

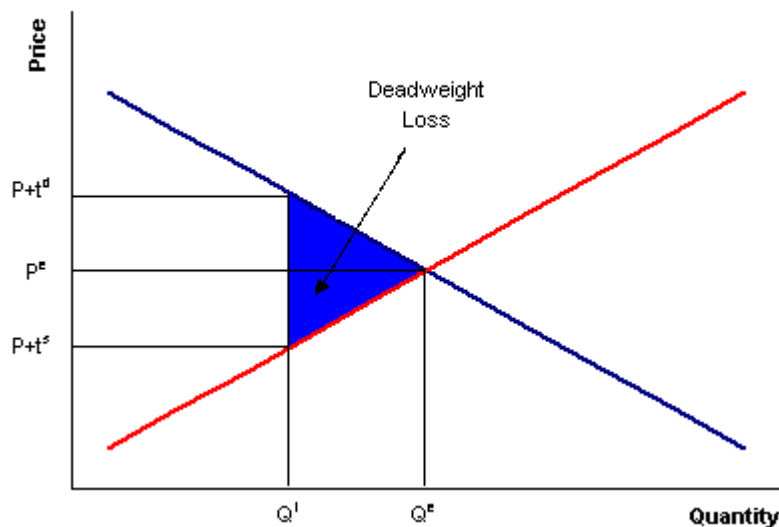
Alton, New Hampshire and Land Value Taxation 2008  
Morgan Seybert sponsored by the Center for the Study of Economics

Over the past decade the number of people that can afford a median-priced house in Belknap County has fallen precipitously. Russell Thibeault has estimated that in 1999 70% of households in the economy could afford median housing, and that number today has plummeted to 44%. At the root of this problem lies a fundamental change to the region in the job market.

Since 2000, Belknap County has lost over 1000 construction jobs which had an average salary of \$777. The pay for construction jobs is \$208 dollars higher than the average weekly wage in the Alton economy. The change in the composition of jobs means that the median household income in the area has only risen by 15% in the past ten years. Further exacerbating the problem is that the price of housing has risen by an astronomical 130%, placing most houses out of reach of the average citizen. Many critical determinants of housing affordability are beyond the scope of a local government, but examining the tax structure would allow us to see if there are any ways that we can alleviate the housing burden on many citizens.

The standard real estate tax is a set tax rate that is levied on both the assessed value of land and buildings. This method has been the predominant method for taxation in the United States, yet there are some inherent flaws that are associated with it.

When Adam Smith theorized the invisible hand of the free market he was referring to unregulated markets without government intervention. When a government intervenes in a free market, such as the real estate market, they cannot avoid creating the phenomenon of dead weight loss. Dead weight loss results as a market moves away from its Pareto optimal equilibrium point and to an artificially created supply and demand and graphically appears as:



In the housing market we see this in the form of a tax on buildings. When a government taxes buildings it discourages homeowners from improving their parcel. This result is counterintuitive: governments inadvertently clamp down on economic growth and leave the proverbial cash on the table as the economic potential of an area is unrealized. Taxes are necessary, as they allow for a government to provide basic services to its constituents, but we should strive to minimize their detrimental effects.

In most areas, the real property tax is a tax imposed on the combined market value and improvements of both land and buildings. The tax, however, discourages land development and rehabilitation, because they increase the value of the property and the tax that must be paid. An alternate solution for communities is to impose low tax rates on structures and high tax rates on land. This approach will raise the cost of holding land vacant will, not penalize land development, and can result in more efficient land use, including increased affordable housing opportunities.

A land value tax is a way to change the current property tax system and instead of taxing improvements upon the land we would propose to tax just the land value itself. We are thus able to maintain revenues from real estate taxes but we are now better able to serve local citizens through changes in the tax incidence and the advancement of economic efficiency.

The Lakes Region and Belknap County provides an interesting case study for the implementation of LVT due to its unique composition. For us to be able to see the effects of LVT on Alton we would first need to devise a system that would allow us to see the different payments that would occur both under the old system and under LVT. We note that there is \$2,209,931,357 worth of assessable land and buildings in the town. With the current tax rate of \$10.24 we receive a revenue yield of \$22,629,697. In order for LVT to be successful we would need to maintain the yield level at the current amount to allow for solvency of the town. This means that since there is \$1,046,303,757 worth of land we would need a tax rate of \$21.62/1000.

In the town of Alton there are 5,542 parcels comprising 39,170 acres. As with the rest of the Lakes Region there is a unique dichotomy with respect to land values, building values, residency and household incomes. Before dissecting the effects of a LVT, it's helpful to get a better idea of the area of study: housing. When studying housing it is interesting to note that housing can be looked upon as both a necessity and a luxury.

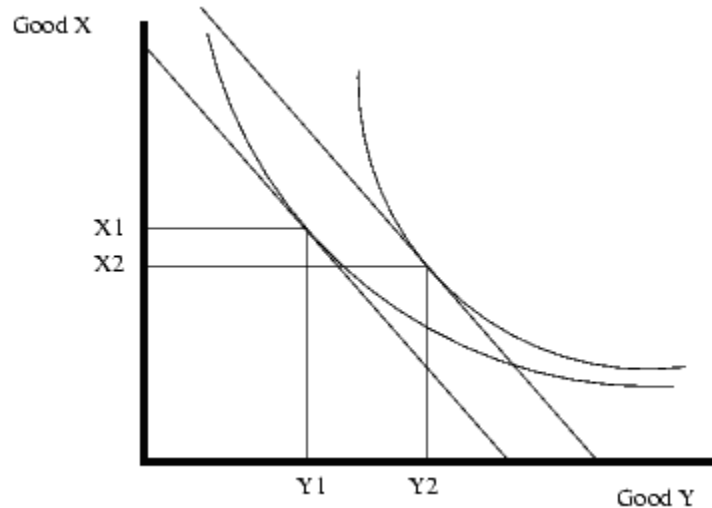
It bemuses to see the differentiation that has created a set of goods that all provide for the same basic need, yet go about it in such vastly different manners. It is this differentiation that is important here due to the accompanying price variation that it causes. At this juncture, we are more interested in the differences in incomes that allow for this vast range of house prices. The table below shows the income elasticity for different types of families:

*Estimates of income elasticity for given types of family composition*

(All observations)

Number of children	Median age of head (years)				
	23·5	29·5	39·5	49·5	59·5
0	1·135	0·630	0·951	0·647	..
	(0·168)	(0·077)	(0·149)	(0·177)	
1 and 2	0·919	0·503	0·844	0·496	0·605
	(0·101)	(0·053)	(0·127)	(0·132)	(0·161)
3 and 4	..	0·855	0·886	1·005	0·692
		(0·090)	(0·087)	(0·154)	(0·249)
5 and 6	..	0·781	0·729	0·612	0·710
		(0·060)	(0·059)	(0·111)	(0·177)
3 and 4	..	0·885	1·010	1·108	..
		(0·190)	(0·088)	(0·449)	
5 and 6	..	0·743	0·847	0·949	..
		(0·137)	(0·075)	(0·374)	
5 and 6	..	1·013	0·561	0·654	..
		(0·384)	(0·109)	(0·265)	
5 and 6	..	0·861	0·513	0·419	0·533
		(0·269)	(0·091)	(0·191)	(0·140)

The data here showed a very high R squared value which indicates that a large percentage of the data was explained by the model. The importance of this data culled from a study by R.K Wilkinson is that it shows a positive income elasticity which is characteristic of a normal good. The degree to which income and the demand for housing are related is a controversial issue for economists. While the exact value for this elasticity is not agreed upon, the general consensus is that housing is a normal good. This means that demand for housing increases when income increases.



The estimates are wide ranging running from 0.25 to 0.70 for renters and 0.36 to 0.87 for owner occupied homes. In the aforementioned ranges it is important to note that the elasticity for owners is higher than it is for renters.

Now that we are confident in the fact that housing is a normal good and the wealthy will consume more, we can begin the analysis.

As the analysis of elasticity has shown us, when people have more money they will consume more housing. With this in mind it is only logical that more housing is consumed by the upper income families, which as we have found, are clustered in certain areas. The one thing that these areas all have in common is that they border the lake. The question now would have to be, do these families consume more in terms of size or do they simply pay more due to the extra utility gained from their proximity to the water. The motto in the current real estate world is location, location, location, and that theory seems to play out here.

One theory for house pricing proposed is that commuting time was a determinant in price. This theory suggested that the farther from work a person resided, the less they would be willing to pay for their home. We can find the cost of this using the formula:

$$r = f[c + (\alpha)(1 - t)g'(w)]$$

This formula leads to the idea that people will cut into their trips as the opportunity cost increases. This is important to us because it said that there was a premium on homes closer to work and therefore these homes would be more expensive. This theory stems from the idea of opportunity cost and there is certainly such a cost associated with commuting. Travel time to work is the largest share of total driving time accounting for 22% of all travel. (Pisarski) This opportunity cost is what theoretically drives housing prices, the closer to work, the more expensive the home. A study done by D. Levinson in Washington backs up this theory with empirical data.

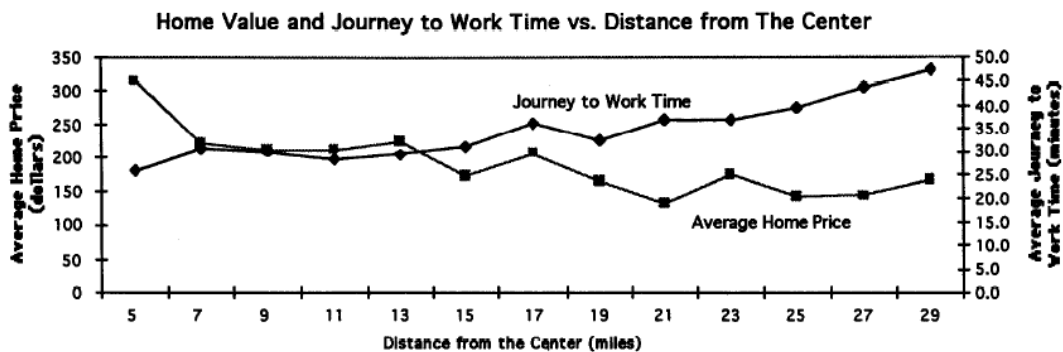


Figure 2 Home value and journey to work time vs distance from the center

His

This graph and study of the people of the city shows that there is a relation between the cost of housing and the travel time.

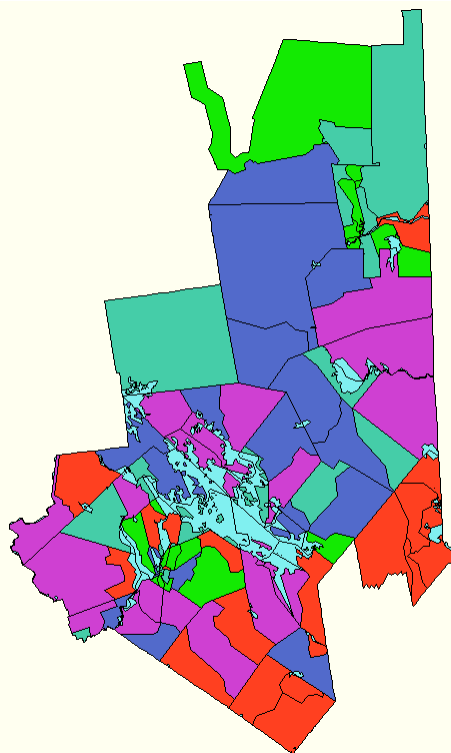
“It is by now well documented that in American urban areas the vast majority of middle and upper income households live further from the city center in separate suburban communities

(see Anthony Cateneese; Edgar Hoover and Raymond Vernon). Despite popular impressions, this trend is not a recent one. It has been evolving gradually ever since the streetcar suburbs of the late nineteenth century (see Samuel Warner)." He continues on to define the price that the upper and middle classes are willing to pay. This is done through a theoretical formula that determines the price of land through the cost of the house and the travel time.

$$R = \frac{y - k(t) - x - c(H)}{q}$$

From here I will attempt to look at both the cost of the house and the travel time to show how they are not the determining factors in the selling price of a home in the Lakes Region.

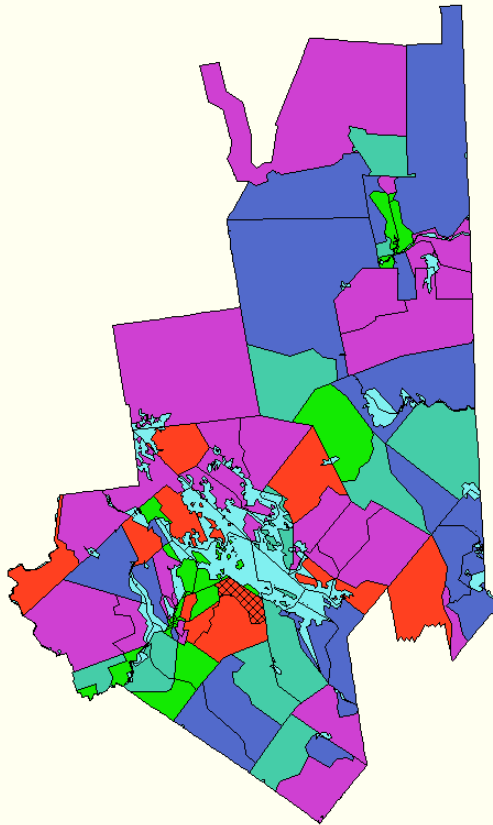
In the Lakes Region this theory does not appear to be a driving factor in the price of homes. "Even though the Lakes Region appears to be becoming more and more suburban - with people living here but commuting to labor markets in the southern part of the state and into Massachusetts - we found that 71 percent of Lakes Region residents still commute from one Lakes Region town to another," Koulet said. In addition to this finding a look at the census data shows an average commuting time of 23.4 minutes. Looking even further one can see that there is no statistically significant difference between the water and non water home in terms of travel time.



Since there does not appear to be a large enough difference, it is safe to say that travel time and its associated opportunity costs are not the motivating factor for waterfront home sales.

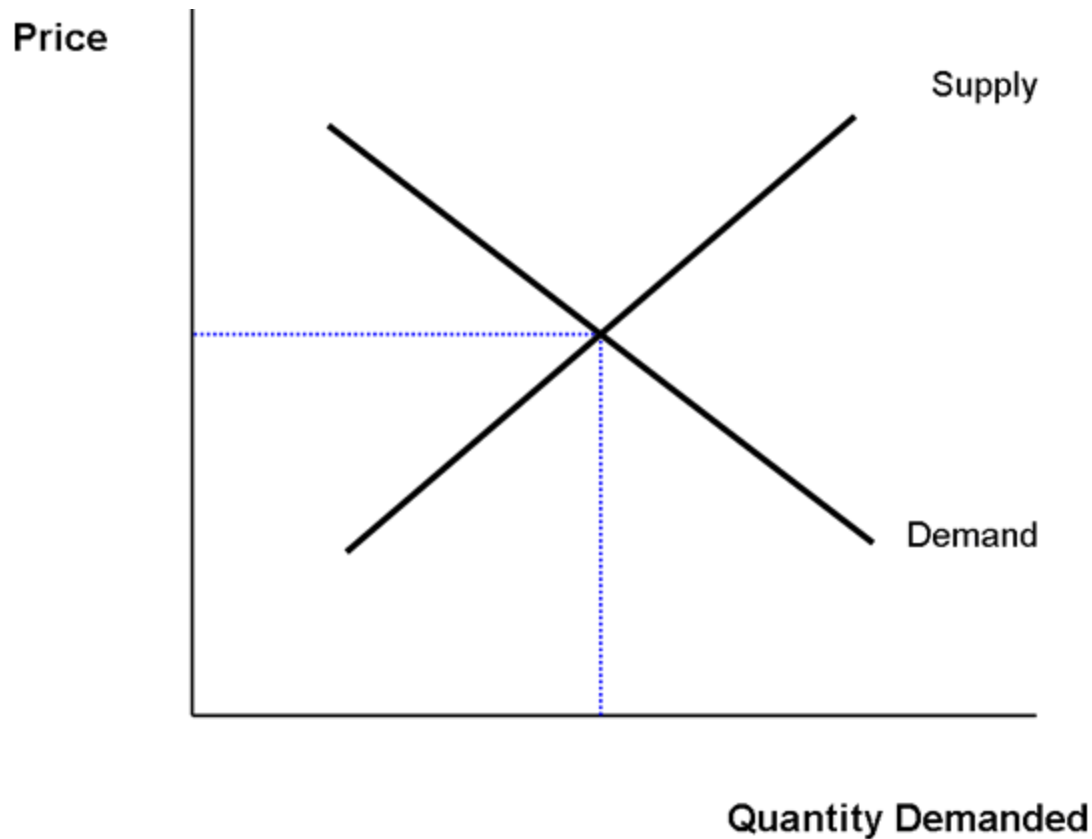
An often postulated theory is that the size of a home determines the price. While it is clear that there is some effect caused by increasing the size of a home, it still does not explain the

difference in price between waterfront homes and no-waterfront. The data for home sizes in the two respective groups was surprising. The water front home had the smaller average, containing only 5.45 rooms as apposed to 5.85 for the homes inland.



It is becoming clearer that the cause for the drastic rise in the price of waterfront homes is simply that they have the added “luxury” of being on the water; these findings do have theoretical backing. The idea is that waterfront land is more expensive so people would be forced to substitute away from size in order to have the added benefit of the water. This idea is analogous to the findings that homes in the city are smaller because of the lack of land. There are only 72 miles of shoreline on the lake; ergo waterfront land is scarce. From this scarcity through simple supply and demand we could understand why this land would be more expensive. Originally, one might assume that the more expensive houses were larger, but in reality they are smaller due to the scarcity of land and the idea of substitution.

The first thing that a student of economics is taught is that a free market is driven by the idea of supply and demand.



The pertinent part here would be to look at the supply side of this equation. In the Lakes Region there are currently 72 miles of lake front property most of which is buildable. The two counties, Carroll and Belknap, which comprise the Lakes Region, have a total of 1,335 square miles. In total, 1/20<sup>th</sup> of the land is usable waterfront property. The question is what does this mean for the price of this land. A basic economic model will tell us that if there is a low supply then the price will be driven up but I intend to get a better idea for exactly how much this is.

Using a sample of the 125 most recent home sales in the Lakes Region I created a regression with the hope of determining the driving factor in home prices. The sample was divided into two groups, waterfront and inland ensuring that I had more than 50 data points in each category. After considering the commonly held theories of home price, I aspired to group the homes into blocs based on size and then determine the price associated with living on the water. Running a regression, I came up with the formula for waterfront homes as  $4.753448 \cdot 10^{-4} X + 0.2472$  where X is measured in square feet. This regression yielded an R value of 0.8696 and an R<sup>2</sup> of 0.756. The high R<sup>2</sup> value means that 75.6% of the price can be explained by the square footage as hypothesized. The non water regression yielded the equation  $1.42726 \cdot 10^{-4} X + 0.06908$ . This equation had a slightly lower R value of 0.81 and an R<sup>2</sup> of 0.6561. This lower R<sup>2</sup> makes sense as homes on the lake can benefit from the amenity of a view (i.e. site). I am led to

believe that this is what created the difference between the two regressions  $R^2$  values. The intercept values create a rough basis for the starting cost of land in the two segments. This however would be hard to extrapolate from the data as there are no data points in this range.

When examining the slope coefficients of each equation, we can begin to gather an estimate for the cost associated with water living. A direct comparison of the two coefficients means that waterfront homes cost 178,120 plus  $3 \frac{1}{3}$  times as much as their similarly sized non waterfront homes. The recent housing bubble has brought rapid price growth to the Lakes Region. The growth of the American economy flooded the market with wealthier consumers who are constantly driving up prices.

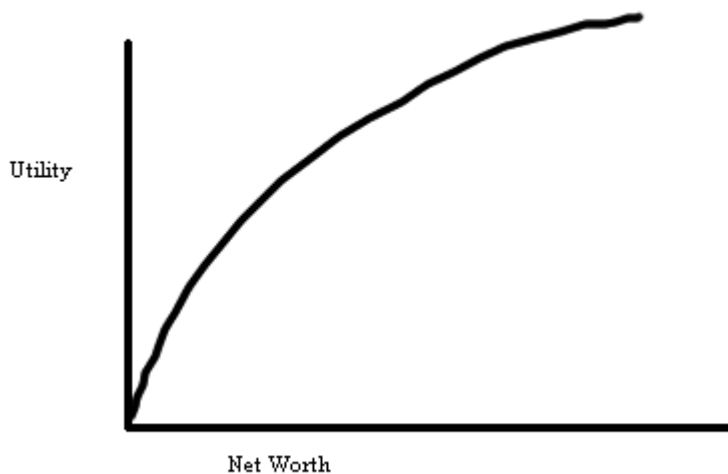
In the Lakes Region there is nothing as expensive as waterfront property which has seen intense growth in recent years. This is a very rough estimate but it clearly demonstrates the basic principle that I was driving at, that house prices are predominantly determined by the land value.

How land is used in Alton? Of the 5,542 parcels of land in Alton 2,209 of them are owned by local residents, i.e. full time residents of the town, who deem Alton their primary place of residency. This means that only 39.9% of parcels are locally owned. This tells us that Alton is a place for speculation or vacation. If this is the case it is a good indication that a significant portion of the town is wealthy landowners.

1,200 parcels of land are waterfront. As indicated above, this would be the upper end of the land value spectrum. The assessment data backs these conclusions as 59% of the land value in Alton is comprised of waterfront parcels despite only being 40% of the parcels and even more astonishingly 3% of the land area. The idea of Alton as a vacation town is supported by the fact that only 22% of waterfront parcels are owned locally. Anecdotally this would make sense as the lake is a big draw for both tourists and second homeowners alike.

We now should have the facts on the ground and can proceed to apply land value tax as a study. When we take away the tax on building we are left with only a tax on the land albeit at a higher rate to ensure that we reach the same revenue. By changing the imposition of the tax, we would thusly change the incidence of payments. Using a full LVT we see that 1,939 of the parcels would experience a savings. While this seems a little low further examination shows us the driving reason behind this. Since there are so many second homeowners our first priority would be to look at the true local constituents. LVT would allow for the majority of local homeowners to directly benefit in the form of a lower tax payment. These people would have a large average annual saving of \$3,612. This large savings allows us to see that there is in fact a large difference between the wealthy and the poor. This savings is significant because of the idea of diminishing marginal returns.

### Diminishing Marginal Utility



We can use a stylized example to understand this phenomenon. Imagine that we were to give a starving homeless man a dollar and Bill Gates a dollar. The homeless man would be able to dramatically increase his well being while Bill Gates would scarcely notice a difference. The importance of this for us is that an increase in the wealth of the poor brings about a drastic increase in their utility while the commensurate increase in the high end tax payment would not cause anywhere near as large of a decrease in their overall well being. By shifting around the incidence of the tax we are able to dramatically increase the overall utility of the community.

The town of Alton runs into significant problems with respect to their land usage. Efficient use of land implies that land is being used as a place for housing or business, but most importantly that it is being used. In Alton there are 949 parcels of vacant land that comprise a total of 5,084 acres. The acreage might not appear significant, but it is mostly high rent land as there is \$85,763,499 worth of fallow land. The value per acre of unused land is \$500 dollars higher than the average which is statistically significant to 99%.

Of the vacant lots in Alton only 25% are held locally which is further indication of speculation firsthand. We now must ask why there are vacant lots and why land use is not being maximized. The root of the problem lies in speculation. As land prices have risen exponentially in the lakes region, investors viewed this as a signal that there were good investment opportunities in the region. Speculators would then buy up prime land and hold it in hopes of seeing strong returns on their capital investment. The problem with this is two fold, but both arise from the decrease in supply. When land is bought up for higher and higher prices it drives up the overall price level and will drive out the marginal consumers, which in most instances are the low income families. Speculation additionally lowers economic activity and construction in the area which creates a drag on the local economy. One question that might be posed is how does speculation lower efficiency? As I have shown speculators are typically buying up the prime real estate and then holding it out of production. If they are doing this that means that others

are now forced on the less productive land and as a result of this they see their productivity decrease.

If land speculation is so inefficient then how best to stop it? When an investor looks at an investment they are looking at their return to their investment but they are also looking at the opportunity cost of their capital and in the case of the land their holding cost. Currently the only holding cost to land is a low tax rate that in many cases is not enough to significantly lower their projected return to their investment.

In order to stop speculation a full tax on land could be implemented. This serves to drastically increase the cost of holding vacant land and in many cases would make land speculation infeasible. By looking at current case studies for a LVT it is clear that this tax would be enough to provide for a growth in construction. In Harrisburg, Pennsylvania the mayor's view of LVT is "The City of Harrisburg continues in the view that such a land value taxation system, which places a much higher tax on land than on improvements, is an important incentive for the highest and best use of land in already developed communities, such as cities...Moreover, the same two-rate system tends to discourage real estate speculators and others who would be inclined under normal conditions to tie up land tracts that could otherwise be used for development purposes."

In order to fully understand the change that a LVT would bring around we should return to the idea of dead weight loss for a moment. When a government places a tax on buildings it effectively discourages improving upon or expanding a building. To understand this concept I think that it would be beneficial to use another theoretical example. If a homeowner were to add on a porch for example worth \$20,000 his assessment would rise by that amount. This means that for every year that he owns the house he would have to pay another 205 dollars per year in addition to the opportunity cost of the original \$20,000. With the current real estate tax in place the addition would have to be worth even more to him than the \$20,000, so in many instances he would not add the addition because of the added disincentive that the tax adds. By eliminating the tax on buildings the cost of the addition is simply that, the cost of building the addition.

LVT removes an inefficient tax that distorts the free market. This spate of building would create what is referred to as "induced spending." The overall addition to the well being of the Alton economy by growth in construction is greater than simply the numbers for the growth of construction itself. This happens because money spent on construction is then spent by the recipient employees and business owners. This then creates a near perpetual cycle that continues until the direct spending peters out of the local economy. The University of New Hampshire has estimated that there is an employment multiplier of 1.41. In lay terms this means that for every 1 million dollars spent in the economy another 1.41 jobs will be added. While it is difficult to estimate the added spending that a drop in building tax would create a few estimates say that "for an average municipality, an increase in the adjusted tax differential of 1 mil will yield an expected increase in the total value of construction of 1.58%." Only time

will tell exactly how many jobs would be created but it is no doubt a substantial number that simply can not be ignored.

When we create a progressive tax it is important to ensure that the tax is in fact progressive. Theoretically, LVT would benefit lower income families but we must examine the numbers to conclude that our assertion is correct. As noted, the difference between waterfront homes and the rest is marked, with the numbers supporting this as the average waterfront home is valued at \$710,000 while every other house is worth \$312,000. This is a significant difference in value and it would be logical to assume that family below the median could not afford a \$700,000+ house. For example the current tax payment on this type of house is \$10,000, which is well over 1/3 of the median income in the Lakes Region.

It is difficult to believe that a lower income family could afford such a home. Taken one step further, examine the tax payment that lakefront houses would be experiencing under a LVT.

With a LVT in place over 98% of waterfront homes would be experiencing an increase in their tax payment. This is exactly as predicted as the wealthy would see an increase in their payment, in turn allowing the poor to see a decrease in their payment and making housing more affordable for the masses. This should be no surprise as the majority of property value for lakefront homes is in the land, 75% to be precise. The rest of the homes in the area derive less than a third of their value from the land. These factors combined support the idea that the wealthy live on the better land and leave the rest for those that can not compete in a rapidly escalating real estate market. The majority of Lake Front owners that would be experiencing a tax increase are in fact second home owners. Of the roughly 1200 waterfront tracts only 22% are owned locally. This finding supports the conclusion that the wealthy live on the lake.

After already establishing housing as a normal good we can progress to looking at census data to further confirm the differences between waterfront and inland residents. Census tract data allows use to determine the mean salaries between these two groups and then from there we can statistically prove a difference. Before continuing it is important to know that the tracts have an ideal size of 4,000 people. This size means that when using tracts for waterfront residents, we will not only include them but we will also include residents in a close proximity to the water. In many instances these people will have a view of the water and as such would be living on expensive land, but tract size is something that we cannot overlook. Using the census information, tracts not touching the water had an average of 41,031 and tracts touching the water had an average of 46,872. In order to compare the two means a 95% confidence interval was created and it yielded the following results:

Location	Lower Bound	Upper Bound
Water	43932	49812
Non-Water	38951	43111

Since the two intervals do not in fact overlap we can say that with 95% confidence that the difference in the means is not due to random chance. This difference in incomes is not as great as one would expect given the large differences in housing prices. Why? Census data is only collected from a household once, and as such many waterfront residents are seasonal and would only fill out the census at their primary residents. In many cases these are very wealthy individuals that are omitted from Alton data. Nevertheless there is still a statistically significant difference between waterfront and inland residents.

The National Association of Realtors', David Lereah said: "Middle-aged, middle-income households are the driving factor in the second-home market, with favorable demographics providing a solid fundamental demand in this sector for the next decade," Lereah said. "Boomers believe in diversifying their assets, and most second-home owners see their purchase as being a better investment than stocks. A surprising majority of survey respondents hold multiple properties, and they are interested in purchasing additional homes." The NAR found that "The typical vacation-home owner is 59 years old, earned \$120,600 last year, and purchased a property that is 220 miles from their primary residence." Their findings are more in line with expectations, and with their income they are in a far better position than many local non-water residents. As we have found 78% of waterfront properties are owned by this type of consumer.

Not only must we look at land type to determine who pays but town of residency is also important. Roughly 60% of non waterfront Alton residents would save under a LVT, and as stated earlier their savings would be significant. Alton residents would be using their homes as their primary resident and would view it as a necessity as opposed to a luxury. By using a LVT we would be able to help these local residents that are in most need of help. As we discussed earlier there is also a subset of the population that is currently locked out of the housing market, and the benefit to them does not directly show in the numbers but would surely be significant.