportation and Warehousing	8,325.71	2,071.29	0.41	842.26
51	Information	7,226.89	-507.89	-0.02	8.54
52	Finance and Insurance	11,352.77	-237.77	-0.06	13.30
53	Real Estate, Rental and Leasing	4,096.89	-1,702.89	-0.18	311.44
54	Professional, Scientific, and Technical Services	13,824.95	-6,026.95	-0.16	988.73
55	Management of Companies and Enterprises	3,452.76	-1,962.76	1.17	-2,289.92
56	Administrative, Support and Waste Management and Remediation Services	15,567.04	-3,236.04	0.09	-303.66
61	Educational Services	3,789.62	3,344.38	-0.24	-804.40
62	Health Care and Social Assistance	26,087.06	9,490.94	-0.07	-694.77
71	Arts, Entertainment and recreation	3,589.97	-1,542.97	0.58	-889.64
72	Accommodation and Food Services	20,321.90	-3,000.90	-0.05	138.41
81	Other Services	8,462.93	-718.93	-0.17	121.75
92	Public Administration	512.25	-479.25	0.00	0
99	Unclassified	2,19915	0	0.00	0

Source: U.S. Department of Labor, Bureau of Labor Statistics

Table A-5. List of variables for an attempted population density regression model

Variables	Expected Sign	Measurement
PD, population density		
LVT, land value taxation dummy	+	Ordinal
AR, area	-	Interval
POP, total population	+	Interval
PMIN, percentage of minority residents	+	Ratio
CS, citizenship status in the US	-	Ordinal
POV, poverty	+	Interval
HHI, median household income	-	Interval
HUT, total housing units	+	Interval
OS, Occupancy Status	+	Ordinal
MYB, median year structure built	-	Interval

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BIOGRAPHICAL SKETCH

Robert J. Murphy, Jr. was born in Albany, New York in 1986 and raised in Mechanicville, New York. He would go on to graduate from Mechanicville High School in 2005 where he was salutatorian of his senior class. After high school, Robert would go on to attend the Rensselaer Polytechnic Institute in Troy, NY. While at Rensselaer, he would spend a fall semester studying at the Università Comerciale Luigi Bocconi in Milan, Italy. In May of 2009, Robert would earn a Bachelor of Science degree from the Lally School of Management and Technology with a minor in economics.

Toward the end of his tenure at Rensselaer, Robert would garner interest in city planning, particularly in his hometown. He channeled this interest by deciding to pursue a Master of Arts in Urban and Regional Planning at the University of Florida in Gainesville, Florida, concentrating his studies in economic development planning. Robert's main interests in planning are economic development, downtown revitalization, and preserving the uniqueness and economic viability of cities, towns, and regions.