An Analysis of Residential Zoning Density and Local Tax Revenue

by
Joseph Walker

A PROJECT

submitted to

Oregon State University

University Honors College

in partial fulfillment of
the requirements for the
degree of

Honors Baccalaureate of Science in Economics
(Honors Associate)

Presented May 29, 2015
Commencement June 2015

AN ABSTRACT OF THE THESIS OF

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Victor Tremblay

There is a considerable body of research on the effect of land use regulations on property values. However, less work has been done on the relationships surrounding tax revenue, small zoning changes, and the fiscal outlook of cities and counties. As a result, the purpose of this study is to examine the property tax receipts for local governments that result from different residential zoning designations. In particular, it focuses on an undeveloped plot within Corvallis, Oregon to determine whether changing this land from low-density to medium-density use would have any financial implications for the city and county. Using property sales data from the Benton County Assessor's Office, linear regression is used to investigate this issue. Under this approach, I find that a low-density housing development would add more to market value on the same plot of land, but it would only provide a modest tax revenue advantage over a medium-density apartment complex in the first year after construction.

Key Words: zoning density, zoning change, city planning, property tax, tax revenue

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APPROVED:

Victor Tremblay, Mentor, representing Economics

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I understand that my project will become part of the permanent collection of Oregon State University, University Honors College. My signature below authorizes release of my project to any reader upon request.

Joseph Walker, Author

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LIST OF ABBREVIATIONS

BRMV……Building Real Market Value

CPR……Changed Property Ratio

LRMV……Land Real Market Value

MAV……..Maximum Assessed Value

NMA……..Neighborhood Maintenance Area

ODLCD……..Oregon Department of Land Conservation and Development

PCC……Property Class Code

1. INTRODUCTION

In 2004, a parcel of land referred to as Witham Oaks was annexed into the city limits of Corvallis, Oregon and zoned for low-density housing. However, the initial development company (Legend Homes) that had planned to build a housing subdivision was forced to abandon the project in light of the recession that transpired a few years later. In recent years, Campus Crest Communities Inc.—a North Carolina company—has sought the rights to rezone and develop 25 acres of the 94.6 acre plot into a 296 unit apartment complex that will serve primarily as housing for the city's expanding college student population (Hall, 2012).

However, in spite of the efforts of Campus Crest, there is some opposition in the community to their proposal. Citing the plot's distance from the Oregon State University campus and the corresponding potential for traffic/parking congestion in the surrounding neighborhood, some factions believe that the Witham Oaks location is unsuitable for medium-density student housing. Instead, they argue that its geography makes it more convenient for development into single-family homes, as its original low-density zoning would have permitted (Day, 2014; "Land Development Code," 2014). Other factions, in particular the local activist group Friends of Witham Oaks, take a more extreme point of view and have argued that the site should be left as a natural area. Some of the acreage at Witham Oaks includes wetlands and Oak savanna. While Campus Crest has promised not to build on the most sensitive areas, it is possible that these ecosystems could be harmed by the impacts of nearby housing activities, particularly during the construction phase (Hall, 2011).

By virtue of the passage of the Oregon Land Conservation and Development Act in 1973, Oregon requires that its city and county governments maintain comprehensive land use plans, generally implemented through the use of zoning ordinances. A zoning ordinance contains permitted uses that do not require any approval from local authorities. However, if property owners wish to pursue an alternative and more intensive land use than what is outlined for their plot, such as the medium-density complex desired by Campus Crest, then they have to request a zoning amendment. By design, it is difficult for most proposed zoning changes to make it past the review process. For example, in Corvallis, it requires a public hearing before the planning commission, then a hearing before the city council, as well as final approval from the Oregon Department of Land Conservation and Development (ODLCD). Under certain circumstances though, there are opportunities for zoning changes to be approved, particularly if a proposed amendment is well suited in relation to the adjacent properties it would affect and does not detract from the overall nature of the community's comprehensive plan ("An Introductory Guide to Land Use Planning for Small Cities and Counties in Oregon," 2007).

As a feature of the legislation enacted in 1973, local planners are required to consider 19 statewide goals when reviewing land use decisions. These include the following ("Oregon's Statewide Planning Goals and Guidelines," 2010):

- Encouraging citizen involvement.
- Preserving natural resources, forestlands, and agricultural lands.
- Upholding air, water, and land quality, as well as protecting people from environmental hazards.
- Supporting opportunities for economic growth and prosperity.

- Supporting affordable housing options.
- Sustaining an inventory of land for future development.
- Accommodating the development of land in transition to urban use in a manner that maintains the livability of communities.
- Establishing public facilities and services to adequately meet the needs of their communities.

While perhaps not fully comprehensive, the above categories can be viewed as the essential variables in the theoretical planning function of an Oregon city or county. Given the above, Corvallis officials will have to weigh the two most probable development options at Witham Oaks—single-family homes or medium-density apartment units—for their compliance with the statewide planning goals. Accordingly, an implicit element of planning that accounts for immediate and lasting effects on a community is the topic of taxation.

Local governments depend on property tax receipts to support their functions, particularly with regards to the provision of public facilities and services. Property taxes are determined as a percentage of assessed property value ("A Brief History of Oregon Property Taxation," 2009). In relation to this, it is interesting to note that cities and counties across the United States, including in Oregon, are reduced to negative planning powers: the government's role in zoning is to restrict activities, not to promote or compel them (Evans, 2004, p.176). As such, zoning amendments present local administrations with a relatively powerful and rare decision making opportunity. It is one that impacts the generation of tax revenue and one that will likely be heavily scrutinized by constituents.

In Corvallis, these circumstances have precipitated a potential dilemma for the city council. In the context of public choice theory, many home-owning residents dislike the construction of medium and high-density residential units in their neighborhood. On the other hand, it is also possible that a zoning change could provide an increase in property tax revenue, albeit with an increased demand for public services. Unfortunately, the level of civic involvement in the planning process is often imbalanced, as it cannot account for the voices of future housing market consumers—who might later benefit from a particular option—as they are not currently residents (Evans, 2004, p.8). Nevertheless, in situations where an official is asked to review a potential zoning amendment, it would be reasonable for that person to have an awareness of how significantly his or her decision will impact the local budget.

In light of these issues, I have conducted this study on Witham Oaks to explore the relationship between residential zoning density and property tax receipts. My hope is that this effort provides some understanding into how local governments may benefit financially from encouraging or discouraging certain types of development. With regards to their revenue prospects, I have investigated each of the land use options available to the City of Corvallis using data published online by the Benton County Assessor's Office. Overall, my projections show a humble $23,965 revenue advantage to keeping Witham Oaks available for a low-density housing development rather than rezoning it for a medium-density apartment complex.

2. LITERATURE REVIEW

Much of the existing literature on the various economic impacts of zoning density does not explicitly focus on tax outcomes, but plenty of work has been done on the related topic of zoning and its association with the housing market. Historically, considerations such as aesthetic design, civic defense, public health, and transportation have been emphasized to different degrees to justify the practice of land use planning (Evans, 2004, pp.1-3). In modern times, however, the concept of externalities has become central to discussions concerning land use.

For urban environments to even exist, positive benefits must be derived from large populations living in a compact geographical area. Unfortunately though, the very existence of many people living in close proximity also ensures that certain types of property activities will negatively impact neighbors, perhaps to an extent beyond whatever gain is accrued from the activities. In contrast, a new development of an intensive land use in a rural setting might not entail any severe complications to outside parties (Evans, 2004, pp.14-15). Nevertheless, with the circumstances of urban life as they are, it follows that the sale of land in a densely populated area would be of interest to those in the community, particularly if the transaction has the potential to create uncompensated external costs for them (e.g. air, water, or noise pollution).

Although not directly, the language used by the ODLCD in a multitude of their published online material suggests a concern with external costs as part of the foundation behind the adoption of the Oregon Land Conservation and Development Act. In discussing the history of Oregon's current land use system, the ODLCD says:

> In the late 1960s and early 1970s, Oregonians became increasingly concerned about the effects of population growth and the threat to the quality of life and resources that make Oregon a special place to live. In response, the Legislature enacted a series of laws to help shape development throughout the state . . . ("An Introductory Guide to Land Use Planning for Small Cities and Counties in Oregon," 2007).

The phrase "quality of life" is intentionally used to broaden the role of zoning to consider how the grouping of certain land activities might benefit or detract from social utility (i.e. to account for externalities). In another publication describing each of Oregon's 19 planning goals, the ODLCD also says:

> All land use plans shall include identification of issues and problems, inventories and other factual information for each applicable statewide planning goal, evaluation of alternative courses of action and ultimate policy choices, taking into consideration social, economic, energy and environmental needs ("Oregon's Statewide Planning Goals and Guidelines," 2010).

This statement establishes a commitment to regulate the economic tradeoffs of diverse land use "needs" that are frequently at odds. By implicit design, the strategy for Oregon's land use system is to approach a socially optimal level of externalities.

Of course, this assumes that it is possible for the social benefits of a planning system to exceed its social costs. From a welfare analysis point of view, much scholarly debate on the equity of zoning practices has occurred. On the justifications for planning policies, Evans (2004, p.58) comments that "...the evidence does seem to confirm the intuitive view that some types of land use have external effects, and that it is possible that intervention in the market may therefore improve welfare. It does not necessarily follow that welfare actually is increased by zoning." Evans goes on to discuss some common manipulations of zoning regimes for political purposes, such as exclusionary zoning. However, the chief concern of this paper is not to investigate the fairness of land use

planning, nor whether the outcomes of the system in Oregon are in congruence with the initial aims of the 1973 legislation. In this study, land use is taken as a political reality. As such, only the effect of zoning on the value of residential property is of particular significance, as that does relate to tax receipts and the corresponding pressure local planners feel in appeals cases.

Given the stagflation within the economic climate of the late 1970s, the aftermath of implementing a statewide land use system was an almost immediate political concern with its impact on prices. Several state legislative panels were commissioned to study inflation in the housing market, including a 1978 task force, which stated in its report that:

> The task force recognizes two major elements which contribute to astronomical increases in the cost of housing—inflation and government regulation…. This is not to say regulation is undesirable or unnecessary. The state's land resources, and a satisfactory quality of life for Oregonians must be preserved. Regulation should be assessed on the basis of these values, compared with the higher costs that will accrue (Oregon Legislative Assembly, 1978, p.1).

Accordingly, the notion that zoning generates an effect on property value is substantiated both theoretically and empirically. Concerning theory, Evans (2004, p.78) demonstrates a Ricardian model, where agricultural land can be considered a commodity (see Figure 1 below). From there, a simplifying assumption can be made to limit the use of land to either agriculture or housing. Under these conditions, if a policy is then introduced to cap the supply of land available for housing, then an increase in price is likely as the amount of land open to this use becomes more restricted. While a Ricardian model lends insight into the overall nature of urban growth boundaries, the Neoclassical framework Evans outlines (Figure 2) perhaps more appropriately represents the situation

at Witham Oaks. In this model, there are two intersecting demand curves for non-commoditized uses of city land that compete for a fixed land supply. If the market is left unregulated, their intersection determines a price equilibrium point. The imposition of a constraint on the supply of one use, however, will tend to result in an increase in price for that use (Evans, 2004, p.82).

Figure 1:

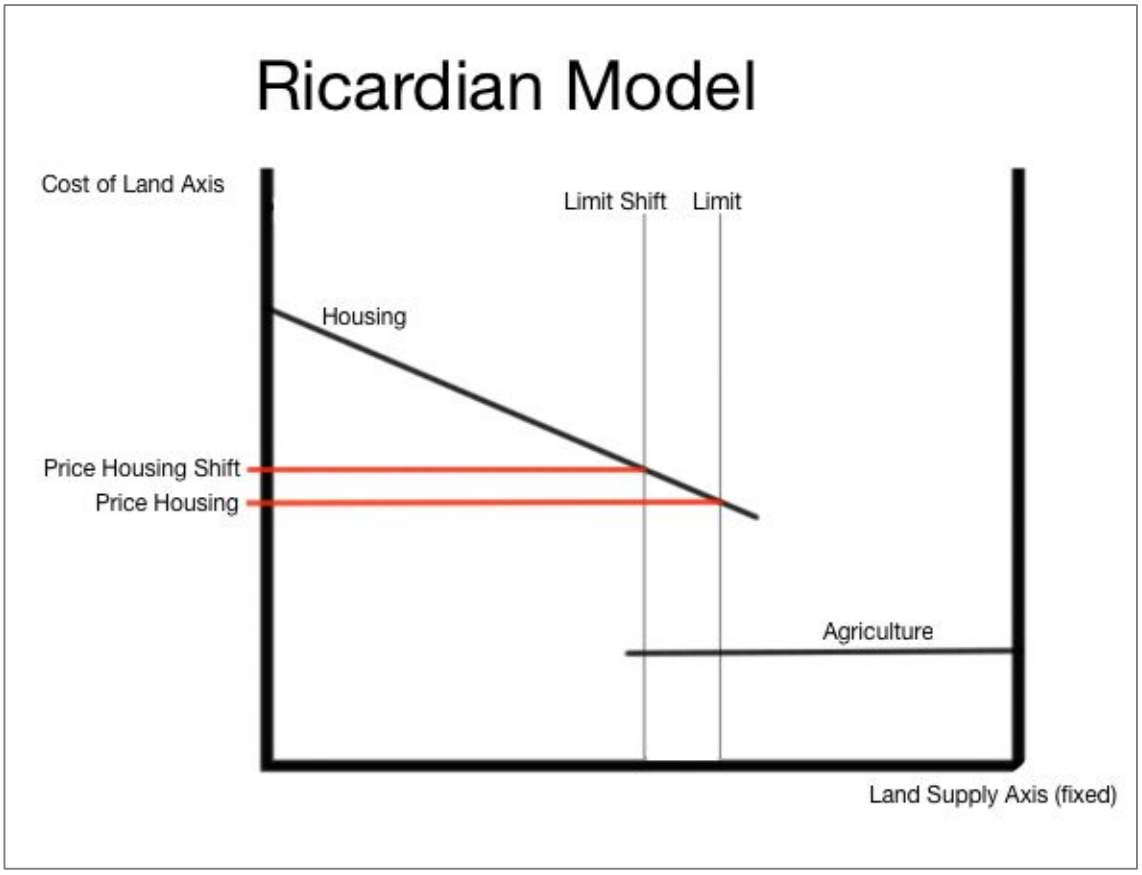
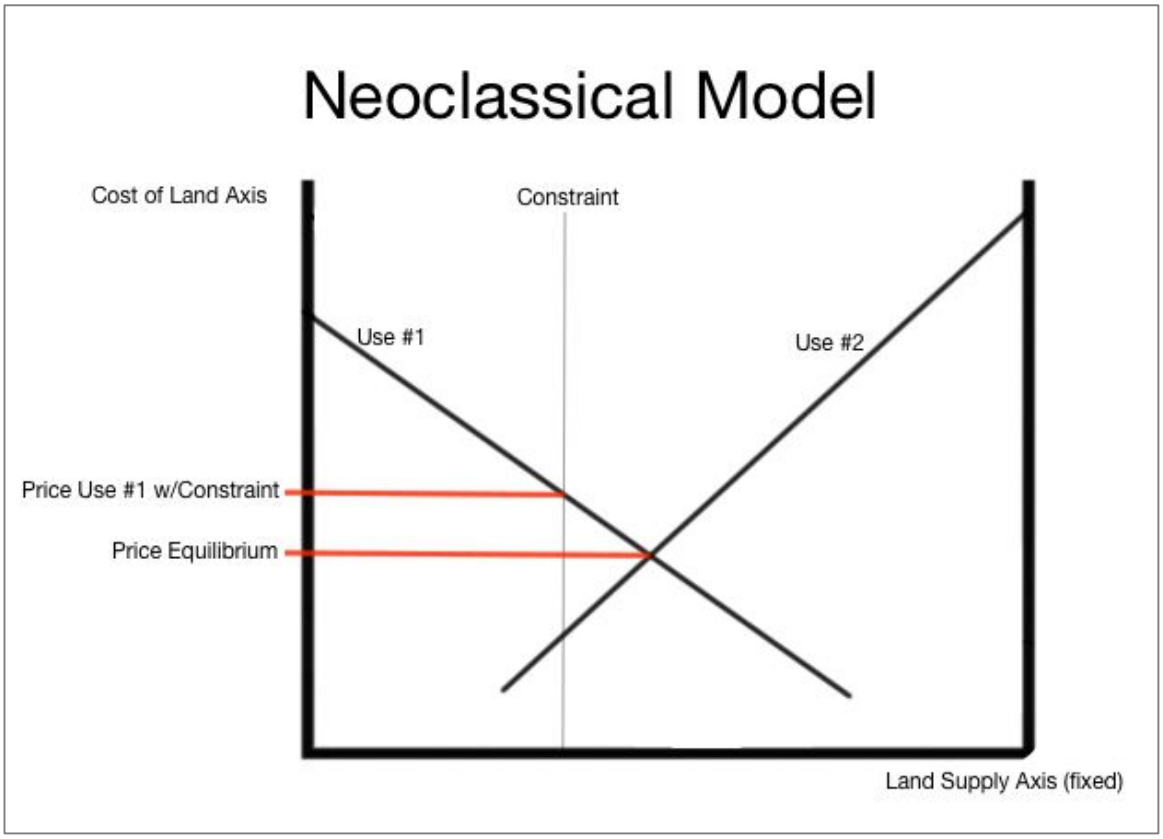


Figure 2:



Empirical examinations of the housing market also generally support the idea that interventions like zoning promote upward pressure on pricing (Quigley & Raphael, 2004). Using a geographically weighted regression, Cho, Kim, & Lambert (2009) develop a hedonic price equation to analyze the impact of zoning changes on housing prices in Knox County, Tennessee. Among other conclusions, their findings show that the conversion of agricultural land into zoned residential land will have a positive effect on housing prices around the urban frontier. Glaeser & Gyourko (2002), for the purpose of assessing the claim that there is a nationwide affordable housing crisis, investigate whether home prices are closely linked to their fundamental construction costs. Despite some exceptions, they conclude on balance that, in most communities, the housing market is overwhelmingly dictated by and in line with the expenses of production

activities. However, they also find that in the regions where the prices for housing greatly exceed production costs, government regulation (chiefly zoning) is the primary factor for that occurrence and not simply the cost of land as determined by market forces.

The very fact that Oregon has 19 official planning goals that are comprised of largely non-fiscal objectives demonstrates that zoning patterns will not wholly reflect monetized incentives. Nevertheless, in circumstances where potential zoning amendments are in compliance with state regulations, understanding the fiscal incentives that influence local planners will lend insight into how they may rule. For example, Lenon, Chattopadhyay, & Heffley (1996) display a land-rent optimization model for the planning decisions of local governments by considering how their choices are affected by neighboring municipalities. Based on an analysis of 164 Connecticut townships, they conclude that interdependencies do exist between the townships and their zoning policies, subject to various budget and land constraints. Their results support the idea that local governments choose strategic patterns of zoning, lot sizing, taxing, and public spending in order to maximize the value of their community's land.

The research on this topic is not always straightforward though. Two pieces of land used for different purposes can reasonably be expected to have different valuations for a variety of reasons. Moreover, as zoning plans were generally applied retroactively to existing cityscapes, it can often be difficult to determine whether they are determinants for property value or the products of pre-existing market forces. Given the above, while some research seeks to understand the influence of zoning on dramatically different land uses, like industry versus agriculture, it is often quite helpful to focus on the variations within a generalized sector.

Najafi et al. (2007) look at how infrastructural costs vary with the density of residential single-family developments. Local governments should have an interest in this topic as they do bear fiscal responsibility for infrastructure management, even if developers pay for the initial capital costs. In their research, Najafi et al. collect information on the length and structural characteristics of roads, water lines, and sewer lines in communities of similar population size and socio-economic status but with different lot sizes. Then, they combine the operating, maintenance, and replacement costs that a local government could expect to pay over a period of 50 years. Over all, their study determines that the present value of life cycle costs increases as density decreases.

While not applicable to roads, Najafi et al. also consider the relationship between user fees and the added infrastructural costs brought about by lower-density development. Ultimately, they show that low-density housing does not provide proportionally greater revenue from fees. In fact, as lot sizes increase (i.e. density decreases), the difference between user fees and life-cycle costs becomes narrower. This is understandable since user fees are generally formulated and standardized without any adjustment for lot size. Furthermore, this study did not factor in the upkeep of water/sewer main lines and treatment facilities, which likely would have exacerbated the observed trend and resulted in costs markedly exceeding revenue as density declined.

In a study more closely related to the topic of this paper, Choudhury (2012) investigates how zoning classifications can manifest differences in property value between single-family and multi-family residential lots. From his results, Choudhury concludes that property characteristics—such as building age, building square footage, lot dimensions, number of bedrooms, and number of bathrooms—impact housing values

differently in each of the zones. This supports the idea that a zone effect has a significant influence on prices in the market for residential property. Ultimately, Chouhury's methodology was a departure point for this paper in examining the differences between low and medium-density property zones in Corvallis. From there, my subsequent analysis of how local property tax receipts and planning decisions might be affected is where I hope to make a unique contribution to the field of literature that already surrounds this subject.

3. METHODS

Complicating tax assessment in Oregon is the state's ballot initiative system. In 1997, Oregonians passed the tax reform Measure 50. The result was that instead of determining property taxes as a percentage of market value, they would instead be calculated as a percentage of a new metric called Maximum Assessed Value or MAV ("A Brief History of Oregon Property Taxation," 2009).

MAV is a means of limiting tax liability, and it operates as follows. At the outset of 1997, it set a property's taxable value to a 10% decrease of its 1995 market value. In each subsequent year, the growth of taxable value has been tied to a strict 3% increase of this reduced figure, a rate that has proved to be below the general inflation in the housing market since the 1990s. On lots with improvements or structures completed after 1997, counties employ what is called the Changed Property Ratio (CPR). This ratio modifies the market value of a new property to achieve a taxable value figure that relates to the MAVs of pre-1997 properties ("The Role of the Assessment Office," 2014).

Given the incomplete information about past/present development plans at Witham Oaks, a direct appraisal was impossible. So, to forecast the future market value, taxable value, and tax receipts of each zoning option, I made the decision to study existing Corvallis properties as a substitute. To this effect, in order to produce a cross-sectional study, I collected data on property characteristics from the sales reports published by the Assessor's Office on Benton County's website (http://www.co.benton.or.us/assess/sales.php). Using this resource, I then sorted the information by the applicable zones—also known as property class codes (PCCs)—and

thus organized Corvallis houses and apartments into separate observational sets that conformed to what could plausibly be constructed at Witham Oaks. For the record, low-density zones are labeled as PCC 101 and are limited to six units per acre by local ordinance. PCC 701 is for medium-density zones, where the maximum number of units per acre is twelve ("Land Development Code," 2014).

Based on the unique circumstances for how the county values land (independent from whatever structures or improvements are placed upon it), untangling this research problem required a few steps prior to running regression analysis on the data. Despite what may seem intuitive, the acreage of a plot is not always valued at a per unit basis. For each city within its boundaries, Benton County divides these incorporated areas into additional subsections with numbers that designate a Neighborhood Maintenance Area (NMA). Under PCC 101, barring the event of an unusual land feature, each lot within a given NMA will be identically valued regardless of acreage. More intuitively, different NMAs will have varying base lot valuations relating to the presumed desirability of the areas they represent. In contrast, while there are still distinctions between the NMAs under PCC 701, a value per acre is set for land within each medium-density neighborhood.

Fortunately, NMA information is linked to the properties within the sales reports that provided my data. Considering the geographic location of Witham Oaks, I was able to approximate its likely NMA number for both development scenarios under consideration and then deduce a probable market value figure for PCC 101 land and PCC 701 land. These outcomes are labeled as LRMV (for land real market value) in my results section below. For the purpose of this paper, the word "real" is not used in a traditional

economic sense. In the tax assessment language utilized by Benton County, “real” is meant to clearly distinguish true market values from the adjustments that are made to produce MAVs (i.e. the figures for taxable value).

Because the Witham Oaks plot contains vulnerable wetland and Oak savanna habitats, I made the assumption that the construction of homes or apartment buildings would be limited to the 25 acres of less environmentally sensitive ground that Campus Crest has proposed to build on. It is worth noting that Legend Homes was prepared to develop 221 houses on a larger share of 44.6 acres of the land at Witham Oaks, but this plan was appealed by local activists prior to the recession (“Recent History of Witham Oaks,” 2013). For the purpose of making a comparison, I decided the most consistent and interesting path to take was to hold both the low and medium-density options to the same number of total acreage in my analysis. Consequently, by keeping the original lot-size per home the same, it would be reasonable to expect the construction of 123 houses in my hypothetical low-density scenario of 25 acres.

After resolving how to treat land values, I next ran individual linear regressions for each relevant zone. For both PCCs 101 and 701, the real market value of property buildings (or BRMV) was regressed on structural square footage and the year the structures were built. With low-density observations, I was also able to utilize a dummy variable on the condition descriptions for PCC 101 buildings (which were described within the data as either “good” or “average”). Unfortunately, this dimension was not able to take effect or be used on medium-density properties because their condition information was not consistently listed.

It should be mentioned that from the sales reports I used, some properties were excluded from my analysis due to one of the following issues. First, properties built before the year 1950 were left out in an effort to reduce the impact that unrecorded remodeling would have on BRMV. Second, PCC 101 properties indicated by the data to have acreage figures above 0.4 and high construction material grades were not considered. This was because these high-value or otherwise unique homes exceeded the development intentions originally put forth by Legend Homes. Indeed, the initial low-density development concept at Witham Oaks was understood as an effort to build a conventional subdivision of modestly priced homes for non-wealthy consumers ("Witham in Accord with Corvallis Goals," 2007). Finally, certain property entries were removed due the absence of interpretable square footage information.

Given the coefficient estimates of my regression analysis, I was then able to compose separate prediction equations to estimate the possible BRMV figures at Witham Oaks under each zoning classification. In terms of using these equations, determining what amount of PCC 101 and 701 square feet to plug in was not straightforward. I was unable to acquire specific construction information for the housing development planned by Legend Homes. So, I made the assumption that the 2013 Census Bureau figure for the median square feet of a new single-family home in the western United States (2,359) would be sufficient to represent each of the 123 houses contemplated in the low-density scenario (US Census Bureau, 2013). For the medium-density option, the draft site plans submitted to the City of Corvallis by Campus Crest suggest that their complex would be around 386,100 square feet. This total breaks down into 60 units of 992 square foot two-bedroom apartments, 164 units of 1,263 square foot three-bedroom apartments, and 72

units of 1,659 square foot four-bedroom apartments. (“Campus Crest Public Hearing Packet,” 2013).

Having developed these approximations, I then respectively plugged these numbers for square feet—along with the applicable year and condition rating inputs for new construction—into the PCC 101 and 701 prediction equations. For the medium-density option, this step yielded the complete BRMV estimation for an apartment complex. To scale up and achieve a full BRMV estimation for an entire housing development, I multiplied the result of the low-density prediction equation by 123, representing the number of houses this analysis has assumed would be constructed under PCC 101.

Having completed this step, I was then in a position to calculate total market values. I added the above estimated BRMV results to their coordinating PCC 101 and 701 LRMV projections that were obtained earlier by using the NMA information. The results of this process foreshadowed what the attractive choice for a local planner would be. Logically, between low and medium-density zones, if an appraisal is proportionally higher for one than the other, that would lead to an eventual disparity in tax receipts.

However, the remaining steps were still important in order to generate the ultimate prediction for what the total difference in property tax receipts would be. Using the total market value results I generated, I next applied the Benton County CPR for residential properties to them in order to calculate the MAVs that an assessor would use (“Changed Property Ratios,” 2013). Lastly, since property taxes are calculated as a percentage of MAV, I multiplied each MAV figure by the tax rate for Corvallis properties in Benton County to arrive at my conclusion (“Tax Rate Summary,” 2014).

4. EMPIRICAL RESULTS

The main concern of this study is to explore the relationship between residential zoning density and its association with tax receipts. Since property taxes are measured as a percentage of assessed property value, I developed the following model to describe the variables that influence how property value is appraised.

$$p_i = \beta_0 + \beta_1 SF_i + \beta_2 YB_i + \beta_3 CD_i$$

In this equation, where *i* signifies an individual property observation, the dependent variable p_i is the market value of a property's buildings. β_0, β_1, β_2, β_3 are the parameters to be estimated. Accordingly, each of the independent variables represents an important property characteristic. SF_i is the sum of the structural square feet of a property's buildings. YB_i is year the structures were built. Lastly, CD_i is a dummy variable for property condition, which takes effect when a property's buildings are listed as "good" (rather than just "average").

The parameters mentioned above are estimated using OLS regression. Table 2 lists the results for medium-density properties. The regression coefficients for the independent variables of this zoning class indicate a value of around $68 per square foot and a factor of $10,776 on the year a property's structures were built. Low-density results are described in Table 3, and they show a value of nearly $59 per square foot and a factor of $803 on the year a property's structures were built. Additionally, this zoning class was able to utilize condition information, and the regression coefficient for a low-density property in "good" condition was $5,373.

The above outcomes indicated that a medium-density zone would have a BRMV advantage over a low-density zone. In particular, this could be interpreted from the fact that the regression coefficient for square feet was larger for medium-density properties, suggesting that apartment buildings are proportionally more valuable than conventional houses. Additionally, the regression coefficient on the year structures were built was also more substantial for medium-density properties, but this can be somewhat accounted for and offset by the fact that low-density observations were analyzed with an extra variable on property condition. A further notable point about each regression is that all estimated parameters were significant at the 95% level.

Ordinarily, geographic features would be included within the framework above, and the dependent variable would be the combined total market value of a property's land and buildings. However, as shown in Table 4, I was able to calculate a concrete possibility for the market value of land at each zone based on the NMA information derived from my data. Consequently, the cumulative LRMV for the low-density option appears to be substantially greater than that for the medium-density one. Although unconventional, this approach still arrives at a projection for total market value by adding together the separate steps for BRMV and LRMV (represented in Table 4 by Total RMV). Furthermore, it provided the extra benefit of simplifying the regression model without sacrificing accuracy.

In terms of BRMV, the figures in Table 4 are reasonable. One would expect a medium-density development to be a more intensive land use in terms of structural square footage. This fact, in combination with the difference between the regression coefficients on square feet, drives up the BRMV for the medium-density option.

However, this outcome was not enough to fully offset the disparity it faced in LRMV. After the application of the CPR and the property tax rate onto the projections for Total RMV, ultimately, the overall difference in tax receipts was modest, but it favored low-density over medium-density zoning at Witham Oaks by a margin of $23,965.

Table 1:

Descriptive Statistics of Benton County Property Data, 2014

Variables	Definition	Min	Mean	Max
Med-Density Property				
SF	Square Feet (the sum measured from a property's buildings and improvements)	2166	30382.076 (42951.365)	172621
YB	Year Built (i.e. the year buildings and other improvements were constructed)	1952	1981 (19.243)	2013
CD	Condition Dummy (properties listed as good are assigned a value of 1)	N/A	N/A	N/A
Low-Density Property				
SF		902	2336.501 (824.436)	6188
YB		1950	1980 (16.985)	2013
CD		0	0.241 (0.428)	1

Standard deviation in parentheses

Table 2:

Med-Density Property Regression: BRMV on Property Characteristics, in Dollars	
Square Feet	68.368***
	(1.901)
Year Built	10,776.455**
	(4,243.206)
Intercept	-21,331,597.392**
	(8,393,249.067)
R-squared	0.942
Observations	92

Standard error in parentheses

** indicates significance at the 95% level

*** indicates significance at the 99% level

Table 3:

Low-Density Property Regression: BRMV on Property Characteristics, in Dollars	
Square Feet	58.756***
	(0.901)
Year Built	803.232***
	(45.330)
Condition Dummy	5,373.191***
	(1,757.843)
Intercept	-1,597,089.450***
	(89,464.446)
R-squared	0.886
Observations	692

Standard error in parentheses

** indicates significance at the 95% level

*** indicates significance at the 99% level

Table 4:

Projections for Tax Receipts	
Med-Density [PCC 701]	
LRMV = $392,040 per acre * 25 acres [based on NMA 378]	$9,801,000.00
SF Witham projection [total from site plans] =	386,100
BRMV = 68.368(SF Witham) + 10776.455(YB) - 21331597.392 =	$26,779,915.19
Total RMV = BRMV + LRMV =	$36,580,915.19
MAV = Total RMV * 0.833 [CPR from 2014] =	$30,471,902.36
PCC 701 Tax Receipts for Witham = MAV * 0.018 [2014 tax rate] =	$548,494.24
Low-Density [PCC 101]	
LRMV = $145,000 per lot * 123 lots [based on NMA 7203]	$17,835,000.00
SF Witham projection [per home, from Census info] =	2,359
BRMV = 123 * {58.756(SF Witham) + 803.232(YB) + 5373.191(CD) - 1597089.450} =	$20,344,241.05
Total RMV = BRMV + LRMV =	$38,179,241.05
MAV = Total RMV * 0.833 [CPR from 2014] =	$31,803,307.79
PCC 101 Tax Receipts for Witham = MAV * 0.018 [2014 tax rate] =	$572,459.54
Tax Advantage Projection in 2015 for PCC 101 =	**$23,965.30**

5. CONCLUSION

Based on my analysis, the year one tax receipts from developing 25 acres of Witham Oaks into a low-density housing development would be about $572,459. This would provide an extremely modest $23,965 in additional revenue—an approximately 4.4% gain—over the estimated $548,494 that would come from a medium-density apartment complex.

In terms of shortcomings, one weakness with this investigation is its limited sample of data from the medium-density zoning class, including the lack of complete information on condition and construction quality. Because of this, in conjunction with the assumptions made about square feet, it is easy to imagine alternative outcomes. One possibility is that if large and expensive houses were constructed at Witham Oaks, the cumulative tax value of building under a low-density zone would greatly surpass that of a development of lower grade apartment units. Likewise, the analysis of market values could also benefit from a nuanced inclusion of geographical variables that might affect properties in Corvallis, such as proximity to school zones or flood plains.

Additionally, more consideration could be given to the prospect of what a natural area at Witham Oaks might entail. It is possible that a lack of amenities in a community might lead to the devaluation of its housing stock. Thus, if a natural area is able to sufficiently increase surrounding property values, it could be considered an indirect revenue source. In that event, it would be interesting to determine what optimal amount of open space a community like Corvallis should maintain.

Another suggestion for improvement involves, particularly if panel data are

obtainable, performing a cost benefit analysis that combines revenue projections with a consideration of zoning's effect on the costs of infrastructural maintenance and other city services. To ascertain an even more comprehensive fiscal outlook, such an analysis could also expand to study the relationship between land use and property depreciation over time.

Also deserving of investigation, beyond a fiscal focus, is the likelihood that other community incentives might be ultimately more influential in planning decisions than tax revenue. For instance, the expansion of Oregon State University and the city itself has led to a concern with livability among residents in Corvallis and its administration. There seems to be a perpetual debate about low-density projects, which can contribute to sprawl, versus higher density arrangements that might subject the local infrastructure to undue stress.

On that same topic, it would be interesting to research certain geographical opportunities. In other words, if growth is expected in both the demographic of people who buy houses (e.g. middle class families) and the demographic of people who live in apartments (e.g. college students), then the city might have an opportunity to strategically optimize where to place such developments. Moreover, in terms of related economic consequences, a city can expect different types of consumption based on the density of development it chooses. The amount that college students spend may not differ that widely from other residents, but this does not mean that college students purchase the same types of goods as everyone else. For example, given a steady source of income and place of residence, employed adults that have paid off their debts are likely to have an elevated consumption of durable goods in comparison to younger adults with existing

loan obligations (Coulibaly & Li, 2006). Thus, if the city wants to promote specific types of commerce, that objective could be accomplished by managing the placement of residential zones.

In conclusion, numerous city and county governments across the nation are facing fiscal shortfalls in the years ahead. In combination with the tax restrictions created by Measure 50, several Oregon localities will have to reduce public services because of the loss of Federal timber payments and because a growing share of their revenue is being dedicated to satisfy old policy commitments that were underfunded (such as the Public Employees Retirement System). Given the need to balance their strained budgets and the unpopularity of most efforts to increase taxes, it is common for municipalities to make cuts in areas such as public safety and education. Of course, these are actions that are controversial in most communities. As such, the underlying motivation for this research was the idea that understanding the factors (such as residential zoning density) that impact tax receipts can provide better insight into what policies planners could pursue to support the financial stability of their local government. To that end, in order to combat the alarming depth of this problem, I hope that my contribution can be a small part in a growing body of literature surrounding this issue.

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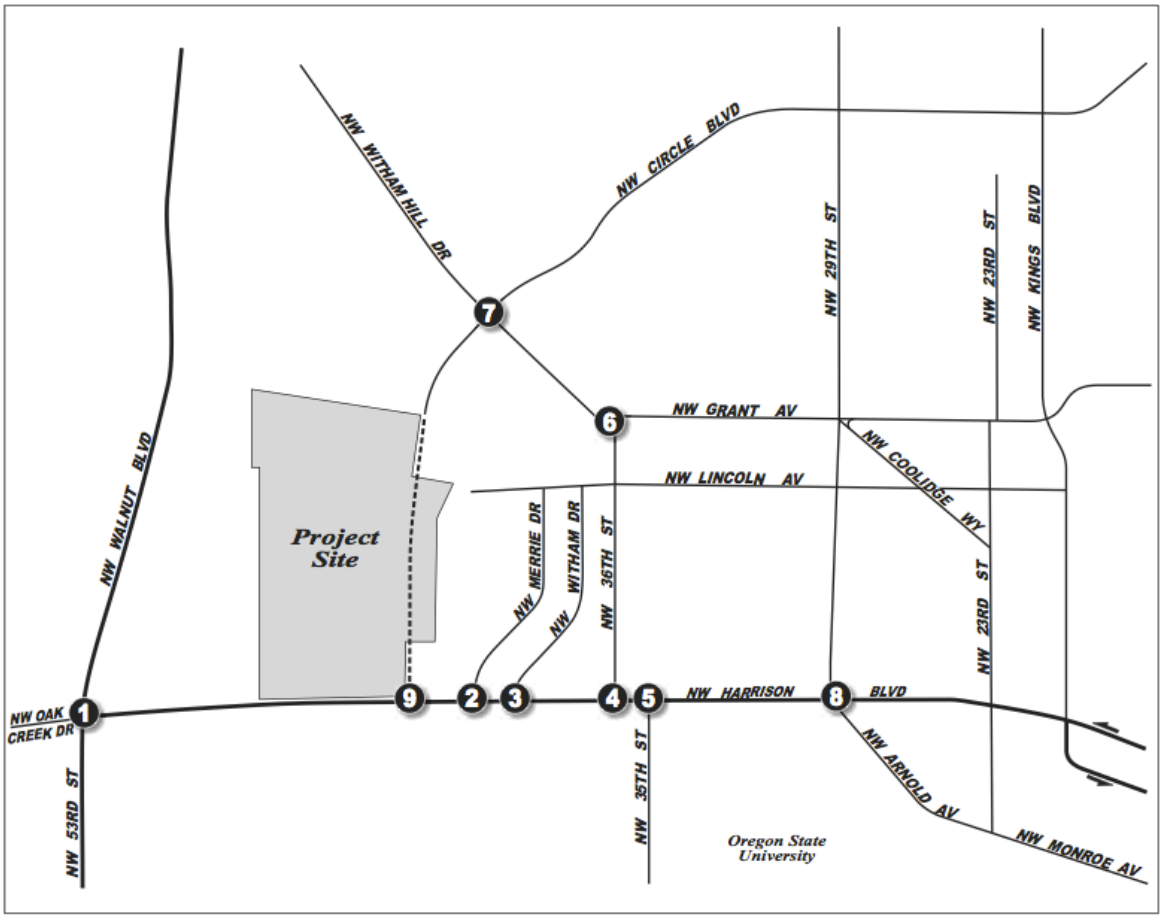
7. APPENDIX

Map of Witham Oaks



("Campus Crest Public Hearing Packet," 2013)