RECONCILING OREGON'S SMART GROWTH GOALS WITH LOCAL POLICY CHOICE:

AN EMPIRICAL STUDY OF GROWTH MANAGEMENT, URBAN FORM, AND DEVELOPMENT OUTCOMES IN EUGENE, KEIZER, SALEM, AND SPRINGFIELD

by

MONICA C. WITZIG

A THESIS

Presented to the Department of Planning, Public Policy and Management
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Master of Community and Regional Planning

March 2014

THESIS APPROVAL PAGE

Student: Monica C. Witzig

Title: Reconciling Oregon's Smart Growth Goals with Local Policy Choice: An Empirical Study of Growth Management, Urban Form, and Development Outcomes in Eugene, Keizer, Salem, and Springfield

This thesis has been accepted and approved in partial fulfillment of the requirements for the Master of Community and Regional Planning degree in the Department of Planning, Public Policy and Management by:

Dr. Yizhao Yang	Chairperson
Dr. Rebecca Lewis	Member
Robert Parker	Member

and

Kimberly Andrews Espy	Vice President for Research and Innovation; Dean of the Graduate School

Original approval signatures are on file with the University of Oregon Graduate School.

Degree awarded March 2014

THESIS ABSTRACT

Monica C. Witzig

Master of Community and Regional Planning

Department of Planning, Public Policy and Management

March 2014

Title: Reconciling Oregon's Smart Growth Goals with Local Policy Choice: An Empirical Study of Growth Management, Urban Form, and Development Outcomes in Eugene, Keizer, Salem, and Springfield

Oregon's Statewide Planning Goals embody Smart Growth in their effort to revitalize urban areas, finance environmentally responsible transportation systems, provide housing options, and protect natural resources; yet the State defers to its municipalities to implement this planning framework. This research focuses on Goal 14 (Urbanization), linking most directly to Smart Growth Principle 7 (Strengthen and Direct Development toward Existing Communities). It assesses Eugene's, Keizer's, Salem's, and Springfield's growth management policies that specifically target infill development of single family homes against this Goal and Principle. Though these municipalities must demonstrate consistency with the same Goals (see Supplemental File 1 for this context), this research questions whether sufficiently different policy approaches to curtailing sprawl yield significantly different results. The primary analytical method is a logistic regression that uses parcel-level data to understand how administration affects development by isolating these policies' direct effects on observed outcomes (see Supplemental File 2 for this theory).

CURRICULUM VITAE

NAME OF AUTHOR: Monica C. Witzig

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene

DEGREES AWARDED:

Master of Community and Regional Planning, 2014, University of Oregon
Master of Public Administration, 2014, University of Oregon
Bachelor of Arts, 2010, Spanish and Planning, Public Policy and Management, University of Oregon

AREAS OF SPECIAL INTEREST:

Inter-agency/Intra-agency Systems and Collaborative Processes
Land Use Planning and Policy
Performance Measurement
Growth Management
Urban Revitalization
Program Evaluation
Environmental Policy
Affordable Housing
Local Public Finance
Urban Design

PROFESSIONAL EXPERIENCE:

Planning Associate; Cameron McCarthy Landscape Architecture and Planning; October 2012 - Present

Graduate Teaching Fellow; Department of Planning, Public Policy and Management University of Oregon; Spring 2013

Associate; Community Planning Workshop, Community Service Center; University of Oregon; June 2011 – August 2012

Program Evaluation Intern; Neighborhood Economic Development Corporation; Summer 2011

Library Student Assistant; University of Oregon Knight Library; Academic Years 2006 – 2011

Community Planning and Revitalization Intern; City of Springfield, OR; Development Services Department; Summer 2009

Maintenance Intern; City of Springfield, OR; Department of Public Works, Summers 2006 - 2008

PUBLICATIONS:

Yang, Yizhao, Witzig, Monica, & Turnoy, Scott. (2010). *Review of Large-Scale Retail Design Standards and Development Principles: Accessibility, public space, human scale, safety, and sustainability in the urban landscape*. University of Oregon. Sustainable Cities Initiative.

ACKNOWLEDGMENTS

I wish to gratefully acknowledge the members of my Committee—Professor Yizhao Yang, Robert Parker, and Professor Rebecca Lewis—for their confidence in my abilities, encouragement, and their direction on this research. They are a large reason why a smile will come to my face when I think of my experience not just with this thesis but of my entire time at the University of Oregon (not to also mention the reason why I found my first gray hair). I would like to extend my sincere thanks to my office for their patience in letting me accomplish my goal. Thank you to all of the City and County agency staff who helped guide and provide data for the beginning phases of this research. My deepest gratitude goes toward my entire family for putting up with a part-time daughter, sister, granddaughter, etc. Dad, I am about ready to put on those "shades." And to Jeff, who washed more dishes for me than what seem to be words on these pages and who helped me manage my stress by putting this great achievement into perspective—you showed me what it means to get something even greater.

TABLE OF CONTENTS

Chapter Page

LIST OF FIGURES

LIST OF TABLES

Table	Page

Table Page

CHAPTER I

INTRODUCTION

PURPOSE AND CONTRIBUTION OF THIS RESEARCH

In an effort to inform citizens and public agencies during their land use policy-making processes, a substantial amount of literature assesses the qualitative and quantitative outcomes of Smart Growth[1] (or lack thereof) and its related growth management tools. Especially prevalent are studies that evaluate the effectiveness of Smart Growth programs and policies at the state and national levels (Anthony, 2004; Burchell, et al., 2001; Carruthers, 2002; DeGrove & American Planning Association, 1984; Ewing, Pendall, & Chen, 2002; Frece, 2008; Howell-Moroney, 2007; Ingram, Carbonell, Hong, & Flint, 2009; Talen & Knaap, 2003). Less common are studies that explicitly examine local land use policies' effects on development patterns, and they often combine these results into metadata as an overall assessment of larger geographic areas (Ingram, Carbonell, Hong, & Flint, 2009; Ewing, Pendall, & Chen, 2002; Wassmer, 2006).

Ingram's, Carbonell's, Hong's, & Flint's (2009) research finds that Oregon leads all other states in several areas of Smart Growth and is a leader in managing urban growth. Within Oregon, the Portland Metropolitan Area (Metro Area) is a case study that is used heavily enough that studying it alone as a representation of what occurs in Oregon may skew assessments of the state's overall performance on Smart Growth. Though a debate exists amongst researchers regarding whether this Metro Area is one of the most successful examples of implementing the comprehensive list of Smart Growth's desired outcomes, it is the only one of such areas in Oregon where its population became more concentrated throughout the 1990s.

This research considers what these studies leave unaddressed— medium-sized cities in Oregon outside of the Portland Metro Area that continue to face numerous challenges to managing growth and providing its residents with a livable environment: revitalizing their downtowns and other urban areas; financing more accessible, environmentally, responsible public

[1] A "Smart Growth" approach to land use policy and development attempts to balance economic development with social and environmental needs. It attempts pragmatism by identifying "how" and "where" to develop rather than limit development altogether. Smart Growth clearly supports the following aspects of development: (1) systems that integrate the built environment with the natural environment to provide an area with aesthetics, opportunities for social interaction, physical activity, and protection of natural areas; (2) housing and employment options that meet the needs of an area's entire resident population; and (3) providing these two aspects in the most fiscally efficient manner possible. See p. 6 for a definition and further discussion of Smart Growth.

transit systems and other multimodal transportation networks; and providing a range of housing opportunities through infill development. The measurement of local jurisdictions' efforts to implement Smart Growth as a development strategy should therefore encompass all of these aspects, including housing affordability and the extent of citizen participation in the regulatory decision-making process given its Principles:

1. Mix land uses;
2. Take advantage of compact building design;
3. Create a range of housing opportunities and choices;
4. Create walkable communities;
5. Foster distinctive, attractive communities with a sense of place;
6. Preserve open space, farmland, natural beauty, and critical environmental areas;
7. Strengthen and direct development toward existing communities;
8. Provide a variety of transportation choices;
9. Make development decisions predictable, fair, and cost effective; and
10. Encourage community and stakeholder collaboration in development decisions.

The administration of local land use policies that seek to meet these aforementioned goals are thought to simultaneously benefit their residents, budgets, and the environment whilst curtailing sprawling development patterns (the antithesis of Smart Growth). Unlike Smart Growth, sprawl: results in an inefficient use of land, detracts financial resources from a community's existing assets that are closer to the urban core and other already-developed areas in favor of constructing new sites at the suburban-rural fringe areas of a city, requires public agencies and private citizens to finance the outward expansion of new infrastructure while also having to pay for the cost of retrofitting existing infrastructure systems, limits housing and transportation options, and diminishes valuable agricultural and natural resource lands.

The focus of this research is on the seventh Principle of Smart Growth (Strengthen and Direct Development toward Existing Communities), linking most directly to Oregon's Statewide Planning Goal 14 (Urbanization). To understand how this Principle and Goal are put into practice, this research specifically assesses the effectiveness of specific Smart Growth policies implemented by the Cities of Eugene, Keizer, Salem, and Springfield against Smart Growth's recommendation to provide housing in areas that are already developed by way of infill housing and asks:

To what extent have selected cities in Oregon: Eugene, Keizer, Salem, and Springfield—effectively managed the development pattern of their single family homes in a manner consistent with Smart Growth Principle 7 and Oregon Statewide Planning Goal 14? More specifically, which policies are more likely to better fulfill the intended outcomes of this Principle and Goal, thereby directing development toward existing communities in an efficient manner?

In essence, this research measures the degree of vertical consistency between local land use regulations and the overall policy framework implemented by the State of Oregon through an empirical assessment of "on-the-ground" development outcomes. It also identifies that the degree of horizontal consistency between jurisdictions' policies to manage the outward growth of single family homes is lacking, which allows for a comparison of how each city's policy performs relative to one another, generally questioning whether different approaches to managing growth and providing opportunities for infill development yield different outcomes that are statistically significant— though they are all required to meet the same goals as provided by State policy. The development outcomes within these cities as they appear today might reveal gaps between what these policies purport to achieve and what actually occurs despite such development being legally allowed by Oregon Revised Statues and Oregon Administrative Rules, despite meeting the approval criteria of the local public agency, and despite demonstrating consistency with the State's definition of infill by way of location within an urban growth boundary (UGB).

ORGANIZATION OF THIS THESIS

The remainder of this thesis is divided into six chapters and four appendices:

- **Chapter II** presents background on and discusses several factors that provide the basis for this research, beginning with a general description of Smart Growth and its importance to communities and citizens. It also recognizes views that question the positive outcomes of Smart Growth. The value of measurement and evidence to help resolve conflicting viewpoints and to provide transparency throughout the policy process follows these subsections and directs attention to the performance measurement of managing urban development as applied to Oregon. Finally, this chapter explains why governments benefit from considering the multiple social, economic, and political forces that influence development outcomes and that are external to a policy's direct effects.
- **Chapter III** provides policy context for how the specific, local policies used in this research operate in a system of State and regional governance. This chapter begins with a

general discussion of Oregon's land use program as represented by its Statewide Planning Goals. It then addresses the next layer of policy that in some instances govern local land use regulation—these policies are those applied at the regional levels. A description of how Eugene's, Keizer's, Salem's, and Springfield's policies that address infill development of single family homes transpired and how their respective City agencies apply them in practice allows for a better understanding of the methodological approach that the next chapter describes.

- **Chapter IV** explains the methods used in this research. It restates the research question, describes how qualitative methods guided the data collection and quantitative approach to this study, and describes the empirical model. Chapter IV presents the theoretical model along with details of the dependent and explanatory variables.
- **Chapter V** presents the findings of the analysis and summarizes the variables' quantitative results.
- **Chapter VI** discusses and interprets the specific results of the descriptive and logistic regression analyses. More broadly, this chapter redirects the findings back to the research question and hypotheses. Chapter VI also comments on the findings' connections to themes from the literature review.
- **Chapter VII** expands on Chapter VI by offering recommendations for policymaking at the State and local levels of government as a substantial component of this chapter. These recommendations emphasize a better outlining of process and clearer definitions of infill as part of this process. This chapter also identifies opportunities for further research inquiries specific to this thesis (e.g., additional data to inform the analysis) and for answering additional questions that arose from the research.
- **Appendix A: Policy Robustness of Prescriptive Smart Growth Policies in Eugene, Keizer, Salem, and Springfield at Policy Adoption to End of Study Period**
- **Appendix B: Maps Identifying Infill Parcels for Each City**
- **Appendix C: Obtaining the Dependent Variable: A Detailed Description**
- **Appendix D: Stata Output: Descriptive Statistics, Correlations, Logistic Regression Results, Marginal Effects, Sensitivity, and Specificity Test Results**

CHAPTER II

LITERATURE REVIEW

As people move from one residential location to another, they express their preferences in pursuit of securing what they perceive as increased quality of life (Fischel, 2001). This movement, by and large, results in people moving from older suburbs and from older suburbs to newly forming suburbs (Garreau, 1991). The decline of their former neighborhoods creates social and economic issues that warrant attention (Porter, 2008). At the same time, cities across the Unites States (U.S.) are attempting to revitalize their downtowns and manage urban expansion to protect natural resources, to ensure fiscal efficiency, and to provide their residents with quality development as their populations become increasingly dispersed (Ingram, Carbonell, Hong, & Flint, 2009; Oregon Department of Land Conservation and Development [DLCD] & Oregon State University [OSU], 2008).

Between 1982 and 1997, the amount of land consumed for urban development in the U.S. increased by 47 percent, causing a dramatic increase in the nation's infrastructure costs (Funders' Network, 2004). Businesses and residents fled the inner city, with the resulting land use pattern leaving areas closer to the downtown core to face deteriorating conditions, eventual blight, and declining incentives to maintain livable communities and economically prosperous areas (Levine, 2005; Smart Growth Network, 2006). This trend left metropolitan areas to expand much faster than the increase in population. Developed areas in the U.S. have since become dominated by the suburban landscape. Since 1950, more than 90 percent of all growth in U.S. metropolitan areas has occurred in the suburbs. In the year 2000, half of the nation's population resided in suburban jurisdictions (Porter, et al., 2000).

Yet after decades of losing residents who favored suburban communities, many cities are beginning to experience population growth in their central areas (Haughey, 2001). According to DeGrove (2005), Communities in the U.S. are:

- Questioning the wisdom of abandoning existing shopping centers only to later rebuild them on farmland;
- Unhappy with development that reduces their mobility and access to services by forcing them to drive long distances in heavy traffic;
- Frustrated with regulations that limit housing choices and drive up housing costs; and are

- Increasingly aware of the negative effects of expanding, low density residential development on their local budgets due to neglecting existing infrastructure and rebuilding it on the community fringe.

Communities debate these issues with stances ranging from one end of the spectrum—uninhibited growth so as to "let the market decide" for economic prosperity (i.e., growth as usual)—to the other extreme of complete restrictions on growth for environmental preservation (Burchell, et al., 2001; Levine, 2005). Yet neither option satisfies mutual interests or resolves long-term problems. Consequently, the popularity of Smart Growth largely comes from its pragmatic focus on how and where to grow.

WHAT IS SMART GROWTH?

Managing growth with a Smart Growth perspective is thought to redirect economic and social forces by balancing the spread of new development with efforts to stabilize or revive existing neighborhoods. It influences the location of growth to improve access for residents to jobs, decent housing, and decent public facilities (Porter, 2008, p. 212).

Current budget problems and competitions between local municipalities for tax revenue have only made the question of how and where to grow even more important. Land use policies—together with provisions for municipal administration—comprise a city's regulatory framework. This system provides governments the capacity to regulate private actions and to tax and spend in ways that encourage or discourage infrastructure improvements and development in certain areas (Ingram, Carbonell, Hong, & Flint, 2009; Levine, 2005). Public expenditures and their associated policies thus profoundly influence residential development patterns.

As previously noted, cities are now advocating for a more efficient approach to land use planning and natural resource consumption in order to minimize adverse environmental impacts whilst also addressing human needs (Heid, 2004; Porter, et al., 2000; Smart Growth Network, 2006). The challenge is to balance these needs and to design areas that can coexist with the natural environment with the ideas of Smart Growth as a basis for development (Porter, et al., 2000). Employing methods to encourage well-designed sites can minimize dependence on the automobile, limit piecemeal encroachment onto land with valuable natural resources, protect scenic views, and alleviate destruction to municipalities' wastewater and stormwater systems (Burchell, et al., 2001; International City/County Management Association [ICMA], 2002).

The Principles of Smart Growth highlight a dimension of growth management that is often overlooked: the quest for advancing economic and social equity during the process of urban development (Porter, 2008). This goal requires recognition of the “triple-bottom-line” approach, where environment, social equity, and economic factors are inextricably linked to represent quality of life as a whole.

A widely accepted approach to measuring sprawl, as the antithesis of Smart Growth, is proposed by Ewing, Pendall, and Chen (2002). These researchers aim to incorporate both land use and transportation in their definition and, accordingly, identify four categories for measurement along the sprawl/Smart Growth spectrum: (1) the strength or vibrancy of activity centers and downtown areas; (2) accessibility of the street network; (3) residential density; and (4) the mix of homes, jobs, and services at the neighborhood level (Frumkin, 2004). Density, diversity, sense of place, and connectivity are thus achieved when translating these ideas into the following Smart Growth Principles (Smart Growth Network, 2006):

1. Mix land uses;
2. Take advantage of compact building design;
3. Create a range of housing opportunities and choices;
4. Create walkable communities;
5. Foster distinctive, attractive communities with a sense of place;
6. Preserve open space, farmland, natural beauty, and critical environmental areas;
7. Strengthen and direct development toward existing communities;
8. Provide a variety of transportation choices;
9. Make development decisions predictable, fair, and cost effective; and
10. Encourage community and stakeholder collaboration in development decisions.

This research focuses on the seventh Principle of Smart Growth, which encourages spatially compact development, though the importance of the remaining elements should not be discounted. The work by the U.S., Smart Growth Network, and the ICMA research team (2003) posits that the most successful communities take a multipronged approach that incorporates many of Smart Growth’s Principles. Principle 7, however, may provide the underlying framework for and facilitate provision of the others.

Smart Growth incorporates complex, even endogenous, relationships among variables in its definition. For example, the need for transportation planning arises because transportation affects—and is affected by—designated land uses. Numerous studies indicate that the infrastructure and energy used for transportation is closely linked to growth patterns (Boarnet et al., 2011; Ewing & Cervero, 2010; Funders' Network, 2004.). By employing methods of residential Smart Growth, multimodal transportation options become available (Heid, 2004).

Compact urban development has become a symbol of Smart Growth. This development pattern is thought to benefit a community economically, environmentally, and socially (Brueckner, 2000; Burchell, et al., 2001; Duany, Plater-Zyberk, & Speck, 2000; Stone, 2003; United States Environmental Protection Agency [EPA], 2007). The extent of compact development realized through effective implementation, however, appears minimal at a national scale (Downs, 2005). Heid (2004) asserts infill as an important development strategy but questions its ability to happen quickly enough or at a large enough scale to make an immediate difference. Yet the term Smart Growth and its associated development outcomes (e.g., nodal development, transit-oriented development [TOD], mixed use, etc.) are widely used throughout municipal agencies' policies and corresponding planning documents, and the momentum for support of Smart Growth continues to grow in both the public and private sectors (U.S., Smart Growth Network, & ICMA, 2003).

Noting Smart Growth's many goals and plans that incorporate its goals, what does its development look like "on-the-ground?" One method of evaluating implementation is to understand if, and how, local governments work to mitigate the sprawl aspect of outward expansion. From a land use and spatial perspective, urban containment within the context of growth management at the state level becomes possible through use of well-crafted building codes and design standards (Porter, et al., 2000; U.S., Smart Growth Network, & ICMA, 2003) and may be used as means to promote compatible, higher density development in established neighborhoods. Porter (2008) asserts, however, that advocates of Smart Growth lack "focus on how individual communities should translate the Principles into forms of development that meet the communities' specific needs and goals" despite their ability to provide examples of sustainable development (p. 31).

To address strategies that directly target residential development in existing communities, one must look at infill development, which Haughey (2001) defines as: compact development in vacant sites, the redevelopment of brownfield sites, and the conversion of structures once used for industrial uses of a city's core area. In doing so, development becomes directed away from remote locations and takes advantage of the city's existing infrastructure, allowing for increased efficiency and revitalization (Haughey, 2001; Porter, et al., 2000; Smart Growth Network, 2006).

Specifically, housing achieved through infill development is seen in the provision of smaller and/or dense, detached single family housing; rowhomes; live/work units; co-ops; apartments; and condominiums that demonstrate energy efficient design (Funders' Network, 2004; Smart Growth Network, 2006). While all illustrate greater residential compactness, they also provide a variety of housing options and accommodate a range of household needs that may correspond to differing income levels. Providing housing choice is important because over the past 20 years, the American household has changed. As of the year 2001, only 25 percent of homebuyers are the traditional 2-parent/2-child household (Haughey, 2001).

Each of these benefits described above, however, do not come without opposing views. Counterarguments to Smart Growth generally attempt to highlight the tradeoffs of decisions and question if the benefits do indeed outweigh the costs.

Criticisms and Limitations of Smart Growth

A metropolitan area's projected and realized population changes are elements of concern when recognizing the Smart Growth Principles that focus on housing affordability. If an area with urban containment policies that restrict development on natural areas can also assume to expect continuous population growth, it should have a strategy to provide housing that not only accommodates the amount of projected growth but also of the type of growth. The overall supply of land for housing is therefore an issue. A need for housing that meets the purchasing abilities and other needs of households will exist in areas with an influx of population without emigration to other communities.

Porter (2008) states that successful infill development increases tax base and subsequently drives up real estate prices due to a limited supply of a desired commodity. If demand is likely to increase without an outwardly expanding supply of land at a comparable rate as a result of urban containment, the price of housing will further increase resulting in greater economic polarization. Oregon appears to be no exception to this rule. Ingram, Carbonell, Hong, & Flint (2009) find that Oregon, a state that disallows Inclusionary Zoning, had the largest increase in cost-burdened owner- and renter-occupied households from the study period of 1990 to 2000 in their study of states with and without Smart Growth policies. These effects of urban containment occurred despite the State's requirement for jurisdictions to provide a specified housing mix that should addresses these issues of affordability (OAR 660-007-0000, 2014; Oregon DLCD, Statewide Planning Goal 10, n.d.).

An argument against Smart Growth might also be that it is expensive to accommodate higher densities by retrofitting existing sewer systems so that they may support increased amounts of flow from areas producing water and waste. Here, the question of who bears the direct financial cost of the retrofit (usually the developer) and who bears the direct financial cost of the extension (a combination of the developer and the municipality) might partially explain why some individuals prefer to develop on greenfield sites at the urban fringe.

Burchell, et al. (2001) pragmatically list several costs and benefits associated with sprawling land development and with Smart Growth that they found in their research design and review of others' perceptions. Among the costs of sprawl, they present: the increase of both the public and private operating costs of accommodating population growth; increased reliance on the automobile with greater trip distances; a disproportionate consumption of agricultural land relative to population growth; environmental degradation, specifically lowered air, water, and soil quality; and observable and increasing incidences of blight and economic disparity in cities' core areas as a result of a spatial mismatch of population and employment opportunities.

Burchell, et al. note that these costs have counterarguments: the capital and operating cost savings through compact growth are trivial—costs of accommodating indefinite population growth will increase irrelevant of land use patterns; the automobile is the most efficient mode of trip choice; increased public safety, better schools, and lower housing costs and taxes at peripheral locations resulting in the claim that quality of life is better there as a result; and the relationship between socioeconomic issues and metropolitan development are too complex to isolate sprawl as the sole cause of inequity (pp. 38-39).

The authors' ultimate conclusion is that both arguments have justifiable aspects. There is merit in the Smart Growth perspective in that there are high infrastructure and land conversion costs associated with sprawl. Yet they conclude that perceived quality of life is higher and housing costs are lower in locations characterized by sprawling development patterns.

Empirical evidence that demonstrates how Smart Growth can mitigate these aforementioned impacts tends to justify interventions by the public sector (Levine, 2005, p. 2). Regardless, research that posits and seeks to prove the "territorial appetites" of sprawl is often met with "countervailing studies [that question] the causal link between metropolitan form and any set of outcomes" if the research with findings in support of Smart Growth leave room for ambiguity and loose interpretations (Levine, 2005, pp. 1-2). Performance measurement is one way to minimize ambiguity.

PROGRESS ON MEASURING THE PERFORMANCE OF SMART GROWTH

Sprawl as the antithesis of Smart Growth is thought to directly affect the increasing presence of pollution, an excess consumption of energy and valuable natural areas, and the threat to peoples' livelihoods with a highway-based transportation system that provides greater chances of automobile crashes than there otherwise might be and that provides fewer less opportunity for outdoor physical activity (Ewing, Pendall, & Chen, 2002). Talen & Ellis (2002) explain that governments and their planning officials who seek to mitigate sprawl will improve the legitimacy of their stances by determining a "robust theory of good city form" (p. 38) and by then demonstrating through empirical evidence that planners achieved good urban form. Agreed upon criteria as a framework for this theory will serve as a mechanism to direct planners' efforts when guiding communities through the planning process, their reasons for which appear two-fold: (1) clearly articulated and sound criteria clarify the outcomes a community wants to see; a city's development pattern should reflect these outcomes; and (2) understanding and having evidence of a problem may convince others that a problem not only exists but that it is solvable, which minimizes the ambiguity of the planner's role in the community-building process (p. 65).

Researchers in the field of urban planning and development attempt to provide what Talen & Ellis (2002) call for. In an effort to inform citizens and public agencies during the policy-making process, a substantial amount of literature assesses the qualitative and quantitative outcomes of Smart Growth (or lack thereof) and its related growth management tools. Especially prevalent are studies that evaluate the effectiveness of programs and policies at the state and national levels (Anthony, 2004; Burchell, et al., 2001; Carruthers, 2002; DeGrove & American Planning Association, 1984; Ewing, Pendall & Chen, 2002; Frece, 2008; Howell-Moroney, 2007; Ingram, Carbonell, Hong, & Flint, 2009; Talen & Knaap, 2003). Less common are studies that explicitly examine local land use policies' effects on development patterns though they are often combined into metadata as an overall assessment of larger geographic areas (Ingram, Carbonell, Hong, & Flint, 2009; Ewing, Pendall, & Chen, 2002; Wassmer, 2006).

Nationwide Smart Growth

Notable results of Ewing, Pendall, & Chen's research, published in 2002, and of the 2001 study from Burchell, et al. reveal measurable effects of sprawl on a national scale.

Measuring Sprawl and Its Impact

Ewing, Pendall, & Chen (2002) assess the degree to which sprawl occurs in 83 U.S. metropolitan areas. The authors define sprawl as: "the process in which the spread of development across the landscape far outpaces population growth" (p. 3). With this definition, they identify four dimensions of sprawl: a widely dispersed population in areas with low density development; rigidly segregated uses; a network of roads marked by huge blocks and poor access; and a lack of well-defined, thriving activity centers, such as downtowns and town centers.

This study then operationalizes these four characteristics by creating an index to measure sprawl through collecting and analyzing data on: residential density, neighborhood mix of land uses, strength of activity in central areas, and the degree of accessibility of the metropolitan area's street network. Ewing, Pendall, & Chen then identify 22 variables that captured these four factors (e.g., density and the proportion of residents living close together in the center of the metro area). Because the variables are quantifiable, they give each metro area a separate score that shows the degree to which each area sprawls, allowing for comparison.

The researchers then compare how each metro area scores on sprawl relative to transportation outcomes, while controlling for socioeconomic variables. These outcomes measure preferences of automobile ownership, travel patterns, commute times, and effects that are negatively associated with Smart Growth such as air pollution and deaths due to traffic accidents. They conclude that their reasoning is sound, as they note that the effect of sprawl on transportation has been well-researched (p. 17). The Oregon DLCD & OSU (2008) identify one limitation of Ewing, Pendall, & Chen's methodology, though its implications are unknown: "their study [does] not present data or findings by individual MSA, nor [does] it operationalize UGBs as a distinct variable" (Oregon DLCD & OSU, 2008, p. 89). The results of Ewing, Pendall & Chen's analysis conclude that there is a statistically significant, positive association between transportation-related problems and sprawling areas. This conclusion leads to their six policy recommendations, consistent with the Principles of Smart Growth (p. 6):

1. Reinvest in Neglected Communities and Provide More Housing Opportunities;
2. Rehabilitate Abandoned Properties;
3. Encourage New Development or Redevelopment in Already Built-Up Areas;
4. Create and Nurture Thriving, Mixed Use Centers of Activity;
5. Support Growth Management Strategies; and
6. Craft Transportation Policies that Complement Smarter Growth.

Costs of Sprawl (2000)

This study is one of the most comprehensive attempts to measure and conduct a cost/benefit analysis of development patterns that are either defined as sprawl or as Smart Growth. The previous section entitled, Criticisms and Limitations of Smart Growth (p. 9) described Burchell, et al.'s framework for comparing sprawl and Smart Growth and also summarized its conclusions that recognized the merits of opposing stances toward Smart Growth. Burchell, et al.'s ultimate conclusion states: "While sprawl is not the villain it is portrayed to be, it is without question an unnecessary and increasing drain on natural resources. More compact development patterns produce savings that are both profound and measurable. It makes sense to pursue these development savings" (Burchell, et al., 2001, p. ii).

This research team asks to what degree sprawl is occurring nationwide in order to reach the above-stated conclusion. Their definition of sprawl is as follows as is similar to Ewing, Pendall, & Chen's (2002): Significant, low density, leapfrog residential and non-residential development occurring at the outer fringe with limitless bounds (Burchell, et al., 2001, p. 85).

With this definition, the study analyzes selected counties under a sprawl scenario (i.e., growth as usual with no policy intervention), a non-sprawl scenario for a time period that development actually occurred (1980-2000), and for a projection period of the years 2000 through 2025. The counties that Burchell, et al. select are those thought to be sprawling. They quantify sprawl in two ways, the first of which is if the county meets the criteria of: a growth rate that is in the upper quartile of the economic area's (EA's) annual county household and employment growth rates; the county's growth rate exceeds the average national county growth rate; and its absolute level of growth exceeds 40 percent of the average annual absolute county growth. A county is also a "sprawl" county if its absolute level of growth exceeds 160 percent of the average annual absolute county growth.

Burchell, et al.'s findings generally show that there are more costs than there are benefits to sprawl; it consumes more land to a level that compact development does not and creates a financial burden on communities when they are required extend their infrastructure systems, thereby minimizing chances for revenue savings or allocating it toward other programs (p. 21). Specific outcomes the authors measure show that:

- Almost one quarter of the land conversion from urbanizable to urban could have been avoided through implementing simple measures to control growth. Nationally, nearly 2.5

million acres could be saved by employing the equivalent of a UGB in these EAs to redirect growth from rural areas to urban areas (p. 9).

- Under uncontrolled growth, developers and local governments in the U.S. will spend more than $190 billion to provide infrastructure for water and sewer systems between 2000 and 2025 to accommodate more than 18 billion gallons of water. Under controlled growth, these areas can save more than 150 million gallons of water and sewer demand per day and can save $12.6 billion in tap-in fees between the years 2000 and 2025 (p. 9).
- Using a Rutgers Road Model to conduct their analysis: the U.S. will spend more than $927 billion to provide road infrastructure during the projection period of 2000 to 2025. Under controlled growth, savings of $110 billion will occur.
- For the same projection period, combined savings of $420 billion in occupancy costs can be achieved through more centralized and compact growth patterns. The average residential housing cost would decrease from $167,038 to $154,035 with the greatest savings realized for single family detached dwellings.

Further, sprawl limits housing choice: "Since a mix of housing types is not provided, primarily single family units on larger lots at the periphery of the metropolitan area are chosen, and lower-priced urban housing markets are not. Overall, housing costs are greater under sprawl development" (p. 21).

Statewide Smart Growth

Ingram, Carbonell, Hong, & Flint (2009), the Oregon DLCD & OSU (2008), and the State of Oregon's effort to revisit and consider revisions to its land use planning policies with its Big Look Report (Big Look Task Force on Oregon Land Use Planning, 2009) provide examples of Oregon's performance on the Principles of Smart Growth.

Smart Growth Policies: An Evaluation of Programs and Outcomes

Ingram, Carbonell, Hong, & Flint (2009), along with the Lincoln Institute of Land Policy, conduct a systematic, comprehensive assessment of the effectiveness of policies in states that have Smart Growth Principles and directly compare these results with states that do not. This study also describes each case study sate's land use policies, administrative procedures, and demographic components that influence the states' development outcomes. Its evaluation measures the performance of four states with statewide Smart Growth programs: Florida, New Jersey, Maryland, and Oregon, against four states without such programs: Colorado, Indiana, Texas, and Virginia. These states are evaluated against five Smart Growth objectives: promote compact development, protect natural resources and environmental quality, promote transportation options, supply affordable housing, and create positive fiscal impacts.

Ingram's, Carbonell's, Hong's & Flint's (2009) research finds that Oregon leads all other states in several areas of growth management. The data "may indicate more Smart Growth success there than in any other state" (p. 43). Oregon's planning system has been most successful at preserving natural resource land. One explanation for this outcome is that it was the only state in the 1990s where developed land per capita declined over the decade. It was also the state that had the smallest decreases in the concentration of employment, yet the share of its population growth was higher than that of the other states (Ingram, Carbonell, Hong, & Flint, 2009, p.195).

The study's qualitative assessment demonstrates similar successes. The results of the researchers' state agency and local agency opinion leader survey indicate that respondents perceived Oregon's Smart Growth program as effective. Survey respondents rate the program as effective more frequently than respondents in any other state (Ibid., p. 196).

On a local scale, the Portland Metro Area in Oregon is widely examined, as it is within a state that is known for its urban containment strategies (Calthorpe & Fulton, 2001; Ingram, Carbonell, Hong, & Flint, 2009; Levine, 2005, pp. 119-120; O'Toole, 2007; Ewing, Pendall, & Chen, 2002; Song & Knaap, 2004). Though a debate exists amongst the aforementioned researchers regarding whether this Metro Area is one of the most successful examples of implementing the comprehensive list of Smart Growth's desired outcomes, the Portland Metro Area is the only one of such areas in Oregon where its population became more concentrated throughout the 1990s. Ingram, Carbonell, Hong, & Flint (2009) note that today, Portland continues to have the highest population and employment densities in the state (p. 195).

An Assessment of the Oregon Land Use Program

Consistent with Levine's (2005) assertion that municipal regulatory practices underpin America's low density development patterns (p. 51), Oregon's DLCD commissioned research from OSU's Institute of Natural Resources (INR) to evaluate the effectiveness of the State's land use planning program. This request provided a foundation for the recommendations of Oregon's Big Look Task Force, which formed in 2005 under the direction of the Land Conservation and Development Commission's (LCDC's) administration of the DLCD. Their recommendations became part of a Big Look Report that became final in 2009.

OSU's INR sets out to answer the extent to which Oregon's Land Use Program historically showed success at fostering citizen participation in land use planning (Goal 1); preserving farm and forest lands for farm and forest use (Goals 3 and 4); managing growth (Goal 14); and, protecting and developing estuarine areas, as appropriate (Goal 16).

Research questions with greater specificity correspond to each of these topics. Of particular interest to this research is the INR's assessment of Goal 14. The primary question the authors answer is: "Has the Oregon land use planning system been effective in facilitating orderly and efficient urbanization?" (p. 77). According to their research, the most appropriate methodology to answer this question entails an extensive review of others' empirical research. Ultimately, they choose 32 peer-reviewed articles with a well-documented research design and robust, trustworthy data as highly relevant to finding the answer (p. 78).

Throughout its review, the INR finds a lack of uniformity—and even conflicting data—regarding the performance of Oregon's UGBs on containing sprawl and creating livable communities. Researchers at the INR also find that few studies use data that come directly from local governments (e.g., assessor's records), which they attribute to the difficulty of gathering such data and to the observation that local agencies vary in the extent to which they gather data (p. 95). Adding to the challenge of summarizing this literature, the researchers state: "[Goal 14] as written does not explicitly lay out how the performance of Oregon UGBs is to be evaluated. The goal does present factors to be considered when drawing UGBs, including 'efficient accommodation of land needs,' 'orderly and economic provision of public facilities and services,' and 'land use compatibility'" (p. 76).

Fulton (2001) is featured in the INR's review. The INR identifies Fulton's research question as: "Who sprawls the most?" Looking at rates of urbanization, the national urban land base increased by 47 percent yet its population grew by only 17 percent, which translates to an overall density decline of nearly 16 percent (p. 79). Fulton's findings for Salem and the Eugene-Springfield areas are consistent. While Salem grew by 28.1 percent, it added 49.5 percent to its land base thus lowering densities by 12.2 percent. Together, Eugene and Springfield lowered their densities by 5.2 percent with a 14.2 percent increase in population and a 20.4 percent addition to its land base.

Overall, the INR concludes that Oregon's growth management system is sound regarding land use policy, but it offers insight as to how to improve measurement through data collection and consistent operationalization of the terms used throughout the State's policies.

With topical chapters that represent the Big Look Task Force's focal areas, the Oregon Task Force on Land Use Planning's Big Look report (Report) discusses issues that directly relate to Oregon's Statewide Planning Goals and the recommendations by the INR. The Task Force considers the role of the State and its local governments in the land use planning process; the extent to which the land use process involves citizens in the formation of goals and policies; the relationship between land use planning and the provision of infrastructure consistent with land use plans and trends in urbanization; the link between land use planning and economic development in local areas; and, growth management tools. Its chapters provide strategies for reducing administrative complexity (e.g., providing objective definitions to evaluate performance) (Chapter IV); improving citizen participation (Chapter VI); planning for regional initiatives (e.g., data collection) (Chapter II); and improving funding mechanisms for and the provision of infrastructure (Chapter VII).

The Report identifies areas in which Oregon's Land Use Program (Program) shows success, including its protection of natural resource lands; revitalizing downtown areas; increasing the use of non-motorized vehicles; and its ability to manage growth and contain sprawl (Big Look Task Force on Oregon Land Use Planning, 2009; 1000 Friends of Oregon, 2008). It shows room for improvement in other aspects of its Program, where: there is somewhat of a perception of infringement on private property rights; its Program as one that is too rigid and not outcome-oriented in its complexity; similarly, many of the State's Goals are better defined as tactics or tools that do not resonate well nor inspire; and that future population growth as projected will challenge Oregon's ability to preserve prime land and publicly finance infrastructure. In its review of the Report, 1000 Friends of Oregon also identify that the State could improve at compliance from local governments—especially when permitting farm and non-farm dwellings on resource lands, a lack of preparedness for natural disasters, and limited citizen involvement (1000 Friends of Oregon, 2008).

The Big Look Task Force identifies a paradox when presenting multiple solutions to the problem of resource consumption; individuals would likely claim each solution as undesirable when asked to state their preferences: "All the growth expected in Oregon must go somewhere. We can either increase the amount of infill and redevelopment in our cities or expand our urban growth boundaries. If we expand our boundaries we will take farm land out of production. If we grow inside our boundaries we will increase density" (Oregon DLCD, 2009).

AN ECONOMIC FRAMEWORK FOR LAND USE POLICY AND DEVELOPMENT

Some studies focus on the demand aspect of development outcomes and attempt to answer the complex perspectives and decisions that bring about such results (Feijten, Hooimeijer, & Mulder, 2008; Levine, 2007; Lewis & Baldassare, 2010; Levine & Frank, 2007; Levinson & Krizek, 2008; Litman, 2010; Morrow-Jones, Irwin, & Roe, 2006; Nelson, 2009; Talen, 2001; Yang, 2008). Others examine the supply component (Garde, 2005; Talen & Knaap, 2003) with questions of whether implementation through land use policy and process might leave cities to fall short of their desired objectives for development outcomes. These supply side factors may ultimately be determined by the weaknesses on the demand side; most Americans are believed to be unwilling to consider compact environments as their ideal places of residency or even as their surrounding residential settings (Gordon & Richardson; 2000, 1997). This research adds to the supply side literature through concern about how systems of governance affect development, as have others (Boschken, 1982; Fischel, 2001; Levine, 2005; Knaap, Meck, Moore, & Parker, 2007; Talen & Knaap, 2003).

Land Use and Zoning as a Mechanism for Publicly-Provided Goods

Fischel (2001) & Levine (2005) present similar perspectives of the role of municipal exclusionary (i.e., Euclidean) zoning, especially in suburban areas. This type of zoning, according to Fischel, serves as a crucial mechanism by which public goods are distributed in an economically efficient manner. For this reason, others have since viewed zoning as "a collective property right held by the municipality as a fiduciary for its citizens" (Levine, 2005, p. 18) or even as a net benefit to society, especially when an opportunity exists to reveal residential preferences through an array of housing options (Burchell, et al., 2001, p. 17). Noting Tiebout's model that residents "vote with their feet," to reveal their preferences and purchasing abilities (i.e., the household budget constraint), this process resembles "a shopping trip for publicly provided goods…," thereby demonstrating residents' willingness to pay for these goods (Levine, 2005, p. 54). Levine (2005) explains that some individuals may view households that desire high density development as free riders who do not pay their fair share of services.

In the case of free riders, public intervention becomes justifiable to eliminate negative externalities and return the market to equilibrium (i.e., efficiency). This explanation is why some people prefer exclusionary zoning, as it is "optimal if high density demanders' willingness to pay is not sufficient to cover the cost of publicly provided goods (Levine, 2005, p. 53). It is no surprise, then, why governments pay so much attention to satisficing the needs of their residents (i.e., tax payers) in an effort to compete for tax base. Fischel (2001) explains that most local governments' property tax is their largest single source of discretionary funds. Further, undeveloped land, commercial and industrial property, and residential property all contribute to this tax base, but residential property contributes considerably more than the others in aggregate (Fischel, 2001).

So why, then, have many local jurisdictions in Oregon proceeded to plan for and designate areas as appropriate for infill development that are implemented by planning districts known as nodal development, mixed use development, and TOD? Perhaps a value-laden concern for environmental protection and social equity are two explanations, as "regulatory takings" and social equity do not always equate to economic efficiency. Levine (2005) posits that these development forms are physically representative of the planning interventions that mitigate sprawling, low density development as a result of the private market's historic inability and/or disinterest in providing denser development closer to the urban core, at least since the mid-20th Century (p. 2).

This theory suggests that the government's role is to protect its citizens from the private market's insatiable demand for land and profit, which also suggests that the government is not a part of the "market" because it is able to intervene. Another theory also justifies no need for the government to promote infill development. The view that land use regulation does not affect the private market is consistent with Cosean logic, where the initial assignment of property rights (i.e., land use jurisdiction) is irrelevant. This theory holds that the land use pattern would be replicated if the municipal regulation did not exist (Levine, 2005).

Others disagree. As noted, the government responds to its constituents and their concerns for maintaining the character of their neighborhoods for the sake of preserving and increasing home values (Fischel, 2001). Knaap, Meck, Moore, & Parker (2007) and Talen & Knaap (2003) provide evidence that land use codes affect development outcomes and even distort the "free market" simply because a project must seek approval prior to construction. This evidence supports Levine's (2005) assertions that: "Zoning lowers development densities and generates greater exclusivity in development patterns than would otherwise hold" (p. 59), and that development outcomes in the U.S. are inefficient: "Compact development that would generate more benefits than costs has been historically excluded from regulation" (p. 65).

Levine (2005) also recognizes that municipal regulation is not the only cause of sprawl. Development patterns and policies are also the result of individual preferences. If developers attempt to propose projects based on what they perceive as the market interest in order to see a favorable return on investment, then municipal regulation is a non-issue to developers if the market is interested in traditional, single family housing. If developers perceive a market for alternative types of housing, then concern rests with the City agency's ability to deny compact development and to refuse project alternatives to developers without room for flexibility in the development code (Levine, 2005, pp. 3, 11-13, 73).

ECONorthwest's (ECO's) Residential Land and Housing Needs Analysis (RLHNA) for Springfield, Oregon (2009b) provides a real-world example of how these issues interact. The evidence from its demographic and socioeconomic study of this city suggest that smaller households, an aging population, and other variables (e.g., Springfield becoming more ethnically diverse) contribute as factors that now support the need for smaller and less expensive units and a broader array of housing choices in Springfield (ECONothwest, 2009b, p. 50). However, single family houses appear to be the preferred housing type for many of its households, yet these preferences may shift; they have become increasingly expensive. Approximately one-third of Springfield's households experienced cost burden in the year 2000. The rate was much higher for homeowners (31 percent) than for renters (18 percent) (p. 52).

Understanding Demand to Direct Development toward Existing Communities through Policy

Levine (2005) and Levine & Frank (2007) assert that the government may play a role in constraining the market and need for compact development when an undersupply of transportation and neighborhood choices exists—intentionally or not. With a fictitious notion of a "free market," government land use policies do not necessarily intervene in "market failures" because they are inseparable components of "the market." Any government intervention to take corrective action on sprawl is more of an intervention to correct a planning/policy failure in and of itself. How might municipal regulations change to instead encourage infill development?

Based on a review of Levine's (2005) model, the conclusion is that any policy must consider what is most appropriate under different political environments though he maintains a stance that the second of the following two paradigms is what most accurately reflects development in the U.S.: (1) market disinterest is the primary explanation for the scarcity of alternatives to sprawl. Increased regulation must come in the form of forceful intervention. Here, then, the burden of proof is with the municipality to provide evidence that alternative development forms are a net benefit to society (p. 4). It makes sense that it might also be possible that when combined with regulation, incentives could also further the outcomes that proponents of Smart Growth desire; (2) the dominant presence of sprawling landscapes in the U.S. are due to regulations that cause developers to lead toward "sprawling tendencies, and that lowering these regulatory barriers to allow alternative forms of development would be in the context of expanding household choice" (p. 4) though the municipality amending existing regulations might still face opposition, as loosening regulations does not equate to incentives.

Levine's (2005) observation exemplifies a land use approach that perhaps some of Oregon's cities are modeled after and attempt to administer, which is a combination of regulation at the State level and an attempt to create market-friendly land use policies (i.e., allow greater densities) (p. 119). If a municipality lifts regulations within its boundaries but the UGB remains, then increases in density are likely to result. Thus, "any observed increases in development densities may be due to the restrictions of the UGB, amendments to existing low density development regulations in favor of higher densities, or some combination of the two" (Levine, 2005, p. 119). The latter explanation is most likely and is easiest to explain due to difficulties of separating the causes of each single action. It is also expected that if one action occurred, the other would naturally follow, or even complement, the alternate process if a municipality seeks stable economic growth whilst preserving natural resources.

How Do We Get There? A Focus on Encouraging Infill as a Response to Smart Growth

Projects are likely to meet most definitions of infill development if they are built within areas that have been previously developed.[2] Some definitions of infill require that the development occur within "established" surroundings (City of Eugene, 2014). Regardless of the nuances of infill's definition, the project concept itself (e.g., design, type, and cost of construction) and its existing context determine development challenges it presents. Regarding context, a city's physical configuration, administrative and policy framework that falls somewhere along the spectrum of incentive-based to pure regulation, economic feasibility, and the potential climate (e.g., dissatisfaction of well-organized residents) affect market potential and

[2] Please refer to the Methodology (Chapter IV) for how I approached the definition of "infill" within the scope of this research.

development (Suchman, 2002). The ultimate benefits of infill development presented in previous sections cannot come to fruition if there are substantial, coinciding barriers to the development process that make it infeasible in the first place.

A number of reasons may explain the less than desired realization of infill and Smart Growth. Previous studies suggest that a need might exist for the revision of land use policies and financing options to encourage the supply of compact development in the form of infill housing, which eases the development process for the private sector. Barriers thought to impede this process include: (1) developers' conservatism that fails to adapt to new market demand due to the development risk thought to be inherent in these projects; (2) technocratic zoning that discourages higher density; (3) financing options that favor construction in undeveloped, outlying areas; and (4) neighbors' abilities and desires to appeal locally unwanted land uses (LULUs) sparked by their "not in my backyard" (NIMBY) perspectives (Ellerbusch, 2006; Fennell, 2004; Ferris, 2001; Haughey, 2005, 2003; Levine, 2005; Knaap, Meck, Moore, & Parker, 2007; Rowley, 1996; Shoup, 2008; Simons, 1998; Suchman, 2002; Talen, 2001).

Zoning and Development Standards as a Barrier

Although many reasons exist for increases in housing prices, growing evidence suggests that local regulatory barriers substantially contribute to price increases. Evidence further suggests that zoning is a common form of such regulatory barriers (Levine, 2005) because it can be used to exclude certain types, densities, or sizes of residential development from a neighborhood or even an entire community (Knaap, Meck, Moore, & Parker, 2007). A municipality's minimum setback requirements, minimum building size requirements, and minimum parking requirements all illustrate this point. For these reasons, the literature on regulatory barriers suggests that zoning often limits the construction of infill housing and lowers the density of single family housing (Knaap, Meck, Moore, & Parker, 2007). Communities with little or no land zoned for high density housing accordingly tend to have the highest housing prices (Suchman, 2002; Tarnay, 2004). Taking this statement and applying it to a developer's perspective, the key issue is that land price determines project density; the higher the price of land, the greater the residential density must be to make the numbers work (Suchman, 2002; Talen, 2001).

Zoning as a barrier can also be seen in the physical layout of an entire area rather than on a pure lot-by-lot basis. Based on piecemeal zoning patterns and lot sizes in cities' central areas, it is rare that a developer will identify and purchase an entire project site outright and in one single, efficient process (Suchman, 2002; Tarnay, 2004). More typically, the success of infill development often depends on the ability to assemble land with multiple parcels and multiple ownerships. Dense development requires large parcels of buildable land, yet in the places where redevelopment is most needed—such as in declining areas of the central city—large parcels are often difficult to find (Shoup, 2008). The grouping of many small parcels often entails cooperation and coordination from different land owners, some of whom may be resistant to sell (Suchman, 2002). One such example is that of the property owner who is hesitant to sell due to the anticipation of higher land prices in the future.

This haphazard process may frustrate developers who may eventually terminate the project. A developer might attempt to buy enough parcels to create a suitable site, but if some owners hold out from land assembly hoping to be the last to sell (and therefore command a higher price), the land remains fragmented and the development is stymied; the developers and their resources go elsewhere (Haughey, 2001; Shoup, 2008, p. 161).

A limited supply of large sites for planned unit developments or master-planned residential areas can increase the difficulty and cost of land assembly and can even further increase the price per unit of area for large sites (Shoup, 2008; Tarnay, 2004). This manifestation is what is known as "tragedy of the anticommons," termed by Heller (as cited in Fennel, 2004): "When too many landowners hold such rights of exclusion, the resource is prone to underuse… resources can become stuck in low-value uses" (p. 912). This single holdout could destroy the surplus that would otherwise be enjoyed by those who impede engaging in mutually beneficial trades.

If the developer proceeds with development, construction on a site-by-site basis may still not account for or improve issues on a larger, comprehensive scale. Changes in land use and their effects on transportation are similarly limited due to this disjointed process. A transportation study conducted by the U.S. EPA shows that while ridership increases and vehicle miles traveled accordingly decrease in some cities, the changes in vehicle travel primarily reflect only shorter car trips rather than resulting in substantial increases in walking or transit use (U.S. EPA, 2007).

A Study conducted by Ferris (2001) showed that in 22 central cities, all infill projects captured only 4.9 percent of the total new housing permits and suggested that Smart Growth advocates should strengthen their focus on the appropriate siting of infill projects. The thought here is that although this approach would limit the production of infill, it would allow for greater success in the long run by developing in the right locations.

A solution might then be for the City to exercise eminent domain (Shoup, 2008; Suchman, 2002), but it is similarly difficult because of its controversial nature though it serves as a catalyst for economic growth and community development (Haughey, 2005; Tarnay, 2004). If the problem of land assembly and the limits of eminent domain by State legislatures cannot be resolved, then development could ultimately result in accelerated suburban sprawl onto large sites that are already in single ownership. Subdivision might also be a possibility, but when the cost to assemble exceeds the costs of subdivision, this causes further fragmentation and a tendency to disrupt the land market.

Risk, Cost, and the Regulatory Development Process

Though they offer certain advantages, infill projects typically cost more and are riskier to develop than similar suburban projects (Haughey, 2001). The previous section noted that there may be higher up-front monetary costs with infill construction than there are with suburban residential development (Suchman, 2002). Financial support might require partnerships with government agencies. For example, in high-cost areas, land prices may prohibit development of housing that is affordable to only households that are very rich. In low-cost areas, or areas with reasonably priced land, low rents and sales prices often create a feasibility gap between the project investment and the expected returns (e.g., “Does the pro forma indicate that the development proposal will come out ‘in the red,’ or not?”) (Suchman, 2002).

Because each of these project considerations is unique, the specific challenges confronting the developer differ, as the principal of a development firm in Atlanta, Georgia points out: “… the very fact that infill developments are unique makes them more risky. You have a multitude of decisions to make but have no history behind them. There is nothing to compare them to” (Suchman, 2002). The market is hard to assess because comparables are rarely available, which could deter development. An Advisory Services Panel Report by the Urban Land Institute (ULI) regarding redevelopment of downtown and riverfront housing recognizes this issue: It is a relatively new product in certain markets, meaning that lenders have no track record that might assure them of market demand and therefore return on investment.

A significant challenge for developers is the risky endeavor that presents itself when economic changes beyond local control can undermine a project overnight. Long and unpredictable delays in securing development approvals add substantial risk to any development, and developers and investors considering major investments weigh those risks in deciding whether to commit to a project. Land entitlement through efficient development processes is critical to reducing the risks of development (Suchman, 2002); “transparent” and “understandable” should also belong on this list.

Many cities’ traditional ways of doing business are those that seek consensus of a majority. Examples are processes that require community buy-in or a recommendation by the Planning Commission to City Council. As a result, decision-making can stretch out through weeks, months, or years of “paralysis by analysis” (ULI, 2006). The community’s reputation concerning its facilitation of the development process could cause many of the best developers to bypass the community. Navigating the land use system therefore adds to the costs of development in the form of soft costs and the time it takes to complete projects. Service and systems development charges can also be a barrier (Knaap, Meck, Moore, & Parker, 2007).

The high, upfront development costs (e.g., administrative permitting) and ambiguities of infill projects leave a challenge for the developer to secure project financing. This problem is further exacerbated by lenders’ lack of familiarity and experience with a particular site, the associated environmental problems with many infill sites (e.g., brownfields), and a lack of comparables (Suchman, 2002). These risks associated with infill development may ultimately cause developers to prefer to develop in a city’s greenfields for the sake of certain approval of a project with marginal returns, opposed to proposing development in infill areas that presents numerous, initial uncertainties and lasting negative impressions on a community, which may not outweigh infill projects’ great financial returns.

There can also be many possible site-specific impediments that relate to costs, which may cause the administrative and regulatory process to drag out further so as to mitigate risk to the municipality and community. Here, the costs increase more so. One factor affecting such costs might be a site’s physical characteristics. As infill developments are rarely in outer areas, developers may face sites that are hilly, irregularly shaped, or those that contain foundations and infrastructure from previous developments (Suchman, 2002). When housing is developed on contaminated sites, substantial marketing problems may arise from deed restrictions, which limit the future use of the site in order to ensure that it remains environmentally sound (Simons, 1998; Suchman, 2002).

As one of the foremost barriers to development, risk and uncertainty also coincide with liability issues that are associated with former industrial properties. Prospective property owners could be held responsible for contamination they did not produce, and lenders could be held responsible because of the association with said owners (which limits the feasibility of the project) (Ellerbusch, 2006). Local governments have faced potential risk-based decisions for choosing to either forgo tax income or to condemn property only to face Federal or State-driven cleanups that cost many times the value of the property (Ellerbusch, 2006).

Members of the ULI assert that the Federal tax incentives to help address risk and cost are more than enough evidence to convince developers to pursue a brownfield infill project (Haughey, 2001), but Ellerbusch (2006) argues that these incentives still do not mitigate the "fear of the Superfund liability."[3] Representatives at the ULI and U.S. Department of Housing and Urban Development (HUD) forum on barriers to land assembly for infill development recognize that while redevelopment of vacant land is a local responsibility, success partly hinges on State and Federal assistance and on these agencies' laws and regulations (Tarnay, 2004). Thus long transaction and negotiation processes suggest that developers may view the risk of future liability as simply too great to get involved.

Community Opposition and Conflicting Perspectives

Solely addressing environmental issues is insufficient to achieve successful redevelopment. Lange and McNeil (2004) explain that many factors are involved, including community support (Lange, 2004). The assembly of land (one barrier) and subsequent acquisition (another barrier) are integral aspects of the bundle of property rights because they represent the potential loss or modification of a right to develop or conduct certain activities on the piece of land in question (Ellerbusch, 2006). As these barriers rarely exist in isolation, infill housing may trigger community opposition through perceptions of a neighborhood's intensification of use (thereby increasing traffic) or residents' perceptions of affordable housing's association with increased levels of crime. Such problems, referred to as "messy" or "wicked" problems in planning and policy, reveal that there is often no easy solution by way of satisfying all stakeholders in an outcome. The solution might have to be one satisfies a greater of two goods in a given situation (Patton & Sawiki, 1986).

Redevelopment through developers' proposals for infill does not always require community involvement—especially if the development proposal is within a zone that allows the proposed use. It may still behoove the developer to conduct outreach and interact proactively with neighborhood residents prior to construction. Citizen participation can bring together experts,

---

[3] Superfund (The Comprehensive Environmental Response, Compensation, and Liability Act) acts to anchor jobs in older industrial areas by providing a disincentive to move to other sites.

which can offer real opportunities for progress, even if the process of involving neighborhood residents draws out the period for a final decision or makes it more difficult than if the developer were to simply wait for an appeal period to terminate in hopes of no one contesting the project (Arnstein, 1969; Ellerbusch, 2006).

However, it would be a mistake to overlook the community involvement process's potential negative impacts (Ellerbusch, 2006; Irvin & Stansbury, 2004). Of people who are classified as primary supporters of Smart Growth, significant numbers of average citizens do not make this list (Lewis & Baldassare, 2010). Due to their impacts associated with high visibility, these projects do not only create issues between neighbors but also attract larger policy debates (Suchman, 2002). An example might be spillover parking (a factor of supply) on surrounding residential streets due to higher densities (supply and demand) as a result of infill. Careful design can help mitigate this challenge, but the tradeoff might be increased costs to developers, thereby increasing prices for prospective residents.

The commonly used term, "NIMBY-ism," in planning exists in some communities—especially in affluent ones that understand their rights to oppose projects they view as unfavorable despite the developer's rights to propose development that meets the approval criteria specified by the municipal agency (Fischel, 2001; Levine, 2005). Homeowners fear that their property and home values will decline if governments allow infill development in their neighborhoods. Their perceived quality of life is reduced by such actions, which leads to community opposition to dense development (Fischel, 2001; Haughey, 2003). There is an additional obstacle if a concerned community previously had negative experiences with the management of apartment complexes (Ellerbusch, 2006; Knaap, Meck, Moore, & Parker, 2007; Haughey, 2003). An interview conducted as part of a study described in Knaap, Meck, Moore, & Parker (2007) identified people that are familiar with public policy and development practices affecting higher density housing in urban areas: "All of the interviewees agreed that zoning and land use controls do contribute to the problem [and that] community opposition has led public officials in some communities to favor single family, low density zoning" (p. 50).

Residential Preferences: Neighborhood Type, Location, and Proximity to Services

Not only input from the immediately surrounding community has an effect on development outcomes. Area-wide residents may hold the notion that there is an increased likelihood of crime near central sites with increased densities (Fischer, 1995). Furthermore, many middle class residents in the suburbs have children that need access to quality education. Because middle class parents will generally send their children to public schools, most urban housing is attractive to people who are childless and to families that are either rich or poor—not to those in between (Suchman, 2002). Thus one of the key issues, together with zoning and regulatory barriers, is the availability of services and their proximity to residential areas.

There is also irony in the fact that it has been said that there are two things Americans hate about growth: sprawl and high density (Haughey, 2003), which demonstrates that we as a nation do not fully comprehend that there is a tradeoff that must be addressed no matter how difficult a process this entails. As of now, the general public does not appear particularly inclined to view the concepts of infill, density, and environmental preservation as being closely linked with one another and are unfamiliar with the terms such as "sprawl" (Lewis & Baldassare, 2010). Emily Talen's work (2001) highlights the notion that suburban residential preferences may be contradictory. Such contradiction becomes evident as a result of lack of involvement and education about planning efforts to encourage infill as a mechanism to achieve the goals of Smart Growth (Talen, 2001). This study questions a random sample of 286 residents in an affluent, planned community in the suburbs of Allen, Texas. Questions in the survey consist of:

- Residential preferences as they relate to attachment to the neighborhood, physical aspects of development, and their social environmental context;
- Residents' stated acceptance of a lifestyle that caters to the Principles of Smart Growth; and
- Basic socioeconomic characteristics.

The study's research design seeks stated preferences and does not gather data on revealed preferences (one problem noted by Levine & Frank, 2007, p. 263), but the results of the study demonstrate said contradiction nonetheless. For example, while a large majority of respondents agree that driving instead of walking, biking, or using public transit is not a problem, more than half agree that they spend too much time in the car. Another example relates to perceptions based on residents' social environmental context. Most respondents (73 percent) have not heard negative views expressed about suburban development yet consciously agree (77 percent) that the suburbs are harmful to the environment (Talen, 2001, p. 208).

Levine & Frank's (2007) results support a similar, unexplained theory of contradicting preferences. They find that 82 percent of residents are more supportive of neighborhoods that do not interfere with the single family pattern yet support restrictions on the automobile (e.g., narrower streets). A question is then raised about what these survey results suggest about Levine's (2005) explanation about an undersupply of housing types that meet the goals of Smart Growth. In this example, residents are perhaps more concerned with safety and the atmosphere of their current neighborhoods regarding transportation impacts than they are with Smart Growth.

Research by Feijten, Hooimeijer, & Mulder (2008) also studies perceptions and preferences and answers: "How does experience with a certain type of residential environment contribute to the explanation of residential environment choice?" With a multinomial logistic regression and a retrospective dataset of 3,000 survey respondents, they estimate the probabilities of these respondents moving to a city, suburb, or rural area based on their experiences during childhood.

The authors explain that circumstances, or "life events," imply or stimulate residential mobility (p. 142). Previous experience is also an indicator of residential preference whether or not it is a return to the same place or move to a different place with a similar environment. To account for these factors and to sufficiently answer their question, the authors control for variables in their analysis that might prove explanatory to the observed residential location. These variables include age, partnership status, whether or not an individual has children, work status, socioeconomic status, and educational level. All of these variables fit into three clear frameworks: "activity space" (physical experience), "social space" (social experience), and "awareness space" (mental experience) (pp. 144-145). Like in Talen's (2001) article, these "experiences" are affected by resources (mostly financial), restrictions such as the distance to work, and opportunities and constraints at the neighborhood level (pp. 143-144).

The authors document three, pooled retrospective studies to measure moves between city, suburban, and rural areas. They also account for the changing characteristics of an area, meaning that what was once designated "rural" on a map from 1961 might now be "suburban." Page 143 provides an explanation of these three types of settings for the purposes of this analysis and makes a distinction that these definitions vary by city.

Their findings show that people prefer to live in an environment that is familiar: "We see that the most common life-path is to continue living in the residential environment where one was born" (p. 150). Further:

> People who… previously lived in a suburb have [a] significantly higher probability of moving to a suburb, and the same holds for the effect of having lived in a rural area… In contrast, the effects of a rural experience on the probability of moving to [a different rural

> area]…did remain significant. This result indicates that it is not only the specific place characteristics that make people return to a rural area, but also the more general aspects of a…residential environment. (p. 153)

Implications of this study as they relate to infill development show that people want to preserve the character of their neighborhoods if they are satisfied with its appearance and intangible aspects (Levine & Frank, 2007), especially if these residents are homeowners (Fischel, 2001). Proposals that change the neighborhood are certain to spark the curiosity of neighbors if the studies described above are generalizable to larger populations or are replicable. If municipalities understand these concepts, we might expect that their development codes require proposals to demonstrate consistency with a neighborhood's character through architectural elements and features of site design.

What Does All of This Underlying Context Mean for Municipal Policy?

Virtually each one of Smart Growth's benefits is not without an opposing view. Yet claims emphasizing that: (1) the benefits of Smart Growth outweigh its costs; and (2) that Smart Growth provides more benefits to society than sprawl, have shifted from being grounded in theory to now attempting to demonstrate empirical evidence. An understanding of the contextual factors under which policies function, furthered by an understanding of the barriers that exist to achieving Smart Growth—even government policy itself—should inform municipalities in their approach to correcting the problems faced by residents and administration alike. Further, it is critical for agencies to have some measure of the effect of their land use policies when comparing measures of regulation (inputs) against performance (outputs and outcomes). Burchell et al. (2001), Ewing, Pendall & Chen (2002), and Ingram, Carbonell, Hong & Flint (2009) provide examples of a framework for measurement. Performance measurement of local land use policies in Oregon is essential for understanding the State's development outcomes because, as current Oregon policy dictates, it is up to Oregon's local governments to implement the State's Planning Goals.

CHAPTER III

POLICY CONTEXT: PLANNING FOR SMART GROWTH IN OREGON AND ITS CITIES

STATEWIDE

The history and components of Oregon's statewide land use planning program help explain how and why Ingram, Carbonell, Hong, & Flint (2009) present the previously described outcomes of Smart Growth in Oregon. The State's LCDC adopted 19 Statewide Planning Goals that local governments must follow during the land use policy update and planning processes. The LCDC coordinates Oregon's land use program and policies, and the DLCD acts as planning staff for the Commission. Though these goals present guidelines and read as such, they are regulatory in nature by way of codification into the Oregon Administrative Rules (OAR) and Oregon Revised Statutes (ORS).

OAR Chapter 660, Division 24 (660-024-0000 Urban Growth Boundaries) outlines rules that "clarify procedures and requirements… regarding a local government adoption [of] or amendment [to] an Urban Growth Boundary." In an effort to balance the protection of valuable natural areas with planning for anticipated growth of its urbanized areas, Oregon's land use planning program outlines provisions for local governments to plan for efficient development of their land to accommodate projected population increases (ORS 197.296 Factors to Establish Sufficiency of Buildable Lands within Urban Growth Boundary).

To curtail sprawl but accept that growth must often be accommodated and managed, Oregon requires that cities and counties establish separate UGBs through Statewide Planning Goal 14: "To provide for an orderly and efficient transition from rural to urban land use, to accommodate urban population and urban employment inside urban growth boundaries, to ensure efficient use of land, and to provide for livable communities" (OAR 660-15-0000(14)).

This Goal represents the growth management element of its planning program. One way Oregon's local governments manage growth is to consider land use efficiency measures that accommodate their cities' future population growth within their existing UGBs (OAR 660-024-0030: Population Forecasts, Stat. Auth.: ORS 197.040; OAR 660-024-0040: Land Need, Stat.

Auth.: ORS 197.040) or to follow the example of ORS 197.012[4] (Compact Urban Development). ORS 197.012 recommends that areas within Oregon that are growing rapidly should: "Consider giving priority to investments that promote infill or redevelopment of existing urban areas to encourage the density necessary to support alternative modes of transportation." Using such measures helps minimize the area needed for UGB expansion and may prevent a UGB expansion altogether.

While local governments inhibit growth outside UGBs to conserve agricultural, rural, and environmentally sensitive resources, they are to delineate—through a complex and lengthy process of public meetings—these growth boundaries that accommodate the demands of expected growth for the next 20 years (Bollens, Nelson, et al., 1995). Employment and residential uses are directed to the urbanizable land within its boundary. Thus, UGBs are not immovable because they may adjust commensurate with the needs of each area's population (OAR 660-025-0070: Need for Periodic Review, Stat. Auth.: ORS 197.040, ORS 197.296, ORS 197.628 & 197.633). This determination is based on two distinct types of buildable land inventories and analyses: (1) residential lands; and (2) employment lands, where vacant, developable, and developed lands are identified for both. An example of the process local governments must follow comes from ORS 197.296 Subsections (4) and (5):

> 4(a) *For the purpose of the inventory described in subsection (3)(a) of this section, buildable lands includes:*
>
> (A) *Vacant lands planned or zoned for residential use;*
> (B) *Partially vacant lands planned or zoned for residential use;*
> (C) *Lands that may be used for a mix of residential and employment uses under the existing planning or zoning; and*
> (D) *Lands that may be used for residential infill or redevelopment.*
>
> (5) *… the determination of housing capacity and need pursuant to subsection (3) of this section must be based on data relating to land within the urban growth boundary that has been collected since the last periodic review or five years, whichever is greater. The data shall include:*
>
> (A) *The number, density, and average mix of housing types of urban residential development that have actually occurred;*
> (B) *Trends in density and average mix of housing types of urban residential development;*
> (C) *Demographic and population trends;*
> (D) *Economic trends and cycles; and*

[4] The Legislative Assembly enacted ORS 197.012 into law in 2009, but ORS Chapter 197, or any series therein by legislative action, did not incorporate this statute.

(E) The number, density, and average mix of housing types that have occurred on the buildable lands described in subsection (4)(a) of this section.

Perhaps the most influential component of these requirements in influencing urban form in Oregon's local areas is the 20-year coordinated population forecast, which considers a local area's demographic and economic trends that ultimately determine the outcomes presented in a Residential Land and Housing Needs Analysis (RLHNA). By way of the RLHNA and Goal 10, Oregon's statewide planning program seeks to provide housing for its residents that addresses their needs at price ranges and rent levels that meet the financial capability of Oregon's households (OAR 660-015 0000(10)).

A community must allow, through its Development Code, lower-priced housing if need is shown for such units during this 20-year period. Such housing typically is in the form of densities that are higher than what currently exists within a community. Statewide Planning Goal 10 complements Goal 14's implementation of a UGB to encourage higher density residential development that allows for a mix of housing choices at different levels of affordability without practicing Inclusionary Zoning. Inclusionary zoning is not a planning practice in Oregon. In the states that do allow this type of zoning, it is often challenged by developers as a denial of due process and as an unwelcome intervention into the "free market," where developers claim that it inhibits all economic use of the property and its potential profits (Lerman, 2006; Mukhija, et al., 2010).

Oregon's growth management policies exemplify how State agencies can encourage—or even require—Smart Growth; the State's planning framework is comprehensive in the land use issues it addresses and includes mandatory elements. Oregon was the first state to adopt growth management policies. As a "first wave state" (DeGrove, 2005), its system was adopted in 1973 initially out of concern for agricultural and environmental preservation (Ingram, Carbonell, Hong, & Flint, 2009). Support by the governor, key legislators, and other leaders was critical for ensuring a successful adoption process (DeGrove, 1984). Its policies to manage growth enjoyed fairly strong political support until the 1990s, when they were eventually met with forceful opposition from private sector groups.

Oregon residents in favor of Measure 37 of 2004 and the initiative to fix the slow implementation process of Measure 37, Measure 49, both provide examples of stakeholders who aligned with anti-government and anti-planning forces. A private property rights movement, Measure 37 arose due to Oregon's power to implement land use regulation on agricultural resource areas and open space such that these regulations constituted "regulatory takings" that limited property owners' rights to benefit economically from developing their land (DeGrove, 2005).

The State, in attempting to recognize autonomy, defers to local governments to determine what goals their local plans will pursue. Though each local area undertakes their planning activities to fit the unique needs of their respective communities within the UGB, each metropolitan area and city must demonstrate compliance with these goals when making land use decisions (e.g., adoption of a Refinement Plan, UGB Adjustment, etc.). Each city adopts a Comprehensive Plan (Plan) that conventionally contains goals, policies, and objectives for transportation, publicly provided infrastructure, housing according to Goal 10, natural resource protection, economic development, and historic preservation, among other elements. Local land use regulations, such as the Development Code, implement the Plan (Goal 2). All actions in the Development Code (Code) must reflect the Plan's intent, as the Code is the implementing tool of the Plan. Moreover, the Plan governs all land use decisions; the Plan takes precedence should an inconsistency exist between the policies and associated provisions in the Code. The State must acknowledge these land use decisions before they become legally enforceable.

CONSISTENCY WITH STATEWIDE GOALS: REGIONAL PLANNING IN OREGON

Some comprehensive plans are developed at the regional level. These regional plans therefore implement goals and policies with greater geographic scopes and wider reaching implications than plans that are specific to each city. Prepared cooperatively and adopted by more than one city within their respective Oregon counties, they are holistic and attempt to direct local planning efforts in a coordinated manner.

Such processes regularly occur in Marion and Lane Counties. Public agencies and developers in the Cites of Keizer and Salem (Marion County[5]) and Eugene and Springfield (Lane County) use several regional plans to determine their approaches to development. The Mid-Willamette Valley Council of Governments (MWVCOG) provides plans that guide development in the Salem-Keizer Metropolitan Area, which include the:

- SKATS Public Participation Plan;
- Regional ITS Architecture Plan;
- Regional Transportation Systems Plan;

[5] A small portion of western Salem is in Polk County.

- Transportation Improvement Plan;
- Unified Planning Work Program; and plans for
- Greenhouse Gas Reduction.

The titles of these plans demonstrate that Salem and Keizer both operate under strong regional strategies for transportation, environmental quality, public participation, and coordination of agency resources. Eugene and Springfield follow similar approaches to planning through policy guidance from its Lane Council of Governments (LCOG) with a greater emphasis on land use planning at the metropolitan level than the MWVCOG. The MWVCOG conducts Salem's and Keizer's Economic Opportunities Analysis and RLHNA at the regional level, but that is the extent of regional, officially adopted plans that address land use and community development for the Salem-Keizer Metro Area. Eugene and Springfield create their plans in accordance with the Eugene-Springfield Metropolitan Area General Plan (Metro Plan, Plan) and functional plans that address a single topic such as the Eugene-Springfield Transportation System Plan and the Public Facilities and Services Plan.

The Oregon Statewide Planning Goals Embodied in the Eugene-Springfield Metropolitan Area General Plan

All of the aforementioned metropolitan area plans and studies address the Oregon Statewide Planning Goals that specifically apply to their geographic areas. For instance, Eugene and Springfield do not discuss Goals 16 through 19, which address coastal and estuarine areas. Examples from the Metro Plan that highlight consistency with Smart Growth and with the Statewide Planning Goals are abundant. The remaining paragraphs in this subsection present some of the Plan's policies.

The expected outcome of the Metro Plan is for development in Eugene and Springfield to achieve an overall redevelopment vision. However, the Metro Plan disaggregates this vision into separate topics including, but not limited to, land use and transportation that serve a similar purpose. The Plan encourages compact and efficient residential growth in "appropriate infill locations" to maximize use of existing public facilities and services; to preserve outlying rural, agricultural, and natural resource land; and to protect air and water quality (LCOG, 2004, p. III-A-7). The comprehensive manner in which this Plan is written allows the intent of its policies in one chapter to help achieve goals and comply with policies in its other chapters as prescribed by Metro Plan Policy A.35:

Policy A.35: *Coordinate local residential land use and housing planning with other elements of this plan, including public facilities and services, and other local plans, to ensure consistency among policies.*

Accordingly, some policies are better analyzed in the context of how well they fit with policies in its other chapters. Pages III-A-1 through III-A-13 of the Metro Plan establish the Residential Land Use and Housing Element goals, findings, and policies. Of these policies, eight are relevant to achieving Smart Growth's goal of directing development to existing communities through infill residential development. Of the policies set forth in the Metro Plan's Transportation Element (Pages III-F-1 through III-F-14), one is also relevant to this Smart Growth Principle though they also simultaneously bring each area closer to achieving its housing, urban form and urbanization, transportation, environmental, and economic objectives. Together, these policies state:

Policy A.4: *Use Annexation, provision of adequate public facilities and services, rezoning, redevelopment, and infill to meet the 20-year projected housing demand.*

Policy A.10: *Promote higher residential density inside the UGB that utilizes existing infrastructure, improves the efficiency of public services and facilities, and conserves rural resource lands outside the UGB.*

Policy A.11: *Generally locate higher density residential development near employment or commercial services, in proximity to major transportation systems, or within transportation-efficient nodes.*

Policy A.12: *Coordinate higher density residential development with the provision of adequate infrastructure and services, open space, and other urban amenities.*

Policy A.13: *Increase overall residential density in the metropolitan area by creating more opportunities for effectively designed infill, redevelopment, and mixed use while considering impacts of increased residential density on historic, existing and future neighborhoods.*

Policy A.17: *Provide opportunities for a full range of choice in housing type, density, size, cost, and location.*

Policy A.30: *Balance the need to provide a sufficient amount of land to accommodate affordable housing within the community's goals to maintain a compact urban form.*

> ***Policy A.37:*** *Consider the suggested implementation measures in the Residential Lands and Housing Study and other measures in order to implement the policy directives of the Residential Land Use and Housing Element of the Metro Plan.*
> ***Policy F.3:*** *Provide for transit-supportive land use patterns and development, including higher intensity, transit-oriented development along major transit corridors and near transit stations; medium and high density residential development within ¼ mile of transit stations, major transit corridors, employment centers, and downtown areas; and development and redevelopment in designated areas that are or could be well served by existing or planned transit.*

Each City's resulting land use pattern, consistent with the above-stated policies, should result in a finding that UGBs are an effective tool that works to achieve Oregon's desired development outcomes such that development will not "leapfrog" but instead represent a logical network of urban services. The Metro Plan's following statement and supporting finding are also consistent with this intended outcome:

> *To effectively control the potential for urban sprawl and scattered urbanization, compact growth and the [UGB] are, and will remain, the primary growth management techniques for directing geographic patterns of urbanization in the community. In general, this means the filling in of vacant and underutilized lands, as well as redevelopment inside the UGB.* (LCOG, p. II-C-1)
> ***Finding C.8:*** *In addition to Finding 7 above, evidence that the UGB is an effective growth management tool includes the following: Consistent reduction over time of vacant land within the UGB; Reduction of vacant [residentially] zoned land in Springfield and Eugene; Greater value of vacant land within Springfield and Eugene than similar land outside unincorporated areas but within the UGB…*

These examples represent the Metro Plan's Growth Management Goal. This Goal sets forth the requirement to use urban, urbanizable, and rural land in an efficient manner, where local policies to guide development must "…encourage orderly and efficient conversion of land from rural to urban uses in response to urban needs, taking into account metropolitan and statewide goals" (p. II-C-1).

Pages II-C-1 through II-C-8 of the Metro Plan set out a deliberate section of Growth Management goals, findings, and policies. Of particular interest is Policy C.1 that should achieve the corresponding "beneficial results of compact urban growth" (p. II-C-1):

Policy C.1: *The UGB and sequential development shall continue to be implemented as an essential means to achieve compact urban growth. The provision of all urban services shall be concentrated inside the UGB.*

Such that:

- *Use of most vacant leftover parcels where utilities assessed to abutting property owners are already in place;*
- *Protection of productive forest lands, agricultural lands, and open space from premature urban development; and*
- *Decreased acreage of leapfrogged vacant land, thus resulting in more efficient and less costly provision and use of utilities, roads, and public services such as fire protection.*

The last sentence of Policy C.1 provides reason for the Metro Plan's Public Facilities and Services Element to be an extension of Statewide Planning Goal 14. Of the policies set forth in the Public Facilities and Services Element, two serve similar purposes and address the holistic intent of the Metro Plan:

Policy G.1: *Extend the minimum level and full range of key urban facilities and services in an orderly and efficient manner consistent with the growth management policies in Chapter II-C, relevant policies in this chapter, and other Metro Plan policies.*
Policy G.2: *Use the planned facilities maps of the Public Facilities and Services Plan to guide the general location of water, wastewater, stormwater, and electrical projects in the metropolitan area. Use local facility master plans, refinement plans, and ordinances as the guide for detailed planning and project implementation.*

This Public Facilities and Services Element, the Metro Plan's chapter recognizing Statewide Planning Goal 14, also specifies Plan Factors (pp. II-G-12 - II-G-14). The Plan Factors and corresponding "results," as stated on Page II-G-12, explain the intent of the UGB and the effects of this intent:

Factor G.1: *"Demonstrated need to accommodate long-range urban population growth requirements consistent with LCDC goals;"*
Factor G.2: *"Need for housing, employment opportunities, and livability;"*
Factor G.3: *"Orderly and economic provision for public facilities and services;"*

Factor G.5: *"Environmental, energy, economic, and social consequences;" and*
Factor G.6: *"Retention of agricultural land…"*

These Policies allow Finding 1 (p. 11-G-3) to provide examples of how this element of the Metro Plan informs development approaches:

Urban expansion within the urban growth boundary is accomplished through infill, redevelopment, and annexation of territory that can be served with a minimum level of key urban services. This permits new development to use existing facilities and services, or those which can be easily extended, minimizing the public cost of extending urban facilities.

Page V-3 of the Metro Plan defines the minimum level of key urban facilities and services on as:

Wastewater service, stormwater service, transportation, solid waste management, water service, fire and emergency medical services, police protection, citywide parks and recreation programs, electric service, land use controls, communication facilities, and public schools on a district-wide basis.

It is evident that the UGB defines the extent of urban infrastructure and service expansion during the local jurisdiction's 20-year planning period. Page 8 of the *Eugene-Springfield Metropolitan Area Public Facilities Services Plan* (PSFP), a specific functional plan that supports and is internally consistent with the Metro Plan states this requirement more clearly: "[c]onsistent with the principle of compact urban growth prescribed in Chapter II, the policies in this element call for future urban water and wastewater services to be provided exclusively within the urban growth boundary. This policy direction is consistent with Statewide Planning Goal 11."

Regulating new development on urban lands, the PSFP stipulates that development requiring annexation must be served by the minimum level of key urban services at the time development is complete. This requirement is thus consistent with Metro Plan Chapter II-B Growth Management, its Finding 5, and Policy C. 8 of its Growth Management Chapter:

Finding 5: *All urbanizable areas within the Eugene-Springfield urban growth boundary can be served with water, wastewater, stormwater, and electric service at the time those areas are developed.*

Policy C.8: *Land within the UGB may be converted from urbanizable to urban only through annexation to a city when it is found that: (a) a minimum level of key urban facilities and services can be provided to the area in an orderly and efficient manner; and (b) there will be a logical area and time within which to deliver urban services and facilities. Conversion of urbanizable land to urban shall also be consistent with the Metro Plan.*

When requests to become incorporated into city limits are formally submitted as land use applications to the City agency that has land use jurisdiction in Eugene and Springfield, they are held against the Metro Plan's set of policies by way of the applicant's responsibility to demonstrate consistency with the City agency's approval criteria. The requirement to meet such criteria exists in many of Oregon's local approval processes when an applicant submits a request for a Zone Change or Annexation. As an example, the Metro Plan policies require properties to annex to either the City of Eugene or Springfield before the City approves new development that the City deems ready for construction or before land becomes subdivided.

The City of Eugene's approval criteria for Annexation at Eugene Code (EC) Section 9.7825 and the City of Springfield's approval criteria at Springfield Development Code (SDC) Section 5.7-140 emphasize that the applicant address timing, appropriateness, and availability of services in their development request. Annexation applications not only require demonstration of contiguity to city limits (ORS 222.111) to provide a logical extension of urban services but also must demonstrate that "the proposed annexation will result in a boundary in which the minimum level of key urban facilities and services, as defined by the Metro Plan, can be provided in an orderly, efficient, and timely manner" (EC 9.7825(3), SDC 5.7-140(C)).

LOCAL CONSISTENCY WITH STATEWIDE AND REGIONAL POLICIES

A local area's initiative to encourage development that more expressly supports the purpose of and need for infill development and its expected outcomes must recognize the provisions and land use diagram of its guiding regional plan, which embody the Statewide Planning Goals. Local area plans must also satisfy the unique needs and preferences of its constituents (OAR 660-015-0000(2)).

As previously noted, Oregon policy dictates that all local plans to manage growth and development must be consistent with the State's Administrative Rules and Oregon Revised Statues as reflected in its Statewide Planning Goals. The local municipality (or metro area) has several options to manage growth if it identifies a deficiency of residential land during its population projection and buildable land inventory process. It may either: (1) expand its UGB proportionate to its expected 20-year population increase; (2) amend and/or implement measures to increase residential densities within its existing UGB; or (3) proceed to conduct an adoption process that combines the two approaches (ORS 197.296(7)). The State does not require that local areas adopt particular measures nor does it require that a precise number of measures to be adopted. The only requirement is that the municipality meets its required housing mix and density mix, provided by its Safe Harbor forecast (ORS 195.034 Alternate Population Forecast).

Through use of conjoint and cooperative state/regional/local planning frameworks and the incorporation of growth-accommodating economic policies (e.g., the provision of affordable housing), local governments may begin to discuss specific implementation strategies. Tools such as tax exemptions, Community Development Block Grant funds, and Urban Renewal Districts to redirect investment toward areas in need of catalytic improvements are likely to be part of this discussion. Local governments may instead choose less market-driven approaches to redevelopment and instead require each private development to meet standards specified in the municipality's development code with no economic incentive. There are, of course, many other mechanisms to influence development outcomes within a city that are consistent with Oregon policy. Most often, a city will choose to implement an array of tools to demonstrate ongoing commitment to increasing housing choice and residential densities within its UGB.

In an effort to comply with Oregon's land use planning program, the Cities of Eugene, Keizer, Salem, and Springfield identified administrative actions to effectively manage and control the outward expansion of single family housing into rural areas. The State determined that these actions meet the intent of the Statewide Planning Goals (i.e., vertical consistency) by acknowledging these cities' proposed plans and corresponding policies though they differ substantially amongst one another. These horizontal inconsistencies are thought to better reflect the characteristics of each community and their unique needs.

The policies chosen by each city are used as the evaluative framework for this research; they are presented and summarized below. Chapter IV, Methodology, discusses these policies further, specifically relating to how their classification informs this study's method of quantitative analysis.

Managing Outward Growth: Where Are They Now?

Eugene and Springfield

Under Oregon House Bill (HB) 3337 (passed in 2007), the State of Oregon required Eugene and Springfield to complete separate residential land inventories for separate UGBs at the request of the City of Springfield. Comprising a metropolitan region, the two cities once shared a UGB beginning in 1982 when the Metro Plan was adopted and acknowledged by the DLCD. Since then, no comprehensive update to the UGB has occurred with only one minor adjustment for two industrial parcels in West Eugene.

Both cities are currently in the process of adopting their buildable land inventories, expansion proposals, and comprehensive plans—Eugene by way of the Envision Eugene process and Springfield through the Springfield 2030 Refinement Plan. Ironically, though Springfield lobbied for HB 3337 because it wanted to add residential land by way of expanding its UGB and Eugene did not, Springfield found no need to expand its UGB for residential land after completing its land inventory. Eugene did find a need to expand its UGB for residential land, but the proposed expansion is only to provide land for single family homes.

Springfield will need 5,920 new dwelling units to accommodate its anticipated population growth between 2010 and 2030. As noted, the Springfield UGB has enough land to accommodate land demand without expanding its UGB for residential land. Of these 5,920 dwelling units, Springfield will need to plan for how to accommodate 3,552 single family homes within its existing UGB (ECONorthwest, 2009a).

Eugene's population is expected to increase by approximately 34,000 residents over the next 20 years. It is estimated that Eugene will require development of 15,000 new homes based on this projected population growth. Analysis by staff, committee members, and ECO determined that, while a large portion of Eugene's future single family housing demand can be accommodated inside the existing UGB, Eugene will be unable to accommodate 10 percent of its future residents if it does not expand its UGB to provide land for their homes (ECONorthwest, 2009b).

Salem and Keizer

ECO's 20-year population forecast for the Salem-Keizer UGB throughout the 2012 to 2032 planning period is informed by the 2009 Marion County coordinated population forecast for 2010 to 2030. Unlike the County's population forecast, the economic and planning consultants' analysis addresses the separate needs of Salem and Keizer. ECO explains that the County's "…forecast includes an adopted projection of population growth in the Salem-Keizer UGB for 2010 to 2030, but does not allocate population within the UGB to the cities of Salem and Keizer" (ECONorthwest, 2011, p. i).

The results of ECO's housing needs analysis for Salem and Keizer project an increase of 67,783 people by 2032 within the Salem-Keizer UGB. Salem and its portion of the UGB is expected to grow by 54,824 people, while Keizer and the remaining UGB land will likely grow by 12,969 people (ECONorthwest, 2001, p. ii).

The numbers on Pages iv and v of ECO's (2011) Salem-Keizer Housing Needs Analysis show that to accommodate growth between 2012 and 2032, Salem will:

- Need to provide about 22,141 new dwelling units—13,393 dwelling units of which are assumed to be for attached and detached single family housing units;
- See a deficit of land allocated toward multifamily residential land; and will
- Have the capacity to accommodate all of its expected single family housing within its existing UGB, as there is a surplus capacity of 10,600 single family dwelling units when comparing its supply to its projected demand.

These same pages show that Keizer, however, has a deficit of all types of residential land. Keizer must provide approximately 4,994 new dwelling units to accommodate growth between 2012 and 2032. About 3,397 dwelling units are allocated for accommodating all types of single family housing (i.e., attached and detached) (ECONorthwest, 2011).

The Salem-Keizer UGB was established in 1979. A challenge to Salem's 1982 UGB resulted in a 1986 amendment to Salem's 1982 Comprehensive Plan and UGB (City of Salem, 1985). This amendment retracted Salem's 1982 UGB through reducing its designated urbanizable area by 2,400 acres. The incorporation of Keizer as a city in 1982 triggered a separate comprehensive plan for Keizer. The UGB has never expanded.

The City of Keizer is discussing the possibility of expanding its own UGB, but recent studies show that there is plenty of room for residential and employment growth within Salem's portion of these cities' joint UGB for the next 20 years. Like Springfield, Keizer might ultimately propose a UGB specifically drawn around its city (i.e., UGB "divorce") so that it may expand its UGB. This proposal remains to be seen.

One Explanation to Answer: How Did They Get There?

The previous chapter presented literature explaining that supply side factors and demand side factors influence a housing market and the overall, tangible development outcomes across a city and region. This section provides a supply side perspective. Each city's effort to manage its urban form when it is faced with outwardly expanding single family homes is explained by their policy frameworks.

Eugene's Growth Management Policies

Eugene's Growth Management Study, "Shaping Eugene's Future," resulted in the City's Growth Management Policies. Eugene City staff formulated and vetted these policies through an extensive public involvement process (e.g., open houses, surveys, and community workshops) and through public debate by the Eugene City Council (Kidd, 1997). The focus of these policies ranges from architectural design to urban form and from economic development to environmental protection— much like Oregon's Statewide Planning Goals (City of Eugene, 2014). Adopted by Resolution Number 4554 in 1998, the 19 policies listed below remain fundamental to Eugene's decision-making processes regarding how to direct and manage growth:

> ***Policy 1****: Support the existing Eugene Urban Growth Boundary by taking actions to increase density, and use existing vacant land and under-used land within the boundary more efficiently.*
>
> ***Policy 2****: Encourage infill, mixed use, redevelopment, and higher density development.*
>
> ***Policy 3****: Encourage a mix of businesses and residential uses downtown using incentives and zoning.*
>
> ***Policy 4****: Improve the appearance of buildings and landscapes.*
>
> ***Policy 5****: Work cooperatively with Metro Area partners (Springfield and Lane County) and other nearby cities to avoid urban sprawl and preserve the rural character in areas outside the urban growth boundaries.*
>
> ***Policy 6****: Increase density of new housing development while maintaining the character and livability of individual neighborhoods.*
>
> ***Policy 7****: Provide for a greater variety of housing types.*
>
> ***Policy 8****: Promote construction of affordable housing.*
>
> ***Policy 9:*** *Mitigate the impacts of new and/or higher density housing, infill, and redevelopment on neighborhoods through design standards, open space and housing*

maintenance programs, and continuing historic preservation and neighborhood planning programs.

Policy 10*: Encourage the creation of transportation-efficient land use patterns and implementation of nodal development concepts.*

Policy 11*: Increase the use of alternative modes of transportation by improving the capacity, design, safety, and convenience of the transit, bicycle, and pedestrian transportation systems.*

Policy 12*: Encourage alternatives to the use of single-occupant vehicles through demand management techniques.*

Policy 13*: Focus future street improvements on relieving pressure on the City's most congested roadways and intersections to maintain an acceptable level of mobility for all modes of transportation.*

Policy 14*: Development shall be required to pay the full cost of extending infrastructure and services, except that the City will examine ways to subsidize the costs of providing infrastructure or offer other incentives that support higher density, infill, mixed use, and redevelopment.*

Policy 15*: Target publicly-financed infrastructure extensions to support development for higher densities, infill, mixed uses, and nodal development.*

Policy 16*: Focus efforts to diversify the local economy and provide family-wage jobs principally by supporting local, and environmentally-sensitive businesses. Direct available financial and regulatory incentives to support these efforts.*

Policy 17*: Protect and improve air and water quality and protect natural areas of good habitat value through a variety of means such as better enforcement of existing regulations, new or revised regulations, or other practices.*

Policy 18*: Increase the amount and variety of parks and open spaces.*

Policy 19*: Expand City efforts to achieve community-based policing.*

Though general, they continue to inform—as means to provide a consistent course of action—more specific efforts to administer and shape future development. On an internal scale, these policies guide the City of Eugene's staffs' work assignments (including the City Manager's) and inform the City's capital budget. More visible throughout the community, Eugene has many Specific Area, Special Area, and neighborhood plans consistent with these policies. Further, any revisions to the City's regulating development code must reflect the intent of these policies. Because the City's Development Code (Code) is the implementing tool of general plans and policies, and because built projects must comply with the Development Code, development must recognize these overarching principles in theory and by default.

As with all four of the jurisdictions included in this study, Eugene's Code stipulates land use regulations and specific development standards. Generally, land use regulations specify requirements for height, bulk, size, and intensity of a property's allowed use within its encompassing zoning district to encourage (or discourage) certain types of development in specific areas. Specific development standards cover site design (e.g., parking, landscaping, etc.). Eugene's Development Code is unique in its approach to manage growth because the Code clearly states these 19 policies at the beginning to provide context about what its chapters include.

Inclusion of these policies in the Code reflects a comprehensive update to the 1971 Eugene's Land Use Code, the majority of which occurred from 2001 through 2002 (e.g., Eugene Code Section 9.1045). To implement Eugene's 19 Growth Management Policies, the Code rewrite included smaller allowable lot sizes (e.g., Eugene Code Section 9.2770) and increased density allowances across all residential zones. These amendments attempted to provide a range of housing options to meet the needs and capabilities of Eugene's residents but in doing so, to also stimulate the creation of well-designed neighborhoods and structures that reduce commonly perceived negative impacts associated with infill development.

Once implemented, the Eugene City Council directed the Planning Division to include as a high priority work item: "address [these] infill standards" (Infill Compatibility Standards [ICS] Task Team, 2008). As a result, the ICS Task Team (Team) formed in 2007 and met monthly for two years. The Team included: 14 neighborhood association representatives; a Housing Policy Board representative; and five additional members with the perspectives of builders, developers, and designers of market-rate and affordable infill housing.

This Team acknowledged that infill in most neighborhoods may not fully respect existing neighborhoods' defining characteristics. Accordingly, they described, categorized, and addressed impacts of infill development by addressing solutions to revise building height, density, and automobile parking requirements (City of Eugene, n.d.).

Currently, the City is undergoing changes to its Comprehensive Plan, otherwise known as "Envision Eugene," which will again provide an opportunity to significantly update its Code and to focus on development priorities expressed by Eugene's residents. One such significant priority is to amend the code section regulating single family housing (City of Eugene, n.d.).

Keizer's Infill and Redevelopment Master Plan and Corresponding Development Standards

Like Eugene, Keizer's efforts to implement Smart Growth by providing opportunities for infill development are visible throughout many of its plans. These plans range from high-level visions to implementing ordinances that, together with a team of consultants and its Citizen Advisory Committee, resulted in the adoption of its Infill and Redevelopment Master Plan (Plan) and amendments to the Keizer Development Code (City of Keizer, 2001).

The adoption process required the City to demonstrate, through findings of fact, that the Plan satisfied the requirements of Oregon's Statewide Planning Goals, Oregon's Administrative Rules, and the City's approval criteria for legislative amendments to a comprehensive plan. Once the City addressed each Statewide Planning Goal, it concluded with the overall finding that:

> The Infill and Redevelopment Master Plan is a logical implementation of the Keizer Comprehensive Plan (KCP)… the [KCP's] policy encouraging infill development and maintaining compact urban form are enhanced by the adoption of this Plan… [and will] provide the city with a regulatory framework to encourage efficient development patterns while maintaining neighborhood compatibility. (City of Keizer, 2001, Exhibit A, pp. 4-5)

The Plan continues to state its four goals as: (1) encourage development of resource-efficient development patterns; (2) maintain neighborhood compatibility; (3) minimize regulatory barriers to infill projects; and (4) improve administrative processes. These goals identify benefits of and constraints to providing infill development, but the City recognizes that these vaguely worded goals may only come to fruition if the Keizer Development Code (KDC) prescribes methods by which proposed development projects would satisfy design standards and meet approval criteria.

The Plan accordingly includes a chapter entitled "Code Audit," which explains that prior to the adoption of Keizer's amendments to its Development Code in 2002, the development standards at the time did not encourage pedestrian or vehicular connections that fostered an efficient transportation system or neighborhood design. Thus, the KDC lacked the ability to implement successful infill development projects whilst also leaving much room for improvement to the infill standards it had. The Plan explains that the code "did not adequately protect neighborhood quality from the impact of infill and redevelopment projects" (City of Keizer, 2001, p.7).

KDC Section 2.316 Infill Development Standards works to address these deficiencies. Adopted by Ordinance in 2002, the purpose of this section is to:

- Enable residential infill development to achieve the planned densities specified in the Comprehensive Plan;
- Encourage a more efficient use of developable land;
- Reduce traffic flow and congestion by creating a more compact form of development; and
- Promote livability and neighborhood quality.

With these objectives presented at the beginning of this section of the KDC, they inform its remaining sections. The revised sections of the 2002 KDC eliminate "unnecessary burden for infill and redevelopment [that was] often difficult to administer" (City of Keizer, 2001, Exhibit B, p. 7). These sections recognize that minimum lot size requirements, limited emergency vehicle and pedestrian access to infill parcels due to transportation networks that favored large lots and large setbacks, and the shape of older lots reduce the appeal to embark upon an infill project in Keizer.

Also like Eugene, the City of Keizer receives ongoing input from its residents who voice concerns about the visible effects of infill development, despite the amendments to the KDC. Documentation and conversations with Keizer City staff in October and November of 2013 show that the City is working to improve these standards through design requirements. Such requirements include KDC Section 2.316.13, which requires infill projects to provide landscaping, including tree planting, along the street and public right-of-way. Additionally, KDC Section 2.316.14 prescribes human-scale building form and mass by including provisions for building articulation (e.g., building offsets, pillars or posts, and bay windows).

The City's decision regarding an application for a Partition on an infill parcel became final on September 4, 2013. The application's subject parcel, which was just over one-half an acre, proposed to create two additional lots. Neighbors filed an appeal who lived adjacent to the parcel and within the area in close proximity to the parcel (though not abutting). However, these residents withdrew their appeal after discussion with Keizer planning staff and an explanation about the binding nature of the partition's objective approval criteria (City of Keizer, 2013).

Residents expressed their primary concern as the feeling that this new, small lot development—although only two lots—would "[disrupt] the established character of the neighborhood" and that, "There are [in]adequate requirements in the KDC for these kinds of infill developments to be aesthetically compatible, and [there are] no specific requirements for building materials, design features, or landscaping," though these are clearly stated in the above-referenced sections of the KDC (City of Keizer, 2013). Staff explained that what applies to new construction would also apply to existing homes that would remodel or expand, as there are several different architectural styles and building types immediately adjacent to these residents' homes. Further, they expressed that a balance is necessary to maintain individual property rights and the regulatory development process (City of Keizer, 2013).

Salem's Compact Development Overlay Zone

The policy that best reflects Salem's effort and ability to increase the densities of single family residential development through infill housing is its Compact Development Overlay Zone of its Salem Revised Code (SRC). This Zone's specific purpose is to increase single family residential development on Salem's vacant and underutilized properties within its UGB whilst encouraging a cost-effective approach to providing public facilities. This Overlay Zone allows the development of a duplex or a triplex on parcels that previously only allowed one single family, detached dwelling. Housing types subject to this SRC chapter are now limited to single family dwellings, duplexes, triplexes, townhouses, and accessory dwelling units (SRC 139.090, Ord. No. 93-98).

Salem has applied the Zone to a few areas within its city limits. Totaling 1.26 acres, one area with this Overlay Zone runs along properties abutting Market Street NE between Evergreen Avenue NE and Baker Street NE, and the second exists in a small area near the intersection of Wallace Road NW and 1st Street NW. Their current locations are consistent with the locations specified in the code, as it: may apply along arterial and collector streets and along local streets identified in special district and urban renewal plans, residential infill studies, and neighborhood plans (SRC 139.030).

This Overlay Zone specifically regulates density and lot size, amongst other development standards. There is no minimum density in the Compact Development Overlay zone, but there is a maximum set at 14 dwelling units per gross acre. This maximum density is a "non-variable" standard, which means the developer may not seek an exception to provide units at greater densities (SRC 139.060). Unlike a maximum, which is established for density, there is no maximum for lot size within these districts. There is a minimum, however, which is established at 1,500 square feet for attached units (e.g., townhomes) and 3,000 feet for detached homes (SRC

139.070). Thus, there is nothing preventing development with small lot sizes, but nothing requires such development to occur.

Though this Overlay Zone has been in place for about 15 years, the parcels within its zoning districts have seen very little development according to Salem City staff. The difficulty of developing these parcels becomes apparent when noting that the developer must comply with its parking requirements and setbacks. This Overlay Zone does not provide different setback and parking requirements than what the base (i.e., underlying) zone allows. If it is a small lot that must meet disproportionate setback requirements then the feasibility of development that meets market demand diminishes without the SRC also adjusting its standards for site design and parking.

As of 2014, Salem is undergoing changes to its Development Code. Once adopted, its Unified Development Code process will change the content of the Compact Development Overlay Zone's corresponding section in the SRC. This Section will further promote the efficient use of its land for single family housing. A draft of the revised section states: "The Compact Development Overlay Zone establishes requirements applicable to the use and development of land… to promote increased density [and] infill residential development on vacant and underutilized land within the Single Family Residential Zone" (proposed SRC Section 631).

Springfield's Land Use Efficiency Measures

During the process of analyzing whether Springfield had a 20-year supply of sufficient buildable land to meet its projected residential needs, the City of Springfield considered methods to allow Springfield to increase residential density within the city's existing UGB rather than assume it must expand its boundary proportionate to the projected increase in population. With ECO as their consultants, the City worked closely with a Housing Stakeholder Committee (Committee) and sought input from Springfield's residents regarding politically and economically viable options to increase Springfield's residential densities (City of Springfield, 2008). These options are formally known as Springfield's Land Use Efficiency Measures.

A list of measures already implemented in Springfield at the time this Committee met ranges from "partially" to "fully" implemented. These measures are:

- Reduce street width standards;
- Mandate minimum residential density in low density residential zones;
- Allow small residential lots;

- Encourage infill and redevelopment;
- Nodal Development;
- Allow mixed use development;
- Encourage transit-oriented design [development] (TOD);
- Downtown revitalization;
- Accessory dwelling units (ADUs);
- Multifamily housing tax credits;
- Allow clustered residential development;
- Allow co-housing;
- Increase allowable residential densities; and
- Allow duplexes, townhomes, and condominiums in single family zones

The City, ECO, and the Committee identified the following additional measures not yet implemented in Springfield despite the long list of measures presented above:

- Provide density bonuses for developers as an incentive to achieve certain community planning goals;
- Establish a mechanism for the transfer/purchase of development rights (TDR) in exchange for the protection of farm and forest land;
- Mandate maximum lot sizes; and
- Implement a process to expedite plan and permit approval for projects that achieve certain community planning goals

Taken together, and integrating survey input from Springfield's residents, the Committee ranked the policies that fit in both categories into "low priority," "medium priority," and "high priority" implementation actions for the City of Springfield's Planning Commission to consider. The measures the Committee identified as "low priority" were classified as such somewhat because the City already implemented these measures to a degree that they were being fully practiced within Springfield. Some existing measures required revision while the Committee considered others that the City should adopt. The "medium priority" and "high priority" categories included previously implemented measures that the Committee wanted to see greater use of. The Committee also included the measures not yet implemented into these two categories.

The result of the Committee's work included the following high priority measures: mandate maximum lot sizes; increase allowable and required densities in the Low Density Residential

(LDR) zones; reduce street width standards; allow (though not require) small lots; improve the provisions for cluster development; increase allowable densities and/or eliminate density maximums in high density zones; and allow duplexes and other types of housing in LDR zones. The Committee identified three medium priority measures: consider additional areas that will allow mixed use and nodal development; increase densities along transit corridors to encourage TOD; and modify design standards for co-housing. Lastly, the low priority measures were identified and are summarized as such: provide density bonuses; expedite project review; establish a TDR mechanism; provide a tax credit for multifamily housing; and lower the restrictions on the City's ADU ordinance.

Input from Springfield City staff in October 2013 revealed the City's progress on putting these measures into practice. The most pertinent measures of interest to this research were adopted by Ordinance (opposed to Resolution) and relate directly to increasing the densities of housing in single family residential zones. Note that three out of four ordinances only recently became adopted, the effects of which have yet to be seen and evaluated as of early 2014:

- **Mandate Minimum Residential Density in the LDR Zone (SDC 3.2-205(A))**. This minimum density standard establishes minimum densities at 6 dwelling units per net acre (Ord. 6286 March 4, 2013; new regulation for the purpose of this analysis).
- **Allow Small Residential Lots (SDC 3.2-205(B))**. This section of the Springfield Development Code (SDC) establishes Springfield's Small Lot Residential District, which prescribes a minimum lot size of 3,000 square feet (Ord. 6286 March 4, 2013; new regulation for the purpose of this analysis).
- **Permit ADUs in Single Family Zones (SDC 5.5-100)**, where the Code specifies provisions for development and design standards for ADUs (Ord. 6018 June 1, 2002; remains the current regulation).
- **Allow Duplexes, Townhomes, and Condominiums in Single Family Zones (SDC 3.2-205(B))**, which is also part of the newly adopted Small Lot Residential District but is the portion of this SDC Section that outright allows these attached single family dwelling units in single family zones that are traditionally low density (Ord. 6286 March 4, 2013; new regulation for the purpose of this analysis).

What Does All of This Policy Context Mean for Research?

As described in this chapter, policies that encourage infill development in Oregon become more detailed as they become successively more local and specific in their geographies even with the Oregon Statewide Planning Goals at the top of the hierarchy of Oregon's land use policy framework. Each policy at the local government level should not only be vertically consistent with regional and statewide policies according to this framework, but Eugene, Keizer, Salem, and Springfield should theoretically achieve the same outcomes if they all comply with the same Statewide Planning Goals and if their policies are incorporated into the development code by ordinance. Chapter IV questions whether such outcomes are actually the case, remembering that the State allows each local government to address each of the Statewide Planning Goals in ways that their cities deem respond best to the unique circumstances of their communities.

CHAPTER IV

METHODOLOGY

To empirically examine the extent to which local municipalities in Oregon are achieving the desired results of Smart Growth policies, consistent with the Oregon Statewide Planning Goals, this research uses qualitative and quantitative methods to evaluate spatial development outcomes of single family homes in the cities of Eugene, Keizer, Salem, and Springfield. These selected cities lend themselves to determining if there are significant relationships between their City governments' respective policy choices to implement these Planning Goals and development outcomes as mandated by the State's DLCD. The Salem-Keizer area (Marion and Polk Counties) and the Eugene-Springfield area (Lane County) comprise two distinct metropolitan regions whose geographic locations, systems of governance, economies, and demographics are nearly directly comparable though this comparability reduces somewhat when comparing results between each city. Table 1 below presents some of these characteristics, which may also influence development.

Table 1. Comparison of Citywide Population and Land Characteristics

	Eugene	Springfield	Salem	Keizer
Population Count	156,185	59,403	154,637	36,478
Rate of Population Increase (2000-2010)	13.2	12.4	12.9	13.3
Population Density (Persons per Square Mile)	3,550	3,713	3,156	5,211
Percent of Population with a Bachelor's Degree or Higher	39.8	14.8	26	23.9
Land Area (Square Miles)	44	16	49	7
Percent Development Constrained Area (Water and Slopes over 25%)	15	8	2	2
Share of Employment Zoning to All Land (expressed as %)	24	39	31	14
Share of Multifamily-Zoned Land to Residentially-Zoned Land (expressed as %)	9	11	19	22

Sources: U.S. Census Bureau, 2000 and 2010 Census data; local GIS data for land analysis

RESEARCH QUESTION

The Principles of Smart Growth and Oregon's Statewide Planning Goals are comprehensive in their approach to address issues that threaten current livability and in their approach to sustain quality of life for future generations. They are also distinctly broad enough that it will take many studies to sufficiently address all of their Principles and Goals. This research focuses on the seventh Principle of Smart Growth (Strengthen and Direct Development toward Existing Communities), linking most directly to Oregon's Statewide Planning Goal 14 (Urbanization) and asks:

> To what extent have selected cities in Oregon: Eugene, Keizer, Salem, and Springfield—effectively managed the development pattern of their single family homes in a manner consistent with Smart Growth Principle 7 and Oregon Statewide Planning Goal 14? More specifically, which policies are more likely to better fulfill the intended outcomes of this Principle and Goal, thereby directing development toward existing communities in an efficient manner?

This study's reasoning for examining outcomes of single family homes is two-fold: (1) the market for single family homes is high and will continue to exist, which means municipalities must continue to pay attention to development that occurs under their regulatory influences with special attention to the development patterns of single family residential development; and (2) studies that analyze the outcomes of multifamily development are likely to consider densities. The most appropriate measure of density for these housing units is net density, which is more difficult to determine than it is for single family housing units. The observed outcomes come from use of Stata Statistical Software to run a logistic regression as the primary method of inquiry. The section explaining quantitative methods (p. 57) expands upon this approach.

QUALITATIVE APPROACH TO INFORM QUANTITATIVE METHODS

This research assesses one aspect of Smart Growth—the urban form of the built environment—which is thought to provide a foundation for many of its associated goals so they may also come to fruition. Infill development is one tool to implement a compact built form that is consistent with Smart Growth. As noted in Chapter III, Policy Context, the amount of infill development realized in each city is one indicator to measure the effective management of each of their UGBs. Cities can use vacant lands and policies to encourage increased densities without having to expand this boundary to accommodate a population that is projected to increase.

This empirical study evaluates outcomes and the performance of specific policies, but to provide a basis for conducting a sound analysis it is important to understand how the selected cities came to implement their policies, which reflects their goals. Input from City staff, along with a review of documents made available on the Cities' public documents archive, inform which policy initiatives best reflect each city's effort to promote infill development of single family housing inside their UGBs and how they differ in approach. These policies are, as described in Chapter III Policy Context:

- **Eugene's Growth Management Policies** implemented in 1998, which are still in place with revised development codes that are continuously consistent with these policies (Note: the development code was not updated to reflect these policies until 2002.);
- **Keizer's Infill Development Standards**, the framework for which the Keizer City Council adopted by ordinance in 1998. The City added its Infill Development Standards to the Development Code Amendments in 2002, which remain;
- **Salem's Compact Development Overlay Zone**, which the Salem City Council adopted by Ordinance in 1998 and remains the current regulation; and
- **Permit Accessory Dwelling Units in Single Family Zones**, which the Springfield City Council adopted by Ordinance in 2002 and remains the current regulation.

A spectrum of policy approaches that commonly range from regulatory, to market-friendly, to incentive-based, partially categorize each city's Smart Growth policy. Using a framework provided by Talen and Knaap (2003), these policies have an additional classification of spatially-oriented, site-specific, or process-oriented. Table 2 shows that Salem and Keizer both attempt to promote infill through regulation but differ in the extent to which this regulation affects the geographic extent of development. Keizer's regulation appears to affect all development across the city, regardless of location, whereas Salem only applies this regulation to one area of its city.

Table 2. Typology of Smart Growth Policies that Address Single Family Development by City

	Scope/Extent			
Administrative Approach	**Site-Specific**	**Spatial**	**Process-Oriented**	**Hybrid**
Incentive-Based				
Market-Friendly	Springfield			
Regulatory	Keizer	Salem		
Hybrid				Eugene

QUANTITATIVE APPROACH

Logistic regression is a common technique researchers use to model the probability of development. This type of regression, like its variants (e.g., a least squares regression or probit regression), seeks to identify the complex interactions amongst variables that influence development outcomes to support decision-making efforts of planners and policymakers at all levels of government. Wu, Huang, Fung (2009) and Zhou and Kockelman (2008) identify variables that integrate preferences and land development constraints, which fall into site-specific characteristics such as a sloping topography or parcel size, neighborhood-level categories (Zhou and Kockelman used Census tracts), proximity measures to amenities and services, amongst others into their logistic regressions. These studies model land use change with little to no emphasis on policy aspects; they do not attempt to measure how a particular area's policies might also influence development outcomes due to the difficulty of isolating the effect of a particular policy variable and attributing development outcomes to that one policy.

Using highly similar variables such as sloping topography, major roads and highways, and other infrastructure such as water and sewer lines, Campbell, Allen, & Lou (2008) and Carrión-Flores & Irwin (2004) model GIS-based and microeconomic theories to predict the future effects of particular growth management policies holding the predicted values against baseline data and their study areas' growth management objectives. Carrión-Flores's & Irwin's (2004) study is of particular interest because it addresses the conversion of lands to residential use at the rural-urban fringe, which they claim "have outpaced urban and suburban areas in population growth for the last several decades" in their review of the academic literature (p. 84). Both studies emphasize parcel-level data as an essential form of spatially disaggregated data to capture discrete relationships between variables within each study area. Parcel-level data are ideal in Carrión-Flores's & Irwin's (2004) study; they not only see widespread effects of land use change but also disaggregate individual land use decisions. Both studies have a policy emphasis yet focus more on modeling and simulation (although Campbell, Allen, & Lou put a logistic regression into their simulation), techniques of which Carrión-Flores & Irwin (2004) warn may not capture endogenous relationships, which could bias results through overestimation.

Studies that emphasize a policy approach do not integrate logistic regression as a fundamental tool of analysis. Those that use logistic regression do little to acknowledge the importance of policies though they state that the results of their studies could better inform policymakers' decisions. Hanlon's, Howland's, & McGuire's (2010) research show an exception to these generalizations. Measuring market pressures for growth in the outer suburbs of

Washington, D.C., Hanlon, Howland, & McGuire study the performance of Maryland's Priority Funding Area (PFA) Program on influencing the development outcomes that the Program prescribed for the year 2000 through 2004. The authors confirm the accuracy of their model with data from the years 2004 through 2008. In terms of logistic regression, they estimate the likelihood that a parcel in agricultural areas will convert to urban use while also accounting for the likelihood that Maryland's PFA Program effectiveness in deflecting development away from land with valuable natural resources.

The following equations conceptually show how a logistic regression works:

$$\text{Prob(infill)} = 1/(1 + e^{-z})$$

Where:

$$Z = a + b_1x_1 + b_2x_{2} + \ldots b_nx_n$$

The dependent variable in this research is the likelihood that the infill parcel was developed as a direct result of each government's respective policy tool to achieve said infill, exclusive of any other influences. This probability is expected to follow a logistic regression model, as represented by the first equation. The second equation represents "Z," an index, in the first equation and captures all possible influences (i.e., "n" independent variables) of the outcome that the model specifies while controlling for the variable of interest. The constant is represented by "a," and the variables and their observed values are shown by the remaining components. Once this portion of the model is determined, the logit function is then used to determine probabilities with a natural log (e). A logistic regression, similar to a probit regression[6], is preferred to a least squares regression in this analysis because of the dichotomous nature of the dependent variable (Berman, 2007; O'Halloran, n.d.). The dependent variable specifies the parcel as an "infill parcel" (or not); the observation can only fall into two categories ("0" or "1"). This assumption violates the assumption of linearity in a least squares regression because the values "0" or "1" do not fit the straight regression line that captures continuous dependent variables.

Assumptions and Limitations

A logistic model makes additional assumptions, some of which include the absence of multicollinearity, that there are no outliers in the sample, and that there is sufficient data for each

[6] The key difference is the assumption of the observations' distribution, where the "tails" in a logistic regression are slightly thinner (i.e., steeper) at the bottom of the bell curve. The theoretical approach and categorization of the dependent variable remain the same (O'Halloran, n.d.).

observation in the sample, as a model will not fit the data if there are too many cells with no observations.

This study uses a cross-sectional logistic regression. Though longitudinal studies are often preferred for quasi-experimental inquiries, a cross-sectional comparison of each city at the end of the study period provides meaningful results due to the nature of the variables and the specific topic in question. While it initially seemed appropriate to use panel data, a control group for these four cities through implicit understanding or even propensity matching is practically impossible at this unit of analysis. There is no comparable city in Oregon that has not implemented a policy consistent with Smart Growth that also has similar geographic, economic, and demographic characteristics; and, if an out-of-state city were selected, then it would not have the same regulatory framework that the Oregon Statewide Planning Goals provide.

It is without question that each of the selected policies have potential to affect development outcomes after their identified implementation periods. Even so, it is difficult to capture the effects of just one policy without regard for changes in development codes and other policies during the study period. Policy updates (e.g., amendments and additions) since the initial implementation of Eugene's, Keizer's, Salem's, and Springfield's efforts to manage outward growth of their single family homes; institutional structures and other influences of municipal operation; and other factors that affect the development process and outcomes such as System Development Charges, emphasis on multifamily development, or protection of open space areas are also important measures but are outside the scope of this research. Accordingly, the original scope of this research initially proposed an index of each city's current development code as a variable to include in the regression as a reflection of policy change over time (i.e., code at the end of the study period), as measured by the robustness of their overall approach to Smart Growth (Appendix A, pp. 91-93). Adding each city's overall score or even a score for each of its categories would yield four different values. (The parcels that belonged to Salem would all have the same value, and so on.) There would be no variation amongst parcels, which explains why the review of their development codes would be appropriate as a part of another assessment.

It is also difficult to account for every factor that influences development outcomes. This statement is especially true for the demand factors that many researchers try to understand, as noted in Chapter II. The next subsection identifies these factors (e.g., socioeconomic and political factors), some of which are untestable. Table 3 (p. 64) integrates some of these factors into the analysis as variables to the extent practicable, and Chapter V explains why and how these specific variables are thought to influence development outcomes along with municipal policy.

Additional parcel-level data that this analysis is unable to incorporate would further inform this assessment of infill development and may also improve the Sensitivity and Specificity test results (Appendix D, pp. 116-118) just as a better understanding of all socioeconomic and political influences would do for the analysis. Such data may provide further information on development constraints and opportunities. These data may include: slope (to identify slopes over 25 percent); soil composition; and percent water for each parcel to address additional development constraints that this analysis does not account for. To address opportunities (or, an additional constraint as some may argue), GIS analysis could overlay the parcels that developed with single family homes with the amount of vacant land—by parcel—throughout each city's UGB to assess if cities underutilized or fully used their capacities to develop within their city limits and/or UGBs.

Modeling Oregon's Policy and Development Framework

The underlying theory— assuming that government is part of "the market," that there is no "free market" when it comes to development outcomes, and that the government has a clear role in influencing development outcomes—is that construction of single family homes is a function of the government's policy and many other variables at the household and neighborhood levels. Figures SF.1 and SF.2 (Supplemental Files) are visual models of this theory, showing the connections of and directions of influence for each variable.

Figure SF.1 is a general framework of Oregon's land use policy structure. This model reflects the discussion in Chapter III (Policy Context) but also reveals that many other factors affect the characteristics of each city in Oregon—politically, socially, and economically. According to DeGrove and Stroud (1980), Goals 2 (Land Use Planning), 9 (Economic Development), 10 (Housing), and 14 (Urbanization) represent structural development, whereas Goal 12 (Transportation) is distinct from these goals but influences, and is influenced by, the built environment. Together, these five Goals represent the characteristics of Oregon's urban areas, which work against the remaining Goals that seek to preserve and enhance its natural areas. A balance between these Goals is what the State ultimately strives to achieve, similar to how the Principles of Smart Growth are meant to complement one another and not occur in isolation. Notice the interaction between these Goals and their implementation phase; a typical policy process implements recommendations and often revises them (or should, in theory) according to how they materialize in practice. Population and employment growth may be primarily a function of economic factors, but this growth is also heavily influenced by public policy. Policies regulating land supply, infrastructure, and pricing mechanisms influence the amount and pace of development and the amount of land retained for open spaces that lessen the available supply of buildable land.

Starting at the State level and continuing to the right to successively smaller levels of governmental jurisdiction, a combination of public leadership, individual voting preferences, and household abilities (e.g., a budget constraint) affect who lives where and what policies become implemented to accomplish Oregon's Statewide Planning Goals. Each level of government process is highly simplified, but four noteworthy explanations consider how the model depicts the Goals and additional underlying assumptions of the model. Each level of government—regional, county-wide, and local—is affected by the State's policies through their requirement to demonstrate consistency with the Goals.

Three additional components of this model require explanation. The first is that the variable "Community Input" is an assumption. The State requires, through Goal 1, that all governments involve citizens in the policy formation process. The actual extent to which governments genuinely involve their stakeholders and promote authentic dialogue whilst integrating many ideas varies from place to place (Arnstein, 1969). Sometimes, the government may even choose to weigh the costs and benefits of not fully involving citizens depending on the expected impacts of a policy or plan (Irvin & Stansbury, 2004). Another substantial influencing factor of development outcomes is physical constraints of the land. Steep slopes, areas with wetlands, and areas with high quality soils all restrict development possibilities. Lastly, the variables that represent household level characteristics are also important. Preferences and purchasing abilities dictate where people choose to live, and this occurs at all geographic levels. For example, many people choose to live in Oregon but may prefer different lifestyles; the Portland Metropolitan Area is very different from communities east of the Cascades.

The second model, Figure SF.2, is a continuation of Figure SF.1 but with a more detailed representation of how development occurs. As noted in Chapter II (Literature Review), developers respond to perceived market demand, but local governments can—and do—influence developers' responses and therefore the housing market by way of their policies. Each local government has a comprehensive plan that serves as the guiding document for its zoning and development code, but sometimes the policies contained by these documents are not enough to implement a desired outcome absent any financial resources with incentive-based and market-friendly approaches or without regulatory enforcement mechanisms.

Operationalizing the Research: Variables and Data Collection

The unit of analysis is any tax lot (i.e., parcel) where development of a single family home occurred during the study periods of 2002-2012 for Eugene and Springfield and 1998-2012 for Salem and Keizer. Subdivision plats and land use applications do not contribute to the analysis because anticipated development does not reveal actual development. Sometimes, intent to build does not mean a project will be completed. The first years in the study period reflect when each policy became effective by Ordinance. Though Eugene adopted its policies in 1998, this adoption process was by resolution. The City did not amend the Development Code to reflect these policies until 2002. Tax lot as the unit of analysis provides a sufficient number of cases (i.e., observations), where n= 10,323 tax lots. The parcel data from the Assessors' offices better accounts for the actual state of the built environment compared to each city's zoning designations.

I identified these parcels using Geographic Information System (GIS) data and verified the GIS results with Assessors' records. Lane County, Marion County, and Polk County provide Public Parcel shapefiles. Each agency made these files publicly available on their websites. By mapping the parcels, I used the shapefile's attribute table to identify the fields that specified structure type. I then defined "single family home" consistent with the Lane County, Marion County, and Polk County Property Classification and Structural Classification lists available from their Assessors' Offices. Detached condominiums, duplexes, and townhomes are included in this definition. I selected each of these parcels by attribute and made them a separate layer in the GIS data frame for ease of analysis in subsequent stages.

Looking at the right-hand side of Figure SF.2 (Local Government Framework Model, Supplemental File 2), it is necessary to account for variables such as development characteristics of each parcel and for socioeconomic variables at the household and neighborhood levels. Initially, citywide variables that affect development seemed appropriate to include in the analysis, but the dataset would then yield only four unique values (one for each city) associated with each variable. I removed these citywide variables but still include these characteristics as Table 1 (p. 54). Overall, the dependent variable (the left side of the equation) represents the degree to which each City's policy alone achieved Smart Growth "on-the-ground" as measured by the development of tax lots consistent with infill development. This dependent variable allows for comparisons, as each city's policy approach is distinct. The remaining variables represent the right side of the equation for each city, where characteristics of the parcel itself represent one grouping (parcel and household level), and the parcel's location within the neighborhood (neighborhood level, defined as Census block group), represent another. Of these independent variables, I designate the independent variable of interest as the City agency's policy approach (e.g., market-friendly and site specific) to determine the effect of this policy on infill development outcomes. Table 3 presents the selected variables on the next page.

General Description of Data Collection

I obtained data for these variables through use of records that were available upon request to government agency staff or that were made publicly available online. The data available from these sources provided information for all variables. Each county Assessor's Office made the public parcel file, with tax lot information, available online. The GIS data were available from each County, Council of Governments, and City agencies. Much of Eugene's and Springfield's data were accessible through the University of Oregon's (UO's) GIS Map Library with the exception of Eugene's stormwater and wastewater lines and Springfield's schools, stormwater lines, and roads.

Census data, also public, is the preferred source of socioeconomic variables because it is defined consistently across cities, it is reasonably available, and has the most accurate information. The American Community Survey's dataset, conversely, requires careful attention and manipulation. For example, it sometimes contains margins of error that are larger than the sample size. It also has limitations regarding data availability for each city (U.S. Census Bureau, 2009). The 1-year estimates, though most recent, do not provide information for smaller cities such as Keizer. The 5-year estimates do, however, but these estimates aggregate all observations and do not disaggregate into a single point in time, which this analysis requires for the variables that use the Census Bureau as a source (U.S. Census Bureau, 2013). This research used the 2000 Census data instead of the 2010 Census data to better reflect the characteristics of each neighborhood when each policy was adopted. I used a spatial join to match the parcel-specific data to neighborhood-level data. Each neighborhood-level variable provided data based on Census block group as a proxy geographic measurement for neighborhood.

Table 3. Description of Independent Variables and Their Data Sources

	Name	Type	Expected Sign	Source
Parcel & Household Level				
Distance from Nearest Public Road	distrd	Continuous	-	UO Map Library; City Agency GIS Data Request
Distance from Nearest Storm Sewer Line	distsw	Continuous	-	UO Map Library; City Agency GIS Data Request
Distance from Nearest Wastewater Line	distww	Continuous	-	UO Map Library; City Agency GIS Data Request
Distance from Nearest Parcel Zoned Public Land	displo	Continuous	-	UO Map Library; City Agency GIS Public Files
Size	acres	Continuous	-	County and City Agency GIS Public Parcel Files
Year Built	yrbuilt	Categorical	-	County and City Agency GIS Public Parcel Files
Medium or High Density Zoning Designation	mprobzon; hprobzon	Categorical (Dummy Transformation)	+	UO Map Library; City Agency GIS Public Files
Aggregate Assessed Value (Land & Improvements) ($1,000s)	totval	Continuous	-	County GIS Public Parcel File
Locational Level: Neighborhood				
Median Household Income ($1,000s)	medhhinc	Continuous	-	U.S. Census Bureau (2000); County GIS Public Parcel File
Median Age of Head of Household	medage	Continuous	+ (?)	U.S. Census Bureau (2000); County GIS Public Parcel File
Average Household Size	avghhsize	Continuous	-	U.S. Census Bureau (2000); County GIS Public Parcel File
Percent of Households that Drive to Work Alone	commcar	Dummy	-	U.S. Census Bureau (2000); County GIS Public Parcel File
Percent of Homeowner Households	prctown	Continuous	-	U.S. Census Bureau (2000); County GIS Public Parcel File
Population Density	popden	Continuous	+	U.S. Census Bureau (2000); County GIS Public Parcel File
Policy Variables to Isolate (Independent Variable of Interest)				
City Name	eug; spr; keiz	Dummy	n/a	County Public Parcel File (2012)

Explanation of Independent Variables

Chapter II, Literature Review, and this chapter explain that more than one institution (e.g., government or household) and more than one geographic area (e.g., neighborhood or parcel) influence development outcomes. These variables reflect such a context. Beginning at the top of Table 3 (p. 64) and continuing downward, the rationale for including each of the variables is as follows:

- **Distance from essential urban infrastructure:** The further the centroid of these parcels are from publicly improved roads and primary sanitary and storm sewer lines, measured in feet, the more likely the parcel will not be an infill parcel (hence, an expected negative relationship with the dependent variable). These services are relatively immovable, though they do extend outward over time. Development consistent with Smart Growth through infill development should take advantage of existing infrastructure and minimize costs of extending service lines.
- **Distance from the nearest parcel designated public land:** Measured in miles, this variable only applies to parcels within city limits. I include this variable with a justification of some households' desires to live close to urban services such as schools, parks, and other types of urban services and open space. A neighborhood served by schools or with available amenities absent schools is more likely to be developed than those without such services. Younger families most likely want to be near educational centers, and the majority of a city's population enjoys open space areas regardless of age. Development that moves further from these areas is an indicator of sprawl, but this is not the only one. Some parks and schools are far from the city's center because school districts and parks and recreation districts strive to evenly distribute resources and to serve each community.
- **Parcel size:** This measurement may be a general indicator of the parcels' locations. The larger the acreage of a parcel, the more likely it is on the urban fringe due to zoning that attempts to preserve a rural character and nearby agricultural uses though this is not always the case. The smaller the parcel, the more likely it represents an infill parcel due to the potential of it resulting from subdivision or from the city's newfound willingness to allow development on small lots.
- **Year built:** With an assumption that some of the policies could perform better than they currently do, development patterns are likely to expand outward. Each successive year in the case study period may indicate a decreased likelihood of infill development (i.e., a

negative expected sign). Alternatively, a positive sign for this variable might appear if the cities' infill development policies are working (though the policies may perform better). Positive signs will reflect infill development patterns in some areas. Thus, "year built" did not inform the definition of my dependent variable.

- **Medium or high density zoning designation:** Instead of simply listing a name (which would prove to be uninformative and to be a long list given the number of cities), I reviewed each of the cities' descriptions of the zoning district that corresponded to the zoning classification of each parcel. I then transformed these ordinal categorical variables into dummy variables that represented the probability that infill development would occur in the parcel. Accordingly, I identify three probability categories: "Low," to represent low density zoning; "Medium," to represent medium density zoning; and "High" to represent high density zoning. "Low" is the reference category. Low density zoning is the least likely to provide infill development opportunities given the development standards that pertain to these zones (e.g., maximum densities, minimum parking requirements, maximum heights, and minimum setbacks).
- **Aggregate assessed value:** This variable suggests that the likelihood that a parcel will classify as infill development decreases with a higher the overall value of land when combined with the value of improvements for single family structures.[7] Infill development, as noted in Chapter II, is thought to provide greater affordability to residents through expanded options for housing choice and structure type. Often, infill structures are on smaller lots, which means that infill structures may be smaller than structures that are on large lots. The smaller the structure, the less likely it is that its hard costs of construction exceed the hard costs of constructing larger homes on large lots. It is expected that more affluent neighborhoods with larger lots are further from the city's center, which means that such neighborhoods (though not all) contain more aesthetically pleasing, larger housing units with more amenities compared to units that are closer to the city's center.
- **Median household income:** Assuming that the households living in affluent, suburban areas can truly afford their homes, this variable represents individuals' abilities to be more selective regarding place of residence. With greater monetary assets comes greater choice. It is unlikely that most households that earn above the median area income choose to live in the urban centers of these four cities because of the greater ability to pay

[7] Aggregate assessed value simplifies Assessors' methodologies across counties.

for transportation to get to urban services and to pay for other services associated with the cost of living. The study areas are sufficiently different than cities like New York City or Boston where it is common to have expensive housing near the city's recreational amenities. Households in these four cities may instead equate social status with type and size of home and may prefer to have a yard and garage, consistent with the deeply-rooted symbol of American success. Measured in thousands of dollars, I capture this median amount instead of the average amount should any averages skew the data though I expect most neighborhoods to be fairly homogenous according to Levine (2005).

- **Median age of head of household:** There are explanations as to why this variable could be both positively associated with infill development and negatively associated with the same outcome. As people grow older, they tend to want to downsize to minimize maintenance requirements on their property, to lower housing costs, and to be closer to urban services such as public transportation and medical offices as their abilities to drive decrease. This observation supports a positive relationship with infill development. Perhaps as residential areas continued to expand outward, newer families moved with new development while older generations chose to remain in their mid-century homes. Yet opposing arguments may also hold true. Eugene and Springfield are university towns, and all four cities provide rental housing closer to the city's center. Most students want to be close to school, while most people in rental housing seek short-term, affordable housing options for a variety of reasons (e.g., anticipation of one day purchasing a home). Another explanation is that with increased age comes greater earning potential. Therefore, increased purchasing ability means a greater likelihood of living in outlying areas. Additionally, if these cities' infill policies are indeed working, more opportunities for first-time home buyers to see positive and aesthetically pleasing examples of infill development should exist as housing choices expand.
- **Average household size:** Remembering that this study gathers Assessors' and other data only on single family homes, large structures on large lots can accommodate larger households. As previously noted, large lots that can accommodate larger structures are generally located closer to the urban periphery.
- **Percent of households that drive to work alone:** It is likely that households closer to the urban core choose to use other modes of transportation to work other than the automobile by way of proximity to major employment centers. The idea of bicycling, use of transit, walking, and other modes may not only appear convenient but also become more appealing when noting the savings realized through less use of gasoline and not

having to pay parking rates. However, many of these cities have "nodes" of commercial activity that serve as neighborhood centers, which might reduce the magnitude or significance of this variable.

- **Percent of homeowner households:** The expected negative sign of this variable accounts for Fischel's (2001) "homevoter hypothesis," whereby households that seek to protect their single largest asset (i.e., their homes) are more likely to resist and even voice opposition to visible changes in the neighborhood, such as density. It also accounts for the historic patterns of suburban areas' outward expansion. It is also likely that the socioeconomic characteristics of homeowners are such that neighborhoods with more homeowners appear better maintained than those with renters, which other variables may not capture.
- **Population density:** This measure of a neighborhood's population per square mile captures visible differences between each neighborhood (i.e., block group). Population count does not infer how compact buildings may be, what the street pattern might look like, or what type of uses are likely to be associated with certain densities. As explained by the U.S. Census Bureau, Census tracts typically have an average number of people. While a Census tract usually covers a fixed area, its spatial size varies widely depending on the density of settlement (U.S. Census Bureau, 2014). A block group represents a statistical division of a Census tract and is also established with a fixed range in the number of people per group.

This analysis intentionally excludes several variables. One of these variables is race due to the lack of any observable variations in these areas where "white" is the overwhelming majority. Secondly, education is widely-known for its correlation with earnings (in this case, median household income). Median household income is preferred over educational attainment as a variable to obtain precise continuous variables and to compare with other monetary variables. The parcel's distance from the city's Central Business District (CBD) is not a part of the analysis despite informative descriptive statistics that this measurement provided. This variable is too correlated with the dependent variable (even theoretically without first checking correlation coefficients), as its measurement essentially provided the definition of the dependent variable.

Explanation of the Dependent Variable: Defining Infill

An operational evaluation based on the observed amount of infill development must define the extent of infill development to direct the analysis. One approach to evaluate the outcomes infill development amongst these four cities is to consider how each city currently defines infill, as it is important to regard any unique circumstances that led them to create their own evaluation measures. If each city defines infill differently, then measuring their outcomes against the same criteria may yield an unsound approach. Eugene, Keizer, and Salem define infill, but they do so to varying degrees. The City of Springfield itself does not provide a definition in its Development Code or anywhere else in its documents. The City mentions sites that are “infill sites” on some of its reports and just recently adopted the Small Lot Residential District, which is consistent with infill. Of the cities that define infill:

- **Eugene defines infill as:** “new residential construction in established areas of the City.” It further explains that developing a vacant lot or redevelopable lot by dividing an existing lot into smaller pieces, such as flag lots or alley access lots, or by developing additional housing units on an existing developed lot is consistent with this definition. The City of Eugene Provides this definition on its Infill Compatibility Standards project update webpage. The City does not have a formal definition in its Code, though the Code mentions infill on several pages.
- **Keizer’s definition of infill in its Development Code** technically meets the definition of Oregon law, where: “Residential infill development is development at densities allowed under existing zoning on vacant, or partially used land. Infill development occurs on lands which may have been bypassed in the urbanization process or which may have a use that could be or has been removed.”
- **Salem provides a definition in its Subdivision Code (Salem Revised Code, Chapter 63).** In January 2006, Salem’s City Council established standards for residential infill development that only applied to flag lots within its Residential Agriculture and Single Family Residential zones. However, these locations, in the outlying areas of the city, require that the minimum required lot size for these parcels change from 4,000 square feet to 5,500 square feet and require that minimum setbacks increase. The Salem Revised Code (SRC) says in infill lot is defined as: “a residential flag lot created by the partition of land after February 8, 2006” (City of Salem, 2009).

Infill development might also identify whether or not construction occurred within city limits or whether it occurred outside city limits but within the UGB. Though still a broad definition, this definition is more refined than what the State of Oregon or these cities currently provide. Technically, any development within the UGB can be classified as infill development according to these definitions— even if a structure is on the outlying areas of a UGB. ECONorthwest (2009b) also provides useful indicators, one of which is the size of the lot (parcel). Lots that are one-half acre in size or less are more likely to represent infill development, as lots near a city's core area tend to be smaller, and lots tend to increase in size as they are closer to a city's greenfield areas (i.e., urban fringe areas). Another indicator is whether a lot that had an address prior to the city's implementation of its policy (one that promotes infill development of single family homes) received an additional address after its implementation.

To measure the amount of infill development of single family homes as a result of each City's policy implemented to manage outward expansion, a tax lot's distance from its city's CBD as of the year 2012 provides a reasonable measure of the extent of infill. Distance from a city's CBD as an indicator allows for an understanding of spatial dispersion and city form. The variables that specify distance from essential and key urban services of the logistic regression reveal limited insight when attempting to understand spatial distribution. The logistic regression shows numeric representations, but visual explanations using mapping techniques with the same GIS data provides a clear presentation of development for each year since policy implementation. This indicator is also consistent with previous studies' definitions of and measures of the antithetical "sprawl" and "infill" (Burchell, et al., 2001; Ewing & Cervero, 2010; Ewing, Pendall, & Chen, 2002; Levine, 2005; Talen & Knaap, 2003; Ingram, Carbonell, Hong, & Flint, 2009; Calthorpe & Fulton, 2001).

Each city's definition of its CBD serves as the definition used in this research. Using GIS, I conducted a spatial join to change the parcel boundaries from an outline to a point (X, Y coordinates) to better measure their distances from each of the CBDs (separately for each city). As the first filter for determining infill, distance from each city's CBD meant that a parcel's location had to meet or fall below a certain threshold distance from the CBD. A 1-mile buffer for Salem did not cover near the same proportion of its land compared to what a 1-mile buffer from Keizer's CBD covered. To normalize distances, I adjusted the buffer's size proportional to the city's size.

Upon mapping, these points clearly show the parcels' locations near the urban fringe, near the urban core, or somewhere in between. The parcels that fall outside of the buffer do not meet the definition of infill under this first buffer analysis, with the caveat that this is a cross-sectional—rather than longitudinal—analysis. To clarify, a parcel developed in the year 2003 might appear as an infill parcel in the year 2012 because it is mapped alongside other parcels further from the city's CBD that became developed after 2003.

One way to minimize the potential of overstating the amount of infill development is to look at the year in which each parcel was built; two ways to do so are: (1) obtain public parcel shapefiles for each year to accurately represent the extent of development for each year and conduct a separate analysis for each year; or (2) use the most recent public parcel shapefile that stores data for the most recently completed year (in this case, 2012) and for all previous years. The second option yields reliable results, as the public parcel file for each city has a field that specifies the year in which each structure was built. I selected parcels that were built in the year each city implemented its policy and repeated the process for each year until the year 2012. This approach visually confirms that each city's general development patterns expanded further out as each year progressed whilst their UGBs never expanded. There are exceptions to this general development pattern for single family homes for each city. Despite gradual outward expansion, some homes developed on parcels closer to the urban center throughout the years, which means that a criterion for a second filter is appropriate.

Considering the visual GIS analysis described above to identify historic development patterns, I conducted a second buffer analysis as an additional filter before finalizing the classification of a parcel as infill. The second filter to identify infill parcels with single family homes accounts for the shape of the cities' jurisdictional boundaries and Gurreau's (1991) observation of edge cities, or "inner-ring" suburbs that are a transition from the cities' CBDs and core areas to the outermost, newer suburbs. Their jurisdictional boundaries show that they are not perfectly circular, so some infill parcels may have been missed with the first measurement. Conversely, some parcels clearly identified on the urban fringe would count as infill if the buffer was drawn too large in the first analysis. This second buffer captures the majority of the parcels that became developed with single family homes after developers bypassed these parcels and contributed toward outward expansion in favor of outlying, greenfield areas throughout the years.

Dissolving these buffers determines the final extent of infill development in each city for each study period. Any parcel that falls outside of the primary and secondary buffers is not an infill parcel. Figures A.1, A.2, A.3, and A.4 (Appendix B) show the final results of this spatial analysis, and Appendix C explains these methods in greater detail.[8]

[8] Figure A.3 (p. 97) is the map of Salem. I considered all parcels within Salem's UGB in this analysis, including West Salem, but the years in which Salem saw construction of single family homes in West Salem fell outside of the study period. I expect that the incorporation of these parcels would lower the extent of infill development in Salem.

HYPOTHESES

Given the empirical approach of this research, the primary hypothesis acknowledges that identifying statistically significant relationships amongst the variables of interest is crucial before jumping to conclusions about their relative performances. The primary hypothesis, stated in terms of the null hypothesis, is:

$H1_0$: The presence of the local government's policy has no observable effect on desired development outcomes (i.e., infill locations consistent with Smart Growth).

$H1_A$: The presence of the local government's policy has an observable, positive effect on desired development outcomes (i.e., infill locations consistent with Smart Growth).

A second inquiry about the results can be made if they violate the assumption that the null hypothesis is true and if the model attempts to minimize the risk of making a Type I error (i.e., rejecting the null when it is in fact true). With an understanding of the literature, I form the secondary hypothesis based on my review of each city's policy:

$H2_0$: A site-specific, regulatory-based policy approach; a site-specific, market-friendly policy approach; a spatial, regulatory-based policy approach; and a hybrid policy approach produce the same locational outcomes regarding the development of single family housing. Overall, the policy approach makes no difference locational outcomes of single family housing.

$H2_A$: The policy approach makes a difference in observed locational outcomes of single family housing. Further, Salem's particular policy— a regulatory, spatial policy approach—is the least effective at achieving desired locational development outcomes.

Levine's (2005) theory suggests that an untapped market exists for infill housing that would achieve more compact forms of development at the time each city implemented its policy. His theory is consistent with others' findings that local governments' proscriptive development regulations are one of the barriers identified in residents' abilities to meet their needs (Knaap, Meck, Moore, & Parker, 2007; Talen & Knaap, 2003). However, the hypothesis that Salem's policy is the least effective at achieving desired development outcomes despite it permitting higher density and infill development within its Compact Development Overlay Zone reasons that this Overlay Zone is too small to have any noticeable effect without any encouragement of infill or denser development forms outside of this boundary. Salem's residents may have simply elected to not live in that neighborhood where the Overlay Zone's regulations apply due to their preferences—especially if they had no incentive to live there.

Perhaps, however, Eugene's 1998 policies are not specific enough in their ability to allow City staff or developers to define a scope for how to encourage infill development or in their ability to allow them to determine when they achieved desired outcomes. Springfield's market-friendly approach might have limited success at providing infill development of single family homes because it does not address base zone development standards for all single family residential development; ADUs are a very specific housing type.

CHAPTER V

ANALYSIS

DESCRIPTIVE STATISTICS

Table 4 below presents selected descriptive statistics for the entire dataset. The results in this table do not include the dummy variables with the exception of the dependent variable (an infill development parcel). Appendix D (p. 104) provides Stata output of the dataset's complete set of descriptive statistics.

Table 4. Descriptive Statistics for Variables of Interest (n=10,323)

	Variable	Mean	Standard Deviation (±)	Minimum Value	Maximum Value
Neighborhood Level Variables	popcnt	2.08	1.06	0.41	6.73
	popden	3,065	2,498	41	22,849
	medage	36.66	5.37	18.30	51.40
	avghhsize	2.64	0.26	1.40	3.70
	medhhinc ($1,000)	71.91	24.24	18.03	650.01
	prctown	72.41	17.29	0.60	95.10
	medhhval ($1,000)	192.40	52.89	0.00	346.51
	commcar	90.00	6.10	27.10	98.90
Parcel-Specific Variables	yrbuilt	2003	3	1998	2012
	totval	219,728	103,038	49,301	1,691,910
	acres	0.17	0.15	0.00	6.34
	distww	88.95	127.54	1.11	3,638.00
	distsw	197.73	429.63	0.15	3,721.58
	distrd	180.46	279.15	0.58	2,710.21
	displo	0.66	0.39	0.02	2.18
	distcbd	3.77	1.42	0.10	6.93
	infilldev	0.22	N/A	0	1

Variables of interest include: median age (medage); average household size (avghhsize); year built (yrbuilt); acres; nearest distance from a publicly owned property (distplo), which may include a park or school; distance from the CBD (distcbd); and the percent of parcels this analysis classified as infill development (infilldev).

- **Neighborhood-level variables (median age and average household size):** These statistics show a median age of approximately 37 years just prior to or just after the four municipalities implemented their growth management policies. This age is one that represents individuals who have likely gained experience and have established themselves in their careers and who may have already started families (noting the average household size of nearly three people). Average household size is relatively small, noting the standard deviation (± 0.26) and range of values.

- **Parcel-specific variables (parcel size and year built):** With an average of 0.17 acres, the parcels in this study appear to provide potential for infill development given their size of less than a half-acre. The standard deviation is also small (± 0.15), however, it is clear that parcel size throughout each city is not homogenous noting that one or parcels with single family homes reach up to 6.34 acres in size.

  The results of the variable "year built" are interesting, though calculating the mode might prove more informative in understanding which year construction was most widespread throughout the study areas. The year 2003 (SD= ± 3) shows that it was not long after the growth policies became implemented that construction occurred. Differences in results may be explained by Salem and Keizer both implementing their policies in 1998 instead of 2002, which allowed more time for the policy's effects to become observable through construction if the policy had any effect at all. As noted in the hypothesis, the effects of the cities' policies are also likely to differ due to different policy approaches.

- **Proximity variables (distance from public land and the CBD):** Parcels are closer to properties with publicly zoned land that is dedicated to parks, schools, and other public uses than they are to the CBD. This finding is unsurprising, as public entities attempt to evenly distribute their services throughout a community, whereas the definition of CBD that this analysis provides remains constant. The average value for distance from the CBD (3.77 miles) and the range show that many of the study areas' homes were likely to be inner-ring or outer-ring suburbs—though not all, as 22 percent of the parcels represent infill development.

While the descriptive statistics for the entire sample may provide other useful measures of the extent of successful growth management, they are less informative to the research question knowing how each city performed relative to the others. The descriptive statistics for certain variables of interest—run separately for Eugene, Keizer, Salem, and Springfield—are in Table 5. The Stata output for all variables within each city is in Appendix D (pp. 105-108).

Table 5. Descriptive Statistics for Variables of Interest by City

		Eugene (n=2,278)	Keizer (n=765)	Salem (n=5,679)	Springfield (n=1,601)
Neighborhood Level Variables	popden	2,966 (+/- 2,718)	2,803 (+/- 2,370)	3,423 (+/-2,438)	2,064 (+/- 2,109)
	medage	39.32 (+/- 6.01)	35.84 (+/- 4.02)	35.68 (+/- 5.12)	36.75 (+/- 4.48)
	avghhsize	2.45 (+/- 0.28)	2.67 (+/- 0.25)	2.71 (+/- 0.23)	2.67 (+/- 0.20)
	medhhinc ($1,000)	76.37 (+/- 27.71)	67.21 (+/- 13.53)	72.30 (+/- 25.92)	66.43 (+/- 12.48)
	prctown	74.61 (+/- 19.03)	70.45 (+/- 14.92)	71.60 (+/- 17.45)	73.09 (+/- 14.66)
	medhhval ($1,000)	196.675 (+/- 61.596)	190.259 (+/- 27.94)	197.409 (+/- 54.24)	169.571 (+/- 34.597)
	commcar	86.32 (+/- 10.42)	91.00 (+/- 2.55)	90.95 (+/- 3.41)	91.41 (+/- 4.04)
Parcel-Specific Variables	yrbuilt	2003 (+/- 1.12)	2000 (+/- 3.05)	2003 (+/- 3.67)	2006 (+/- 3.07)
	totval	278,789 (+/- 127,896)	208,845 (+/- 65,846)	196,488 (+/- 91,183)	223,329 (+/- 81,762)
	acres	0.19 (+/- 0.20)	0.21 (+/- 0.24)	0.16 (+/- 0.10)	0.18 (+/- 0.19)
	distplo	0.55 (+/- 0.33)	0.37 (+/- 0.22)	0.82 (+/- 0.40)	0.40 (+/- 0.21)
	distcbd	3.58 (+/- 1.52)	1.27 (+/- 0.61)	4.19 (+/- 0.99)	3.76 (+/- 1.57)
	infilldev	0.30 (N/A)	0.43 (N/A)	0.15 (N/A)	0.25 (N/A)

Table 5 shows that the population densities within each city's neighborhood (i.e., Census block group) are similar with the exception of Salem's, which is slightly higher at 3,423 persons per square mile. This observation, however, is not necessarily contrary to the observation that Salem has the fewest parcels that are identified as infill development (15 percent). While Salem appears to perform better on the measure of population density in the year 2000, this density may occur at outer rings or locations where it might be inappropriate according to the Principles of Smart Growth; (note its parcels' average distances from the Salem CBD at 4.19 miles, with the next furthest in Springfield at 3.76 miles, and the smallest average distance in Keizer at 1.27 miles). This outcome might also be explained by Salem's larger population size and its greater number of parcels with single family homes in this sample; Keizer's is notably smaller. Another explanation might show that the other three cities may have greater potential for infill development on vacant parcels compared to Salem, but without knowing the extent of the cities' other land dedicated to multifamily and employment land (and what land was vacant and developable or already developed), this explanation remains to be studied and confirmed.

Households with higher median incomes reside in Eugene ($76,370), which results in a positive association with home ownership rates. Eugene has the highest rate of homeownership across its neighborhoods (74.6 percent), though Springfield is only just over a percentage point behind Eugene (73 percent). Springfield has the lowest median household value, which might explain its greater prevalence of home ownership than that in Salem or Keizer. Salem and Keizer have higher median household incomes than Springfield, but a greater discrepancy between household incomes and housing values appears to exist in these two cities.

Despite interesting results, descriptive statistics do not show statistical significance nor do they isolate the effects of other variables related to development outcomes that may confound results. Accordingly, logistic regression analysis is central to achieving the goals of this research.

LOGISTIC REGRESSION

The logistic regression model that best-represents development outcomes is a result of a stepwise approach to analysis. I used correlation analysis and marginal effects analysis to refine the original model to more accurately predict the likelihood of a Smart Growth's policy's direct effect on infill development of single family homes. The first logistic regression model specifies all variables but remembers to remove the neighborhood's population count and distance from the CBD from the descriptive statistics, as noted on Pages 74 and 76. Correlations on each of the variables check for potential problems of multicollinearity.

The results of the correlations for the entire model are in Appendix D (p. 109). Only two variables specified in the model seem to demonstrate such an issue. I determined variables to be highly correlated—and therefore candidates for removal from the model—if the analysis produced a correlation coefficient higher than 0.7. Looking at Appendix D, these variables are the neighborhood's median household value and median household income. Ownership and age are also somewhat correlated with these variables though they are much less so than are the median values for household value and income (Appendix D, p. 109).

I then ran the marginal effects for the three possible combinations of variables without removing the insignificant variables determined by the original logistic regressions. The logistic regression output prior to running the marginal effects through Stata and the output of the marginal effects are in Appendix D (pp. 110-112). These tables show the coefficients of the constant, which is not of interest given the chosen method of logistic regression.[9] Comparing results of the marginal effects with different models shows that the directions and significance levels of the variables remain highly similar regardless of manipulation, confirming that the underlying theory represented in the model holds true. The analysis produced three distinct models (all variables, median household income excluded, and median household value excluded), which Table 6 shows on the next page.

Addressing the first hypothesis, the results of these models show that Smart Growth policies in Salem (the constant), Eugene, Keizer, and Springfield have a positive, significant effect on development outcomes consistent with directing single family housing toward existing communities instead of at the urban fringe (with the exception of Springfield in Model 3). Model 2 is the model that best represents the extent of the effectiveness of each city's Smart Growth policy because it is the most stable, as all variables' values remained unchanged with different assumptions in the model. Variables' coefficients change more prominently when median household value is excluded in Model 3. Unlike Model 3, Model 2 also retains the independent variables of interest as significant variables while dropping one of the variables representing multicollinearity.[10] Median household value in Model 3 might capture not only median household income in the model as a correlation issue but might also represent other variables that are unaccounted for in these three models.

---

[9] The interpretation of the constant does not make as much sense in a logistic regression as it does in a linear regression. In a linear regression, the interpretation of the constant indicates that if all the explanatory variables included in the model have a value of zero at a given time period, then the value of the dependent variable will be equal to the constant term. Anything above or below zero might infer statistically significant differences. This logistic regression model defines the independent variables of interest as dummies and the dependent variable as a dummy, where only zeroes or values of one are in each cell.

[10] I used post estimation methods to interpret additional differences between the models. These methods produced the sensitivity and specificity test for each model. The results of these tests are in Appendix D (p. 116-118). These sensitivity tests are different sensitivity tests with running different models due to multicollinearity, tests model specifications and robustness in another way. Sensitivity and specificity show the degree to which each model was accurate in terms of percentages. Sensitivity captures the number of true positives in the model (the number of accurately predicted infill parcels with a dependent variable value of "1" and divides that number by the total predicted positives, regardless of if they were accurately predicted. Hence, true positives are divided by the sum of true positives and falsely predicted negatives (i.e., zeroes). The specificity test uses the same approach as sensitivity but calculates the number of true, accurately predicted negative (or "0") values (i.e., those parcels that were not infill parcels). The results show that all three models were equally as good (or bad), as the values did not change with variations in the models. These models fit the set of observations fairly well by correctly classifying roughly 85 percent of the observations.

Table 6. Logistic Regression Model Results Incorporating Marginal Effects and (P Values) (n=10,323)

	infilldev	Model 1	Model 2	Model 3
Independent Variables of Interest	eug	0.0297 (0.020**)	0.0297 (0.020**)	0.0313 (0.016**)
	spr	0.0406 (0.000***)	0.0416 (0.000***)	0.0101 (0.325)
	keiz	0.1306 (0.000***)	0.1308 (0.000***)	0.1261 (0.000***)
Neighborhood Level Variables	popden	0.0000 (0.000***)	0.0000 (0.000***)	0.0000 (0.000***)
	medage	0.0140 (0.000***)	0.0141 (0.000***)	0.0130 (0.000***)
	avghhsize	0.0379 (0.105)	0.0398 (0.085*)	0.0039 (0.867)
	medhhinc	0.0002 (0.573)	.	0.0040 (0.000***)
	prctown	-0.0063 (0.000***)	-0.0062 (0.000***)	-0.0080 (0.000***)
	medhhval	0.0015 (0.000***)	0.0015 (0.000***)	.
	commcar	-0.0116 (0.000***)	-0.0116 (0.000***)	-(0.0110) (0.000***)
Parcel-Specific Variables	yrbuilt	-0.0007 (0.499)	-0.0007 (0.508)	-0.0014 (0.180)
	totval	0.0000 (0.327)	-0.000 (0.325)	-0.000 (0.933)
	acres	0.0241 (0.275)	0.024 (0.274)	0.0239 (0.280)
	distww	0.0000 (0.530)	0.0000 (0.541)	0.0000 (0.353)
	distsw	-0.0001 (0.000***)	-0.0001 (0.000***)	-0.0001 (0.000***)
	distrd	-0.0001 (0.000***)	-0.0001 (0.000***)	-(0.0001) (0.000***)
	displo	-0.3792 (0.000***)	-0.3780 (0.000***)	-0.3809 (0.000***)
	mprobzon	0.0607 (0.000***)	0.0605 (0.000***)	0.0662 (0.000***)
	hprobzon	0.0263 (0.306)	0.0272 (0.289)	0.0156 (0.546)

* = significance at the 90% confidence level
** = significance at the 95% confidence level
***= significance at the 99% confidence level

Interpretation of the Selected Model

The significant coefficients with negative values—percent of households within a neighborhood that own a home, percent of households within a neighborhood that drive to work alone, and distance from roads and stormwater lines—are consistent with Table 3 and its associated description (Chapter IV Methodology, p. 64). Surprising results are: (1) the insignificant values of wastewater coefficients, when private development must bear the cost of financing both the extension of stormwater and wastewater lines to their structures as a typical condition of approval (not just stormwater); and (2) the insignificance of parcel size and its positive relationship with the likelihood of infill development, perhaps explained by its insignificance in the first place.

Zoning also has an effect on the likelihood of infill development. With low density zoning as the reference category, a parcel is more likely to be developed as a single family residential infill parcel if its zoning regulations do not match those prescribed by low density zoning. Medium density zoning is likely to have a greater impact on encouraging infill development than low density zoning when controlling for other factors, as its coefficient is larger (0.0605 compared to 0.0272) and is also significant at the 99 percent confidence level. One explanation for the result that single family residential homes are more likely to build on medium density residential lots is because high density zoning is usually more appropriate for other uses. While high density zoning allows for more infill development to occur, it gives greater opportunity for employment used and multifamily uses to build on these lots. It is also unlikely that developers of single family homes want to build on high density-zoned lots, knowing that profits would be much greater at higher densities and knowing that people occupying single family homes typically look for a neighborhood that reflects their aesthetic tastes and lifestyles.

Independent Variables of Interest to the Research Question

Most important are the results of the city-specific policy variables. The observed directions and magnitudes that pertain to each of these variables shows the relationship between markedly different approaches to encouraging infill (whilst controlling for other factors that also influence development outcomes). With Salem as the constant, the positive signs of Eugene's, Keizer's, and Springfield's coefficients suggest that their policies alone perform better on this one measure of smart Growth than Salem's, though they do so to varying degrees. This result is consistent with the second hypothesis that there are expected differences between cities given their unique policy approaches.

Keizer is the most effective at influencing infill development of single family homes. Its parcels are approximately 13 percent more likely to develop as infill parcels as a direct result of its policy than Salem's parcels are as a direct result of its policy (odds ratio= 0.131, p= 0.000). Eugene's and Springfield's policies also provide a greater influence on desired development outcomes than Salem's, but their effects are similar in magnitude and are not as great as Keizer's. Eugene's parcels with single family homes, those of which are directly attributable to its policy's effects, are nearly 3 percent more likely to be infill development than Salem's (odds ratio= 0.0297, p= 0.020). Stated differently, Eugene's policy is approximately 3 percent more effective than Salem's at achieving single family residential infill development. Springfield performs only slightly better than Eugene, where it is 4 percent more likely than Salem that infill development of single family homes occurred due to its growth management policy (odds ratio= 0.0416, p= 0.000).

CHAPTER VI

DISCUSSION

Through logistic regression, this research estimated the likelihood that each policy directly affected the outcomes of infill development as an indicator of achieving Smart Growth Principle 7 and Statewide Planning Goal 14. To address the first research question, while all cities had a significant, positive association with infill development, certain policies performed better than others. This finding empirically demonstrates that the approach and extent of land use policy matters—not just based on perception but to the level of statistical significance.

The best explanation of why Keizer is likely to have a greater impact on the infill development of single family residential homes than Salem becomes clear when comparing their respective policy approaches. Both seek to increase infill development with regulation, but the spatial scope of their policies differs. Salem selects one particular area where it applies its infill regulations, and it is a small enough area that many—or all—of its residents could elect to live elsewhere within the city to avoid necessary compliance with the development requirements specified by its regulation. Conversely, the manner in which Keizer administers its infill regulations make it such that certain parcels across the entire city have to comply with its infill standards in the KDC. Though every developer has an option to not build on an infill lot given the scope of each city's policy, it is much more difficult to find sites throughout Keizer where infill regulations do not apply than it is in Salem.

Keizer's provisions in its Code perhaps appear less like regulations when considering the Code section's original intent rather than merely acknowledging the development standards that development on these parcels comply with. Levine (2005); Knaap, Meck, Moore, & Parker (2007); Talen & Knaap (2003); and other studies presented in the Literature Review (Chapter II) explain that many municipal regulations limit, or even prohibit, alternative forms of single family residential development through requirements such as maximum densities and minimum parcel size and setbacks. While Keizer preserves the option of the traditional form of American suburban development in its Code, it also encourages measures to use its land more efficiently through creating infill development standards, thereby making what was once passed over during the urbanization process and what was once prohibited now legally allowable. Research that identifies a model of Keizer's extent of infill development of single family homes without integrating the implementation of its infill development standards as a variable (i.e., a baseline model) may find interesting results. This baseline model could compare its findings to the model in this research (i.e., the one that includes Keizer's Infill Development Standards), where such a comparison should find less development in areas closer to the urban fringe than there otherwise would be with the Infill Development Standards included.

Comparing Salem's and Keizer's outcomes to Eugene's and Springfield's shows how regulatory approaches differ from hybrid and market-friendly approaches. Some aspects of Eugene's hybrid policies and all of Springfield's market-friendly policies apply to sites throughout their cities, mirroring Keizer's approach on the spatial spectrum. Eugene's and Springfield's policies perform similarly under the logistic regression model. Both cities' policies are more likely to provide infill development of single family homes than Salem, which suggests that a policy with a site-specific component (i.e., one that applies to each site within the city) might be more effective than a regulatory policy that affects a small spatial area. I recommend caution in interpreting these results as generalizations that apply to all areas; testing this hypothesis in other communities would increase validity. Keizer outperforming Eugene and Springfield may be due to Springfield's policy being too particular in only permitting accessory dwelling units on its traditional single family lots, whereas Eugene's overall Growth Management Policies may not be specific enough regarding development of single family homes despite updates to its Code in its regulatory, market-friendly, or incentive-based approach.

Springfield recently added to the scope of its infill policies with its newly adopted Land Use Efficiency Measures by way of Ordinance 6286 (effective March 4, 2013). A follow-up study to determine the effects of this ordinance would be worthwhile, as it mandates minimum residential density in its Low Density Residential Zone; allows small lots (3,000 square feet) as a new residential zoning district; and permits duplexes, townhomes, and condominiums in its Low Density Residential Zone.

The results of infill development are not solely attributable to the policies themselves. The spatial and quantitative findings of this research show that the Smart Growth policies directed toward single family homes in each of the jurisdictions are not the only cause for the observable outcomes (a questionable result for any policy). The "invisible hand" is not the only force at work in the market; residents' self-selection into certain neighborhoods as a confounding variable in the equation of program evaluation (Levine, 2005) and the form of government regulation is included in these factors. The descriptive statistics in the Analysis (Chapter V) and in Tables A.2., A.3., A.4., A.5., and A.6. (Appendix D, pp. 104-108) show that the process of policy formation, evaluation, and adaptation must respond to the political and socioeconomic environments under which the policy is expected to operate, especially if political viability and appeals are of concern. Education, conversation, and even collaboration amongst citizens and governments might also affect residents' attitudes and preferences toward infill development.

Planners and policymakers must correctly identify the root of any perceived problems to get the policy's problem definition correct. This understanding might result in crafting a policy with less regulatory backbone, whereas disinterest in infill development might mean approaching the goal another way (e.g., regulation combined with incentives). In the case of some of the barriers to infill development as part of the problem, and as described in Chapter II, standards to ensure compatibility of infill development in established neighborhoods may lower the NIMBY perspectives of existing neighbors, which Eugene and Keizer are working to resolve. To address landowners who may withhold selling their property in hopes of higher sale prices during a developer's land acquisition process, an incentive-based approach may work to satisfy all parties involved, but others may see such an approach to unfairly favor or even reward a discriminate number of property owners over others. Where there is market disinterest or a lack of precedent for successful infill development in an area, governments that identify and dedicate sources of revenue to provide financial assistance during the financing phases or identify staff resources to provide administrative assistance during the land and infrastructure acquisition process would support developers in expediting development.

Though local plans identify desired outcomes, these outcomes may take longer to achieve or may never come to fruition if developers have identified substantial barriers to development, and the municipality has not clearly stated strategies to garner resources to initiate the implementation phase even if it desires to assist the private development process. This assistance would become justifiable to many more stakeholders if the municipality could demonstrate where the intended outcomes of the policy have commonalities with its constituents' interests such as lower taxes, redirecting revenue to parks programs, or emergency services instead of financing infrastructure expansion.

CHAPTER VII

CONCLUSION: RECOMMENDATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

OVERALL RECOMMENDATION: EMPHASIS ON SCIENTIFIC EVIDENCE SHOULD NOT UNDERMINE EMPHASIS ON PROCESS

The magnitude and effectiveness of measures to implement Smart Growth in Oregon's cities will remain ambiguous without a concerted effort to define a process that measures progress on achieving Oregon's Statewide Planning Goals or any of the Smart Growth Principles. The complexity of the Oregon Statewide Planning Goals, societal and economic influencing factors that are less clear, a lack of operationalized definitions of what constitutes a Smart Growth project within each city (as noted by the DLCD and OSU), and now realizing that infill is not easily nor consistently defined between Oregon's cities presents difficulties in clarifying the analysis of local outcomes of Oregon's planning program's clearer for researchers and planning practitioners.

On a State level, Oregon's Big Look Task Force on Land Use Planning (2009) recommended that the Oregon Statewide Planning Goals read as goals rather than as technical, complex policies that do not resonate, inspire, or focus a community on achieving these Goals. Aside from improving the administration of the Statewide Planning Goals within the State, a clearer statement of what Oregon's local governments should strive for would provide a stronger link between these Goals and Oregon's local governments' efforts to implement these goals, thus, achieving better defined results. An issue that the State and local governments may face as a result of reworking the wording of these goals is how to balance the State's interest in maintaining its implementing authority with local governments' desires to maintain their autonomy in achieving the goals in ways they feel most appropriate.

One way that cities could better define process to establish a method to measure outcomes is to consider flagging projects that fit the criteria of Smart Growth and to further consider specifying which criteria of Smart Growth they satisfy when developers submit their land use or building permit applications; infill projects would satisfy some of these criteria. Such a process should allow each city to track the incidence of actual Smart Growth, would allow local governments to retain autonomy in their planning efforts, and would minimize some subjectivity in assessments of infill development as it relates to Smart Growth Principle 7 and Statewide Planning Goal 14, so long as the cities provided their definitions of infill consistent with some sort of guidelines from the State.

Prior to embarking on new processes and programs, local and regional governments would benefit from coordinating their efforts to collect data and information that they use for analysis. Aside from interagency collaboration on recent datasets, a lack of sustained effort amongst agencies to maintain historic data was also apparent, which limits the feasibility of valid and reliable longitudinal analyses. Data collection and analysis for this research was more complex than anticipated for this reason. Though all government agencies used as a source of data in this research collect the same information, the manner in which they maintained their datasets for GIS analysis differed substantially. For example, Marion and Polk Counties differed in the amount of fields they included in their public parcel files. One County did not provide "year built" in its public parcel file or its corresponding GIS file. Though County staff were extremely helpful in their attempt to make this analysis process more efficient, the only way to identify the year each parcel saw construction was to click on each parcel's Assessor's map and tax lot number, which provided an online link to its individual property report. This analysis required reading the property report to manually enter the data. Another County did not provide identifiers for land use jurisdiction, which then required a review of each of the jurisdiction's zoning districts prior to conducting GIS attribute queries by zoning designation and manually manipulating the dataset to create a dataset that reflected tax lots by local land use jurisdiction.

IMPLICATIONS FOR FURTHER RESEARCH

Research that will add value to academic fields and practitioners alike will recognize the need to bridge the gap between explaining statistical significance and presenting results that are meaningful for those who emphasize practical significance. Infill development of single family housing can only occur to a certain extent with a limited amount of land in a city's core area. Cities typically reserve core areas for denser development, which includes commercial areas and multifamily housing. Eugene's Multiple Unit Property Tax Exemption program and Vertical Housing Zone are examples of an emphasis to increase densities at the urban core with these types of uses instead. The effects of these programs on achieving the goals of Smart Growth should not be overlooked though they do not directly affect the infill development of single family homes.

Other influences on development outside of the scope of this research may be at work in cities' abilities to achieve these goals that this research did not account for. Knowing that local governments in Oregon that have UGBs exercise land use jurisdiction within these boundaries, how have Oregon's counties that have land use jurisdiction outside of these boundaries worked to mitigate sprawl and protect valuable agricultural and natural resources in their plans and policies? Counties may recognize the importance of preserving a rural character in their unincorporated areas, but they may face takings claims under the scenario of harsh restrictions on land development. Secondly, each city's ability to operate as a functional organization that establishes sound communication and decision-making processes might affect its ability to deliver the desired outcomes of Smart Growth. Specifically related to Oregon's Statewide Planning Goal 14, haphazard extensions of infrastructure systems may occur without coordination or collaboration on timing development with planned infrastructure improvements between a municipality's Public Works staff and staff who focus on community and economic development.

Discrepancies in data formatting, collection, availability, and records management reveal how further research can improve the design of this research. Most notably, a longitudinal study would provide more accurate results. Researchers could collect and analyze the same data for each year within the study period and compile these results into a dataset rather than analyze current infill in the aggregate for the most recent year. This cross-sectional approach is a snapshot of development as it is today, which may limit the particulars of measurement. Infrastructure lines that currently exist in some neighborhoods may have been built as a result of planned growth—after development occurred. Developers of growing residential areas do not necessarily build according to stormwater and wastewater capacity though that is most often what they try to do to save on hard costs.

Broader Implications

This research measures the extent to which different policy approaches are effective at increasing the amount of infill development in fairly comparable areas (given certain assumptions). Though specific in their assessment, the results also raise additional questions. Each local jurisdiction in this study has its own definition of infill and its own definition of a business district. Are these unique definitions the cause of differing results? Though they all meet the State's definition of infill by way of developing inside their UGBs, is the State's definition of infill enough to deflect sprawl, or should infill be considered only as development inside city limits? This question gives rise to other questions: Is it better to have a consistent definition so that the measurement of outcomes can be more easily assessed, or would requiring local governments to have the same definitions limit their abilities to pursue their own missions and goals so long as they achieve the State's general objectives? These questions reveal the subjectivity in determining if a program or policy proves effective after adoption.

Relatedly, other metrics can identify and measure the effectiveness of infill development to manage outward growth. Such metrics may include: rates of urbanization; the conversion of rural Census tracts in fringe areas to suburban, and suburban Census tracts to urban; how changes in density affect urban form, housing prices, and land values; and the costs of providing municipal infrastructure (e.g., wastewater/sanitary sewer lines).

Additional metrics may not even include assessing the impact of policies on infill development but might look at how infill development affects other aspects of the community. Further, each community might value these metrics differently. Housing affordability in one local area might outweigh mitigating air and water pollution. Studies to determine effectiveness might also be less quantitative, at least initially. People's experiences and perceptions with the policies matter as well. Qualitative perspectives to supplement these quantitative findings would include input from residents, developers, and public agency staff. Examples from the Cities of Eugene and Keizer with their Infill Compatibility and Development Standards show that one way to better understand residents' experiences with infill is to track and follow up with their concerns and other comments.

Measuring effectiveness also requires the need to recognize scale. The outward growth rates and urbanization trends in Oregon show its communities are more effectively managing outward growth compared to nearly all cities elsewhere in the nation. The urban areas in this case study are much smaller than large metropolitan regions in some states in the eastern and southern parts of the nation, for example. Development patterns that appear to be sprawling in Oregon's cities and metropolitan areas, when overlaid with other local and regional areas in the U.S. may appear only as a fraction of larger areas' development patterns that resulted from urban development and expansion. A different level of geographic analysis may yield findings that reveal different assessments of effectiveness.

This study uses tax lots within cities as a framework for policy evaluation, as cities are the units of government responsible for creating and implementing their own plans in Oregon. However, these cities operate amidst regional interdependencies despite their efforts to manage their development and growth as separate geographic entities. Research to uncover the effectiveness of managing growth as separate cities versus at the metropolitan level may provide an understanding of the benefits and drawbacks to both approaches for various stakeholders, which could inform policies for infill development.

CONCLUDING THOUGHTS

Regardless of the many approaches to evaluate how well Oregon's Statewide Planning Goals and Smart Growth goals translate into "on-the-ground" implementation, it is apparent that Oregon's communities outside of the Portland Metro Area—such as Eugene, Keizer, Salem, and Springfield—are also attempting to develop in a manner consistent with the Principles of Smart Growth, though the degree to which their policies realize success vary as evidenced by the notable difference between Keizer's performance and Salem's performance. It is also apparent that the political viability of these communities' respective policies should increase with supporting evidence of the economic, social, and environmental benefits of Smart Growth.

An important part of any program and corresponding policy is to review its existing components, to identify shortcomings, and to determine how its shortcomings may improve within the scope of the program or if developing new programs to directly fill those gaps is required. The underlying issue how to get these policies right—from the broadest levels of thinking to the details. Those involved in the policymaking process must heed their overall understanding of institutional factors that influence development, the policy's scope, and its wording. Some may question why it matters for Eugene, Keizer, Salem, and Springfield to understand why their policies may fall short of their intended results and how their policies may improve if Oregon is performing so well on managing the urban forms of its cities. Oregon's status as a model example of states that successfully limit outward growth does not mean that its communities should ignore opportunities to strive for continuous improvement when serving its citizens. The social, economic, and natural environment is never static, which means policies should adjust accordingly no matter how well they respond to the current situation.

APPENDIX A

POLICY ROBUSTNESS OF PRESCRIPTIVE SMART GROWTH POLICIES IN EUGENE, KEIZER, SALEM, AND SPRINGFIELD AT POLICY ADOPTION TO END OF STUDY PERIOD

Table A.1. on the following page is a comprehensive representation Eugene's, Keizer's, Salem's, and Springfield's efforts to implement Smart Growth. There were likely to be many other explanatory factors for the results of each city's incidence of infill development and urban form, which the model does not account for. To account for these other influences that occurred throughout the study period, the intent was to include aggregate scores and even the subtotal scores of the separate categories for each city as separate variables, the values of which would correspond to the parcels belonging to the respective city. However, doing so would prove problematic. The variables would only yield four distinct values, which would provide only variations between cities and no variation between parcels within each city.

Talen & Knaap (2003) provide the framework for the Spatial, Site-Specific, and Process-Oriented categories. The specific topics listed below each category were not necessarily unique to this research (i.e., these topics are common in studies of urban land use planning, design, and policy), but they originated from first-hand observation throughout several years of professional and academic experience.

Each city received a "0," "1," or "2" ranking, with "0" representing non-existent, "1" representing some acknowledgement of the topic yet required improvement (at least as compared to the other three cities), and "2" representing the topic as sufficiently addressed (also as compared to the other cities). This classification scheme thus represented the strength of the policy or process implemented by the City agency. Strength did not necessarily equate to regulatory policies for the purpose of this evaluation. While regulatory backbone influenced the score, there were other instances where regulation did not apply to receiving a "2." The majority of these cases applied to the Process-Oriented category. Cities that received a "1" for certain topics may have also had implementing regulations to support the topic, but the scope of the policy, its wording, and other factors posed questions as to whether it could have been improved to meet its intent.

Table A.1. Policy Robustness of Prescriptive Smart Growth Policies in Eugene, Keizer, Salem, and Springfield at Policy Adoption to End of Study Period (1998-2012)

	Eugene	Keizer	Salem	Springfield
Spatially-Oriented Policies				
Park & Open Space Zoning	2	2	2	2
Scenic Preservation	2	2	2	2
Cluster Zoning and/or Development	1	0	1	2
Environmental/Natural Resource Protection Zoning	2	2	2	2
Nodal Development/Compact Development Zones	2	1	2	1
Permits Accessible Residential Development in Alleyways	1	0	1	2
Provisions for Short Block Length where Perimeter is equal to or less than 2,400 ft. (through Alleys, Mid-Block Connectors, Flag Lots, etc.)	2	2	2	2
Corridor Planning	2	2	2	1
Special Area Zones/Districts (to Minimize Variances)	2	1	1	1
Mixed Use Zoning	2	2	2	2
Transfer of Development Rights	1	2	0	0
Urban Renewal Areas or Improvement Districts	2	2	2	2
Consistency Requirement with Regional Policies & Functional Plans	2	1	1	2
Emphasis on Downtown Revitalization in Plans	2	1	2	2
Subtotal:	24	18	22	23
Site-Oriented Policies (Prescriptive)				
Street Connectivity through Standards & Site Design	2	2	1	1
Flexible On-Site Automobile Parking Requirements (e.g., Percentage Reduction, Shared Parking, etc.)	1	1	1	1
Bicycle Parking Requirements	2	1	2	2
Maximum Front Yard Setbacks (2) or Small Minimum Front Yard Setbacks (1)	1	0	1	1
Accessory (or Secondary) Dwelling Units Permitted	1	0	2	2
Maximum Lot Area for New Subdivisions & Partitions ("2") Minimum Lot Area Equal to or Less than 4,000 sqft. (Per Unit if Duplex, Rowhouse, etc.) ("1")	2	1	0	1
Uses Net Density Instead of Gross Density ("1" or "0" Only)	1	0	0	0
Density Bonus	1	1	0	0
Minimum (Or Maximum, if Applicable) Density Consistent with OR Safe Harbors ("1" or "0" Only)	1	0	0	1
Small Lots Permitted in Single Family Residential Zones (less than 5,000 sqft.)	2	2	1	1
Allows Higher Density Single Family Development in the LDR/R-1 Zone (i.e., Encourages Housing Mix)	2	2	0	2
Performance Standards (e.g., environmental, noise impacts, etc.)	2	2	2	2
Narrow Residential Street Standards (Paving Between 20 ft. and less than 28 ft.)	1	0	0	0*
Subtotal:	19	12	9	12

(Table A.1.: Continued)

Process-Oriented Policies				
Incentive-Based				
Property Tax Exemption	1	0	1	1
City-Provided Incentives with Developer Exactions (e.g., Provision of On-Site Amenities)	1	0	1	0
City-Initiated Acquisition Program or other Initiative for Affordable Housing (e.g., Landbanking)	2	0	2	0
Community Development Block Grant/HOME funds/Capital Improvement Assistance	2	2	2	2
City-Initiated SDC Grants/Waivers (Not Including Deferred Payment Options, Credits, Reimbursement Districts)	1	1	2	0
Market-Friendly				
Low SDCs for Higher Density Single Family Residential Development Compared to Neighboring Jurisdiction ("1" or "0" Only)	1	1	0	0
Concurrent Application Review	2	2	2	2
Organizational Structure Facilitates Efficient and Informed Internal Review through Building Permit Stage	1	2	1	2
Expedited Review for Smart Growth Projects	0	0	0	0
Code Provides Procedural Flexibility to Minimize Uncertainty & Risk of Approval Process	2	1	2	1
User-Friendly Application Forms	2	2	2	1
Reasonable Application Materials Required for Submittal	2	2	2	1
User-Friendly Land Use Fee Schedule	2	2	1	1
User-Friendly Development Code	2	1	0	1
Administrative Review for Minor Adjustments	2	2	2	2
Design Assistance (e.g., Pre-Application Meeting, Images in Development Code)	2	2	2	1
PUD or Master Plan Requirements Minimize Complexity	1	1	1	2
Higher Density Single Family Homes Permitted Outright in R-1 or other Small Residential Lot Zone (i.e., no Discretionary Use or Conditional Use)	1	2	1	2
Regulatory				
Design Review as an Option ("1" if Applies to few Areas)	1	2	2	1
Infill Compatibility Standards (e.g., Density Transitioning, Landscaping, Human Scale Design, Entrance and Window Orientation, etc.)	2	2	2	2
Special Use Standards	2	2	2	2
Neighborhood/Applicant Meeting	2	0	0	1
Exactions (e.g., Street Standard Exactions; Environmental Protection; Architectural Elements for Human Scale, Public Space, and Accessibility)	2	2	2	1
Subtotal:	36	29	31	26
TOTAL:	**79**	**59**	**62**	**61**

APPENDIX B

MAPS IDENTIFYING INFILL PARCELS FOR EACH CITY

Figure A.1. Parcels Developed with Single Family Homes in Eugene, Oregon (2002-2012)

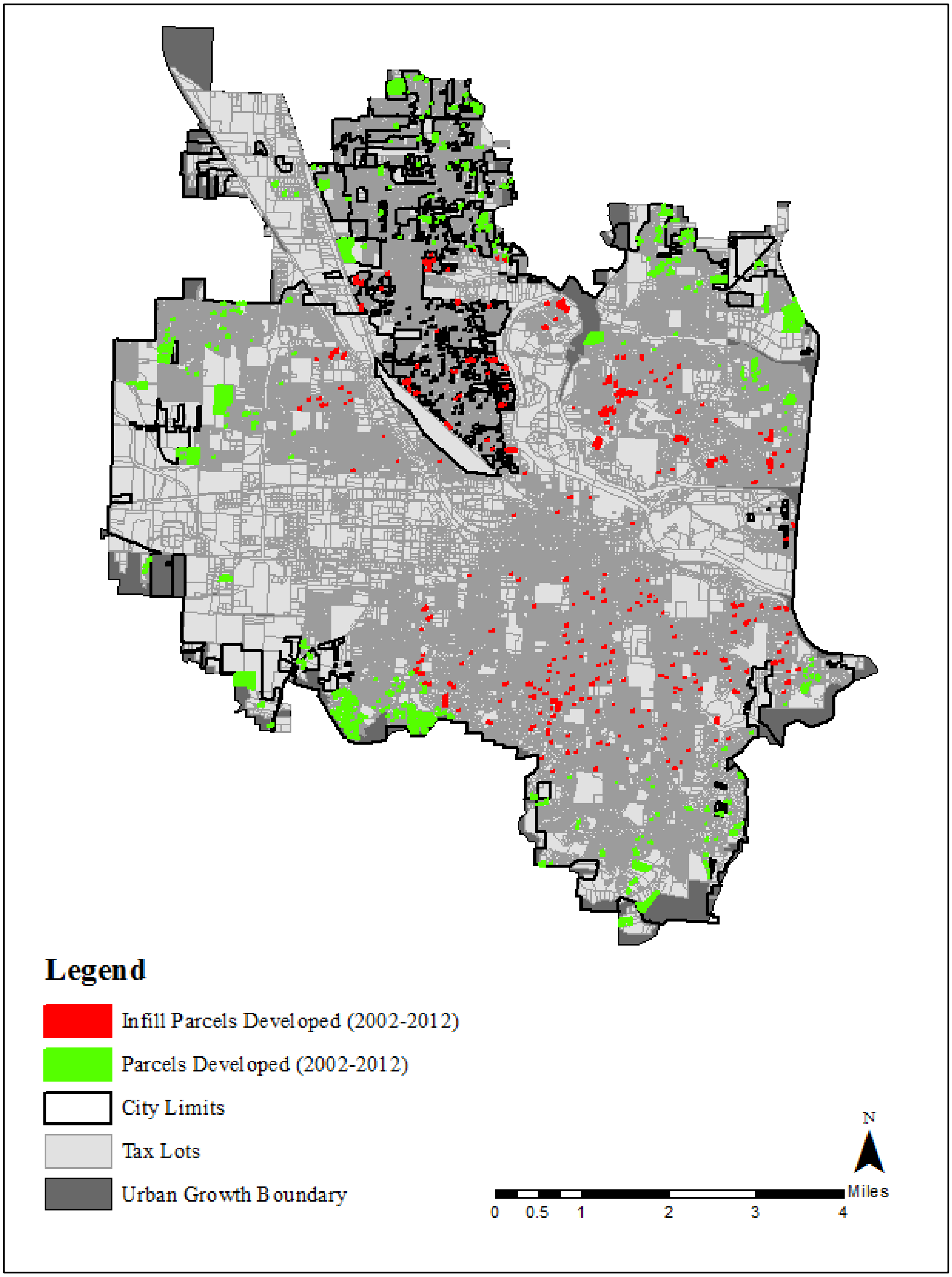


Figure A.2. Parcels Developed with Single Family Homes in Keizer, Oregon (1998-2012)

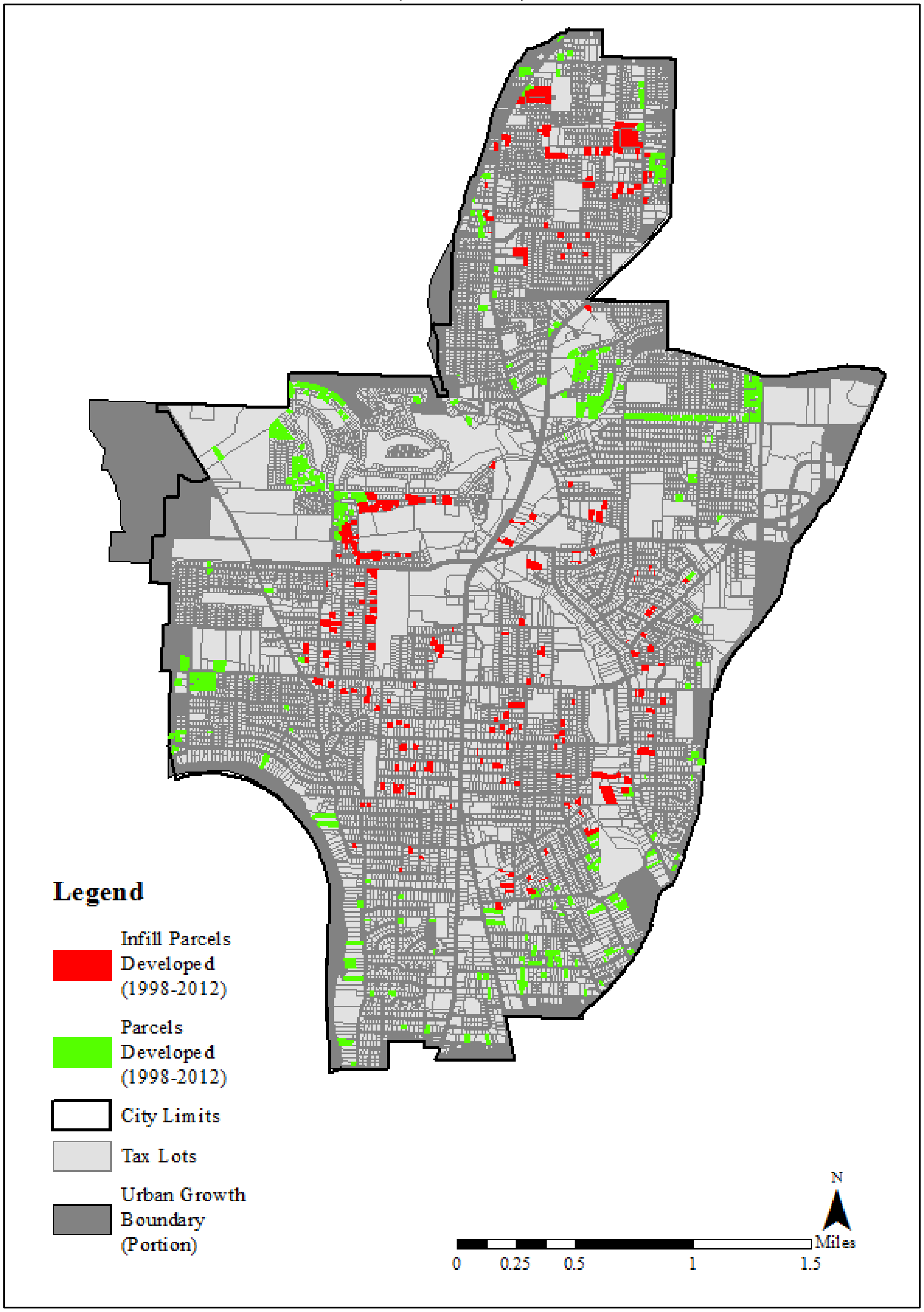


Figure A.3. Parcels Developed with Single Family Homes in Salem, Oregon (1998-2012)

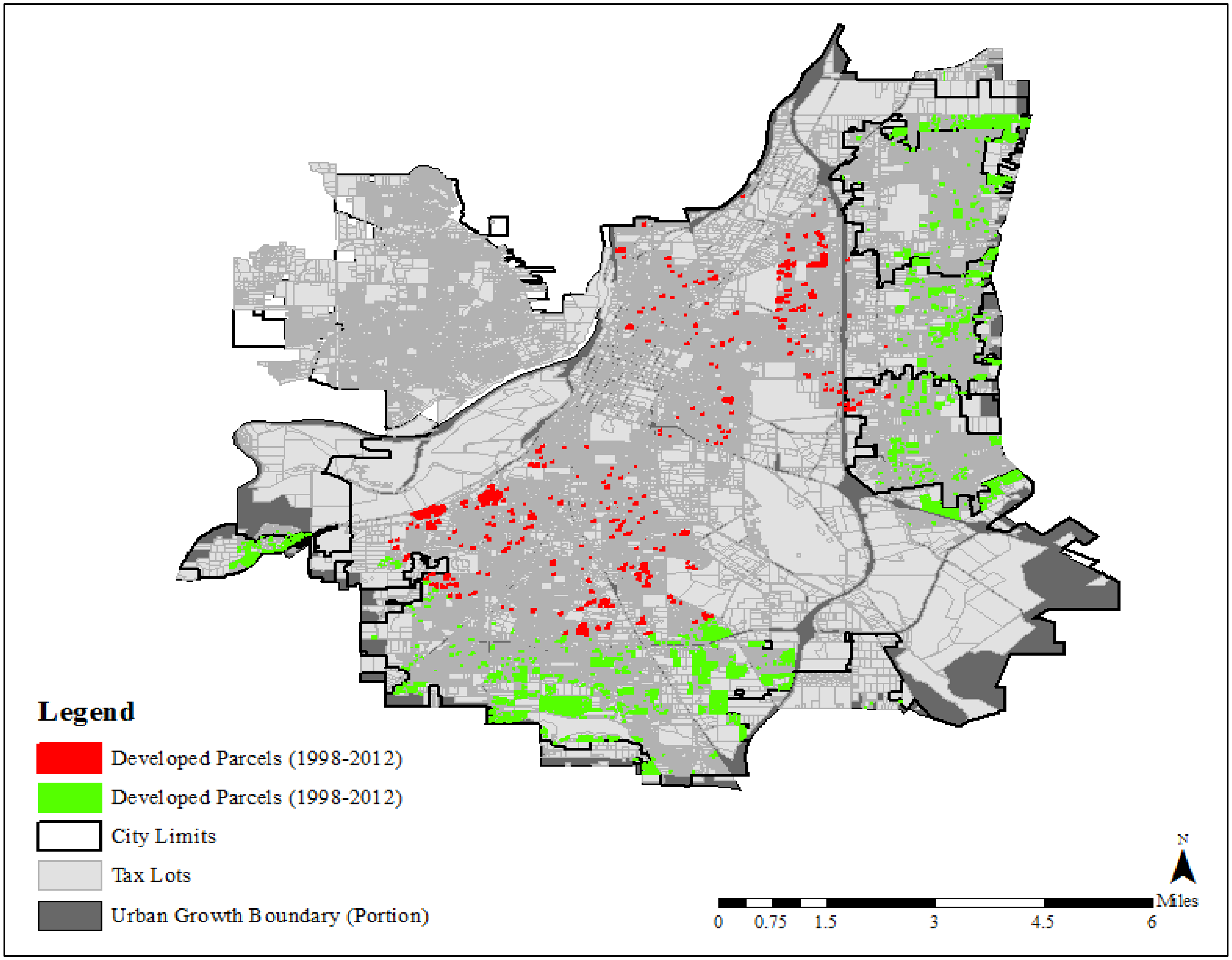
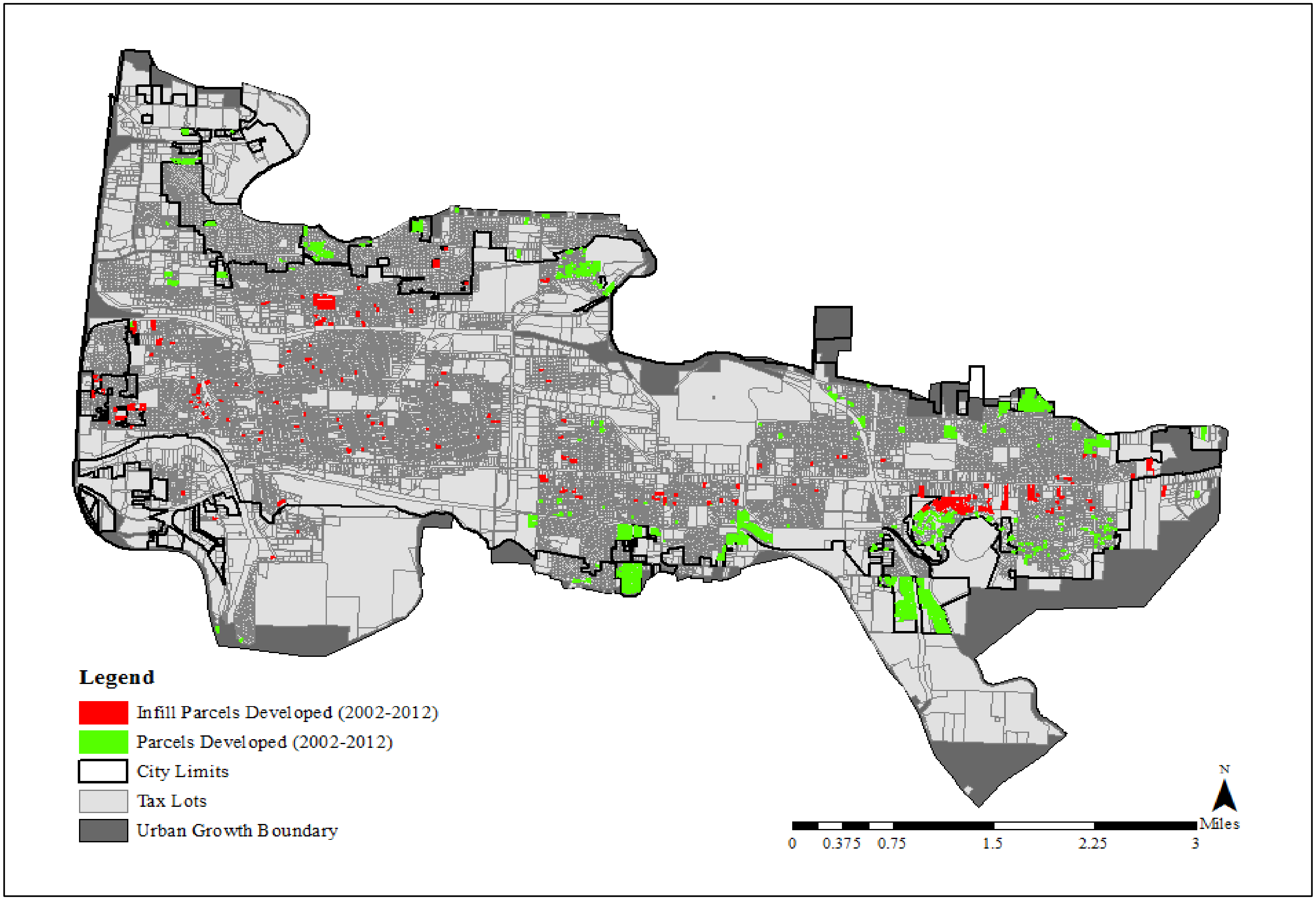


Figure A.4. Parcels Developed with Single Family Homes in Springfield, Oregon (2002-2012)



APPENDIX C

OBTAINING THE DEPENDENT VARIABLE: A DETAILED DESCRIPTION

As noted in Chapter IV, each city's definition of its CBD serves as the definition used in this research. The Census of Retail Trade discontinued its inventory and collection of data for these small statistical areas in 1982, partly because of the high cost of defining a CBD (U.S. Census Bureau, n.d.). Traditional definitions of a CBD may also no longer describe patterns of land development and commercial activity because the ideas of TOD and nodal development (Marlay & Gardner, 2010). This definition also reflects a better understanding of locals' knowledge, perceptions, and experiences. The cities' Development Codes and other planning documents (e.g., refinement plans, comprehensive plans, special area plans, etc.) provide guidance on how to identify their locations. Salem's Revised Code, Chapter 154, specifies the Central Business District as a zoning district. Trade Street, Front Street, D Street NE, and Church Street encompass this site.

The remainder of the cities do not have such a clear definition. Upon review of the City of Springfield's Downtown District Urban Design Plan and Implementation Strategy and the Economic Element of its 2030 Refinement Plan, Springfield's definition of its CBD identifies the area in its downtown bounded by Mill Street and 10th Street to the west and east and by B Street to the north and just south of Booth Kelly Road as one CBD (City of Springfield, 2013; Springfield Downtown Citizen Advisory Committee, 2010). Additionally, consistent with the goals of TOD, and accounting for Springfield's elongated form that runs east-west, it also identifies Main Street as a major center for retail activity. The City of Keizer's Comprehensive Plan Map and its River Road Renaissance Implementation Report identify a portion of River Road as its CBD (City of Keizer, 2009; Spencer & Kupper, n.d.). Just south of Plymouth Road to Chemawa Road to the north serves as the north-south boundary of this area; the east-west boundary continues approximately a quarter-mile in each direction from the road. Eugene's emphasis on its downtown, like Springfield, is clear in its Downtown Refinement Plan and its Zoning Map (City of Eugene, 2004). The area designated as its CBD is a Transit-Oriented Overlay Zone in its downtown area, which includes its downtown core just east of the Downtown Westside Special Area Zone.

Using GIS, I conducted a spatial join to change the parcel boundaries from an outline to a point (X, Y coordinates) to better measure their distances from each of the CBDs (separately for each city).[11] As the first filter for determining infill, distance from each city's CBD meant that a

[11] This GIS function normally computes the point as a centroid within the parcel. It does not necessarily reflect the precise location of the structure itself on the lot.

parcel's location had to meet or fall below a certain threshold distance from the CBD. A 1-mile buffer for Salem did not cover near the same proportion of its land compared to what a 1-mile buffer from Keizer's CBD covered. To normalize distances, I adjusted the first buffer's size proportional to the city's size, which resulted in Eugene's buffer of 2.75 miles, Keizer's buffer of 1.5 miles, Salem's buffer of 2.75 miles, and Springfield's buffer of 1.75 miles. These buffer distances captured a distance from the CBD that constituted the measurement for the innermost ring.

Upon mapping, these points clearly show the parcels' locations near the urban fringe, near the urban core, or somewhere in between. The parcels that fall outside of the buffer do not meet the definition of infill under this first buffer analysis, with the caveat that this is a cross-sectional—rather than longitudinal—analysis. To clarify, a parcel developed in the year 2003 might appear as an infill parcel in the year 2012 because it is mapped alongside other parcels further from the city's CBD that became developed after 2003.

One way to minimize the potential of overstating the amount of infill development is to look at the year in which each parcel was built; two ways to do so are: (1) obtain public parcel shapefiles for each year to accurately represent the extent of development for each year and conduct a separate analysis for each year; or (2) use the most recent public parcel shapefile that stores data for the most recently completed year (in this case, 2012) and for all previous years.

The second option yields reliable results, as the public parcel file for each city has a field that specifies the year in which each structure was built. I mapped all parcels that had addresses separately for each city. Through the "select by attribute" query, I selected parcels that were built in the year each city implemented its policy, made it a separate layer, and then repeated the process for each year until the year 2012. This approach is a visual confirmation that each city's general development patterns expanded further out as each year progressed whilst their UGBs never expanded—allowing for inference as to whether a neighborhood was "established" prior to development occurring on the parcel. This method was still unable to show whether the parcel added a new address after the date of policy adoption. There are exceptions to this general development pattern for single family homes for each city. Despite gradual outward expansion, some homes developed on parcels closer to the urban center throughout the years, which means that a criterion for a second filter is appropriate.

Considering the visual GIS analysis described above to identify historic development patterns, I conducted a second buffer analysis as an additional filter before finalizing the classification of a parcel as infill. The second filter to identify infill parcels with single family homes accounts for the shape of the cities' jurisdictional boundaries and Gurreau's (1991) observation of edge cities, or "inner-ring" suburbs that are a transition from the cities' CBDs and core areas to the outermost, newer suburbs. Their jurisdictional boundaries show that they are not perfectly circular, so some infill parcels may have been missed with the first measurement. Conversely, some parcels clearly identified on the urban fringe would count as infill if the buffer was drawn too large in the first analysis. This second buffer captures the majority of the parcels that became developed with single family homes after developers bypassed these parcels and contributed toward outward expansion in favor of outlying, greenfield areas throughout the years.

APPENDIX D

STATA OUTPUT: DESCRIPTIVE STATISTICS, CORRELATIONS, LOGISTIC REGRESSION RESULTS, MARGINAL EFFECTS, SENSITIVITY, AND SPECIFICITY TEST RESULTS

DESCRIPTIVE STATISTICS

Table A.2. Descriptive Statistics for the Entire Sample

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
eug	10323	0.2206723	0.41472	0	1
spr	10323	0.1550906	0.3620085	0	1
keiz	10323	0.0741064	0.2619566	0	1
popcnt	10323	2.084837	1.062889	0.412	6.726
popden	10323	3065.41	2497.547	40.5	22849.4
medage	10323	36.66355	5.369553	18.3	51.4
avghhsize	10323	2.641412	0.2631959	1.4	3.7
medhhinc	10323	71.90895	24.24148	18.027	650.005
prctown	10323	72.41004	17.29393	0.6	95.1
medhhval	10323	192.3999	52.89127	0	346.505
commcar	10323	90.00412	6.09994	27.1	98.9
yrbuilt	10323	2003.752	3.380343	1998	2012
totval	10323	219.728	103.0383	49.301	1691.91
acres	10323	0.1714376	0.1541525	0.0041322	6.340219
distww	10323	88.94931	127.5381	1.111153	3637.996
distsw	10323	197.7329	429.6316	0.1543407	3721.581
distrd	10323	180.4556	279.1457	0.5782273	2710.214
displo	10323	0.6603212	0.3944105	0.0177976	2.18197
mprobzon	10323	0.0389422	0.1934665	0	1
hprobzon	10323	0.0189867	0.1364846	0	1
distcbd	10323	3.771027	1.423176	0.1043364	6.932662
infilldev	10323	0.2181536	0.4130123	0	1

Table A.3. Descriptive Statistics for Eugene

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
eug	2278	1	0	1	1
spr	2278	0	0	0	0
keiz	2278	0	0	0	0
popcnt	2278	1.855946	0.747275	0.611	3.565
popden	2278	2965.798	2718.126	40.5	22849.4
medage	2278	39.32493	6.013547	19.6	50.9
avghhsize	2278	2.448683	0.279116	1.4	3
medhhinc	2278	76.3689	27.70825	18.027	650.005
prctown	2278	74.60821	19.03118	0.6	95.1
medhhval	2278	196.6748	61.5956	0	346.505
commcar	2278	86.32177	10.41864	27.1	96.3
yrbuilt	2278	2003.341	1.121839	2002	2012
totval	2278	278.789	127.8962	58.813	1691.91
acres	2278	0.185004	0.202705	0.004132	6.340219
distww	2278	91.13797	152.3194	3.273995	3637.996
distsw	2278	107.6918	84.14388	0.154341	1264.923
distrd	2278	524.6544	443.5005	2.620681	2710.214
displo	2278	0.54727	0.325837	0.031551	1.437001
mprobzon	2278	0.071554	0.257805	0	1
hprobzon	2278	0.007463	0.086083	0	1
distcbd	2278	3.575124	1.519867	0.104336	6.235824
infilldev	2278	0.304214	0.460175	0	1
sal	2278	0	0	0	0

Table A.4. Descriptive Statistics for Keizer

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
eug	765	0	0	0	0
spr	765	0	0	0	0
keiz	765	1	0	1	1
popcnt	765	3.601759	2.115126	1.121	6.726
popden	765	2802.745	2369.891	221.5	7980.3
medage	765	35.84	4.019604	27.7	42.1
avghhsize	765	2.671503	0.2543824	2	3.1
medhhinc	765	67.21206	13.534	30.302	91.741
prctown	765	70.45072	14.92202	23.7	93.5
medhhval	765	190.259	27.94032	140.609	220.211
commcar	765	91.00588	2.554717	86.1	98.9
yrbuilt	765	2000.506	3.053027	1998	2012
totval	765	208.8458	658.4622	59.560	719.840
acres	765	0.2090839	0.2364436	0.01	5.34
distww	765	96.89323	54.1024	2.066428	590.9582
distsw	765	363.7217	609.2372	0.2214601	3128.248
distrd	765	91.43114	47.1691	9.973253	449.2153
displo	765	0.3688594	0.2198362	0.0223419	0.9297249
mprobzon	765	0.1045752	0.3062054	0	1
hprobzon	765	0	0	0	0
distcbd	765	1.273521	0.6078392	0.1650842	2.730283
infilldev	765	0.4313725	0.4955919	0	1
sal	765	0	0	0	0

Table A.5. Descriptive Statistics for Salem

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
eug	5679	0	0	0	0
spr	5679	0	0	0	0
keiz	5679	0	0	0	0
popcnt	5679	1.985526	0.851325	0.412	4.414
popden	5679	3423.209	2437.963	150.3	11166.1
medage	5679	35.68183	5.116698	18.3	49.2
avghhsize	5679	2.706832	0.235437	2	3.7
medhhinc	5679	72.29674	25.92802	20.8	122.148
prctown	5679	71.59937	17.45479	11.7	94.3
medhhval	5679	197.4093	54.2376	61.943	323.226
commcar	5679	90.94983	3.408562	74.8	97.2
yrbuilt	5679	2003.726	3.668856	1998	2012
totval	5679	196.4879	91.18248	52.350	1603.6
acres	5679	0.15793	0.089255	0.034461	1.92
distww	5679	91.36714	110.909	1.111153	3571.824
distsw	5679	238.7355	514.5258	3.061476	3299.566
distrd	5679	81.62221	32.90468	0.578227	539.782
displo	5679	0.818768	0.400309	0.03833	2.18197
mprobzon	5679	0.012502	0.111122	0	1
hprobzon	5679	0.031344	0.17426	0	1
distcbd	5679	4.188894	0.990124	0.620781	6.084984
infilldev	5679	0.145448	0.352583	0	1
sal	5679	1	0	1	1

Table A.6. Descriptive Statistics for Springfield

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
eug	1601	0	0	0	0
spr	1601	1	0	1	1
keiz	1601	0	0	0	0
popcnt	1601	2.037964	0.757176	0.677	3.437
popden	1601	2063.478	2108.668	165.7	8631.6
medage	1601	36.75259	4.480856	26.1	51.4
avghhsize	1601	2.669207	0.197819	1.8	3.1
medhhinc	1601	66.4318	12.48604	22.183	93.485
prctown	1601	73.09413	14.66185	18.7	91
medhhval	1601	169.571	34.59729	19.399	211.917
commcar	1601	91.41031	4.035273	75.8	97.7
yrbuilt	1601	2005.983	3.073629	2002	2012
totval	1601	223.3289	81.76215	49.301	766.473
acres	1601	0.18206	0.195346	0.04902	4.43819
distww	1601	73.46291	163.0022	1.491548	2974.369
distsw	1601	101.0921	154.8212	6.497809	3721.581
distrd	1601	83.82443	37.34413	27.1091	555.6526
displo	1601	0.398409	0.210106	0.017798	1.014311
mprobzon	1601	0.054966	0.227984	0	1
hprobzon	1601	0.000625	0.024992	0	1
distcbd	1601	3.760904	1.570634	0.156517	6.932662
infilldev	1601	0.251718	0.434136	0	1
sal	1601	0	0	0	0

CORRELATIONS

Table A.7. Correlations for All Variables

	infill~v	eug	spr	keiz	popden	medage	avghhs~e	medhhinc	prctown	medhhval	commcar	yrbuilt	totval	acres	distww	distsw	distrd	displo	mprobzon	hprobzon
infilldev	1																			
eug	0.1109	1																		
spr	0.0348	-0.228	1																	
keiz	0.1461	-0.1505	-0.1212	1																
popden	0.1963	-0.0212	-0.1719	-0.0298	1															
medage	-0.0706	0.2638	0.0071	-0.0434	-0.4754	1														
avghhsize	-0.2853	-0.3897	0.0452	0.0323	-0.0826	-0.381	1													
medhhinc	-0.1069	0.0979	-0.0968	-0.0548	-0.4526	0.4272	0.0821	1												
prctown	-0.3522	0.0676	0.0169	-0.0321	-0.5515	0.6281	0.2822	0.5489	1											
medhhval	-0.027	0.043	-0.1849	-0.0115	-0.4907	0.3422	0.0427	0.7916	0.3628	1										
commcar	-0.3519	-0.3212	0.0988	0.0465	-0.2339	0.1016	0.4241	-0.0541	0.3695	-0.074	1									
yrbuilt	-0.0227	-0.0648	0.2827	-0.2717	-0.1719	0.0473	-0.007	0.0684	0.0214	0.053	-0.0069	1								
totval	-0.01	0.305	0.015	-0.0299	-0.3061	0.3148	-0.1529	0.3379	0.2593	0.3394	-0.0503	0.0905	1							
acres	0.0179	0.0468	0.0295	0.0691	-0.0877	0.0918	-0.0272	0.0901	0.0778	0.0908	-0.0033	-0.0461	0.3841	1						
distww	0.0051	0.0091	-0.052	0.0176	0.0137	-0.0219	0.0046	-0.0217	-0.0626	0.0406	-0.0261	-0.031	-0.0156	0.0457	1					
distsw	-0.0775	-0.1115	-0.0964	0.1093	0.1926	-0.0802	-0.0066	-0.1433	-0.1487	-0.116	-0.0024	-0.1249	-0.1563	-0.0205	0.1744	1				
distrd	-0.007	0.6562	-0.1483	-0.0902	-0.0921	0.2897	-0.2042	0.1218	0.1241	0.0713	-0.0878	-0.0395	0.2488	0.083	0.0361	-0.0806	1			
displo	-0.3834	-0.1525	-0.2845	-0.2091	-0.1697	0.051	0.2349	0.2555	0.2286	0.2929	0.1441	-0.01	0.0038	-0.0296	0.0673	0.1181	-0.0765	1		
mprobzon	0.0707	0.0897	0.0355	0.096	0.0202	-0.0258	-0.0298	-0.0346	-0.0546	-0.0139	-0.0034	-0.0128	0.0437	0.0034	-0.0056	-0.0024	0.0779	-0.0622	1	
hprobzon	0.0331	-0.0449	-0.0576	-0.0394	0.0582	-0.1205	0.0113	-0.0595	-0.0699	-0.0423	0.0171	0.0975	-0.0854	-0.0863	-0.0267	-0.0278	-0.0421	-0.038	-0.028	1

LOGISTIC REGRESSION RESULTS

Table A.8. Logistic Regression Results for Model 1 (All Variables)

```
Logistic regression                               Number of obs   =      10323
                                                  LR chi2(19)     =    3847.08
                                                  Prob > chi2     =     0.0000
Log likelihood = -3491.5029                       Pseudo R2       =     0.3552
```

infilldev	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
eug	.2725549	.1142522	2.39	0.017	.0486248	.496485
spr	.3707802	.0980507	3.78	0.000	.1786043	.562956
keiz	1.069796	.1123236	9.52	0.000	.8496455	1.289946
popden	.0002161	.0000183	11.81	0.000	.0001802	.0002519
medage	.1326767	.0136397	9.73	0.000	.1059433	.1594101
avghhsize	.3574923	.2202766	1.62	0.105	-.074242	.7892266
medhhinc	.0022281	.0039542	0.56	0.573	-.005522	.0099781
prctown	-.0598853	.004255	-14.07	0.000	-.0682249	-.0515457
medhhval	.0139306	.001342	10.38	0.000	.0113003	.0165609
commcar	-.1090989	.0076741	-14.22	0.000	-.1241397	-.094058
yrbuilt	-.0070521	.0104375	-0.68	0.499	-.0275093	.0134051
totval	-.0003527	.0003597	-0.98	0.327	-.0010577	.0003523
acres	.2278497	.2086323	1.09	0.275	-.1810621	.6367616
distww	.0001735	.0002762	0.63	0.530	-.0003679	.0007148
distsw	-.0012152	.0001309	-9.28	0.000	-.0014718	-.0009585
distrd	-.0011424	.0001746	-6.54	0.000	-.0014847	-.0008001
displo	-3.581774	.1380035	-25.95	0.000	-3.852256	-3.311292
mprobzon	.5302464	.1349812	3.93	0.000	.2656882	.7948046
hprobzon	.2391058	.2254306	1.06	0.289	-.2027301	.6809416
_cons	19.55105	20.97439	0.93	0.351	-21.55801	60.6601

Table A.9. Logistic Regression Results for Model 2 (Median Household Income Omitted)

Logistic regression	Number of obs = 10323
	LR chi2(18) = 3846.73
	Prob > chi2 = 0.0000
Log likelihood = -3491.6791	Pseudo R2 = 0.3552

infilldev	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
eug	.2727974	.1142308	2.39	0.017	.0489091	.4966857
spr	.3796105	.0968341	3.92	0.000	.1898191	.5694019
keiz	1.071163	.1123287	9.54	0.000	.851003	1.291323
popden	.0002169	.0000182	11.89	0.000	.0001811	.0002526
medage	.1331631	.0135945	9.80	0.000	.1065184	.1598079
avghhsize	.3754436	.2175623	1.73	0.084	-.0509708	.8018579
prctown	-.0588275	.0038163	-15.41	0.000	-.0663073	-.0513476
medhhval	.0145102	.0008743	16.60	0.000	.0127965	.0162238
commcar	-.109648	.0076119	-14.40	0.000	-.124567	-.094729
yrbuilt	-.0069191	.0104429	-0.66	0.508	-.0273869	.0135486
totval	-.0003542	.0003599	-0.98	0.325	-.0010595	.0003512
acres	.2277282	.2083413	1.09	0.274	-.1806132	.6360696
distww	.0001687	.0002758	0.61	0.541	-.0003719	.0007092
distsw	-.0012178	.0001309	-9.31	0.000	-.0014743	-.0009613
distrd	-.0011288	.0001727	-6.53	0.000	-.0014673	-.0007902
displo	-3.569936	.1362371	-26.20	0.000	-3.836956	-3.302916
mprobzon	.5284235	.134896	3.92	0.000	.2640321	.7928149
hprobzon	.2472258	.224736	1.10	0.271	-.1932487	.6877004
_cons	19.22766	20.98171	0.92	0.359	-21.89574	60.35106

Table A.10. Logistic Regression Results for Model 3 (Median Household Value Omitted)

Logistic regression	Number of obs	=	10323
	LR chi2(19)	=	3747.56
	Prob > chi2	=	0.0000
Log likelihood = -3541.2628	Pseudo R2	=	0.3460

infilldev	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
eug	.2783702	.1144979	2.43	0.015	.0539584	.502782
spr	.0897836	.0938617	0.96	0.339	-.0941819	.2737491
keiz	1.054369	.1199255	8.79	0.000	.8193199	1.289419
popcnt	-.0222165	.029591	-0.75	0.453	-.0802139	.0357808
popden	.0001471	.0000174	8.48	0.000	.0001131	.0001811
medage	.120082	.0134997	8.90	0.000	.0936231	.1465409
avghhsize	.0245925	.2180373	0.11	0.910	-.4027528	.4519378
medhhinc	.0372612	.0026222	14.21	0.000	.0321217	.0424006
prctown	-.0749277	.0040467	-18.52	0.000	-.0828591	-.0669963
commcar	-.1019879	.0076385	-13.35	0.000	-.1169591	-.0870166
yrbuilt	-.0135601	.0102965	-1.32	0.188	-.033741	.0066207
totval	-.0000259	.0003493	-0.07	0.941	-.0007105	.0006588
acres	.2183302	.2064358	1.06	0.290	-.1862766	.6229369
distww	.0002495	.0002889	0.86	0.388	-.0003168	.0008157
distsw	-.0012121	.0001341	-9.04	0.000	-.0014749	-.0009493
distrd	-.0013662	.0001755	-7.79	0.000	-.0017101	-.0010223
displo	-3.542285	.1375297	-25.76	0.000	-3.811839	-3.272732
mprobzon	.5617527	.1354056	4.15	0.000	.2963625	.8271428
hprobzon	.1422848	.2303009	0.62	0.537	-.3090967	.5936663
_cons	34.83147	20.68726	1.68	0.092	-5.714823	75.37777

MARGINAL EFFECTS

Table A.11. Marginal Effects Results for Model 1 (All Variables)

```
Average marginal effects                          Number of obs   =      10323
Model VCE    : OIM

Expression   : Pr(infilldev), predict()
dy/dx w.r.t. : 1.eug 1.spr 1.keiz popden medage avghhsize medhhinc prctown
               medhhval commcar yrbuilt totval acres distww distsw distrd
               displo 1.mprobzon 1.hprobzon
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.eug	.0296757	.0127748	2.32	0.020	.0046375	.0547139
1.spr	.0405931	.0110609	3.67	0.000	.0189141	.0622721
1.keiz	.1306044	.015248	8.57	0.000	.100719	.1604898
popden	.0000229	1.89e-06	12.10	0.000	.0000192	.0000266
medage	.0140479	.0014275	9.84	0.000	.0112501	.0168457
avghhsize	.0378515	.0233303	1.62	0.105	-.0078751	.0835781
medhhinc	.0002359	.0004187	0.56	0.573	-.0005847	.0010565
prctown	-.0063407	.0004375	-14.49	0.000	-.0071982	-.0054832
medhhval	.001475	.0001393	10.59	0.000	.001202	.001748
commcar	-.0115514	.0007787	-14.83	0.000	-.0130777	-.0100252
yrbuilt	-.0007467	.001105	-0.68	0.499	-.0029125	.0014191
totval	-.0000373	.0000381	-0.98	0.327	-.000112	.0000373
acres	.0241249	.0220843	1.09	0.275	-.0191595	.0674092
distww	.0000184	.0000292	0.63	0.530	-.0000389	.0000757
distsw	-.0001287	.0000137	-9.42	0.000	-.0001554	-.0001019
distrd	-.000121	.0000184	-6.58	0.000	-.000157	-.0000849
displo	-.3792402	.0130903	-28.97	0.000	-.4048968	-.3535836
1.mprobzon	.0607062	.0165574	3.67	0.000	.0282543	.0931581
1.hprobzon	.026312	.025729	1.02	0.306	-.0241158	.0767399

Note: dy/dx for factor levels is the discrete change from the base level.

Table A.12. Marginal Effects Results for Model 2 (Median Household Income Omitted)

```
Average marginal effects                          Number of obs   =      10323
Model VCE    : OIM

Expression   : Pr(infilldev), predict()
dy/dx w.r.t. : 1.eug 1.spr 1.keiz popden medage avghhsize prctown medhhval
               commcar yrbuilt totval acres distww distsw distrd displo
               1.mprobzon 1.hprobzon
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.eug	.0297009	.0127722	2.33	0.020	.0046678	.054734
1.spr	.0415831	.0109372	3.80	0.000	.0201465	.0630197
1.keiz	.130766	.0152489	8.58	0.000	.1008787	.1606533
popden	.000023	1.88e-06	12.19	0.000	.0000193	.0000267
medage	.0140986	.0014226	9.91	0.000	.0113105	.0168868
avghhsize	.0397501	.0230427	1.73	0.085	-.0054129	.084913
prctown	-.0062284	.0003895	-15.99	0.000	-.0069917	-.005465
medhhval	.0015363	.0000882	17.42	0.000	.0013634	.0017091
commcar	-.011609	.0007717	-15.04	0.000	-.0131215	-.0100964
yrbuilt	-.0007326	.0011055	-0.66	0.508	-.0028993	.0014342
totval	-.0000375	.0000381	-0.98	0.325	-.0001122	.0000372
acres	.0241107	.0220523	1.09	0.274	-.019111	.0673324
distww	.0000179	.0000292	0.61	0.541	-.0000394	.0000751
distsw	-.0001289	.0000137	-9.44	0.000	-.0001557	-.0001022
distrd	-.0001195	.0000182	-6.57	0.000	-.0001551	-.0000839
displo	-.3779668	.0128819	-29.34	0.000	-.4032148	-.3527187
1.mprobzon	.0604738	.016536	3.66	0.000	.0280639	.0928837
1.hprobzon	.0272371	.0257075	1.06	0.289	-.0231487	.0776229

Note: dy/dx for factor levels is the discrete change from the base level.

Table A.13. Marginal Effects Results for Model 3 (Median Household Value Omitted)

```
Average marginal effects                          Number of obs   =      10323
Model VCE    : OIM

Expression   : Pr(infilldev), predict()
dy/dx w.r.t. : 1.eug 1.spr 1.keiz popden medage avghhsize medhhinc prctown
               commcar yrbuilt totval acres distww distsw distrd displo
               1.mprobzon 1.hprobzon
```

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
1.eug	.0313479	.0130137	2.41	0.016	.0058414	.0568543
1.spr	.0101079	.0102775	0.98	0.325	-.0100356	.0302515
1.keiz	.1261889	.0152414	8.28	0.000	.0963163	.1560615
popden	.0000161	1.80e-06	8.95	0.000	.0000126	.0000197
medage	.0130773	.0014238	9.18	0.000	.0102866	.0158679
avghhsize	.0039233	.0233953	0.17	0.867	-.0419306	.0497772
medhhinc	.0040107	.0002734	14.67	0.000	.0034748	.0045466
prctown	-.0080783	.0004114	-19.64	0.000	-.0088846	-.0072719
commcar	-.01106	.0007843	-14.10	0.000	-.0125971	-.0095229
yrbuilt	-.0014845	.0011073	-1.34	0.180	-.0036548	.0006859
totval	-3.17e-06	.0000376	-0.08	0.933	-.0000768	.0000705
acres	.0239311	.0221452	1.08	0.280	-.0194726	.0673348
distww	.0000287	.0000308	0.93	0.353	-.0000318	.0000891
distsw	-.00013	.0000142	-9.16	0.000	-.0001578	-.0001022
distrd	-.0001476	.0000187	-7.89	0.000	-.0001842	-.0001109
displo	-.3809091	.0133181	-28.60	0.000	-.4070121	-.3548062
1.mprobzon	.0662451	.0170515	3.88	0.000	.0328247	.0996655
1.hprobzon	.0156372	.0259098	0.60	0.546	-.035145	.0664195

Note: dy/dx for factor levels is the discrete change from the base level.

Sensitivity and Specificity Test Results

Table A.14. Sensitivity and Specificity for Model 1

```
. estat classification

Logistic model for infilldev

              -------- True --------
Classified |         D            ~D  |      Total
-----------+--------------------------+-----------
     +     |      1107           371  |       1478
     -     |      1145          7700  |       8845
-----------+--------------------------+-----------
   Total   |      2252          8071  |      10323

Classified + if predicted Pr(D) >= .5
True D defined as infilldev != 0
--------------------------------------------------
Sensitivity                     Pr( +| D)   49.16%
Specificity                     Pr( -|~D)   95.40%
Positive predictive value       Pr( D| +)   74.90%
Negative predictive value       Pr(~D| -)   87.05%
--------------------------------------------------
False + rate for true ~D        Pr( +|~D)    4.60%
False - rate for true D         Pr( -| D)   50.84%
False + rate for classified +   Pr(~D| +)   25.10%
False - rate for classified -   Pr( D| -)   12.95%
--------------------------------------------------
Correctly classified                        85.31%
--------------------------------------------------
```

Table A.15. Sensitivity and Specificity for Model 2

```
. estat classification

Logistic model for infilldev

              -------- True --------
Classified |         D            ~D  |      Total
-----------+--------------------------+-----------
     +     |      1074           394  |       1468
     -     |      1178          7677  |       8855
-----------+--------------------------+-----------
   Total   |      2252          8071  |      10323

Classified + if predicted Pr(D) >= .5
True D defined as infilldev != 0
--------------------------------------------------
Sensitivity                     Pr( +| D)   47.69%
Specificity                     Pr( -|~D)   95.12%
Positive predictive value       Pr( D| +)   73.16%
Negative predictive value       Pr(~D| -)   86.70%
--------------------------------------------------
False + rate for true ~D        Pr( +|~D)    4.88%
False - rate for true D         Pr( -| D)   52.31%
False + rate for classified +   Pr(~D| +)   26.84%
False - rate for classified -   Pr( D| -)   13.30%
--------------------------------------------------
Correctly classified                        84.77%
--------------------------------------------------
```

Table A.16. Sensitivity and Specificity for Model 3

```
. estat classification

Logistic model for infilldev

              -------- True --------
Classified |         D            ~D  |      Total
-----------+--------------------------+-----------
     +     |      1110           370  |       1480
     -     |      1142          7701  |       8843
-----------+--------------------------+-----------
   Total   |      2252          8071  |      10323

Classified + if predicted Pr(D) >= .5
True D defined as infilldev != 0
--------------------------------------------------
Sensitivity                     Pr( +| D)   49.29%
Specificity                     Pr( -|~D)   95.42%
Positive predictive value       Pr( D| +)   75.00%
Negative predictive value       Pr(~D| -)   87.09%
--------------------------------------------------
False + rate for true ~D        Pr( +|~D)    4.58%
False - rate for true D         Pr( -| D)   50.71%
False + rate for classified +   Pr(~D| +)   25.00%
False - rate for classified -   Pr( D| -)   12.91%
--------------------------------------------------
Correctly classified                        85.35%
--------------------------------------------------
```

REFERENCES CITED

1000 Friends of Oregon. (2008, October 3). Report says Oregon land-use plan is working. *Daily Journal of Commerce*. Retrieved from http://www.friends.org/news/20081003_daily_journal_commerce_land_use_working

Anthony, J. (2004). Do State Growth Management Regulations Reduce Sprawl? *Urban Affairs Review, 39*(3) 376-397.

Arnstein, S. R. (July 01, 1969). A Ladder of Citizen Participation. *Journal of the American Institute of Planners, 35,* 4, 216-224.

Berman, E. M. (2007). *Essential statistics for public managers and policy analysts*. Washington, D.C.: CQ Press.

Big Look Task Force on Oregon Land Use Planning. (2009). *The Big Look*. Final Report to the 2009 Oregon Legislature. State of Oregon, Department of Land Conservation and Development. Retrieved from http://www.oregon.gov/LCD/docs/budget/wm2009/b4-Big_Look_Report.pdf

Boarnet, M., Joh, K., Siembab, W., Fulton, W., & Mai, T. N. (2011). Retrofitting the Suburbs to Increase Walking: Evidence from a Land-Use-Travel Study. *Urban Studies,* 48(1), 129-159.

Bollens, S. A. (1992). State Growth Management: Intergovernmental Frameworks and Policy Objectives. *Journal- American Planning Association,* 58(4), 454.

Boschken, H. L. (1982). *Land use conflicts: Organizational design and resource management*. Urbana: University of Illinois Press.

Brueckner, J. (2000). Urban Sprawl: Diagnosis and Remedies. *International Regional Science Review*. 23(2), 160-171.

Burchell, R. W., United States [U.S.], Transit Cooperative Research Program, Transit Development Corporation, & National Research Council. (2001). *Costs of Sprawl-2000*. Washington, D.C.: National Academy Press.

Calthorpe, P., & Fulton, W. B. (2001). *The Regional City: Planning for the end of sprawl*. Washington, D.C.: Island Press.

Campbell C.E., Allen J., Lu K.S. (2008). Modeling growth and predicting future developed land in the upstate of South Carolina. *Proceedings of the 2008 South Carolina Water Resources Conference*, Clemson University Restoration Institute, Clemson.

Carrión-Flores, C., & Irwin, E. G. (2004). Determinants of Residential Land-Use Conversion and Sprawl at the Rural-Urban Fringe. *American Journal of Agricultural Economics, 86*(4), 889-904.

Carruthers, J. I. (2002). The Impacts of State Growth Management Programmes: A Comparative Analysis. *Urban Studies,* 39(11), 1959-1982.

City of Eugene, OR. (2014). *Chapter 9: Land Use. Eugene Development Code*. Retrieved from http://www.eugene-or.gov/index.aspx?NID=2128

City of Eugene, OR. (2004). *Eugene Downtown Plan*. Archive Center. Retrieved from http://www.eugene-or.gov/Archive.aspx?ADID=57

City of Eugene, OR. (n.d.). Current Projects: Infill Compatibility Standards. http://www.eugene-or.gov/index.aspx?nid=794 .

City of Keizer, OR. (2001, December 3). *Keizer City Council Regular Session in the Matter of Adopting the Infill and Redevelopment Master Plan; Amending the Keizer Comprehensive Plan (Ordinance No. 87-077) and the Keizer Development Code (Ordinance No. 98-389)*. Retrieved from http://keizer.org/?action=page&name=Public%20Record%20Retrieval%20System

City of Keizer, OR. (2009). Comprehensive Plan Designations Map. Retrieved from http://www2.keizer.org/index.plx?action=page&name=COMM%20DEV%20-%20MAPS

City of Keizer, OR. (2013, October 21). *Keizer City Council Regular Session Minutes Concerning Administrative Action Item 6a*. Retrieved from http://keizer.org/?action=page&name=Public%20Record%20Retrieval%20System

City of Salem, OR. (2009, November 9). Community Development Department report to the Salem Mayor and the Salem City Council. Amendments to the Salem Revised Code Regarding the Definitions of "Flag Lot" and "Accessway" and Clarifying that Minimum Lot Width, Depth, and Frontage must be Calculated Exclusive of the Flag Lot Accessway. Salem Revised Code Chapter 63: Subdivisions. Retrieved from www.cityofsalem.net/.../Future%20Report%20%20Ord%2054-09.pdf

City of Salem, OR. (1985). *City of Salem v. Families for Respons. Govt*., 694 P.2d 965 (1985), Supreme Court of Oregon, en banc., Argued and Submitted March 7, 1984.

City of Springfield, OR. (2008, March 18). Minutes of the Springfield Planning Commission Work Session. Retrieved from http://www.springfield-or.gov/dpw/CommunityPlanningDevelopment/SupportFiles/2030Plan/RLS/PlanningCommissionPrioritization.pdf

City of Springfield, OR. (2013, January 10). Metro Plan Amendment LRP 2009-00014. *Springfield 2030 Refinement Plan: Economic Element*. Draft 3.

DeGrove, J. M., & Lincoln Institute of Land Policy. (2005). *Planning policy and politics: Smart Growth and the states*. Cambridge, Mass: Lincoln Institute of Land Policy.

DeGrove, J. M., & American Planning Association. (1984). *Land, Growth & Politics*. Washington, D.C.: Planners Press, American Planning Association.

DeGrove, J. M., Stroud, N. E., United States, & National Academy of Public Administration. (1980). *Oregon's state urban strategy*. Washington, D.C.: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Downs, A. (2005). Smart Growth: Why we discuss it more than we do it. *Journal of the American Planning Association,* 71(4), 367.

Duany, A., Plater-Zyberk, E., Speck, J. (2000). *Suburban Nation: the rise of sprawl and the decline of the American dream*. New York, North Point Press.

ECONorthwest. (2009a). Springfield Residential Land and Housing Needs Analysis. Retrieved from http://www.ci.springfield.or.us/dpw/CommunityPlanningDevelopment/SupportFiles/2030Plan/RLS/DRAFT_RLS_12-09.pdf

ECONorthwest. (2009b, June 18). *Preliminary Residential Infill and Redevelopment Analysis*. Presented to the City of Eugene Community Advisory Committee. Retrieved from http://www.eugene-or.gov/Search/Results?searchPhrase=Preliminary%20Residential%20Infill%20and%20Redevelopment%20Analysis&page=1&perPage=10

ECONorthwest. (2011). *Final Salem-Keizer Housing Needs Analysis, 2012-2032*. Retrieved from http://www.mwvcog.org:8080/2/document-folder/eoa/20144%20Salem%20Keizer%20HNA%20DRAFT.pdf

Ellerbusch, F. (2006). Brownfields: Risk, Property, and Community Value. *Local Environment, 11*(5), 559-575. DOI: 10.100/13549830600853486. New Jersey: Routledge.

Ewing, R. H., Pendall, R., & Chen, D. D. T. (2002). *Measuring sprawl and its impact*. Washington, D.C.: Smart Growth America.

Ewing, R., & Cervero, R. (2010). Travel and the built environment. *Journal of the American Planning Association, 76*(3), 265-294.

Feijten, P., Hooimeijer, P., & Mulder, C. H. (2008). Residential Experience and Residential Environment Choice over the Life-course. *Urban Studies (sage Publications, Ltd.), 45*(1).

Fennell, L. A. (2004). Common Interest Tragedies. *Northwestern University Law School Review, 98*(3), 907-990.

Ferris, J.T. (2001). The Barriers to Using Urban Infill Development to Achieve Smarter Growth. *Housing Policy Debate, 12*(1), 1-30.

Fischel, W. A. (2001). *The homevoter hypothesis: How home values influence local government taxation, school finance, and land-use policies*. Cambridge, Mass: Harvard University Press.

Fischer, Claude S. (1995). The Subcultural Theory of Urbanism: A Twentieth Year Assessment. *The American Journal of Sociology, 101*(3), 543-577.

Frece, J. W. (2008). *Sprawl & politics: The inside story of smart growth in Maryland*. Albany: State University of New York Press.

Frumkin, Howard, et al. *Urban Sprawl and Public Health: Designing, Planning, and Building for Healthy Communities*. Washington D.C..: Island Press, 2004.

Fulton, W. B., Pendall, R., Nguyen, M., Harrison, A., & Brookings Institution. (2001). *Who sprawls most?: How growth patterns differ across the U.S*. Washington, D.C.: Brookings Institution, Center on Urban and Metropolitan Policy.

Funders' Network. (2004). *Energy and Smart Growth.*

Garde, A. (2005). New Urbanism as sustainable growth? A supply side story and its implications for public policy. *Sage Urban Studies Abstracts, 33*(2).

Gordon, P., & Richardson, H. W. (2000). Defending suburban sprawl. *Public Interest*.

Gordon, P., & Richardson, H. W. (1997). Are compact cities a desirable planning goal? *Journal of the American Planning Association, 63*(1).

Garreau, J. (1991). *Edge city: Life on the new frontier*. New York: Doubleday.

Hanlon, B., Howland, M., & McGuire, M. (2010). *Hotspots for Growth: Land Use Change and Priority Funding Area Policy in a Transitional County in the U.S*. National Center for Smart Growth Research & Education. Retrieved from http://smartgrowth.umd.edu/hotspotsforgrowth.html

Haughey, R. (2005). *Higher Density Development: Myth and Fact*. Washington D.C.: Urban Land Institute.

Haughey, R. (2003). *The Case for Multifamily Housing*. Washington D.C.: Urban Land Institute.

Haughey, R. (2001). *Urban Infill Housing: Myth and Fact*. Washington D.C.: Urban Land Institute.

Heid, J. (2004). "Greenfield Development without Sprawl: The Role of Planned Communities." Washington D.C.: Urban Land Institute.

Howell-Moroney, M. (2007). Studying the Effects of the Intensity of U.S. State Growth Management Approaches on Land Development Outcomes. *Urban Studies, 44*(11), 2163-2178.

Infill Compatibility Standards [ICS] Task Team. (2008, December 10). Project Update to the Eugene City Council.

Ingram, G. K.; Carbonell, A.; Hong, Y.H.; & Flint, A. (2009). *Smart growth policies: An evaluation of programs and outcomes*. Cambridge, Mass: Lincoln Institute of Land Policy.

International City/County Management Association (ICMA). (2002). *Measuring Success in Brownfields Redevelopment Programs*.

Irvin, R. A., & Stansbury, J. (2004). Citizen Participation in Decision Making: Is It Worth the Effort? *Public Administration Review, 64*(1), 55-65.

Kidd, J. (1997, December 9). Council adopts growth management tools. *Eugene Register Guard*. Retrieved from http://news.google.com/newspapers?nid=1310&dat=19971209&id=O01WAAAAIBAJ&sjid=7-sDAAAAIBAJ&pg=6936,2218695

Knaap, G.; Meck, S.; Moore, T.; Parker, R.; & American Planning Association. (2007). *Zoning as a barrier to multifamily housing development*. Chicago, IL: American Planning Association.

Lane Council of Governments (LCOG). (2004). *Metro Plan: Eugene-Springfield Metropolitan Area General Plan*. 2004 Update. Retrieved from http://www.lcog.org/documents/metro/METROPLAN_currentto12-31-10.pdf

Lange, D.A. & McNeil, S. (2004). Clean it and they will come? Defining Successful Brownfield Development. *Journal of the American Planning Association, 130*(2), 101-108.

Lerman, B. R. (2006). Mandatory Inclusionary Zoning: The Answer to the Affordable Housing Problem. *Boston College Environmental Affairs Law Review, 33*(2), 383.

Levine, J., & Frank, L. (2007). Transportation and Land-Use Preferences and Residents' Neighborhood Choices: The Sufficiency of Compact Development in the Atlanta Region. *Transportation, 34*(2), 255-274.

Levine, J. (2005). *Zoned out: Regulation, markets, and choices in transportation and metropolitan land-use*. Washington, D.C.: Resources for the Future.

Levinson, D. M., & Krizek, K. J. (2008). *Planning for place and plexus: Metropolitan land use and transport*. New York: Routledge.

Lewis, P. G. & Baldassare, M. (2010). The Complexity of Public Attitudes Toward Compact Development. *Journal of the American Planning Association*, *76*(2), 219-237.

Litman, T. (2010). *Where we want to be: home location preferences and their implications for smart growth*. Victoria Transportation Policy Institute.

Marlay, M., & Gardner, T.K. (2010). Identifying Concentrations of Employment in Metropolitan Areas. U.S. Census Bureau. Retrieved from http://www.census.gov/population/www/cen2000/EmploymentClusters-Methods.pdf

Morrow-Jones, H., Irwin, E., & Roe, B. (May 01, 2006). Consumer Preference for Neotraditional Neighborhood Characteristics. *Sage Urban Studies Abstracts, 34*(2).

Mukhija, V., Regus, L., Slovin, S., & Das, A. (2010). Can Inclusionary Zoning Be an Effective and Efficient Housing Policy? Evidence from Los Angeles and Orange Counties. *Journal of Urban Affairs, 32*(2), 229-252.

Nelson, A. (2009). The New Urbanity: The Rise of a New America. *The annals of the American Academy of Political and Social Science*. 626, 192-208.

O'Halloran, S. (n.d.) Lecture 9: Logit/Probit. Sustainable Development U9611, Econometrics II. Columbia University. Retrieved from http://www.columbia.edu/~so33/SusDev/Lecture_9.pdf

Oregon Administrative Rule (OAR) 660-007-0000. (2014). Metropolitan Housing. Division 7. Retrieved from http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_660/660_007.html

Oregon Department of Land Conservation and Development (DLCD). (2009). *Big Look Task Force Identifies Key Issues for Change to Oregon's Land Use System*. State of Oregon, U.S. Retrieved from *library.state.or.us/repository/2009/200904181153586/index.pdf*

Oregon Department of Land Conservation and Development (DLCD) & Oregon State University (OSU). (2008). *The Oregon Land Use Program: An assessment of selected goals (Draft Final Report)*. Corvallis, OR: Institute for Natural Resources.

Oregon Statewide Planning Goal 1. (n.d.). Citizen Involvement. Retrieved from http://www.oregon.gov/LCD/docs/goals/goal01.pdf

Oregon Statewide Planning Goal 10. (n.d.). Housing. Retrieved from http://www.oregon.gov/LCD/docs/goals/goal10.pdf

Oregon Statewide Planning Goal 14. (2006). Urbanization. Retrieved from http://www.oregon.gov/LCD/docs/goals/goal14.pdf

O'Toole, R., & Cato Institute. (2007). *Debunking Portland: The city that doesn't work*. Washington, D.C.: Cato Institute.

Patton, Carl V. & Sawiki, David S. (1986). *Basic Methods of Policy Analysis and Planning*. New Jersey: Prentice Hall.

Porter, D. R. (2008). *Managing growth in America's communities*. Washington, D.C.: Island Press.

Porter, D. R., et al. (2000). *The practice of sustainable development*. Washington, D.C.: Urban Land Institute.

Rowley, A. (1996). Mixed-use Development: ambiguous concept, simplistic analysis and wishful thinking?. *Planning Practice & Research, 11*(1).

Shoup, D. (2008). Graduated Density Zoning. *Journal of Planning Education and Research, 28*(161). Sage Publications.

Simons, R. R. (1998). *Turning Brownfields into Greenbacks*. Washington D.C.: Urban Land Institute.

Song, Y., & Knaap, G.-J. (2004). Measuring Urban Form: Is Portland Winning the War on Sprawl?. *Journal of the American Planning Association, 70*(2), 210.

Smart Growth Network. (2006). "This is Smart Growth."

Spencer & Kupper. (n.d.). *Keizer River Road Renaissance Implementation Report*. Retrieved from http://www.keizer.org/commdev/rrr/reportfinal.pdf

Springfield Downtown Citizen Advisory Committee. (2010). Downtown District Urban Design Plan and Implementation Strategy. Retrieved from http://www.ci.springfield.or.us/dpw/CommunityPlanningDevelopment/SupportFiles/DowntownPlanning/DowntownDistrictPlan.pdf

Stone, B. J. (2003). Air Quality by Design: Harnessing the Clean Air Act to Manage Metropolitan Growth. *Journal of Planning Education and Research*, *23*(2), 177-190.

Suchman, D. R., & Urban Land Institute [ULI]. (2002). *Developing successful infill housing*. Washington, D.C.: Urban Land Institute.

Talen, E. (2001). Traditional Urbanism Meets Residential Affluence: An Analysis of the Variability of Suburban Preference. *Journal of the American Planning Association*, *67*(2), 199-216.

Talen, E., & Ellis, C. (2002). Beyond Relativism: Reclaiming the Search for Good City Form. *Journal of Planning Education and Research, 22*(1), 36-49.

Talen, E., & Knaap, G. (2003). Legalizing Smart Growth: An Empirical Study of Land Use Regulation in Illinois. *Journal of Planning Education and Research,* 22(4), 345-359.

Tarnay, S. (2004). *Barriers and Solutions to Land Assembly for Infill Development*. Urban Land Institute. Retrieved from http://www.uli.org/wp-content/uploads/2012/07/LandAssembly.ashx_.pdf

Taylor, R. (1996). Neighborhood Responses to Disorder and Local Attachments: The Systemic Model of Attachment, Social Disorganization, and Neighborhood Use Value. *Sociological Forum*, *11*(1), 41-74.

U.S., Smart Growth Network, & International City/County Management Association [ICMA]. (2003). *Getting to smart growth II: 100 more policies for implementation*. Washington, D.C.: Smart Growth Network.

U.S. Census Bureau. (2009). *A Compass for Understanding and Using American Community Survey Data: What State and Local Governments Need to Know*. Retrieved from http://www.census.gov/acs/www/Downloads/handbooks/ACSstateLocal.pdf

U.S. Census Bureau. (2013). Guidance for Data Users: When to use 1-year, 3-year, or 5-year estimates. Retrieved from http://www.census.gov/acs/www/guidance_for_data_users/estimates/

U.S. Census Bureau. (2014). Geographic Terms and Concepts: Census Tract. Retrieved from http://www.census.gov/geo/reference/gtc/gtc_ct.html

U.S. Census Bureau. (n.d.). Local Census Statistical Areas Committees and Other Assistance. Retrieved from http://www.census.gov/geo/reference/pdfs/GARM/Ch3GARM.pdf; and

U.S. Census Bureau. Definitions of Geographic Concepts, Guide to the 1997 Economic Census. Retrieved from http://www.census.gov/epcd/www/g97geo2.htm

U.S. Environmental Protection Agency [EPA]. (2007). *Measuring the Air Quality and Transportation Impacts of Infill Development*. Washington D.C.: United States Environmental Protection Agency.

Urban Land Institute [ULI]. (2006). *An Advisory Services Panel Report: Salem, Oregon*. Washington D.C.: Urban Land Institute.

Wu, B., Huang, B., & Fung, T. (2009). Projection of Land Use Change Patterns Using Kernel Logistic Regression. *Photogrammetric Engineering and Remote Sensing, 75*(8), 971-980.

Yang, Y. (2008). A Tale of Two Cities: Physical Form and Neighborhood Satisfaction in Metropolitan Portland and Charlotte. *Journal of the American Planning Association, 74*(3), 307-332.

Zhou, B., & Kockelman, K. (2008). Neighborhood impacts on land use change: A Multinomial Logit Model of Spatial Relationships. *The Annals of Regional Science, 42*(2), 321-340.