

# **The Potential Impacts of a Split-Rate Property Tax in the City of Erie**

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## **ACKNOWLEDGEMENTS**

This research began as the result of an inquiry from a concerned citizen. This Erie resident, who prefers to remain anonymous, contacted ERIE in May of 2006 to ask if a split-rate tax system might help the City out of its financial problems. We at ERIE had done no research on this topic, but said that it would be possible to study the issue if financial support could be found. Our public-spirited citizen then began the effort to find funding for the project.

Ultimately, Pennsylvania Senator Jane Earll provided funding for the project through the Technology Council of Northwest Pennsylvania. ERIE would like to thank Perry Wood, Chief Executive Officer of the Tech Council, and Matthew Wiertel, Chair of the Civic Engagement Committee of the Young Erie Professionals, who helped make this project a reality. And, of course, our anonymous friend.

ERIE's objective in undertaking this project was to provide background information which will help Erie leaders and voters determine whether a split-rate tax system would be beneficial for the City of Erie. ERIE approached this project with no agenda either to promote the split-rate tax system nor to disparage it, but rather to present the information in an objective, professional way. With this report, we think we have done so.

We should also point out that the sponsors of this research had no impact on how the results turned out. Similarly, their sponsorship does not imply that they support or oppose the adoption of a split-rate tax system in the city.

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## Executive Summary

In response to a request from the Technology Council of Northwest PA, the Economic Research Institute of Erie at the Black School of Business at Penn State Erie, The Behrend College, prepared this report analyzing the impacts of a split-rate property tax in the City of Erie. A split-rate property tax structure involves taxing the assessed value of land at a higher rate than the assessed value of buildings and improvements. Currently, the City of Erie uses a single-rate system with a millage of 10.21 for both components of the property tax.

By shifting the tax liability from buildings to land, the expectation is that we will observe an increase in the intensity of land use, potentially leading to higher rates of economic growth. Given the expected benefits from such a tax structure, the aim of our study is to estimate the impact of a split-rate tax system on the tax burden across property owners in the City of Erie. In other words, our goal is to determine who the “winners” are and who the “losers” are from such a tax change. The following points are the major findings from our analysis.

- Residential property owners pay more, on average, under a split-rate tax system, although the difference is negligible.
  - Using a 7.78:1 land-to-building tax ratio (30.32 mills on land and 3.89 mills on buildings) leaves residential owners with only a \$14 average increase in their tax burdens.
- Apartment, Commercial, and Industrial property owners pay less, on average, under a split-rate tax system.
  - Using a 7.78:1 land-to-building tax ratio leaves apartment owners with a \$320 decrease in their average tax burdens. Under the same tax ratio, commercial property owners pay \$44 less, while industrial property owners pay \$508 less, on average.
- Those property owners most affected by the switch to a split-rate tax system are those furthest away from the City average building-to-land value ratio of 3.18.
  - A building-to-land ratio significantly below the City average implies a large increase in the tax burden.
  - A building-to-land ratio significantly above the City average implies a large decrease in the tax burden.
- If the City were to switch to a split-rate system, we advise city officials to take the following steps:
  - Transition slowly to the split-rate tax ratio chosen, not decreasing the building tax rate by more than 20 percent of its current value per year. This equates to a maximum of 2.04 mills per year.
  - Preannounce the transition at least one year before the policy takes effect to allow sufficient time for educational campaigns.
- Switching to a split-rate tax structure while simultaneously increasing property tax revenue is strongly discouraged. ■

# The Potential Impacts of a Split-Rate Property Tax in the City of Erie

## I. Introduction: What is a Split-Rate Property Tax?

The idea of using what is called a “land value tax” has been around for centuries. Although first discussed by well renowned economists such as Adam Smith, David Ricardo, and John Stuart Mill (to name a few), the person most often associated with land taxation is Henry George, a 19th century philosopher and political economist. George is best known for his 1879 book, *Progress and Poverty*, where he proposed a solution to the growing incidence of poverty that was experienced in California in the 1850s and 1860s. During this period, George noticed that bouts of poverty seemed to follow economic booms. He believed this was the result of an artificial scarcity of land created by speculators withholding land from production. His solution was to abolish all taxes except for those on land values. He argued that this would make land speculation unprofitable and would create greater accessibility of land for more productive uses.

A pure land value tax refers to a situation where taxes are levied only on land values and not on the buildings or improvements associated with that land. Today, if a local government were interested in switching from its current property tax system to a land value tax, this would mean that all taxes on buildings and improvements could be eliminated. As it stands today, pure land value taxes are used in the countries of Taiwan, Singapore, Hong Kong, and Estonia.<sup>1</sup>

In the United States, and in particular the state of Pennsylvania, a version of the land value tax has been in existence since 1913. Instead of using a pure land value tax, cities in the U.S. have experimented with what is referred to as a split-rate tax system (or a two-rate system) where property taxes are broken into two components: the taxation of the assessed value of buildings and improvements, and the taxation of the assessed value of land.<sup>2</sup> Instead of having a single rate for both components (as the majority of cities throughout the world currently do), a split-rate system proposes having a different tax rate for each entity. More specifically, proponents of such a system propose the imposition of a higher tax rate for the land component relative to the rate on buildings

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<sup>1</sup> Two U.S. towns were founded on Henry George’s principles: Fairhope, Alabama and Arden, Delaware, but due to political pressures Fairhope discontinued the use of its land rent policies and in Arden land prices are high which implies that the community is probably not collecting the full rental value of land. See [www.henrygeorge.org](http://www.henrygeorge.org) for further information.

<sup>2</sup> See Andelson (2000) for a list of other cities around the world using various versions of a split-rate tax.

and improvements. For example, as can be seen in Table 1, suppose an individual owns a parcel of land with an assessed value of \$50,000 and a home with an assessed value of \$200,000. Suppose further that the property tax rate is 10 mills. If a single rate were imposed, this individual would owe \$2,500 in taxes. On the other hand, suppose a split-rate system is implemented with the criterion that the same amount of revenue must be raised as in the single-rate system. If we lower the tax rate to 7.5 mills on buildings and improvements we must raise the tax rate on land to 20 mills in order to create the same amount of revenue as before. Although in this example, (because of the assumption of revenue neutrality), this individual still pays \$2,500 in taxes, one can see from the table that the tax liability has changed with regards to how it is generated. With the split-rate system, this individual sees her tax liability on land double, while she enjoys a decrease in her tax liability on buildings and improvements of approximately 25 percent.

**Table 1. Example of Split-Rate Tax**

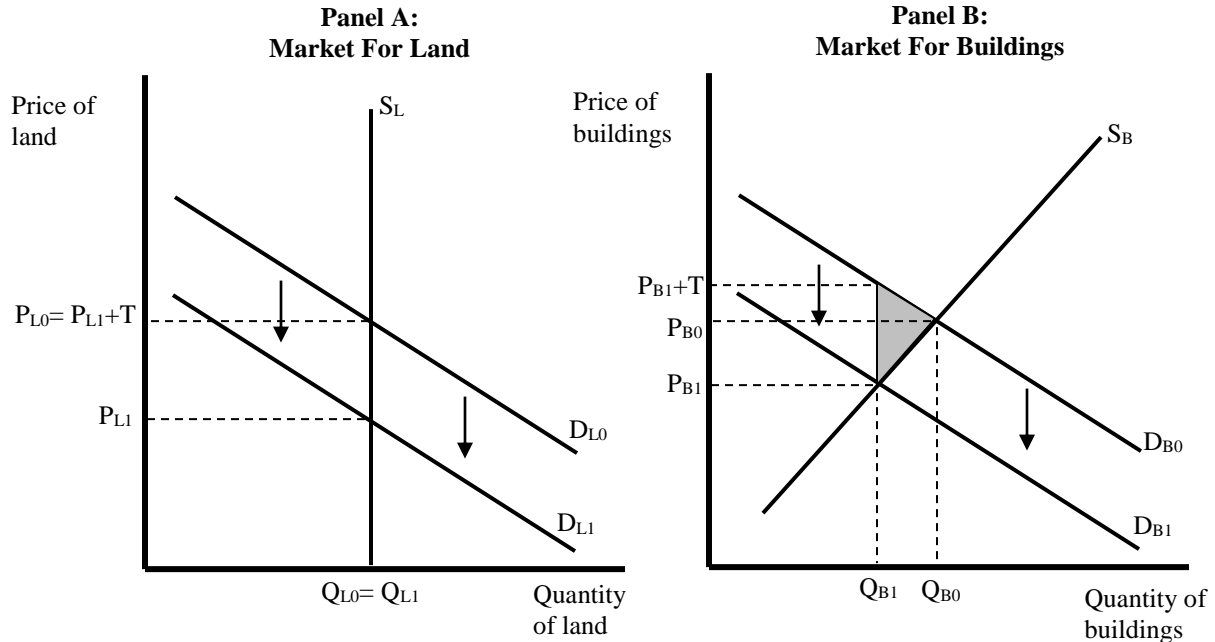
	Value	Tax Rate (mills)	Tax Liability
<b>Single-Rate Tax</b>			
Land	\$50,000	10	\$500
Building	\$200,000	10	<u>\$2,000</u>
Total			\$2,500
<b>Split-Rate Tax</b>			
Land	\$50,000	20	\$1,000
Building	\$200,000	7.5	<u>\$1,500</u>
Total			\$2,500

## II. Property Taxation: A Lesson in Supply and Demand

In order to better understand the implications of a split-rate tax system, it is convenient to examine the supply and demand of property and the economic theory concerning the taxation of property. There are two types of goods encompassed in the definition of property: buildings and land. Land has the distinguishing feature of being fixed in quantity which means that the supply of land cannot respond to changes in its price. Even if the price of land were to approach infinity, man cannot manufacture more land; thus it is fixed in quantity. Buildings however, being manmade, are not fixed in quantity. Therefore the supply of buildings does adjust to changes in its price, meaning that when prices rise, we have the incentive to construct more buildings or improve upon the existing structures. In economic jargon, the supply of land is perfectly inelastic (completely unresponsive to price changes), while the supply of buildings is more elastic than that of land (exhibits some responsiveness to price changes). Graphically, this implies that land has a vertical supply curve ( $S_L$ ) and the supply of buildings ( $S_B$ ) is upward sloping, as can be seen in Panel A and B of Figure 1. The different slopes of these two curves will play a key role in choosing an efficient property tax system.

For the sake of simplicity, we will assume that the demand for land ( $D_L$ ) and the demand for buildings ( $D_B$ ) are of the same shape. This assumption is not required in order to reach the conclusions of this analysis. The equilibrium price and quantity in each market (land and buildings) are determined by the intersection of the demand and supply curves, denoted in Figure 1 with subscript zero. It should be noted that the axes of the two graphs are not of the same scale.

**Figure 1: Impact of Taxation of Land and Buildings**



Now consider the imposition of an equal tax on all property (both land and buildings). This situation describes the current property tax structure in Erie, PA in which both land and buildings are taxed at a rate of 10.21 mills. Since the tax is on the consumers of land and buildings, it can be modeled as a downward shift of the demand curves by the amount of the tax.<sup>3</sup> The intersection of the supply curve and the new demand curve determine the equilibrium quantity ( $Q_{L1}$  and  $Q_{B1}$ ) and the before-tax price ( $P_{L1}$  and  $P_{B1}$ ). In order to determine the after-tax price ( $P_{L1} + T$  and  $P_{B1} + T$ ), the amount of the tax ( $T$ ) is added to the new market-determined price. The tax has placed a wedge between the price paid by the consumers of property (the after-tax price) and the price received by the sellers of property (the before-tax price). The price received by sellers of property has fallen while the price paid by consumers of property has risen relative to the original price without the tax.

The key result of this analysis of the property tax is in regards to its impact on the quantity of land and buildings. The quantity of buildings consumed has fallen in

<sup>3</sup> Rather than a pure shift of demand, the more accurate representation of the property tax, which is an ad valorem tax, is a pivot of the demand curve downward from the y-intercept. In any case, the qualitative result for the purpose of this study is the same.

response to the tax on buildings. This reduction in the quantity of buildings is achieved through multiple methods: a reduction in the construction of new buildings, a reduction in the up-keep of existing buildings, and the demolition of existing buildings. This all happens in an effort to avoid the higher costs imposed by the taxation of buildings. Consumers of buildings substitute away from high taxed assets (buildings) toward lower taxed (or untaxed) assets. This substitution effect does not occur in the market for land; every parcel of land must be owned by someone. Certain individuals may decide to substitute away from the consumption of land, but in order to do so someone else must be willing to purchase the land. Thus, the quantity of land consumed remains unchanged from before the imposition of the tax to after the imposition of the tax.

With the quantity of land remaining unchanged and the quantity of buildings being reduced, more land will tend to sit idly and the land that is used is not used to its full capacity. In other words, more empty lots will result. Furthermore, for those lots on which buildings exist, the buildings will be smaller and will grow decrepit over time. Thus, the excessive taxation of buildings can partially explain the massive exodus from city downtown areas across the nation (although many other explanations exist).

Overall, the tax on land exerts a minimal effect in the market for land; in fact, the tax does not reduce the efficiency of this market, as only the market price changes. However, the economic efficiency in the market for buildings is reduced in response to the tax. Specifically, a deadweight loss (also known as excess burden) is created. This deadweight loss comes as a result of the tax preventing the consumption of otherwise advantageous (to both the seller and the consumer) buildings, and it should be viewed as an overall loss of welfare in the community. This deadweight loss is shown as the shaded triangle in Panel B of Figure 1.

### **III. Advantages and Disadvantages of a Split-Rate Tax**

The basic premise for using a split-rate tax is linked to the incentives that are created from implementing such a system. Proponents of the split-rate tax claim that these incentives create many potential benefits over conventional property taxes. For example, it is argued that employing lower taxes on buildings and improvements encourages the revitalization of dilapidated urban areas. In addition, a split-rate tax has the potential to promote infill development, while at the same time discouraging real estate speculation and the underutilization of land. It is also argued that higher land taxes increase the cost of both holding on to vacant property and allowing buildings to deteriorate, thus giving property owners the incentive to develop their land in the most efficient manner or encourage them to sell to someone who will. For the same reason, switching to a split-rate system provides the incentive for more commercial development to occur in centrally-located areas of cities. From this, it has been asserted that more office and retail space will increase economic activity and ultimately create more jobs close to existing infrastructure. Finally, proponents of the split-rate system contend that a larger quantity and better quality of affordable housing will result. With lower taxes on improvements, the disincentive to develop or renovate existing housing is lessened. Property owners

thus have more incentive to improve the quality of the city's housing stock by renovating deteriorated buildings. This in turn can attract more residents, improve the overall living conditions within the city, and raise morale in the community.

Although there are a large number of existing studies regarding the advantages of a split-rate system, citations that mention the drawbacks are harder to come by. In fact, the few studies that do mention the shortcomings of the split-rate system seem to be most concerned with the measures used to assess the value of buildings and land, not the structure of the tax itself. For example, Pittsburgh, PA is often used as an example city where a split-rate system was revoked after assessment problems raised taxes so dramatically that homeowners banded together in a public outcry that resulted in an upheaval of the system. Another example city where negative connotations concerning the split-rate system can be found is Uniontown, PA where the split-rate tax was rescinded after only one year.<sup>4</sup> Here, proponents of the split-rate system are quick to point out that the switch from a single-rate to a split-rate system coincided with a tax hike which caused most residents to blame the new tax structure, ultimately resulting in its demise.

There are at least two potential drawbacks of a split-rate tax system that deal with the tax structure itself rather than the extenuating circumstances mentioned above. First, a higher tax rate on land will cause the price of green space to rise, creating less incentive to preserve it. City officials are often concerned with the beautification of downtown areas, and with a split-rate tax there may be much less privately provided space available for projects of this nature. Second, when deciding upon the best tax structure (or any policy for that matter), policy makers generally must balance efficiency and equity. Many of the above mentioned gains associated with the switch to a split-rate tax structure are in reference to efficiency. That is, the tax change may allow the economy to operate closer to its optimal level. Equity issues, such as the distribution of income, are much less straightforward and are therefore more difficult to address. Any change to a tax structure will undoubtedly change the distribution of income. The split-rate tax structure is potentially regressive<sup>5</sup> in nature, and it may impose larger tax burdens on residential landowners relative to properties zoned as commercial, industrial, and apartment. This is because high income residents and businesses typically own larger and more expensive buildings relative to lower income residential owners. Thus, a higher percent of their total property value is wrapped up in the lower taxed attribute (building) rather than the higher taxed attribute (land).

Another possible drawback of switching to a split-rate system deals with the administrative costs associated with making such a change. Although determining an exact dollar amount for these costs is beyond the scope of this study, we feel it is an important topic for local officials to consider when looking at the overall costs and benefits of switching to a split-rate system.

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<sup>4</sup> Hazleton, PA also stopped using a split-rate tax after only one year.

<sup>5</sup> A regressive tax system is one in which effective average tax rates fall with income.



Given the long list of potential benefits and relatively few drawbacks from using a split-rate system, one might question why more cities do not currently use this type of tax. In fact, even with the large amount of literature that exists on the topic of land value and split-rate taxes this question seems to remain unanswered. One possible explanation deals with the political aspects of implementing a tax change. Although maintaining revenue neutrality is often the goal when switching to a split-rate tax system (at least in the beginning), this does not mean that the tax liability for all individuals will remain the same. In fact, as discussed previously, the distribution of income will be affected. In other words, some people will pay more, and some people will pay less under a split-rate system than under a single-rate system. The determination of how much more and how much less, and for whom depends on the specific policy put into place. Politicians are often wary of new ideas when it comes to changing the tax structure and rightly so given the public's distaste for taxes in the first place. This apprehension on the part of local government officials may be at least part of the reason why the idea of a split-rate tax has not gained more momentum. In addition, the positive impacts of a split-rate tax are known to be gradual, and city officials often are looking for quick, short-term remedies to the current problems they are facing rather than a long-term solution that may take years of planning to achieve.

#### **IV. Case Studies: The Experiences of Other Pennsylvania Cities**

Before discussing specifically how a split-rate tax could potentially impact the City of Erie, it is important to understand how other cities in Pennsylvania have implemented this tax and the outcomes that have ensued. Beginning in 1913, when Pennsylvania Legislators passed Act 147 which allowed Pittsburgh and Scranton to reduce property taxes to a half-mill on buildings, Pennsylvania became and continues to be the premier state when it comes to the use of the split-rate tax system. Currently there are 15 cities in Pennsylvania that use the split-rate system. Table 2 lists these cities along with the year the split-rate tax was adopted, the most recent land and building tax rates and the land-to-building tax ratio.

Findings regarding the impacts of a split-rate tax system are somewhat mixed. When analyzing the results of studies conducted by organizations such as the Center for the Study of Economics and the Earth Rights Institute, the outcomes for many of the cities in Pennsylvania appear to be quite positive. For example, once considered one of the most distressed cities in the nation, Harrisburg has seen a major revitalization since 1982, seven years after the split-rate tax was implemented. For example, in 2004, Harrisburg recorded over 1,800 new building permits representing approximately \$407.5 million in new investments, the largest ever in City history. Harrisburg has also witnessed a sharp increase in the number of businesses in the City, a reduction in unemployment, lower crime rates, fewer vacant structures, and higher assessed values of real estate over the past two decades. Given the apparent success of the split-rate system in Harrisburg, it is interesting to note how the City went about implementing the new tax structure over a period of years. Table 3 shows how the two-rate system in Harrisburg has changed since

**Table 2. Pennsylvania Cities Using a Split-Rate Tax**

City	Year Split-Rate Adopted	Building Tax Rate (mills)	Land Tax Rate (mills)	Land/Building Tax Ratio
Aliquippa	1988	0.011	0.081	7.364
Allentown	1997	10.720	50.380	4.700
Altoona	2002	13.770	140.220	10.183
Clairton	1989	1.220	28.000	22.951
DuBois	1991	3.000	89.000	29.667
Duquesne	1985	11.470	19.000	1.656
Ebensburg	2000	6.500	17.500	2.692
Harrisburg	1975	4.779	28.675	6.000
Lock Haven	1991	12.950	85.890	6.632
McKeesport	1980	4.260	16.500	3.873
New Castle	1982	6.644	23.500	3.537
Scranton	1913	22.432	103.145	4.598
Steelton	2000	10.000	12.000	1.200
Titusville	1990	12.460	52.620	4.223
Washington	1985	not reported	not reported	not reported

\*The Aliquippa School District and the Pittsburgh Improvement District also use a split-rate system. These figures were obtained from [www.newpa.com](http://www.newpa.com).

its initial implementation and gives the City's current rate. It should be noted that Harrisburg started shifting taxes away from buildings very slowly using a land-to-building ratio of 1.4:1 in 1975 and then 1.5:1 in 1980. The City used a 3:1 land-to-building ratio for approximately ten years before moving to a ratio of 4:1 in 1999. Currently Harrisburg's land-to-building ratio is 6:1 and has been since 2002.<sup>6</sup>

**Table 3. Harrisburg's Split-Rate Tax Ratios**

Year	Land-to-Building Ratio
1975-1976	1.4:1
1977-1979	1.8:1
1980-1981	3.0:1
1982-1983	2.7:1
1984-1986	2.9:1
1987	2.6:1
1988-1998	3.0:1
1999-2000	4.0:1
2001	5.0:1
2002-2007	6.0:1

The city of Scranton has been using the split-rate system the longest (since 1913) and is famous for making a big change in 1979 when it nearly doubled the tax rate on land and

<sup>6</sup> Facts and figures were provided by Joshua Vincent from the Center for the Study of Economics.

removed the property tax from new construction. Cord (1983) found that average annual building permits increased by 23 percent in Scranton over the three years following the tax change while the nearby city of Wilkes-Barre (with its single-rate system) experienced a decrease of 47 percent from the three previous years. McKeesport experienced a similar situation in 1980 when it increased the tax rate on land, decreased the tax rate on buildings, and offered three year tax abatements for new construction. In the three years following the change, this city saw its building-permit issuance increase by 38 percent. Cities such as Allentown, New Castle, and Washington have also seen increases in the number of building permits in the years following a switch to a split-rate system with reported numbers of 32 percent, 70 percent and 23 percent respectively.<sup>7</sup>

Even though there exists a variety of studies that point to the benefits of a split-rate tax system, there are also many studies that find no significant correlation between construction activity and lower tax rates on buildings relative to land. Examples of such studies include Mathis and Zech (1982), Bourassa (1990), and Tideman and Johnson (1995) who all use data on Pennsylvania cities and find no evidence of a relationship between construction rates and the land-to-building tax ratio. Another study by Oates and Schwab (1997) reveals no direct relationship between the 70 percent increase in building permits recorded in the city of Pittsburgh and an increased tax rate on land to five times that of buildings.<sup>8</sup> It should be noted however, that all of the above mentioned studies have been criticized by Plassman and Tideman (2000) for having large standard errors which could be the result of using “inadequate econometric techniques, insufficient data, or data that are biased against finding a tax effect.” They find that the overall impact on the total value of construction when using a split-rate tax is indeed positive and statistically significant.<sup>9</sup>

## **V. The Current Situation in Erie, PA<sup>10</sup>**

Before examining the various impacts of the change in property tax structure from a single-rate system to a split-rate system, it is worthwhile to examine the current characteristics of property and the property tax in Erie. Table 4 provides a brief statistical description in this regard. As of 2006, there were a total of 36,246 parcels in the city, representing a total value of over \$2.5 billion. Buildings make up just over 76 percent of the total property value, with land composing the remaining 24 percent. Furthermore, there are a total of 3,397 vacant properties (parcels without any buildings constructed on site) in Erie; that is, about nine percent of all properties in the city are vacant. The property tax revenue generated from the 10.21 millage rate totals to over \$26 million, with an average tax liability of \$723 per parcel. Nearly \$20 million (just over 76 percent)

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<sup>7</sup> Facts and figures were obtained from the Earth Rights Institute in “The 237 Report” by Steven Cord.

<sup>8</sup> Oates and Schwab did conclude however, that the split-rate tax contributed to economic growth in Pittsburgh by increasing general revenues which allowed the city to provide more public goods and services thus attracting more residents.

<sup>9</sup> The authors employ a Markov Chain Monte Carlo method, the Gibbs Sampler.

<sup>10</sup> All statistics derived in this analysis are derived from the 2006 assessed property values for the City of Erie.

of total property tax revenue comes from the taxation of buildings, while a little over \$6 million is generated from the taxation of land.

The City of Erie classifies each parcel in one of the following five categories: Apartment, Commercial, Farm, Industrial, or Residential. There is only one property within the city limits classified as Farm. While we do include this single Farm property in our analysis, for the sake of brevity we do not include it in any of the tables that follow. Of the remaining four categories, Residential is the largest, accounting for about 69 percent of total property value (and tax revenue). Commercial (24 percent of total property value and tax revenue) is the next largest category with Industrial (4 percent) and Apartment (4 percent) following.

**Table 4. Current Conditions in Erie as of 2006**

	Apartment	Commercial	Industrial	Residential	Total
<b>Total Property</b>					
Number of Properties	668	3,410	185	31,983	36,246
Total Value	\$92,424,400	\$605,398,835	\$102,188,020	\$1,766,392,821	\$2,566,453,176
Average Value	\$138,360	\$177,536	\$552,368	\$55,229	\$70,807
Building/Land Ratio	5.60	3.36	3.90	3.02	3.18
<b>Land</b>					
Total Value	\$14,007,920	\$138,961,010	\$20,867,430	\$439,481,570	\$613,367,030
Average Value	\$20,970	\$40,751	\$112,797	\$13,741	\$16,922
% of Total Property	15.16%	22.95%	20.42%	24.88%	23.90%
<b>Buildings</b>					
Total Value	\$78,416,480	\$466,437,825	\$81,320,590	\$1,326,911,251	\$1,953,086,146
Average Value	\$117,390	\$136,785	\$439,571	\$41,488	\$735,234
% of Total Property	84.84%	77.05%	79.58%	75.12%	76.10%
<b>Tax Revenue</b>					
Land	\$143,021	\$1,418,792	\$213,056	\$4,487,107	\$6,262,477
Buildings	\$800,632	\$4,762,330	\$830,283	\$13,547,764	\$19,941,010
Total	\$943,653	\$6,181,124	\$1,043,340	\$18,034,879	\$26,203,487
Average	\$1,413	\$1,813	\$5,640	\$564	\$723
% of Total Tax Rev.	3.60%	23.59%	3.98%	68.83%	100.00%

As will be described below, the ratio of building value-to-land value will play a key role in determining whether the tax liability of a property owner rises or falls in response to this proposed tax change. Likewise, the average building-to-land value ratio will shed some light as to which groups of owners will, on average, benefit from the adoption of

the split-rate tax. The average building-to-land value ratio for the City of Erie as a whole is 3.18 (76.1 percent building / 23.9 percent land). Residential property, with a 3.02 building-to-land ratio, is the only category that, on average, has a lower ratio than the overall average. As would be expected, given that apartment buildings are generally multiple stories (causing the building value to rise), properties classified as Apartment have by far the largest building-to-land ratio at 5.60. Industrial and Commercial properties have ratios of 3.90 and 3.36, respectively.

## **VI. Choosing the Split-Rate Tax Structure**

The choice of the most appropriate split-rate tax structure is a subjective one. It ultimately boils down to a comparison of two counter-acting forces: the efficient use of land versus the distribution of income (although there are also other factors that surely matter, but these are likely the two most prevalent). The use of a larger tax ratio (land tax to building tax) is suitable when society places more emphasis on the efficient use of land. Recall from the supply and demand analysis above that the building tax discourages the consumption of buildings and creates an excess burden on the community. On the other hand, as the importance of an equal distribution of income grows, the ratio should be lowered (theoretically even below a ratio of one).

There are an infinite number of possible land-to-building tax ratios that can be considered, with each possible ratio resulting in different levels of efficiency and equity. Thus, deciding upon a specific tax ratio is no easy task, as any one of them could be the best ratio for the City of Erie. As impartial researchers, we make no attempt to decide which is more important: efficient land use or equitable distribution of tax burden. Rather, we attempt to summarize the impact of various split-rate tax ratios on the tax shares and the intensity of land use. We then leave the normative decision as to which tax ratio is best for the local economy to the voters and their elected officials.

In order to decide upon a starting value of the split-rate tax ratio for the purposes of this study, we collected data for all of the current tax ratios used in Pennsylvania as of 2007 (see Table 2). The highest ratio of the land tax to building tax that is currently being used in Pennsylvania is 29.67:1 (Dubois), and the smallest ratio is 1.20:1 (Steelton). We use the mean of the current Pennsylvania split-rate tax ratios (7.78:1) as our starting value and then varied the rate by 0.5 standard deviations (4.14:1) in both directions. We could reduce the ratio by only 0.5 standard deviations, as further reductions would have reduced the ratio below zero. Thus, the smallest ratio considered, other than the single-rate structure (ratio of 1:1), is 3.64:1. We consider tax ratios up to two standard deviations above the mean (24.35:1); currently, only Dubois employs a ratio in excess of this ratio. For each of the ratios examined in this study we solve for the respective revenue neutral land tax and building tax rates for the City of Erie. Refer to Table 5 for a list of all tax ratios studied and the respective land and building tax rates.

We compare the current single-rate tax system to three of the split-rate ratios studied: 3.64:1, 7.78:1, and 24.35:1. Results concerning the other ratios considered in this study

can be found in the Appendices; however, we do not discuss them in the text. For each of the three tax ratios discussed, we first summarize how the overall tax shares associated with land and with buildings changes. Next, we discuss how the aggregate tax liabilities of owners in each of the four major property categories (Apartment, Commercial, Industrial, and Residential) changes. We then further segment the owners of each property type by total property value and demonstrate how the tax liability changes by decile for the Residential classification and by quintile for all other property categories. The change in tax burden across groups will be shown to depend on the building-to-land value ratio.

**Table 5. Tax Ratios and Revenue Neutral Tax Rates**

Tax Ratio (Land/Building)	Land Millage Rate	Building Millage Rate
1.00:1	10.21	10.21
3.64:1	22.79	6.26
7.78:1	30.32	3.89
11.93:1	33.72	2.83
16.07:1	35.66	2.22
20.21:1	36.91	1.83
24.35:1	37.78	1.55

### A. Increasing the Land-to-Building Tax Ratio to 3.64:1

First, consider the impact of switching from the single-rate tax system (10.21 mills on both land and building) to a split-rate structure in which the land-to-building tax ratio equals 3.64:1. Solving for the revenue neutral tax rates given this ratio implies that the tax rate on land and buildings are 22.79 mills and 6.26 mills, respectively. As demonstrated in Table 6, this tax system causes the buildings tax share to fall from 76 percent to 47 percent. Recall that one of the goals of the split-rate tax structure is to reduce the tax burden on buildings such that the total cost of constructing or improving buildings falls (tax liability will not rise by as much as before with capital improvements). Thus, owners become more likely to engage in such behavior, leading to a more intensive use of land and potentially to higher rates of economic growth.

**Table 6. Land and Building Tax Shares by Tax Ratio**

Tax Ratio (Land/Building)	Revenue from Land		Revenue from Buildings	
	Amount	Percent of Total	Amount	Percent of Total
1.00:1	\$6,262,477	23.90%	\$19,941,010	76.10%
3.64:1	\$13,981,206	53.36%	\$12,222,291	46.64%
7.78:1	\$18,596,657	70.97%	\$7,606,840	29.03%
11.93:1	\$20,681,794	78.93%	\$5,521,703	21.07%
16.07:1	\$21,869,736	83.46%	\$4,333,761	16.54%
20.21:1	\$22,637,028	86.39%	\$3,566,469	13.61%
24.35:1	\$23,173,490	88.44%	\$3,030,007	11.56%

With any change in the tax system, there will undoubtedly be some shifting of tax burden from some taxpayers to other taxpayers. The most direct method in determining whether an individual (or a group of individuals, on average) will experience an overall increase or decrease in tax liability is to compare that individual's (or group's) building-to-land value ratio to the average ratio of the city.<sup>11</sup> The average building-to-land value ratio in the city is 3.18, as noted above in Table 4. Any individual or group with a building-to-land value ratio above the city average will experience a reduction in tax liability. Conversely, any individual or group with a ratio below 3.18 will observe an increase in tax liability.

An example may be beneficial here. Table 7 presents the change in tax liability for a fictitious city of nine properties in which the city is considering various revenue neutral land-to-building tax ratios.<sup>12</sup> The building-to-land value ratios range from 0.5 to 12.0 with an average ratio of 5.0. Notice that regardless of the tax ratio considered, those properties with a building-to-land value ratio less than 5.0 (the average) incur an increase in their property tax bill. Those with a building-to-land ratio in excess of 5.0 enjoy a tax reduction. Furthermore, those properties with building-to-land ratios further from the mean ratio experience tax liability changes of greater magnitudes than those close to the mean. Note that property number 5, which has a building-to-land ratio equal to the mean, never experiences a change in tax liability.

**Table 7. Fictitious Example: Change in Tax Liability from Single-Rate Tax**

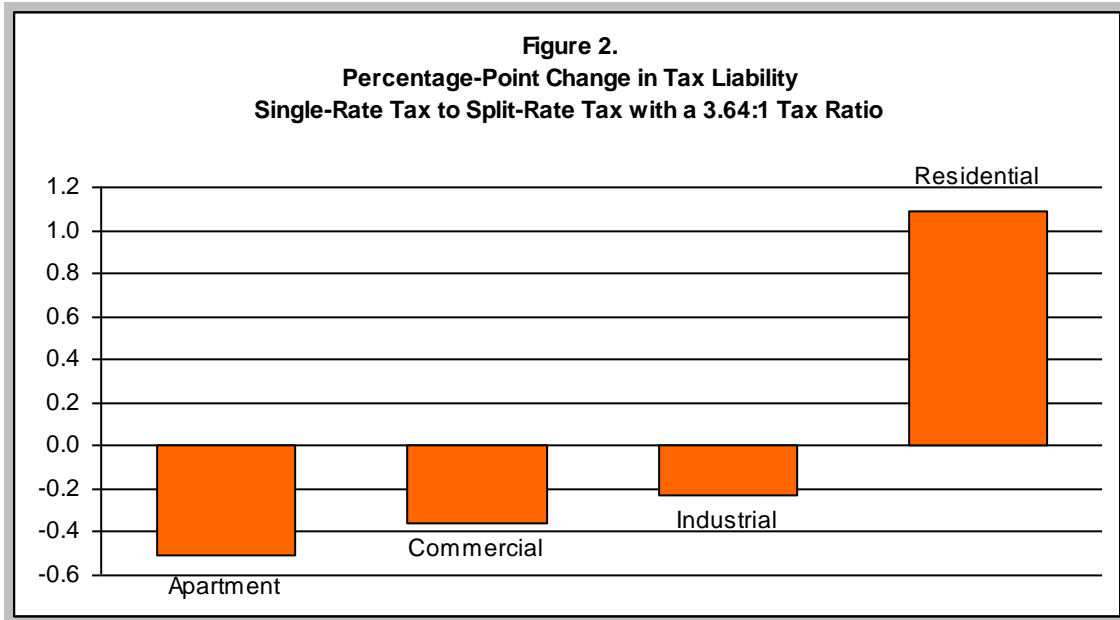
Property Number	Building-to-Land Value Ratio	Land-to-Building Tax Ratio					
		3.64:1	7.78:1	11.93:1	16.07:1	20.21:1	24.35:1
1	0.5	\$14.05	\$24.38	\$29.66	\$32.86	\$35.01	\$36.55
2	2.0	\$9.37	\$16.25	\$19.77	\$21.91	\$23.34	\$24.37
3	2.5	\$7.80	\$13.55	\$16.48	\$18.26	\$19.45	\$20.31
4	4.0	\$3.12	\$5.42	\$6.59	\$7.30	\$7.78	\$8.12
5	5.0	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
6	5.5	-\$1.56	-\$2.71	-\$3.30	-\$3.65	-\$3.89	-\$4.06
7	6.5	-\$4.68	-\$8.13	-\$9.89	-\$10.95	-\$11.67	-\$12.18
8	7.0	-\$6.24	-\$10.84	-\$13.18	-\$14.60	-\$15.56	-\$16.25
9	12.0	-\$21.85	-\$37.93	-\$46.14	-\$51.12	-\$54.46	-\$56.86

Applying the above lesson to the aggregated property classifications for the City of Erie, only residential property owners, on average, have a building-to-land value ratio that is below the city average (see Table 4), suggesting that the tax burden will increase for residential property owners. Specifically, as shown in Figure 2, residential property owners, in the aggregate, experience over a one percentage point increase in their share of the tax burden. The tax burden of the other three classifications (Apartment,

<sup>11</sup> This method applies only when the tax change under consideration is revenue neutral.

<sup>12</sup> The change in tax liability obviously depends on the value of the properties in addition to the ratio of building value-to-land value. Property values have been suppressed from the table for simplicity.

Commercial, and Industrial) all decrease, with apartment owners realizing the largest benefit, a 0.5 percentage point fall in tax liability.

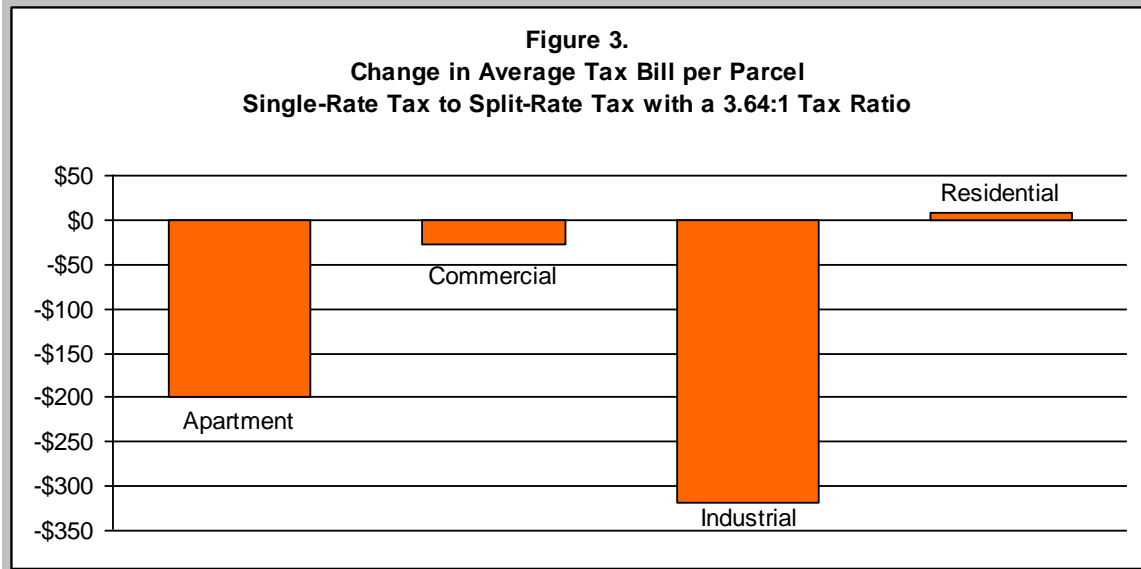


Note: The information represented in this figure was extracted from Appendix A1.

The fact that this split-rate tax structure shifts the tax burden toward residential owners is only the first step. Next, we must determine whether this tax shifting is large enough to be considered significant. As shown in Figure 3, the average residential property owner experiences less than a nine dollar increase in his or her annual property tax bill, arguably a minimal rise. This small increase in residential tax liability coincides to a somewhat larger benefit to the average owner in the other three classifications, with the industrial property owners receiving the largest reduction at nearly \$320. Apartment owners observe, on average, a \$200 reduction in their annual tax bills; likewise, commercial owners benefit from nearly a \$30 reduction.

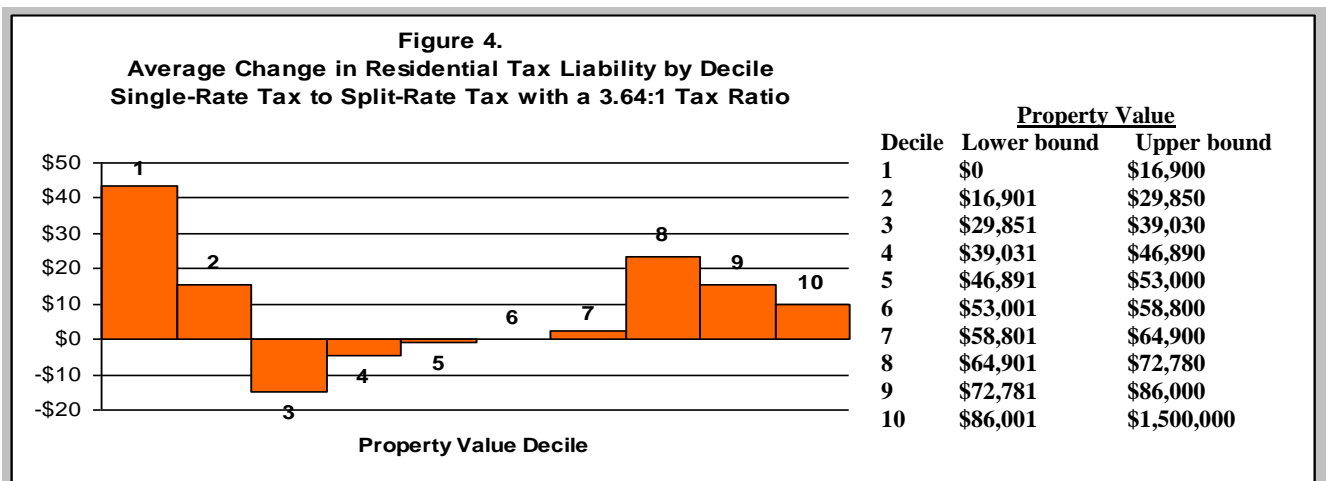
The changes in tax liability across each property classification are arguably modest, at best (the \$320 decrease in taxes experienced by the average industrial property owner is likely dwarfed by average company sales). But, this is not to say that the adoption of the split-rate tax will have negligible impacts on the local economy. It is true that owners of property similar to the average Erie property will see minimal changes in tax liability; however, the largest changes in tax liability will be observed in the extremes. Those owners of property with extremely low (relative to the average) building-to-land value ratios will experience a large increase in their tax burden. Thus, it is expected that owners of such property will seek to increase the value of the buildings on the land in an effort to reduce the average tax liability (tax per dollar of property).





Note: The information represented in this figure was extracted from Appendix A2.

To further explore the redistribution of tax burden within the residential classification, we separate the properties by decile. As shown in Figure 4, the average tax liability increases for owners of property within the extremes while it actually decreases for some deciles in the middle. The average change in tax liability in each decile once again appears minimal, with the exception of the lowest decile. The \$43 increase in the average tax represents slightly more than a 75 percent increase in tax liability within this decile.



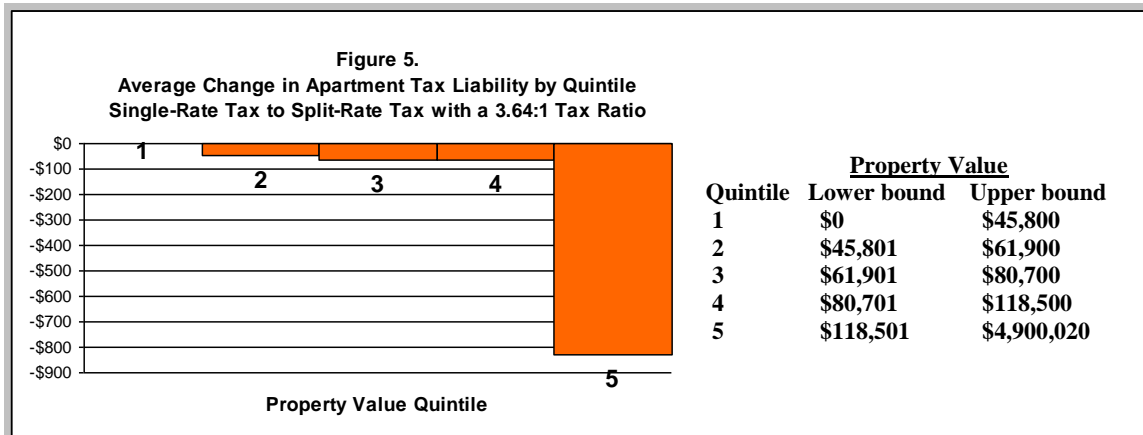
Note: The information represented in this figure was extracted from Appendix A3.

It is tempting to interpret the relationship described in Figure 4 as an estimate of how the tax burden across different income groups will change; however, this interpretation should be avoided. Those with little income rarely hold vacant land as an investment.

The lowest decile has a building-to-land value ratio of only 0.38, suggesting that a high proportion of the properties in the lowest decile are empty plots. Indeed, of the 3,200 residential properties in the lowest decile, 2,583 of them are vacant. It is therefore likely that the financially wealthy are dispersed regularly throughout the deciles; owning vacant land in the lower deciles, rental homes in the middle, and their personal homes in the upper deciles. Thus, the results described by Figure 4 cannot be used to draw conclusions in regards to the regressive nature of the split-rate tax.

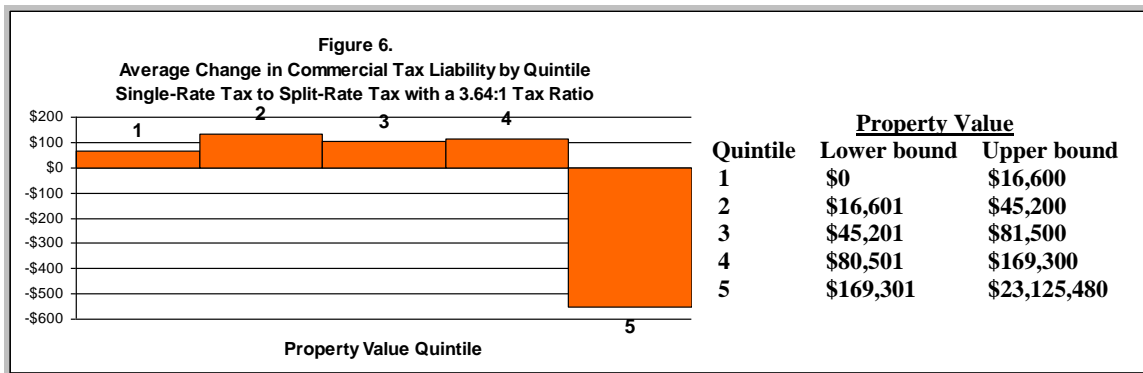
A comparison of the Erie residential properties experiencing the largest increase in tax burden against the residential property receiving the biggest decrease in tax burden may allow for greater understanding of how this split-rate tax structure can encourage the more intensive use of land. Property-A is valued at \$202,200 and is vacant (building-to-land ratio of zero). Property-B is valued at \$1,500,000 with a building-to-land ratio of 8.17. While the total split-rate tax bill associated with Property-A (\$4,609) is less than that of Property-B (\$12,090), it is the change in this tax that is of concern. Because the building-to-land ratio of Property-A is lower than the average ratio in Erie, it experiences an increase of \$2,545 in tax liability, representing a 123 percent increase. The relatively large building-to-land ratio of Property-B enables the tax liability associated with this property to fall by \$3,224, a 21 percent reduction. Constructing a building on Property-A will certainly increase the total tax bill; however, the average tax rate per dollar of property will fall, making the construction less costly. Thus, the owner of this property has greater incentive to use the land in a more intensive manner.

We now turn our attention to the examination of the change in tax burden across the property value quintiles in the other three property classifications, beginning with the apartment category. Each quintile within the apartment classification experiences a decrease in tax liability (see Figure 5); however, only the top quintile experiences a tax decrease of more than ten percent. The largest reduction in tax liability associated with a single property is nearly \$11,500 (a 37.5 percent decrease); the corresponding property is valued at \$3 million with a building-to-land ratio of about 130. Conversely, the property with the largest tax increase (\$818, a 123% increase) is vacant and is valued at \$65,000.



Note: The information represented in this figure was extracted from Appendix A3.

When considering only the dollar change in tax liability, each of the lower four commercial quintiles experience, on average, fairly negligible increases, as shown in Figure 6. However, these tax increases are fairly substantial in percentage terms. For instance, the lowest quintile experiences an 84 percent increase in the average tax bill, while the second and third quintiles encounter a 42 and 16 percent increase, respectively. The largest tax increase for a single property was \$10,277, which occurred for a property valued at over \$4.8 million with a building-to-land value ratio of 1.72. This tax increase represents a 21 percent change. The largest tax reduction across all property classifications is associated with a property valued at over \$23 million dollars with a building-to-land ratio of 47.7. This property would experience an \$83,500 fall in tax burden, a 35 percent reduction.



Note: The information represented in this figure was extracted from Appendix A3.

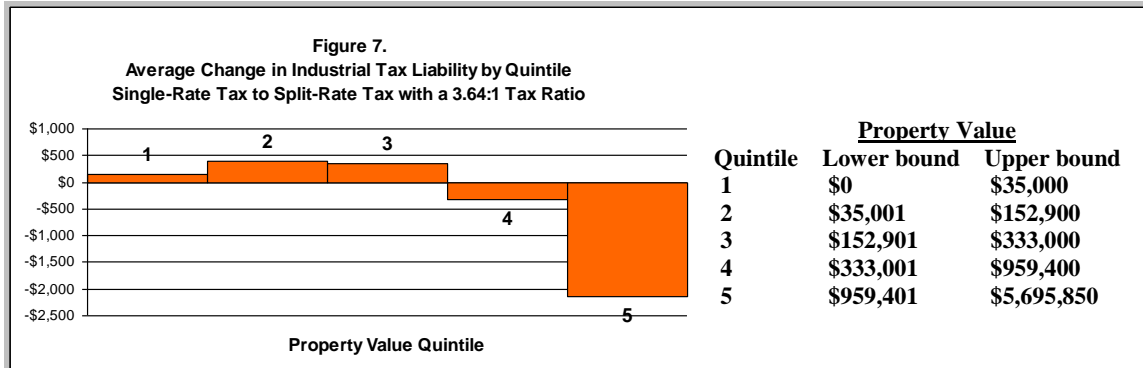
Within industrial properties, the lowest three quintiles all experience tax increases on average while the top two enjoy an average reduction (see Figure 7). The average tax burden for the lowest quintile rises by 112 percent; it is also noteworthy that not a single property in this quintile experiences a tax reduction. On the opposite end, the top quintile receives an average tax decrease of over \$2,100, roughly a 12% drop. The largest benefactor of this tax change within this category is a property valued at nearly \$5.7 million with a building- to-land ratio of 6.96. The tax liability for this property falls by 18.4 percent or roughly \$10,700. The biggest increase for industrial property owners is about \$9,700 (a 29 percent rise), which is experienced by a property valued at over \$3.3 million with a building-to-land ratio of 1.40.

## B. Increasing the Land-to-Building Tax Ratio to 7.78:1<sup>13</sup>

If the mean split-rate tax ratio of Pennsylvanian cities (7.78:1) were employed instead, the revenue neutral tax rates on land and buildings would be 30.32 mills and 3.89 mills respectively. The trends observed above in the analysis of a 3.64:1 tax ratio will once

<sup>13</sup> The statistics discussed below have been extracted from Appendices A1, A2, and A4.

again be observed given the new larger tax ratio. The primary difference is that the magnitudes of the changes in the tax distribution will be larger. For instance, the tax share on buildings will fall by nearly 30 percentage points if the 3.64:1 tax ratio were employed. However, if the 7.78:1 ratio were applied, the tax share on buildings would decrease by 47 percentage points, reaching only 29 percent. Thus, an even greater incentive to use land more intensively exists for the higher tax ratio than for the lower ratio.



Note: The information represented in this figure was extracted from Appendix A3.

The higher tax ratio also leads to greater fluctuations in the tax distribution. The tax burden on residential land owners increases by 1.75 percentage points relative to the single-rate tax. Overall, this increase is 0.66 percentage points larger than that of the 3.64:1 tax ratio; this equates to a 60 percent larger change in residential tax share relative to the 3.64:1 tax ratio. Likewise, the tax shares for apartment, commercial, and industrial categories experience a 60 percent larger (in magnitude) change relative to the 3.64:1 tax ratio.

The average residential property would pay only \$14 more than they do under the current system. While the change in the average tax bill across property value deciles does increase in magnitude, the changes are still small in magnitude and only one decile experiences a change in excess of 10 percent. The lowest decile (primarily composed of vacant property) observes a 125 percent increase in average tax liability. The largest increase in the tax bill for a single property is \$4,066, while the largest drop in tax for a single property is \$5,152.

Apartment owners, on average, would enjoy a \$320 reduction in tax liability if the 7.78:1 tax ratio were instituted. All but the lowest quintile enjoys an average tax reduction in excess of 10 percent. The top quintile receives a reduction of over \$1,300 on average (or 30 percent). The largest decrease in the tax bill for a single property is over \$18,300, a 60 percent drop. On the other hand, the largest increase within the apartment category is \$1,300. While much smaller in magnitude than the maximum decrease in tax liability, the \$1,300 increase represents a 200 percent increase in tax liability.

While commercial property owners, on average, would pay only \$44 less under the 7.78:1 tax ratio, the analysis is more interesting at the quintile level. The lowest four quintiles all experience tax increases by at least 15 percent with the bottom quintile paying 133 percent more. The top quintile pays roughly 12 percent less under this split-rate tax. The largest increase in tax would be more than \$16,300, a 33 percent increase, while the largest decrease in taxes would be over \$133,500, a 57 percent decrease.

Finally, industrial property owners receive a more substantial \$508 tax reduction on average than apartment and commercial owners. The average owner in the lowest quintile would pay nearly 180 percent more under the 7.78:1 split-rate tax ratio than under the current system, while the average owner in the second and third quintiles pay 71 and 23 percent more. Those in the top quintile pay about 19 percent less. The largest increase in tax liability is over \$15,500 while the maximum decrease is \$17,000.

### **C. Increasing the Land-to-Building Tax Ratio to 24.35:1<sup>14</sup>**

The final land-to-building tax ratio discussed here is a ratio of 24.35:1. This represents the mean Pennsylvania city split-rate tax ratio plus two standard deviations. The revenue neutral tax on land and on buildings would be 37.78 mills and 1.55 mills, respectively. Under this tax system, only about \$3 million, or 11.6 percent, of the City's property tax revenue would come from the taxation of buildings. Residential owners would account for over 71 percent of total tax revenue generated, 2.40 percentage points more than they pay under the current system. Apartment, commercial, and industrial property owners would pay 2.48, 22.80, and 3.49 percent of total property tax revenue, respectively.

The average residential property owner would pay just under \$20 more annually than under the current single-rate system. The average owner within each quintile still has yet to observe a \$100 increase in tax liability; the largest increase is \$95 which is associated with the lowest quintile. The largest and smallest tax increases are \$5,575 and -\$7,064, respectively.

Each of the other three property classifications experience decreases in tax liability, on average. Commercial property owners receive the smallest benefit of the three, as the average tax bill decreases by only \$61. The average apartment owner pays \$438 less per year. Finally, the industrial property owners benefit the most, receiving a \$696 reduction in tax liability, on average. Of all properties within these three classifications, the commercial category contains the property with the largest increase and the property with the largest decrease in tax liability. The largest increase is \$22,400 while the largest decrease is \$183,000.

On a side note, while we chose to stop the analysis at the tax ratio of 24.35:1 somewhat arbitrarily as it is the mean ratio used by Pennsylvania cities plus two standard deviations;

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<sup>14</sup> The statistics discussed below have been extracted from Appendices A1, A2, and A8.

we have reason to suggest that the ratio should not be much higher than this unless converting to a pure land value tax. As the tax ratio increases, the tax rate on buildings continues to fall. As such, the revenue generated from buildings also falls. However, the administrative costs, particularly the costs of appraisals, associated with collecting building tax revenue remain unchanged. As such, the rate of return on the building tax falls as the tax ratio rises. At some point, it becomes more practical to completely abandon the building tax altogether, adopting a pure land value tax instead.

## **VII. A Summary: Who Benefits and Who Loses from a Change to a Split-Rate Tax?**

Individual property owners can fairly easily determine whether a split-rate tax structure will cause their tax liability to rise or fall by simply calculating the building value-to-land value of their own property and comparing it to the 3.18 city average. Those property owners whose building-to-land value ratio is less than the overall average for the city, 3.18, will ultimately pay more under a split-rate tax while those whose ratio is more than 3.18 (relatively more value in buildings than average) will pay less. Owners of vacant properties face the largest percentage increase in their tax liabilities. On the other hand, owners of property with low levels of ground footage but with tall buildings will enjoy sizable reductions in the average tax rate applicable to their property, allowing their tax liability to fall substantially.

Residential property owners, as a group, will face an increase in tax liability while the other three property classifications each enjoy tax reductions, on average. This is because residential property tends to have lower building-to-land value ratios. However, the magnitude of the average change in residential tax liability is fairly minimal. Furthermore, the decrease in average tax liability for owners of property in the other three classifications is also small relative to typical sales in each industry. As such, we should not anticipate massive changes in the behavior of property owners, on average.

This is not to suggest that the split-rate tax structure will not be effective in promoting more intensive land use. The owners of property with very low building-to-land value ratios, and particularly those with vacant land, incur large increases in tax liability. This reduces the incentive to speculatively hold idle land in hopes that a large developer will decide to buy up the property. Owners of vacant land (and owners of land with low building-to-land values, in general) will have more incentive to construct structures on the land such that the average property tax paid is reduced and the owners' profit margin is increased.

The long-run result of such a set of incentives is that the City of Erie should observe more economic development, less vacant land, taller buildings, and a higher quality building stock, in general. This potential economic growth, if it does indeed occur, would then lead to increased employment and income in the City as well as higher property values, resulting in greater tax revenue for the City. It should be stressed, however, that this economic growth would not be immediately observable, as economic

development stemming from changes in tax structure will take time. Perhaps more importantly, there is no consensus in the empirical literature that the split-rate tax structure guarantees the greater economic development indicated by theory.

While employment in the City may rise as a result of the adoption of a split-rate tax structure, as mentioned above, the impact of the tax will not be the same across firms of various sizes. If small firms tend to have relatively low building-to-land value ratios while large firms own property with large building-to-land ratios, as is suggested in Appendices A3 – A8, then the small firms will experience higher costs and lower profits, making them less competitive, on average.<sup>15</sup> As a result, small firms may reduce production and employment. However, the increased profitability of the larger firms may encourage increased employment, more than offsetting the losses experienced by smaller firms.

While business owners in each of Apartment, Commercial, and Industrial classifications, on average, are shown to benefit from lower tax liabilities, it is possible that the tax savings are passed on to their clientele in the form of lower prices. The nature of competitive markets forces firms to set their prices close to their marginal costs. Of the three markets, industrial is the most likely to pass on the tax savings to their consumers because these firms are generally competing in the highly competitive world-market. The market for apartments, on the other hand, is a local market and will certainly be less competitive than the industrial world market. This is not to imply that the apartment market in Erie is not competitive; indeed, with 668 apartment properties, apartment owners likely face a good deal of competition. However, without further knowledge concerning the level of this competition, the share of the tax savings that is passed on to renters in the form of lower rental prices remains unclear.

## **VIII. Methods of Implementation**

If the City of Erie were to adopt a split-rate property tax system, one hurdle would be to determine how the new tax system would be implemented. The answer to this question would likely depend on the tax ratio chosen and on the city residents' resistance to change. We discuss the latter before returning to how the chosen tax ratio may influence the implementation of the tax. It is human nature to be resistant to change. However, this opposition can be overcome with a combination of education and time. The generally accepted time-table for a transition from a single-rate property tax structure to a land value tax (no tax on buildings) is five years. This means that the tax on buildings is reduced by 20 percent of its original rate every year.

For the City of Erie, this “rule” suggests that the tax on buildings would be reduced by a maximum of 2.04 mills per year until the desired tax-ratio is reached. If the City of Erie were to choose the 3.64:1 land-to-building tax ratio, in which the tax on buildings is

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<sup>15</sup> In Appendices A3-A8, it can be seen that as Commercial and Industrial property values rise, so too does the building-to-land value ratio.

reduced from 10.21 mills to 6.26, this transition should span across two years with the building tax rate being reduced by 1.98 mills per year. On the other hand, if city officials were to choose the 7.78:1 tax ratio (building tax rate of 3.89), the transition should take 4 years in which the building tax rate is reduced by 1.58 mills per year. The summary of the transition process for the other tax ratios considered in this study are provided in Table 8. More specific details regarding both the building tax rate and the land tax rate during each year of transition is provided in Appendix A9. It should be noted that we have erred on the side of slower transition, always rounding the number of transition years up and then using the rounded number of years to calculate the change in the building tax rate per year.

**Table 8. Transition Chart: From Single-Rate to Split-Rate Property Tax**

Final Tax Ratio (Land/Building)	Years for Transition	Decrease in Building Tax per Year (mills)	Ending Building Tax Rate (mills)
3.64:1	2	1.98	6.26
7.78:1	4	1.58	3.89
11.93:1	4	1.85	2.83
16.07:1	4	2.00	2.22
20.21:1	5	1.68	1.83
24.35:1	5	1.73	1.55

In addition to a relatively slow implementation of the new tax structure, we suggest city officials take actions that educate property owners to decrease uncertainty. We recommend that if the city does adopt the split-rate tax structure, it should not make the change effective until at least a year after the decision (although not more than two years). That way, city officials can implement an educational campaign concerning these changes so that property owners are not surprised by changes in tax liability. One possible (and relatively inexpensive) method to educate property owners of the tax change is to include a letter with the final property tax bill under the single-rate tax. This letter should inform them of the change that is to take place in the following year. The letter could also indicate the exact tax bill for the following year so that each property owner can adjust their savings or escrow account accordingly.


An alternative method of implementation (“go-forward basis”) frequently comes up in conversations concerning the split-rate tax, although it rarely appears in related literature. The most important difference between this method and what we propose here is that under the go-forward plan the split-rate tax is implemented only through tax revenue increases. The go-forward method suggests that all future tax rate increases be applied to land, leaving the tax rate on buildings unchanged. If this method were employed as the means of transition from the single-rate system, the benefits of the split-rate tax would be minimal for several years because the ratio would remain close to 1:1. Only when the tax ratio is large do those property owners with very low building-to-land value ratios face greater incentive to use their land more intensely. Plus, when taxes are increased along with the change to the split-rate structure, additional problems arise, as will be described below. Thus, the go-forward method is not recommended as an effective means of



transition to the split-rate tax. However, if the local government were to adopt a split-rate tax (say 3.64:1) and then decided to raise additional tax revenue five or ten years into the future, we do recommend that the tax rate increase apply only to land and not buildings. Thus, once the split-rate tax structure is implemented, the principles of the go-forward plan should be applied, never increasing the tax rate on buildings.

One final word of caution: if the city were to adopt the split-rate tax, it should not be done simultaneously with a tax increase. In such a situation, the size of the average increase in tax bill grows larger, hitting those with low building-to-land value ratios particularly hard. At the same time, those owners with high building-to-land value ratios (who benefit from the split-rate tax) do not observe as big a reduction in their tax bills. Thus, the opponents to the split-rate tax grow more vocal, while the proponents become less so. The tax increase biases the public against the split-rate tax system, increasing the likelihood of failure. For example, Uniontown rescinded its split-rate systems after only one year due to public outcry. So, even though the split-rate tax is more economically efficient relative to the single-rate tax, it has been interpreted as a means for the government to “sneak” a tax increase past the taxpayers.

Recently, it has been suggested in multiple local television news reports that the City of Erie would likely attempt to increase tax revenue if the split-rate tax is adopted. The simultaneous increase in property tax revenue and switch to the split-rate tax structure is strongly discouraged. If the City of Erie wants to increase property tax revenue, it should increase the tax rates separate from the transition to the split-rate tax system. Specifically, we suggest that the tax increase precede the adoption of the split-rate tax structure by at least a year (maybe even two years). This way, property owners will not confuse the effects of the tax increase with the impacts of the split-rate tax.



## APPENDICES

**Appendix A1. Percent of Total Property Tax Revenue by Property Classification**

Tax Ratio (Land/Building)	Apartment		Commercial		Industrial		Residential	
	% of Total	Change in %	% of Total	Change in %	% of Total	Change in %	% of Total	Change in %
1.00:1	3.60%	-	23.59%	-	3.98%	-	68.83%	-
3.64:1	3.09%	-0.51	23.23%	-0.36	3.76%	-0.22	69.92%	1.09
7.78:1	2.79%	-0.81	23.01%	-0.58	3.62%	-0.36	70.57%	1.75
11.93:1	2.65%	-0.95	22.91%	-0.68	3.56%	-0.42	70.87%	2.04
16.07:1	2.57%	-1.03	22.86%	-0.73	3.53%	-0.45	71.04%	2.21
20.21:1	2.52%	-1.08	22.82%	-0.77	3.51%	-0.48	71.15%	2.32
24.35:1	2.48%	-1.12	22.80%	-0.79	3.49%	-0.49	71.22%	2.40

**Appendix A2. Average Tax Liability by Property Classification**

Tax Ratio (Land/Building)	Apartment		Commercial		Industrial		Residential	
	Ave. Tax Liability	Change in Liability	Ave. Tax Liability	Change in Liability	Ave. Tax Liability	Change in Liability	Ave. Tax Liability	Change in Liability
1.00	\$1,412.65	-	\$1,812.65	-	\$5,639.68	-	\$563.89	-
3.64	\$1,212.61	-\$200.04	\$1,784.88	-\$27.77	\$5,321.92	-\$317.76	\$572.85	\$8.96
7.78	\$1,092.99	-\$319.66	\$1,768.28	-\$44.37	\$5,131.92	-\$507.76	\$578.20	\$14.31
11.93	\$1,038.96	-\$373.70	\$1,760.78	-\$51.87	\$5,046.08	-\$593.60	\$580.62	\$16.73
16.07	\$1,008.17	-\$404.49	\$1,756.50	-\$56.14	\$4,997.18	-\$642.50	\$582.00	\$18.11
20.21	\$988.28	-\$424.37	\$1,753.74	-\$58.90	\$4,965.59	-\$674.09	\$582.89	\$19.00
24.35	\$974.38	-\$438.28	\$1,751.81	-\$60.83	\$4,943.50	-\$696.17	\$583.51	\$19.62

**Appendix A3. Change in Tax Burden Across Property Values: From 1:1 to 3.64:1 Tax Ratio**

<b>Apartments</b>					<b>Tax Liability</b>			
Property Value					Minimum	Maximum	Mean	Mean
Quintile	Minimum	Maximum	Mean	B/L Ratio	Increase	Increase	Increase	Tax Liability
1	\$0	\$45,800	\$36,713	3.26	-\$113	\$325	-\$2	\$372
2	\$45,801	\$61,900	\$53,991	4.46	-\$183	\$329	-\$50	\$501
3	\$61,901	\$80,700	\$70,569	4.49	-\$234	\$818	-\$66	\$654
4	\$80,701	\$118,500	\$96,063	4.02	-\$338	\$736	-\$63	\$918
5	\$118,501	\$4,900,020	\$438,950	7.00	-\$11,476	\$634	-\$828	\$3,654
<b>Commercial</b>					<b>Tax Liability</b>			
Property Value					Minimum	Maximum	Mean	Mean
Quintile	Minimum	Maximum	Mean	B/L Ratio	Increase	Increase	Increase	Tax Liability
1	\$0	\$16,600	\$7,879	0.32	-\$66	\$205	\$67	\$148
2	\$16,601	\$45,200	\$30,322	1.00	-\$175	\$566	\$131	\$440
3	\$45,201	\$81,500	\$61,260	1.94	-\$319	\$1,004	\$102	\$728
4	\$81,501	\$169,300	\$114,741	2.36	-\$662	\$1,982	\$112	\$1,283
5	\$169,301	\$23,125,480	\$673,479	4.28	-\$83,546	\$10,227	-\$551	\$6,325
<b>Industrial</b>					<b>Tax Liability</b>			
Property Value					Minimum	Maximum	Mean	Mean
Quintile	Minimum	Maximum	Mean	B/L Ratio	Increase	Increase	Increase	Tax Liability
1	\$0	\$35,000	\$13,189	0.08	\$7	\$440	\$151	\$285
2	\$35,001	\$152,900	\$86,111	0.95	-\$438	\$1,888	\$388	\$1,267
3	\$152,901	\$333,000	\$232,713	2.06	-\$680	\$2,771	\$340	\$2,716
4	\$333,001	\$959,400	\$643,674	3.79	-\$2,124	\$2,271	-\$322	\$6,249
5	\$959,401	\$5,695,850	\$1,786,152	5.01	-\$10,679	\$9,724	-\$2,145	\$16,092
<b>Residential</b>					<b>Tax Liability</b>			
Property Value					Minimum	Maximum	Mean	Mean
Decile	Minimum	Maximum	Mean	B/L Ratio	Increase	Increase	Increase	Tax Liability
1	\$0	\$16,900	\$5,418	0.38	-\$61	\$213	\$43	\$99
2	\$16,901	\$29,850	\$24,259	2.61	-\$108	\$372	\$15	\$263
3	\$29,851	\$39,030	\$34,266	3.70	-\$136	\$483	-\$15	\$335
4	\$39,031	\$46,890	\$43,286	3.30	-\$184	\$573	-\$4	\$438
5	\$46,891	\$53,000	\$50,054	3.20	-\$200	\$635	-\$1	\$510
6	\$53,001	\$58,800	\$55,882	3.19	-\$223	\$641	\$0	\$570
7	\$58,801	\$64,900	\$61,826	3.14	-\$174	\$317	\$2	\$634
8	\$64,901	\$72,780	\$68,616	2.85	-\$283	\$901	\$23	\$724
9	\$72,781	\$86,000	\$78,454	2.98	-\$307	\$1,007	\$16	\$817
10	\$86,001	\$1,500,000	\$130,630	3.10	-\$3,224	\$2,545	\$10	\$1,344

**Appendix A4. Change in Tax Burden Across Property Values: From 1:1 to 7.78:1 Tax Ratio**

<b>Apartments</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$45,800	\$36,713	3.26	-\$181	\$520	-\$4	\$371
2	\$45,801	\$61,900	\$53,991	4.46	-\$293	\$526	-\$80	\$472
3	\$61,901	\$80,700	\$70,569	4.49	-\$374	\$1,307	-\$106	\$614
4	\$80,701	\$118,500	\$96,063	4.02	-\$540	\$1,176	-\$101	\$880
5	\$118,501	\$4,900,020	\$438,950	7.00	-\$18,338	\$1,014	-\$1,323	\$3,159
<b>Commercial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,600	\$7,879	0.32	-\$105	\$328	\$107	\$188
2	\$16,601	\$45,200	\$30,322	1.00	-\$280	\$905	\$209	\$519
3	\$45,201	\$81,500	\$61,260	1.94	-\$509	\$1,605	\$164	\$789
4	\$81,501	\$169,300	\$114,741	2.36	-\$1,058	\$3,167	\$178	\$1,350
5	\$169,301	\$23,125,480	\$673,479	4.28	-\$133,503	\$16,343	-\$880	\$5,996
<b>Industrial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$35,000	\$13,189	0.08	\$12	\$704	\$241	\$375
2	\$35,001	\$152,900	\$86,111	0.95	-\$700	\$3,016	\$620	\$1,500
3	\$152,901	\$333,000	\$232,713	2.06	-\$1,087	\$4,427	\$543	\$2,919
4	\$333,001	\$959,400	\$643,674	3.79	-\$3,395	\$3,629	-\$515	\$6,057
5	\$959,401	\$5,695,850	\$1,786,152	5.01	-\$17,064	\$15,538	-\$3,427	\$14,809
<b>Residential</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Decile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,900	\$5,418	0.38	-\$98	\$340	\$69	\$125
2	\$16,901	\$29,850	\$24,259	2.61	-\$172	\$595	\$24	\$272
3	\$29,851	\$39,030	\$34,266	3.70	-\$218	\$772	-\$24	\$326
4	\$39,031	\$46,890	\$43,286	3.30	-\$294	\$915	-\$7	\$435
5	\$46,891	\$53,000	\$50,054	3.20	-\$319	\$1,015	-\$1	\$510
6	\$53,001	\$58,800	\$55,882	3.19	-\$356	\$1,024	\$0	\$570
7	\$58,801	\$64,900	\$61,826	3.14	-\$277	\$506	\$4	\$635
8	\$64,901	\$72,780	\$68,616	2.85	-\$453	\$1,440	\$37	\$738
9	\$72,781	\$86,000	\$78,454	2.98	-\$490	\$1,609	\$25	\$826
10	\$86,001	\$1,500,000	\$130,630	3.10	-\$5,152	\$4,066	\$16	\$1,350

**Appendix A5. Change in Tax Burden Across Property Values: From 1:1 to 11.93:1 Tax Ratio**

<b>Apartments</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$45,800	\$36,713	3.26	-\$212	\$608	-\$5	\$370
2	\$45,801	\$61,900	\$53,991	4.46	-\$342	\$614	-\$93	\$458
3	\$61,901	\$80,700	\$70,569	4.49	-\$437	\$1,528	-\$124	\$597
4	\$80,701	\$118,500	\$96,063	4.02	-\$631	\$1,374	-\$118	\$863
5	\$118,501	\$4,900,020	\$438,950	7.00	-\$21,439	\$1,185	-\$1,546	\$2,935
<b>Commercial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,600	\$7,879	0.32	-\$123	\$383	\$126	\$206
2	\$16,601	\$45,200	\$30,322	1.00	-\$327	\$1,058	\$244	\$554
3	\$45,201	\$81,500	\$61,260	1.94	-\$595	\$1,876	\$191	\$817
4	\$81,501	\$169,300	\$114,741	2.36	-\$1,237	\$3,703	\$208	\$1,380
5	\$169,301	\$23,125,480	\$673,479	4.28	-\$156,073	\$19,106	-\$1,029	\$5,847
<b>Industrial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$35,000	\$13,189	0.08	\$14	\$823	\$281	\$416
2	\$35,001	\$152,900	\$86,111	0.95	-\$819	\$3,526	\$725	\$1,605
3	\$152,901	\$333,000	\$232,713	2.06	-\$1,270	\$5,176	\$634	\$3,010
4	\$333,001	\$959,400	\$643,674	3.79	-\$3,969	\$4,243	-\$602	\$5,970
5	\$959,401	\$5,695,850	\$1,786,152	5.01	-\$19,949	\$18,165	-\$4,007	\$14,230
<b>Residential</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Decile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,900	\$5,418	0.38	-\$114	\$397	\$81	\$136
2	\$16,901	\$29,850	\$24,259	2.61	-\$202	\$696	\$29	\$276
3	\$29,851	\$39,030	\$34,266	3.70	-\$254	\$903	-\$28	\$322
4	\$39,031	\$46,890	\$43,286	3.30	-\$343	\$1,070	-\$8	\$434
5	\$46,891	\$53,000	\$50,054	3.20	-\$373	\$1,187	-\$1	\$510
6	\$53,001	\$58,800	\$55,882	3.19	-\$416	\$1,197	\$0	\$570
7	\$58,801	\$64,900	\$61,826	3.14	-\$324	\$592	\$4	\$636
8	\$64,901	\$72,780	\$68,616	2.85	-\$529	\$1,683	\$43	\$744
9	\$72,781	\$86,000	\$78,454	2.98	-\$573	\$1,881	\$29	\$830
10	\$86,001	\$1,500,000	\$130,630	3.10	-\$6,024	\$4,753	\$19	\$1,352

**Appendix A6. Change in Tax Burden Across Property Values: From 1:1 to 16.07:1 Tax Ratio**

<b>Apartments</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$45,800	\$36,713	3.26	-\$229	\$658	-\$5	\$370
2	\$45,801	\$61,900	\$53,991	4.46	-\$370	\$665	-\$101	\$450
3	\$61,901	\$80,700	\$70,569	4.49	-\$473	\$1,654	-\$134	\$586
4	\$80,701	\$118,500	\$96,063	4.02	-\$683	\$1,488	-\$128	\$853
5	\$118,501	\$4,900,020	\$438,950	7.00	-\$23,205	\$1,283	-\$1,674	\$2,808
<b>Commercial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,600	\$7,879	0.32	-\$133	\$415	\$136	\$216
2	\$16,601	\$45,200	\$30,322	1.00	-\$354	\$1,145	\$265	\$574
3	\$45,201	\$81,500	\$61,260	1.94	-\$644	\$2,031	\$207	\$833
4	\$81,501	\$169,300	\$114,741	2.36	-\$1,339	\$4,008	\$226	\$1,397
5	\$169,301	\$23,125,480	\$673,479	4.28	-\$168,931	\$20,680	-\$1,114	\$5,762
<b>Industrial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$35,000	\$13,189	0.08	\$15	\$891	\$305	\$439
2	\$35,001	\$152,900	\$86,111	0.95	-\$886	\$3,817	\$785	\$1,664
3	\$152,901	\$333,000	\$232,713	2.06	-\$1,375	\$5,602	\$687	\$3,063
4	\$333,001	\$959,400	\$643,674	3.79	-\$4,296	\$4,592	-\$652	\$5,920
5	\$959,401	\$5,695,850	\$1,786,152	5.01	-\$21,592	\$19,662	-\$4,337	\$13,900
<b>Residential</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Decile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,900	\$5,418	0.38	-\$124	\$430	\$88	\$143
2	\$16,901	\$29,850	\$24,259	2.61	-\$218	\$753	\$31	\$279
3	\$29,851	\$39,030	\$34,266	3.70	-\$275	\$977	-\$30	\$320
4	\$39,031	\$46,890	\$43,286	3.30	-\$372	\$1,158	-\$9	\$433
5	\$46,891	\$53,000	\$50,054	3.20	-\$404	\$1,285	-\$1	\$510
6	\$53,001	\$58,800	\$55,882	3.19	-\$451	\$1,296	\$0	\$570
7	\$58,801	\$64,900	\$61,826	3.14	-\$351	\$640	\$5	\$636
8	\$64,901	\$72,780	\$68,616	2.85	-\$573	\$1,822	\$47	\$747
9	\$72,781	\$86,000	\$78,454	2.98	-\$620	\$2,036	\$32	\$833
10	\$86,001	\$1,500,000	\$130,630	3.10	-\$6,520	\$5,145	\$20	\$1,354

**Appendix A7. Change in Tax Burden Across Property Values: From 1:1 to 20.21:1 Tax Ratio**

<b>Apartments</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$45,800	\$36,713	3.26	-\$241	\$690	-\$5	\$370
2	\$45,801	\$61,900	\$53,991	4.46	-\$389	\$698	-\$106	\$445
3	\$61,901	\$80,700	\$70,569	4.49	-\$496	\$1,735	-\$141	\$580
4	\$80,701	\$118,500	\$96,063	4.02	-\$717	\$1,561	-\$134	\$847
5	\$118,501	\$4,900,020	\$438,950	7.00	-\$24,346	\$1,346	-\$1,756	\$2,726
<b>Commercial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,600	\$7,879	0.32	-\$139	\$435	\$143	\$223
2	\$16,601	\$45,200	\$30,322	1.00	-\$371	\$1,201	\$278	\$587
3	\$45,201	\$81,500	\$61,260	1.94	-\$676	\$2,130	\$217	\$843
4	\$81,501	\$169,300	\$114,741	2.36	-\$1,404	\$4,205	\$237	\$1,408
5	\$169,301	\$23,125,480	\$673,479	4.28	-\$177,236	\$21,696	-\$1,169	\$5,707
<b>Industrial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$35,000	\$13,189	0.08	\$15	\$934	\$320	\$454
2	\$35,001	\$152,900	\$86,111	0.95	-\$930	\$4,004	\$824	\$1,703
3	\$152,901	\$333,000	\$232,713	2.06	-\$1,443	\$5,878	\$720	\$3,096
4	\$333,001	\$959,400	\$643,674	3.79	-\$4,507	\$4,818	-\$684	\$5,888
5	\$959,401	\$5,695,850	\$1,786,152	5.01	-\$22,654	\$20,628	-\$4,550	\$13,687
<b>Residential</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Decile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,900	\$5,418	0.38	-\$130	\$451	\$92	\$147
2	\$16,901	\$29,850	\$24,259	2.61	-\$229	\$790	\$32	\$280
3	\$29,851	\$39,030	\$34,266	3.70	-\$289	\$1,025	-\$32	\$318
4	\$39,031	\$46,890	\$43,286	3.30	-\$390	\$1,215	-\$9	\$433
5	\$46,891	\$53,000	\$50,054	3.20	-\$423	\$1,348	-\$2	\$509
6	\$53,001	\$58,800	\$55,882	3.19	-\$473	\$1,360	\$0	\$570
7	\$58,801	\$64,900	\$61,826	3.14	-\$368	\$672	\$5	\$636
8	\$64,901	\$72,780	\$68,616	2.85	-\$601	\$1,912	\$49	\$750
9	\$72,781	\$86,000	\$78,454	2.98	-\$651	\$2,136	\$33	\$834
10	\$86,001	\$1,500,000	\$130,630	3.10	-\$6,840	\$5,398	\$21	\$1,355

**Appendix A8. Change in Tax Burden Across Property Values: From 1:1 to 24.35:1 Tax Ratio**

<b>Apartments</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$45,800	\$36,713	3.26	-\$249	\$713	-\$5	\$370
2	\$45,801	\$61,900	\$53,991	4.46	-\$401	\$721	-\$109	\$442
3	\$61,901	\$80,700	\$70,569	4.49	-\$513	\$1,792	-\$145	\$575
4	\$80,701	\$118,500	\$96,063	4.02	-\$740	\$1,612	-\$139	\$842
5	\$118,501	\$4,900,020	\$438,950	7.00	-\$25,143	\$1,390	-\$1,813	\$2,668
<b>Commercial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,600	\$7,879	0.32	-\$144	\$449	\$147	\$228
2	\$16,601	\$45,200	\$30,322	1.00	-\$384	\$1,241	\$287	\$596
3	\$45,201	\$81,500	\$61,260	1.94	-\$698	\$2,200	\$225	\$850
4	\$81,501	\$169,300	\$114,741	2.36	-\$1,450	\$4,342	\$244	\$1,416
5	\$169,301	\$23,125,480	\$673,479	4.28	-\$183,042	\$22,407	-\$1,207	\$5,669
<b>Industrial</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Quintile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$35,000	\$13,189	0.08	\$16	\$965	\$330	\$465
2	\$35,001	\$152,900	\$86,111	0.95	-\$960	\$4,136	\$851	\$1,730
3	\$152,901	\$333,000	\$232,713	2.06	-\$1,490	\$6,070	\$744	\$3,120
4	\$333,001	\$959,400	\$643,674	3.79	-\$4,654	\$4,976	-\$706	\$5,866
5	\$959,401	\$5,695,850	\$1,786,152	5.01	-\$23,396	\$21,304	-\$4,699	\$13,538
<b>Residential</b>					<b>Tax Liability</b>			
Property Value					Minimum Increase	Maximum Increase	Mean Increase	Mean Tax Liability
Decile	Minimum	Maximum	Mean	B/L Ratio				
1	\$0	\$16,900	\$5,418	0.38	-\$134	\$466	\$95	\$150
2	\$16,901	\$29,850	\$24,259	2.61	-\$236	\$816	\$33	\$281
3	\$29,851	\$39,030	\$34,266	3.70	-\$298	\$1,059	-\$33	\$317
4	\$39,031	\$46,890	\$43,286	3.30	-\$403	\$1,254	-\$10	\$432
5	\$46,891	\$53,000	\$50,054	3.20	-\$437	\$1,392	-\$2	\$509
6	\$53,001	\$58,800	\$55,882	3.19	-\$488	\$1,404	\$0	\$570
7	\$58,801	\$64,900	\$61,826	3.14	-\$380	\$694	\$5	\$636
8	\$64,901	\$72,780	\$68,616	2.85	-\$621	\$1,974	\$51	\$751
9	\$72,781	\$86,000	\$78,454	2.98	-\$672	\$2,206	\$34	\$835
10	\$86,001	\$1,500,000	\$130,630	3.10	-\$7,064	\$5,575	\$22	\$1,356



**Appendix A9. Transition Tables for Various Split-Rate Tax Ratios Based on the 20% Building Tax Reduction Rule**

Ending Tax Ratio = 3.64:1			
Transition Year	Building Tax (mills)	Land Tax (mills)	Tax Ratio
0	10.21	10.21	1.00:1
1	8.23	16.51	2.01:1
2	6.26	22.79	3.64:1

Ending Tax Ratio = 7.78:1			
Transition Year	Building Tax (mills)	Land Tax (mills)	Tax Ratio
0	10.21	10.21	1.00:1
1	8.63	15.24	1.77:1
2	7.05	20.27	2.88:1
3	5.47	25.3	4.63:1
4	3.89	30.32	7.78:1

Ending Tax Ratio = 11.93:1			
Transition Year	Building Tax (mills)	Land Tax (mills)	Tax Ratio
0	10.21	10.21	1.00:1
1	8.36	16.1	1.93:1
2	6.51	21.99	3.38:1
3	4.66	27.88	5.98:1
4	2.83	33.72	11.93:1

Ending Tax Ratio = 16.07:1			
Transition Year	Building Tax (mills)	Land Tax (mills)	Tax Ratio
0	10.21	10.21	1.00:1
1	8.21	16.58	2.02:1
2	6.21	22.95	3.70:1
3	4.21	29.32	6.96:1
4	2.22	35.66	16.07:1

Ending Tax Ratio = 20.21:1			
Transition Year	Building Tax (mills)	Land Tax (mills)	Tax Ratio
0	10.21	10.21	1.00:1
1	8.53	15.56	1.82:1
2	6.85	20.91	3.05:1
3	5.17	26.26	5.08:1
4	3.49	31.61	9.06:1
5	1.83	36.91	20.21:1

Ending Tax Ratio = 24.35:1			
Transition Year	Building Tax (mills)	Land Tax (mills)	Tax Ratio
0	10.21	10.21	1.00:1
1	8.48	15.72	1.85:1
2	6.75	21.23	3.15:1
3	5.02	26.74	5.33:1
4	3.29	32.24	9.80:1
5	1.55	37.78	24.35:1

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Growing up in the town of Conneaut Lake, Pennsylvania, Dr. King considers herself a native of northwestern PA. After taking two Bachelor's degrees in the fields of Economics and Mathematics, Magna cum Laude, from West Virginia University, she continued her education at the University of Pittsburgh where she took a Master's degree in Economics. Dr. King then spent a year teaching at Lycoming College in Williamsport, PA where she quickly realized her passion for the profession. She decided to go back to West Virginia University to earn a Ph.D. in Economics which she was able to accomplish in only two years. While at West Virginia University she worked as a research assistant at the Regional Research Institute studying the effects of migration on regional economic growth.

She is currently an Assistant Professor going into her third year at Penn State Behrend where she has taught a variety of subjects. Currently she teaches Introductory Microeconomics, Public Economics, and Managerial Economics at both the undergraduate and MBA levels. Dr. King also serves as a research associate to the Economic Research Institute of Erie (E.R.I.E.).

She has published a variety of articles dealing with the Economics of Education. In particular, she has looked at the effects of school choice on regional economic growth, student outcomes, and entrepreneurship. In addition, she has analyzed the spillover effects created by K-12 public education and has discussed the proper role of government in the education sector. Besides education, she has also worked on papers dealing with salary disparity, voting rules in the U.S. court system, legislative voting behavior, and the healthcare market. Her most current project involves the study of a split-rate tax for the City of Erie.

She is a member of the Southern Economic Association and the Association for Private Enterprise Education and regularly attends and participates in both of their annual conferences.

**Todd M. Nesbit, Ph.D.**  
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Originally from Urbana, Ohio, a small rural city in west-central Ohio, Dr. Nesbit completed his undergraduate work in near-by Columbus at Capital University. Upon earning a Bachelor's degree in each of Economics and Mathematics in 2001, he continued his education at West Virginia University where he was awarded the Vicker's Doctoral Fellowship. While working toward his Ph.D in Economics at WVU, he also taught numerous undergraduate courses during his final three years in the program. Upon completing his degree, Dr. Nesbit received a one-year teaching position in Economics at Wabash College located in Crawfordsville, Indiana prior to joining the Penn State Behrend faculty.

Dr. Nesbit is beginning his second year at Penn State Behrend, where he is an Assistant Professor of Economics. He currently teaches Introductory Macroeconomics, Intermediate Macroeconomics, Econometrics, and Business Forecasting. Dr. Nesbit also serves as a research associate to the Economic Research Institute of Erie (E.R.I.E.). His most recent projects for E.R.I.E include the 2007 Erie County employment forecast and a study of the split-rate property tax structure for the City of Erie.

In addition to his teaching duties and his work with E.R.I.E., Dr. Nesbit remains an active academic researcher. His primary research interest is public economics. More specifically, Dr. Nesbit has examined the secondary impacts of the gasoline and alcohol excise taxes, the efficiency of the provision of both primary education and health care, optimal jury size in civil jury trials, and automobile safety regulation. Dr. Nesbit's work in regards to automobile safety in NASCAR was recently mentioned in numerous regional and national outlets, such as *The Pittsburgh Tribune*, SI.com, MSNBC.com, and FoxSports.com. Dr. Nesbit is a member of the Southern Economic Association and the Association for Private Enterprise Education and regularly presents his research at both Associations' annual conferences.

# ***ECONOMIC RESEARCH INSTITUTE OF ERIE***

The purpose of Penn State Behrend's **Economic Research Institute of Erie (ERIE)** is to collect, analyze, interpret and disseminate data and information on the Erie regional (Erie County) economy. Another important goal of ERIE is to provide our students with relevant experience with applied economic research and data analysis. Established in late 1982, the Institute is an applied research unit of Penn State Behrend's Sam and Irene Black School of Business.

ERIE does not wish to duplicate the activities of other Erie-area organizations. Rather, we seek to use our collective training and experience in the areas of data manipulation and technical analysis to provide support to those whose expertise falls in different fields.

ERIE's continuing research program helps the local community better understand the regional economy and its linkages to the national economy. ERIE provides a source of information for local leaders and media who have questions about the local, national and international economies. ERIE compiles data on the local economy from a range of sources, and helps local users access and evaluate these data.

Some of the studies that ERIE has undertaken include:

- estimates of productivity of Erie's workers through time and across industries, compared to the nation;
- estimates of brain drain and brain gain for Penn State graduates, from Erie County;
- creation of a model to forecast total Erie employment and selected industries;
- three studies of philanthropic giving in the Erie area sponsored by leading non-profit agencies;
- a model to estimate the cost of living in all 67 counties of Pennsylvania for a state government agency;
- and
- an examination of the effect of Erie's changing industrial structure on the severity of its business cycle.

With the support of the Erie Regional Chamber and Growth Partnership, ERIE has created [www.ERIEdata.org](http://www.ERIEdata.org), a free website with hundreds of thousands of data points for the Erie and national economies, along with copies of ERIE and other research reports on the local economy, all easily available for free downloading.

ERIE staff have made numerous presentations in the local community, speaking to audiences at the Manufacturer's Association of Northwest Pennsylvania, The Erie Ambassadors, the Erie Community Foundation, the Erie Chapter of the National Association of Purchasing Management, and all eleven Leadership Erie classes, among others. ERIE regularly provides information for the print and electronic media in the community. In addition, ERIE's work has resulted in an enhanced awareness of the Erie regional economy among national and international audiences. This stems from the nearly 90 technical paper presentations made by Institute staff members at national and international conferences and over 30 articles in refereed professional journals. And four dozen students have had the chance to do meaningful research with ERIE, often with funding from contracts and grants.

We would be happy to discuss potential projects with members of the Erie community, and welcome all to attend our annual economic conference. Contact Dr. Kurre at [k12@psu.edu](mailto:k12@psu.edu) or (814) 898-6266.



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