“IT TAKES A VILLAGE?”: ASSESSING ECONOMIC AND SOCIAL EQUITY OUTCOMES UNDER SEATTLE’S URBAN VILLAGES POLICY

A Thesis

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by

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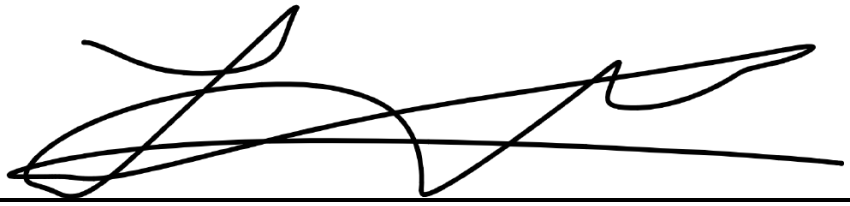

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ABSTRACT

The coupling of rapid economic and population growth in urban areas around the world presents both opportunities and challenges, particularly within the realms of equity and sustainability. Over the last 50 years, the City of Seattle has witnessed this fast-paced growth firsthand; to manage it, the city implemented a novel planning policy in its 1994 comprehensive plan: the Urban Village Element. Originally designed to promote equitable and sustainable development in delineated villages, the plan has faced challenges in speeding redevelopment, spurring housing construction, and securing an equitable future for city residents. This paper centers itself around a qualitative and quantitative study of urban equity-determining factors, implementing a difference-in-differences approach to estimate the average treatment effect of Seattle's urban villages policy on social equity relative to neighborhoods outside of villages. This paper concludes by extrapolating those findings to present-day conversations about urban densification and growth management, including the 15-Minute City.

BIOGRAPHICAL SKETCH

Lucien Carl Wostenholme is currently in his 4th year of study at Cornell University, enrolled in the College of Architecture, Art, and Planning and the College of Arts and Sciences. In May 2023, he will graduate with a concurrent degree: a Bachelor of Science with Honors in Urban and Regional Studies and a Bachelor of Arts in Economics.

Lucien was born in New York City and raised in Great Neck, NY. In the summer of 2021, Lucien interned at the Port Authority of New York and New Jersey, a public bistate agency that manages air, land, rail, and sea infrastructure in the New York Metropolitan Area. In his time at the Port Authority, Lucien was a part of the Major Capital Projects division, contributing to the environmental review of the $10 billion Port Authority Bus Terminal Replacement. The following summer, he interned at Ernst & Young Infrastructure Advisors, providing financial consulting services to U.S.-based government and urban planning clients undertaking major infrastructure projects. Upon graduation, Lucien will join Ernst & Young Infrastructure Advisors full-time as an analyst in New York City.

Outside of academics, Lucien served as the 21st President of Cornell Consulting, the leading student-run consulting firm on campus, and as the 131st Tapping Chair of the Quill and Dagger Senior Honor Society. He is or has previously been active in many project teams and organizations at Cornell University. He enjoys outdoor sports, road trips, making music, and spending time with family and friends.

To my mom, Julie; dad, Martin; and brother, Oscar, who have supported me every step of the way, and to John Carruthers, who introduced me to the world of research and urban economics in spring 2020.

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This thesis is, literally and figuratively, the capstone of my college career, blending my two majors, two colleges, and many on-campus activities into one paper. I'd like to thank my parents, Martin and Julie Wostenholme, for supporting me every step of the way during my time at Cornell. Through thick and thin, through semesters here on campus and the two-and-a-half semesters at home during the COVID-19 pandemic, you have always been there for me. I'd like to thank my brother, Oscar Wostenholme, for his advice, open ear, deep friendship, and well-timed jokes. I'd like to thank my advisor, Professor John Carruthers, for his tireless support of my academic endeavors, for his inspiring mentorship, and for thinking of me when launching the Seattle project in the summer of 2020. I'd like to thank Cornell Consulting for building my career and project skills, equipping me with the mindset and experience necessary to complete this undertaking. And last but not least, I'd like to thank my friends for always being there for me at Cornell and beyond, and for supporting me, workshopping this idea, and offering to read my thesis drafts in many different places—it has meant so much to me.

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LIST OF ABBREVIATIONS

ATET	Average Treatment Effect on the Treated
BIPOC	Black, Indigenous, and People of Color
COVID-19	Coronavirus Disease 2019
DID	Difference-in-Differences
GIS	Geographic Information Systems
GMA	Growth Management Act
RSECI	Race and Social Equity Composite Index
RTA	Greater Cleveland Regional Transit Authority
SE	Standard Error
SOM	Self-Organizing Map
TOD	Transit-Oriented Development
UGB	Urban Growth Boundary

LIST OF SYMBOLS

β	generic symbol for coefficient
$BIPOC_{it}$	percentage of the residents in tract *i* that identify as BIPOC in year *t*
CTR_{it}	binary interaction term equal to 1 if tract *i* is wholly or partly within an urban center and is in the post-implementation phase of the Urban Village Element
D_{it}	percentage of residents in tract *i* with an educational attainment status of less than a bachelor's degree in year *t*
ε_{it}	error term in tract *i* in year *t* for the RSECI component regression
G_{it}	percentage of residents in tract *i* that speak English less than very well in year *t*
HUV_{it}	binary interaction term equal to 1 if tract *i* is wholly or partly within a hub urban village and is in the post-implementation phase of the Urban Village Element
p	p-value
P_{it}	binary indicator that takes the value of 1 if time *t* is post-implementation of the Urban Village Element for tract *i*
Q_{it}	RSECI in tract *i* in year *t*
$\widehat{Q_{it}}$	fitted RSECI values in tract *i* in year *t*
R^2	R-squared value
S_i	fixed-effects variable for the sector of tract *i* to account for local spatial effects
U_i	binary indicator that takes the value of 1 if tract *i* is wholly or partly within an urban village
u_{it}	error term in tract *i* in year *t* for the primary and secondary models

$U_i P_{it}$	binary interaction term equal to 1 if tract *i* is wholly or partly within a village and is in the post-implementation phase of the Urban Village Element
X_{it}	average life expectancy of residents in tract *i* in year *t*
Y_t	fixed-effects variable for year *t* to account for temporal effects

1 Chapter 1: Introduction

1.1 Equity in the Planning Context

The coupling of rapid population and economic growth, particularly in the urban context, presents both opportunities and challenges, and can have adverse effects if not managed and distributed fairly. Massive increases in output, productivity, and innovation in cities must be met with a corresponding increase in awareness for equity in planning decisions. In the urban and spatial setting, policymakers, city planners, and urban scholars have coalesced around the idea that equity means (1) minimizing or eliminating disadvantages in the city and (2) establishing a baseline level of access to the opportunities and amenities that enable people to live happy and healthy lives.[1]

Many policymakers and scholars trace the beginnings of equity considerations in American municipal planning to 1969, when Norman Krumholz, director of the Cleveland City Planning Commission, implemented a novel agenda centered around activism on behalf of the least privileged residents in the city.[2] In his words, the overarching goal of his commission was "to provide a wider range of choices for those Cleveland residents who have few, if any, choices."[3] In recent years, much of the research into equity planning has focused on creating data-driven tools with which policymakers can assess accessibility and inclusion, including accessibility in transit, healthcare access, and job opportunity.[4]

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[1] Neutens, Tijs; Schwanen, Tim; Witlox, Frank; De Maeyer, Philippe. "Equity of urban service delivery: a comparison of different accessibility measures." *Environment and Planning*. Vol. 42, 2010: 1613-1635.

[2] Krumholz, Norman, "A Retrospective View of Equity Planning Cleveland 1969–1979," *Journal of the American Planning Association*, Vol. 48, No. 2 (1982): 163-174.

[3] Ibid., 163.

[4] Mayaud, Jerome R.; Tran, Martino; Nuttal, Rohan. "An urban data framework for assessing equity in cities: Comparing accessibility to healthcare facilities in Cascadia." *Computers, Environment and Urban Systems*, Vol. 78, 2019: 1-12.

If the benefits of growth are to be shared fairly in cities, it is imperative that planners and policymakers have the ability to—as recent research methods and frameworks have enabled—measure and quantify *specific* equity-determining factors in municipal regions. This paper implements data-driven analyses to measure those factors in the city of Seattle. However, it is also imperative that municipalities understand the quantitative and qualitative equity impacts of their policies *holistically*. This paper also assesses the output of its data models in the context of Seattle's current stage as a growing metropolis, one that is studying a potential planning pivot as it strives to accommodate its anticipated future development.

1.2 Emerald City, Red-Hot Growth

An emerald city of beautiful greenery and breathtaking scenery, Seattle is the urban gateway to the Puget Sound and to the larger Pacific Northwestern region of the United States. Banked by the Pacific Ocean to the west, the Cascade Range to the east and south, and the Canadian border to the north, Seattle is physically distant from much of the country. Yet, despite its geographical solitude, the city has—on a macro level—grown and thrived economically over the last 50 years. Since 1950, the population of the city has grown by a quarter million, reaching nearly 740,000 in the 2020 U.S. Census, and is projected to grow by another quarter million by 2044.[5] The Seattle Metropolitan Area has long been the most important region for the American aerospace industry, home to two major production facilities for Boeing.[6] In addition to its aerospace core, the city has become a major agglomeration economy anchored by major tech firms such as Microsoft and Amazon.[7]

[5] U.S. Census Bureau, 2020 Decennial Census. https://data.census.gov/all?q=seattle+wa

[6] U.S. Bureau of Labor Statistics. "Occupational Employment and Wage Statistics," May 2021. Accessed March 15, 2023. https://www.bls.gov/oes/current/oes172011.htm

[7] Wei, Hanxue; Wostenholme, Lucien; Carruthers, John. "Planning and Markets at Work: Seattle under Growth Management and Economic Pressure," *Sustainability*, Vol. 13 (2021): 1-18.

Seattle's significant economic and population growth, discussed further in Chapter 2, has necessitated strategic approaches for mitigating sprawl and managing its high levels of new development. The core focus of this thesis is on the equity effects of one particular strategy: the Urban Village Element of Seattle's Comprehensive Plan of 1994. Entitled *Towards a Sustainable Seattle*, the city's comprehensive plan was mandated by Washington State's Growth Management Act (GMA) of 1990, legislation that required the state's major cities to create long-term planning strategies for managing their expected growth.[8] The urban villages approach has directed the vast majority of new growth into specific, delineated areas of the city, each designated as one of four types of urban villages (Figure 1).

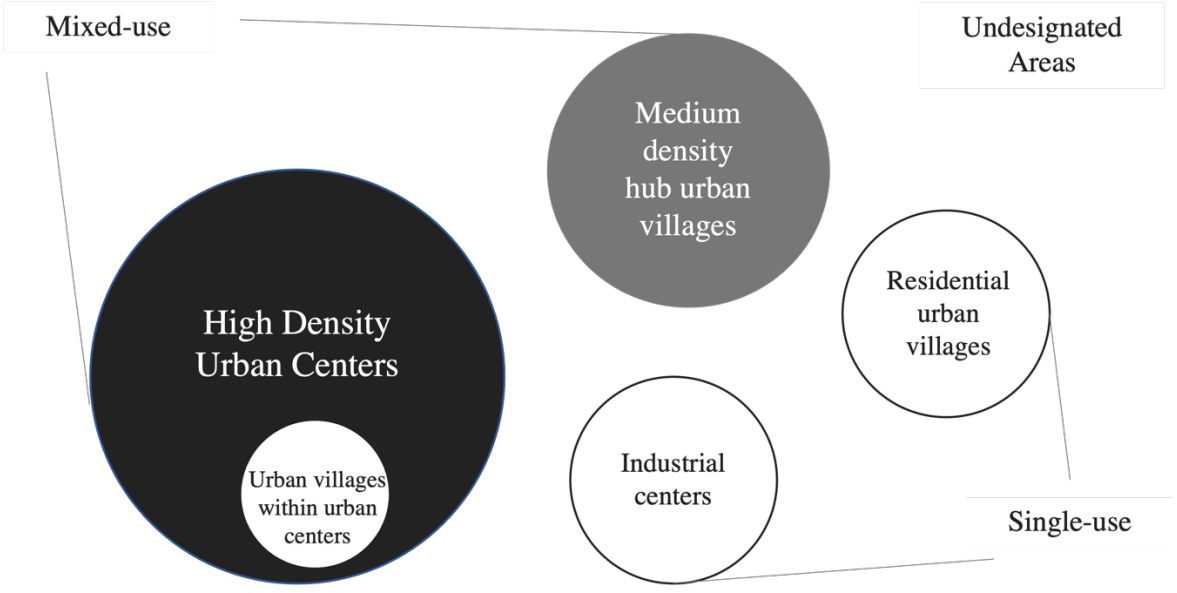

Figure 1: Various types of urban villages as defined in the Seattle 1994 Comprehensive Plan

At its most fundamental level, the Urban Village Element has sought to guide both public and private actions in achieving a specific "function, character, amount of growth, intensity

[8] Shields, Chloe. "A False Promise of Green, Equitable Urban Growth? A Critical Review of the Literature and Implications for Seattle," Master's thesis, University of Washington (2020): 2.

of activity, and scale of development" in each village to match the village's designation.[9] The determinants for each designation are discussed further in Chapter 2.

1.3 Research Questions

The Urban Village Element has touched every city resident in Seattle for the last 30 years. Given its wide-reaching impact, this study aims to answer two critical research questions that are important for Seattle's current and future planning endeavors:

- **Question 1:** What effect has Seattle's urban villages policy had on the city's social and economic equity?
    - Based on qualitative and quantitative analyses, has the policy lived up to its stated goals from 1994?
    - What might a holistic consideration of equity impacts and factors look like in the city?
- **Question 2:** If the urban villages policy has had a negative impact on equity in Seattle, what are the implications of this finding for other cities that may implement villages or 15-Minute Cities in the future?
    - Are urban villages fundamentally similar to 15-Minute Cities?
    - How can Seattle (and other cities) mitigate negative equity impacts resulting from these novel forms of planning?

1.4 Broader Impacts

While limited to Seattle in its quantitative analysis, the insights from this thesis are designed to be applicable to other cities facing similar dilemmas surrounding the equity

[9] City of Seattle, "Urban Village Element," *Towards a Sustainable Seattle* (1994): https://www.seattle.gov/documents/departments/opcd/ongoinginitiatives/seattlescomprehensiveplan/urbanvillageelement.pdf

impacts of planning strategies, both in the U.S. and around the world. The broader impacts of this paper can best be summarized around two categories:

- **Improving Society:** Social and economic equity is a pertinent topic for cities. This research uses econometric methods to build transferrable insights for other cities. In theories of urban containment and urban administration, these insights can help quantify and/or predict the broader societal impacts of seemingly harmless or otherwise efficient decisions.
- **Engaging a Wider Audience:** Professional planners, economists, consultants, financiers, policymakers, and engineers who have direct influence over the planning process can utilize this research to inform their own municipal decisions. Beyond direct actors, this thesis is also aimed at the indirect actors participating in the city; real estate agents, business leaders, and politicians must always incorporate equity considerations into their decisions. These actors will also be better informed as to whether specific planning tools are working in practice.

1.5 Approach

As aforementioned, this paper approaches the issue of social and economic equity in Seattle both qualitatively and quantitatively. Chapter 2 is a review of the current qualitative factors in the city and theories relating to social and economic equity. Chapter 3 presents several alternative hypotheses as to why Seattle faces equity deficits, including the historical roles of highway building, transit deserts, and lack of greenspace. In Chapters 4 and 5, this paper employs the difference-in-differences (DID) method to build several econometric models estimating the treatment effects of the Urban Village Element. Finally, Chapter 6 and Chapter 7 discuss the implications of this study, draw conclusions from the qualitative

and quantitative analyses, and provide a forward-looking assessment of possible solutions to the equity problem.

2 Chapter 2: Literature Review

2.1 It Takes a Village: Urban Villages and the Comprehensive Plan

Past studies have focused on Seattle for its unique position as the major employment center of the Pacific Northwest, for its rapid population growth, and for its massive high tech economic base. Seattle has also received considerable attention, alongside its neighboring city of Portland, for implementing an urban growth boundary (UGB) in its comprehensive plan as a response to Washington State's Growth Management Act (GMA) of 1990.[10] UGBs are policy tools that strive to achieve the same goals as land-use restrictions, such as specifying types of zoning or development that can occur in a place, without the same level of government and/or legal involvement as land-use policies.[11] Instead, UGBs simply provide an outer boundary for urban construction, often at a natural place such as the existing urban-rural divide, a natural landform or coastline, or even, as Ebenezer Howard envisioned, a greenbelt.[12] The outer boundary works by constraining the total amount of buildable space for development, wielding the power of markets to create demand pressures in specific areas of cities, pushing the supply of residential, commercial, and industrial spaces inward and upward.[13]

The Urban Village Element was the other major policy change to arise out of Seattle's 1994 comprehensive plan, *Towards a Sustainable Seattle,* in an effort to direct the proper planning resources and goals into specific, delineated areas of the city. As shown in Figure 2 and as mentioned briefly in Chapter 1, urban villages fall into four primary

[10] Wei et al. "Planning and Markets at Work: Seattle under Growth Management and Economic Pressure," (2021): 3-4.
[11] Ibid., 4.
[12] Ibid., 4.
[13] Ibid., 4-5.

categories: (1) urban centers, which are the densest neighborhoods and major regional employment centers; (2) hub urban villages, which are lower density than urban centers but provide a mix of residential zoning and employment opportunities; (3) residential urban villages, which focus specifically on residential zoning; and (4) manufacturing centers, which are home to the city's important industrial businesses.[14] In anticipation of significant future growth, Seattle's urban villages, combined with its UGB, have sharply constrained development into the green-shaded regions shown in Figure 2, which cover roughly 17% of Seattle's total land area. Urban villages aim to accommodate the majority of new housing complexes, commercial buildings, and other job centers in the city symbiotically with the existing character of those neighborhoods.[15] Urban villages are also idealized to be well-connected transit districts, receiving large sums for infrastructure enhancement, as well as

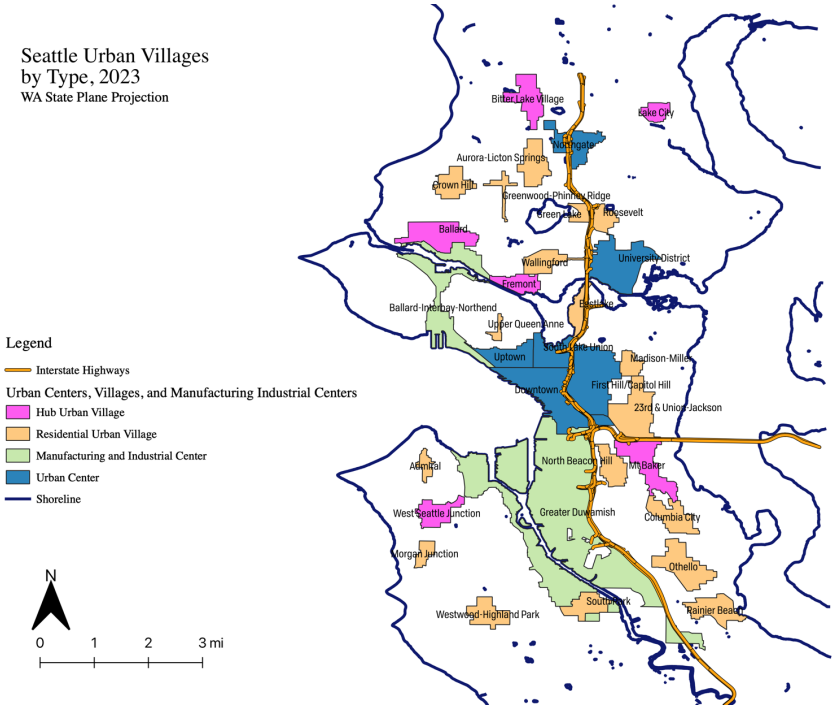

Figure 2: Map of Seattle's urban centers, villages, and manufacturing industrial centers, with Interstate highway and shoreline context

[14] City of Seattle, "Urban Village Element," (1994): 1.3-1.4.
[15] Ibid., 1.4.

environmentally friendly spaces defined by the socially equitable delivery of public services.[16] In some cases, the policy was meant to directly uplift "economically distressed communities to focus economic reinvestment to benefit the existing population."[17]

On the surface, urban villages have, from a macro perspective, been successful at capturing growth; 75% of new development has occurred within the villages.[18] Logically, though, the sharp limitation on prime, developable space in Seattle has created affordability

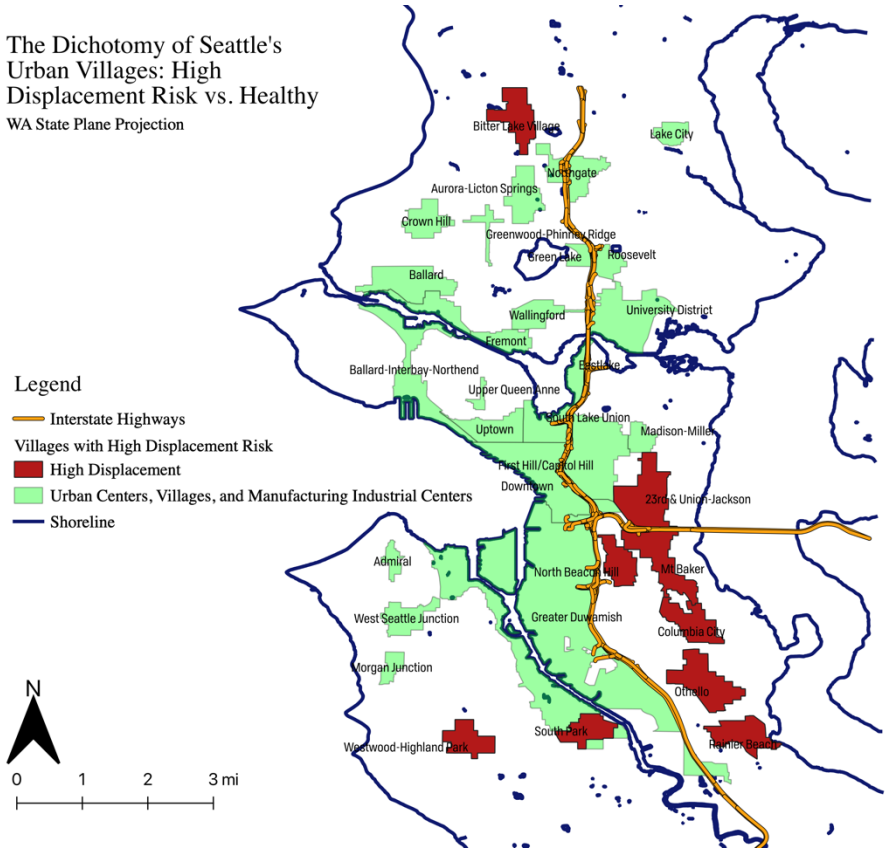

Figure 3: Map of the dichotomy of Seattle's urban villages. High displacement risk villages are shown in red shading, and these are located furthest geographically from downtown

challenges in the city. Despite planners' best intentions, demand increases for housing and other real estate types typically precede supply increases in those properties, and that gap

[16] City of Seattle, "Urban Village Element," (1994): 1.5.
[17] Ibid., 1.6-1.7.
[18] Wei et al., "Planning and Markets at Work: Seattle under Growth Management and Economic Pressure," (1994): 9.

often results in the displacement of residents and businessowners who cannot afford those living or working spaces. As urban villages have densified and their population bases have expanded, media reports and scholarly articles covering Seattle's affordability and gentrification issues are documenting a different side of that growth.[19] Seattle's homelessness rate reached third in the nation in 2018, and *The New York Times* dubbed "Seattle-ization" as a derogatory term for areas hit by gentrifiers, mostly young urban tech professionals.[20]

Urban villages in neighborhoods that are disproportionately low-income now face high displacement risks as shown in Figure 3; often, these village residents are predominantly Black, Indigenous, and/or People of Color (BIPOC). These villages are:

- Bitter Lake Village
- 23rd and Union-Jackson
- Mt. Baker
- North Beacon Hill
- Columbia City
- Othello
- Rainier Beach
- South Park
- Westwood-Highland Park

Development in these red-shaded "high displacement" villages, which are situated furthest from the central business district in the most extreme eastern, southern, and western areas of

[19] Haines, Taylor. "Micro-Housing in Seattle Update: Combating "Seattle-ization," *Seattle University Law Review*, Vol. 43, No. 11, 2020: 11-12.
[20] Ibid., 11-12.

Seattle, has occurred as a spillover from other, more expensive villages (Figures 4-6).[21] This is a classic precursor to gentrification and pricing out. As higher income residents move into these areas, they demand more high-end housing and more services to accommodate their preferences, which leads to new, more expensive amenities, which ultimately leads to higher property taxes and home values.[22] This side of the urban villages' story would indicate that the policy may be falling short on at least two critical goals: promoting social equity and preserving neighborhood character. The encroachment of new housing development on outer villages, creating a displacement risk, is a key observation that motivates this study.

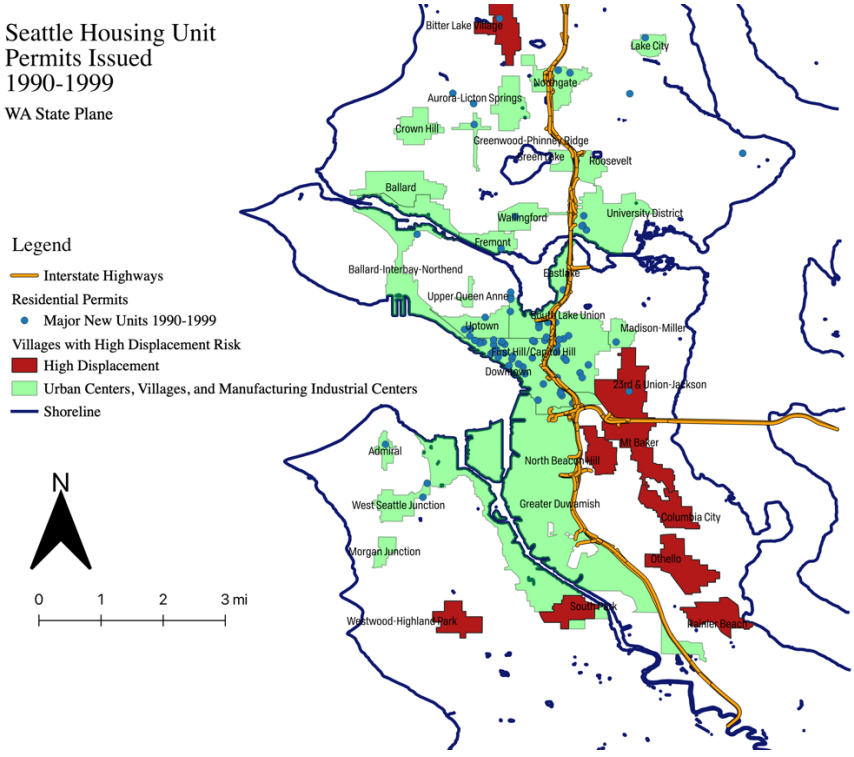

Figure 4: Seattle housing unit permits issued for new construction above 50 units, 1990-1999

[21] Shields, Chloe. "A False Promise?" (2020): 9.
[22] Ibid., 10-11.

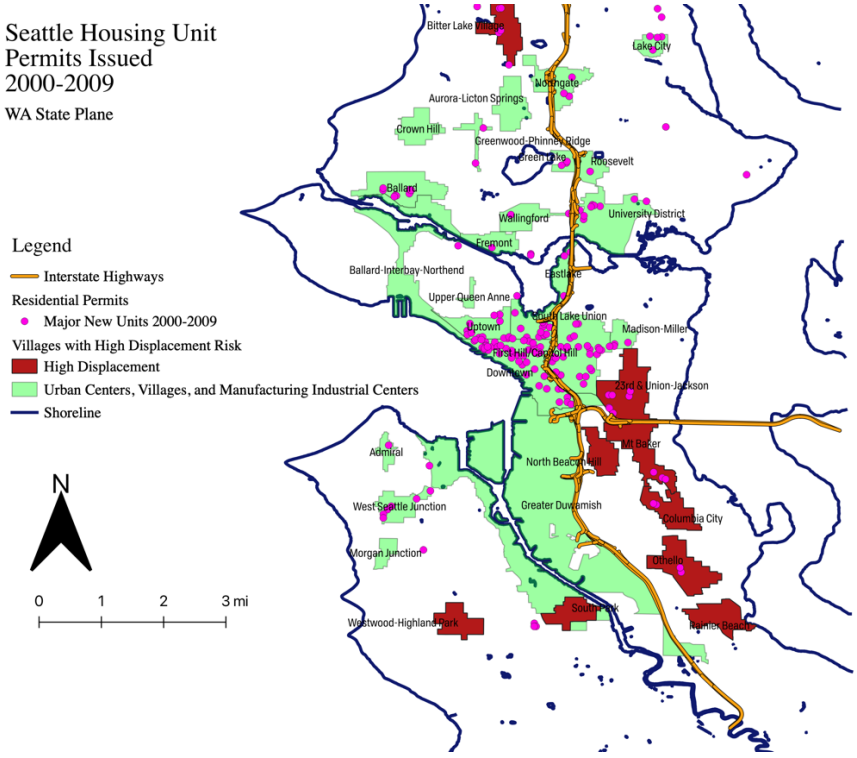

Figure 5: Seattle housing unit permits issued for new construction above 50 units, 2000-2009. Note the increased major housing development spillover into the "high displacement" villages

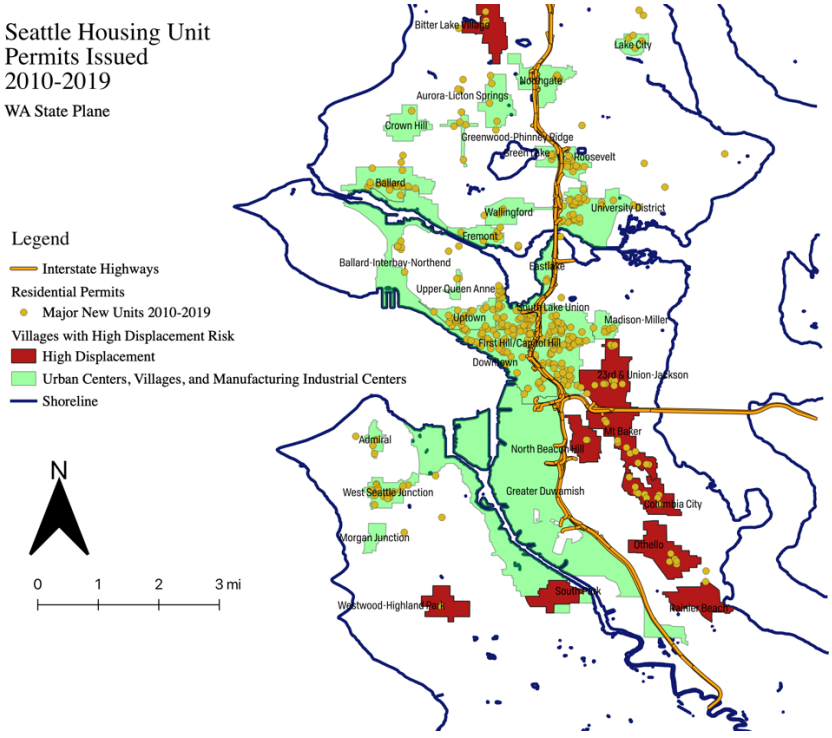

Figure 6: Seattle housing unit permits issued for new construction above 50 units, 2010-2019. Note the sharply increased major residential development in "high displacement" villages

Empirically, urban villages, with the exception of hub urban villages, have seen less parcel-level redevelopment since 2010 relative to areas outside of villages.[23] This finding would further suggest that urban village redevelopment, a proxy for housing supply, has strongly lagged increases in demand brought on by urban containment. Additionally, the same analysis showed that single-family housing was the least likely to be redeveloped.[24] On the one hand, Seattle's Urban Village Element has promoted a redirection of development away from single-family areas. On the other hand, however, many land uses within urban villages have remained as single-family residential, and one goal of urban villages going forward is to encourage the growth of "ground-level homes…including single-family homes."[25] As such, housing affordability would be poor inside of most investment- and amenity-rich villages. Furthermore, contrary to the policy's goals, areas outside of villages would bear the burden of increased development without the same level of attention from policymakers as villages.

The remainder of this chapter is devoted to a review of other approaches to analyzing equity in cities, a discussion of other planning theories at work in Seattle, and a contextualization of urban villages within the 15-Minute Cities discourse.

2.2 Selected Previous Approaches to Equity Planning and Analysis

Norman Krumholz's tenure as Director of the Cleveland City Planning Commission from 1969-1979 is widely acknowledged as the defined start of U.S. equity planning in practice.[26] During his time in Cleveland, Krumholz and his team de-stressed the importance

[23] Wei et al., "Planning and Markets at Work, Seattle Under Growth Management and Economic Pressure," (2021): 15.
[24] Ibid., 15.
[25] City of Seattle, "Urban Village Element," (1994): 1.5.
[26] Krumholz, Norman, "A Retrospective View of Equity Planning Cleveland 1969–1979," (1982): 163.

of mainstream planning techniques—zoning, land use laws, etc.—and replaced them with a singular focus on improving living conditions for the most vulnerable populations.[27] Krumholz carved a practical pathway to "advocacy planning" by taking actions that would help Cleveland guarantee at least an adequate level of services for all of its residents. For example, in an effort to "ensure a decent level of mobility to those transit dependent persons" in the era of the automobile, he pushed the Greater Cleveland Regional Transit Authority (RTA) to absorb and stabilize the failing Cleveland Transit System, a move that helped pave the way for discounted fares for seniors and handicapped persons.[28] Later, in an effort to only seek "new development which was of benefit to the city and its people," Krumholz took the politically impossible position of fighting a commercially-focused, misguided urban renewal project in the 1970s called Tower City; despite losing the fight, he warned the city that investing in this glitzy office complex would take away funds from other projects for disadvantaged portions of the city.[29]

Recent research, as introduced briefly in Chapter 1.1, has circled back to Krumholz's revolutionary idea to raise all city residents to at least an adequate level of access to essential services. Building on spatial accessibility models pioneered in the 1970s, 1980s, and 1990s by Kwan, Burns-Miller, and Lenntorp, Neutens et al. used people- and place-based utility measures to assess equity through a spatial accessibility lens in the city of Ghent, Belgium.[30] These measures include analyses of street network constraints on people's movement, data on trips taken, time constraints (all hours spent in fixed activities, such as full-time jobs) and opportunities for activities (items that could feasibly be on a person's agenda) within a given

[27] Krumholz, Norman, "A Retrospective View of Equity Planning Cleveland 1969–1979," (1982): 166.
[28] Ibid., 166-167.
[29] Ibid., 167-168.
[30] Neutens et al., "Equity of Urban Service Delivery," (2015): 1626-1627.

radius.[31] The study found that the Lenntorp measure of binary accessibility of opportunities was most useful for evaluating the distributions of public service delivery, as it could best incorporate quality of services into the study as well.

Ultimately, the equity analysis in Neutens et al. was closely tied to, if not conflated with, equality and the Gini coefficient.[32] As a measure of how far a society differs from perfect equality, the Gini coefficient is often considered imperfect; though Neutens et al. uses the Gini particularly to assess equality of access to opportunities as a proxy for equity,[33] that approach misses the other critical, first piece to equity as defined in Chapter 1: minimizing disadvantages in the city. Another primary critique and shortcoming of this approach, defined by Neutens et al. as a limitation within the study, is that only out-of-home trips for fixed-schedule activities were considered by virtue of their relative ease of measurement.[34] This leaves out equity and equality of access measures for urban citizens who do not follow these rigid criteria, including part-time and gig workers, young people, and seniors. Finally, this analysis also leaves out the impacts of districts and cities in determining which services are offered, where, and why.

Mayaud et al. employs a similar thematic approach to Neutens et al. but includes a novel econometric approach in assessing the accessibility of healthcare facilities in Vancouver, Portland, and Seattle.[35] In this study, a few of the shortcomings of the Neutens et al. study were improved upon. First, this study considered the broader impacts of the Seattle, Vancouver, and Portland regions as having an important bearing on the findings of the

[31] Neutens et al., "Equity of Urban Service Delivery," (2015): 1617.
[32] Ibid., 1632-1634.
[33] Ibid., 1631.
[34] Ibid., 1627.
[35] Mayaud et al., "An urban data framework for assessing equity in cities: Comparing accessibility to healthcare facilities in Cascadia," (2019): 4-5.

study. Census facts such as population density, transit network quality and reach, and age brackets were considered.[36] Second, the researchers employed a self-organizing maps (SOMs) procedure to cluster together groups of citizens by income and then measure each cluster's proximity to healthcare facilities, focusing primarily on health outcomes instead of a more general "black box" of opportunities.[37] Lastly, the findings from the Mayaud et al. study show that healthcare access—as a proxy for other equity factors—is greatly influenced by public transit quality and access.[38]

These three separate selections of equity analysis, each also impacted by the literature before them, paint a picture of the factors that must be included in future studies. Krumholz pioneered the approach of minimizing disadvantages between residents in the discipline of planning. Neutens et al. approached the problem through an opportunity access lens, which works well with fixed-schedule activities (i.e., jobs, education, etc.). Mayaud et al. emphasized the importance of healthcare access and public transit systems on equity outcomes in cities, particularly with a focus on Cascadian cities.

2.3 Planner's Triangle: Trade-Offs in the City

The Planner's Triangle, developed by Scott Campbell in 1996, formalizes the trade-offs between environmental protection, economic development, and equity in an ideal abstraction (Figure 7). Cities demand attainment of all three to ensure sustainability for the future, and much research has been devoted to the harmony (or disharmony) between the three characteristics in different cities, including Seattle.[39] However, tensions between each

[36] Mayaud et al., "An urban data framework for assessing equity in cities: Comparing accessibility to healthcare facilities in Cascadia," (2019): 3-4.
[37] Ibid., 5-6.
[38] Ibid., 9-10.
[39] Shields, Chloe. "A False Promise?" (2020): 3-5.

side of the Planner's Triangle are typical; economic development is often the primary focus, with environmental and equity concerns often relegated to become the secondary and tertiary focus, respectively.[40] In most practical cases, it is impossible to succeed on all three corners of the Planner's Triangle; the diagram often represents ideal, impossible-to-reach perfection rather than a legitimate goal.[41] The Planner's Triangle concept is illustrative of the

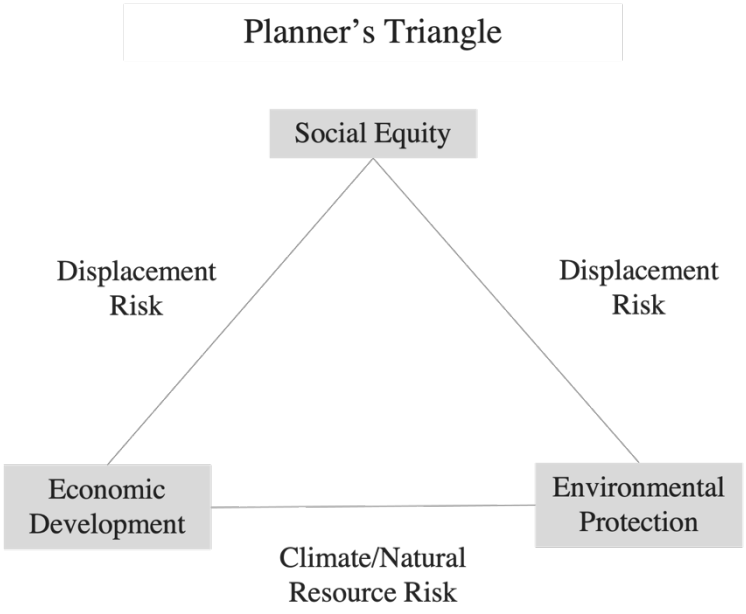

Figure 7: Planner's Triangle and associated risks

tensions that currently exist in Seattle that undermine its goal of social equity. Displacement risk, primarily via the potential for gentrification and pricing-out, exists when economic development occurs, environmental sustainability initiatives are enacted, or both. Given Seattle's rapid economic growth and desire to achieve its sustainability targets, the city faces an uphill battle against theoretical limitations when it also tries to attain a high level of social equity.

[40] Campbell, Scott. "The Planner's Triangle Revisited: Sustainability and the Evolution of a Planning Ideal That Can't Stand Still," *Journal of the American Planning Association*, Vol. 82, No. 4 (2016): 391-392.

[41] Shields, Chloe. "A False Promise?" (2020): 4.

If Seattle (or any city) is to overcome the theoretical paradox imposed by the Planner's Triangle, it must find a way to mitigate the associated risks between each corner of the diagram. Mitigation efforts would require the protection of natural resources and the prevention of displacement by limiting the impacts of gentrification. While other papers have called for a "new world order" that would eliminate the tensions of the Planner's Triangle, such as the eradication of capitalism and, therefore, the end of economic development as the primary goal in planning,[42] this paper takes capitalism and economic growth as a given condition in its analysis. Taking the Planner's Triangle as a constraint on the success of Seattle's urban villages policy, this paper views the tensions between economic development, environmental sustainability, and social equity to be a distinct theoretical hypothesis for why urban villages—which share the exact same triangular aims—have not lived up to their original goals. Additionally, by taking the present economic conditions as a given, this paper follows the economic theory behind urban containment as a market-driven technique for rationing space, pushing growth inward and upward in Seattle.

2.4 15-Minute Cities and Urban Villages: More Alike Than Different

This paper's conclusion extrapolates the findings from Seattle's urban villages to evaluate potential equity concerns stemming from 15-Minute Cities. Before extrapolation, however, it is important to draw a logical equation between urban villages and the new concept of 15-Minute Cities. Urban villages preceded the idea of 15-Minute Cities by over 20 years. Fundamentally, however, this paper argues that the two are more alike than different in their structural design.

[42] Shields, Chloe. "A False Promise?" (2020): 3-4.

First formalized by Carlos Moreno in 2016, 15-Minute Cities have gained major momentum in academic, media, and policy circles over the last 7 years for their potential to re-shape the structure and character of cities as the public knows them.[43] Put simply, Moreno argues for a structure where residents are never more than a 15-minute walk or bicycle ride from essential amenities and services, such as parks, schools, job centers, healthcare facilities, and places of entertainment.[44] The structure can be overlain in either neighborhoods, entire urban areas, or both.[45] Smaller city and/or neighborhood footprints force higher densities and push development inward and upward. Because of increased urban density and proximity, residents can at once reduce their commuting time, more easily access amenities, and improve the character of neighborhoods through proximity-induced social interactions.[46] Smaller city footprints also necessitate a greater diversity of land uses and businesses within a more compact space, which enables governments to improve local service delivery through economies of scale. For example, a sprawling city, such as Atlanta, requires a vast network of major highways to move residents from peripheral areas to the central business district or to other amenities. In a 15-Minute City, a much more compact network of streets, bike lanes, and pedestrian thoroughfares would suffice.[47]

Structurally, this approach adapted to individual neighborhoods is similar in design to the urban villages plan. Urban villages, particularly hub urban villages, also have mobility, transit accessibility, and a diverse range of land uses as their primary goals.[48]

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[43] Moreno, Carlos; Allam, Zaheer; Chabaud, Didier; Gall, Catherine; Pratlong, Florent. "Introducing the '15-Minute City': Sustainability, Resilience, and Place Identity in Future Post-Pandemic Cities." *Smart Cities*, Vol. 4, No. 1, 2021: (section 5)

[44] Ibid., section 5.

[45] Ibid., section 5.

[46] Ibid., section 5.

[47] Ibid., section 5.3.

[48] City of Seattle, "Urban Village Element," (1994): 1.4-1.6.

Supported by the delineated villages' small amount of buildable space relative to the entire city, economic forces demand that Seattle's developers build at greater density and proximity within the villages. Hub urban villages have the added dimension of being secondary job and amenity centers in Seattle marked by mixed-use zoning and mini downtowns, which closely mirrors the 15-minute city overlaid onto the full city. Transit improvements, increased open space, and community-oriented public services are paramount policy instruments in both models.[49] Urban villages were and are designated based on either their existing transit and public services or their potential to transform from "automobile-oriented environments into more cohesive, mixed-use pedestrian environments."[50] The 15-Minute Cities model explicitly shares these goals.

As aforementioned in Chapter 2.1, empirical research shows that only hub urban villages were positively correlated with parcel-level redevelopment. This evidence would suggest that the hub urban village development outcomes are most aligned with the 15-minute city's desired outcomes. In the concluding chapter of this paper, more weight is given to the findings from hub urban villages in extrapolations to 15-Minute Cities, though the results from other types of villages serve more as ancillary examples in the link to the 15-Minute City model.

2.5 Difference-in-Differences Method

Up to this point, most other equity planning studies have been conducted using spatial and/or hedonic regression modeling techniques. These include models such as the shortest-path travel time SOMs to measure access to services and opportunities (as discussed

[49] City of Seattle, "Urban Village Element," (1994): 1.6.
[50] Ibid., 1.6.

in Chapter 2.2) or other hedonic regressions that break down the value of an amenity at one point in time.[51] In Chapter 5, this paper makes use of the difference-in-differences inference method (DID) in the equity planning context. The current chapter discusses the applications of DID inference in other social science research, and Chapter 4 discusses the specific selection of DID in this study relative to other econometric methods.

DID inference is different from previous equity planning travel time data modeling because it isolates the treatment effect over time of a certain policy rather than focusing on accessibility metrics or static revealed preference models. It works by comparing the outcomes of two separate groups (a treatment and control group) after a treatment or policy is applied to one group, subtracting the difference in a control group statistic post- and pre-policy intervention from the corresponding difference in a treatment group (Figures 8 and 10).[52] DID is often implemented in cases where the experimental design is imperfect, often *ex post,* retroactively, and outside of controlled laboratory conditions. The most basic DID setup involves a two-period, two-group design in which the two groups share many important characteristics *except* for the application of the treatment.[53]

$$DID\ Estimator = \left(\bar{y}_{\substack{POST \\ TREATMENT}} - \bar{y}_{\substack{PRE \\ TREATMENT}}\right) - \left(\bar{y}_{\substack{POST \\ CONTROL}} - \bar{y}_{\substack{PRE \\ CONTROL}}\right)$$

Figure 8: Difference-in-differences estimator equation

$$TREAT_i \times POST_t \ (where\ TREAT_i = \{0,1\}\ and\ POST = \{0,1\})$$

Figure 9: Interaction term dummy variable that takes the value of 1 when the group is post-treatment and 0 otherwise

[51] Heckert, Megan. Mennis, Jeremy. "The economic impact of greening urban vacant land: a spatial difference-in-differences analysis," *Environment and Planning A*, Vol. 44 (2012): 3015.
[52] Goodman-Bacon, Andrew. "Difference-in-differences with variation in treatment timing," *Journal of Econometrics,* Vol. 225, No. 2, 2021: 254-255.
[53] Ibid., 255.

When DID regression occurs, this DID estimator shown above (Figure 8) is equal to the estimator on the interaction term dummy that takes the value of 1 if the group is the post-treatment group and the value of 0 otherwise (Figure 9).[54] This occurs as a result of several model assumptions. First, the model is assumed to follow the standard multiple linear regression form, which is defined by four necessary conditions:

1. **Linearity**: the model is standard form, $y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k + u$
2. **Random Sampling**: all data points are independent, identically-distributed draws of their corresponding random variables
3. **No Perfect Collinearity**: no linear regressor is linearly dependent on the others
4. **Mean Independence**: the expected value of the error term given the values of the other independent variables is zero

Second, the two groups—treatment and control—must theoretically be forecasted to experience similar trends, or growth rates, in the absence of the treatment effects. This is known as the **parallel trends assumption**; because it implies that both the treatment and control groups only differ by whether or not the treatment was applied, it is considered the most critical assumption when using DID inference (Figure 10).[55] Chapter 4 provides evidence for the application of the parallel trends assumption to the Seattle dataset. Chapter 4 also details additional assumptions and procedures for DID inference.

The first documented use of DID inference is an 1855 study on a cholera outbreak in London, England, an analysis of the treatment effect of relocating a water pump from downstream to upstream of a sewage outflow pipe. Since then, DID has been used in studies

[54] Goodman-Bacon, Andrew. "Difference-in-differences with variation in treatment timing," *Journal of Econometrics,* Vol. 225, No. 2, 2021: 255.
[55] Wooldridge, Jeffrey. *Introductory Econometrics: A Modern Approach*. Fifth Edition (2012): 457-458.

ranging from analyzing the length of time that an injured worker receives worker's compensation before and after a state policy change to simple econometrics studies about two groups before and after job training.[56] In the urban planning context, equity planning examples are sparse, but a prime example is Heckert and Mennis' 2012 study on Philadelphia's greening program in vacant lots. The researchers use a spatial DID method to assess property values in treated and non-treated communities both before and after the introduction of the greening program.[57] Heckert and Mennis utilized DID inference because, as they argue, it better isolates the treatment effect of the greenspace policy intervention.

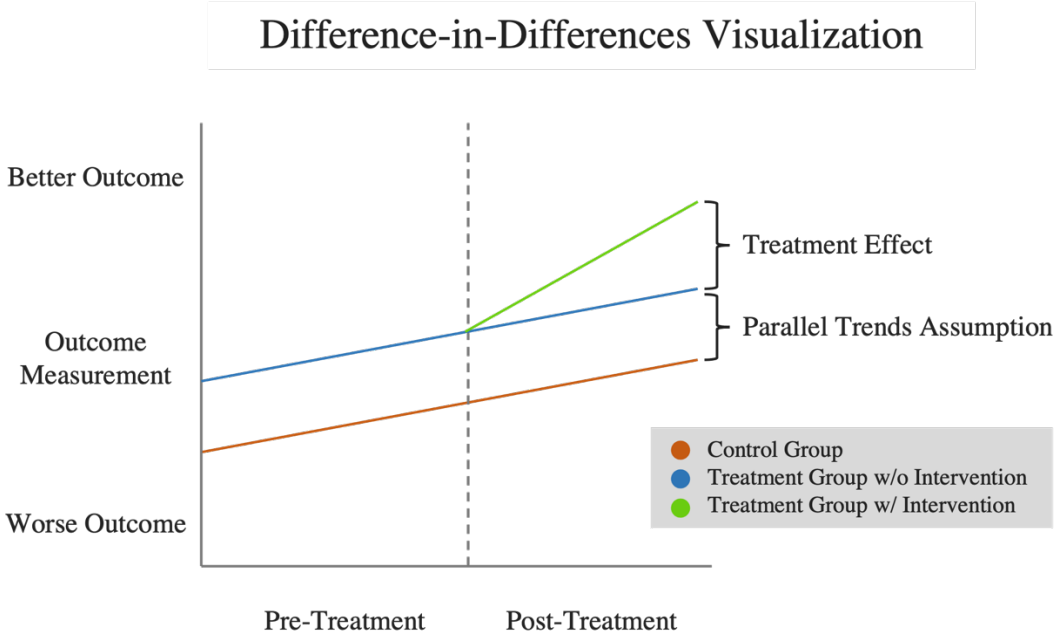

Figure 10: Difference-in-differences visualization

[56] Wooldridge, Jeffrey. *Introductory Econometrics: A Modern Approach*. Fifth Edition (2012): 458.
[57] Heckert et al., "The economic impact of greening urban vacant land," 2012: 3015-3016.

3 Chapter 3: Hypotheses

3.1 Null Hypothesis

The null hypothesis in this study is that the passage of the Urban Village Element of Seattle's 1994 comprehensive plan, *Towards a Sustainable Seattle*, had no significant impact on equity outcomes in the city of Seattle.

3.2 Other Hypotheses

Before formally outlining the urban village hypothesis, this paper first addresses other alternative hypotheses about forces impacting equity outcomes in Seattle. To better organize other potential theories, this paper uses King County's "Healthy Stream" theory of change to include factors that the county deems important and impactful for promoting equity. These streams flow from the largest to smallest unit of analysis (societal to individual) along three major lines: (1) pro-equity policies, (2) structural racism, and (3) diversity and inclusion.[58]

1. **Policy Alternative Hypotheses**
    a. Housing is not affordable: areas affected by high levels of transit-oriented development (TOD) or areas without comprehensive affordable housing policies are more inequitable
    b. Education is subpar: education disparities lead to inequity
2. **Structural Racism Alternative Hypotheses**
    a. Unhealthy food systems: food deserts lead to inequity

[58] Beaty, Abigail; Foster, Dionne. "Determinants of Equity Baseline Project," King County Office of Performance, Strategy, and Budget (2015): 12. https://kingcounty.gov/~/media/elected/executive/equity-social-justice/2015/The_Determinants_of_Equity_Report.ashx

b. Poor environmental and social justice in certain communities: communities located in areas split by highway construction (on I-5 and I-90), near environmental hazards, or far away from public transit stations are more likely to experience inequities

c. Disparities in healthcare: neighborhoods located further from hospitals experience more inequity

3. **Diversity and Inclusion Alternative Hypotheses**

a. Disparities in parks and open space: communities with less open space, fewer parks, and less tree cover are more likely to be inequitable

b. Disparities in neighborhood safety: dangerous neighborhoods are less equitable

3.3 Urban Village Hypothesis

This paper hypothesizes that the Urban Village Element, which underpins many planning decisions in the City of Seattle, has led to inequities in the city. Firstly, as described in Chapter 2.1 and depicted in Figures 3-6, this paper hypothesizes that those areas of the city "treated" with the urban village policy experience a significant negative effect on equity compared to those that are "untreated"—outside of villages. Additionally, this paper hypothesizes that those areas "treated" specifically with the hub urban village policy in particular experience a significant negative impact on equity. These hypotheses both imply a one-tailed test. As described in Chapter 4, this paper uses DID inference to compare equity metrics before and after the imposition of the urban village policy both inside and outside of village areas.

4 Chapter 4: Methodology

4.1 Difference-in-Differences Inference

As introduced in Chapter 2.5, this paper utilizes DID inference to test the validity of the null hypothesis that the implementation of the Urban Village Element had no significant effect on equity in the city of Seattle. DID enables cross-period inference using the same groups in both periods, which isolates the treatment effect of the Urban Village Element on equity, within a theoretically measurable bias.[59] As shown in Figure 11, DID inference can also be applied in situations where the treatment effect is negative, such as for the urban village hypothesis.

This study uses data from the years 1990, 2010, and 2020. The year 1990 is used to collect cross-sectional data at the Census tract level pre-implementation of the Urban Village Element for areas inside and outside villages. The year 2010 is used to collect cross-sectional data to measure the short-term impacts of implementation, while 2020 is used to measure the long-term impacts. Short-term impacts and long-term impacts are included in this analysis for two reasons. First, segmentation of 2010 and 2020 allows for a continuation of the discussion started by Wei et al. about Seattle's surprising parcel-level redevelopment trends during the 2010s decade.[60] Second, analyzing 2010 separate from 2020 helps to contextualize various trends. The impacts of the 2008 financial crisis may be more greatly reflected in the 2010 data, while the 2020 data adds the context of the rise of Seattle's tech industry.

[59] Goodman-Bacon, "Difference-in-differences with variation in treatment timing," (2021): 254.
[60] Wei et al., "Planning and Markets at Work," (2021): 14-18.

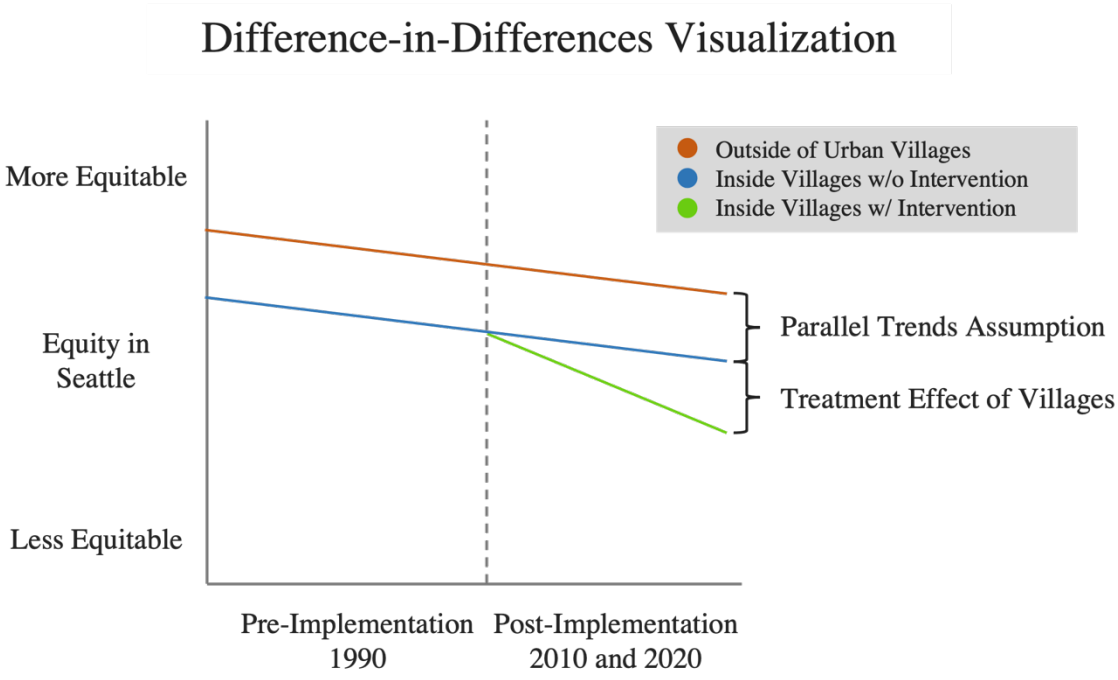

Figure 11: Difference-in-differences method applied to the Seattle urban village hypothesis in this paper

4.2 Data Collection

To build this model, data was obtained primarily from the city of Seattle's GIS Open Data tool, as well as from the U.S. Census Bureau and the Centers for Disease Control and Prevention.[61] Seattle's Open Data tool is an open access repository managed by its city planners and urban analysts; files range from data on infrastructure networks, to city administrative borders, to demographics information.[62] In this model, only residential urban villages, hub urban villages, and urban centers are considered as treatment groups (Figure 12) because those village types are communities with residential and commercial areas. Manufacturing and industrial centers are not included because they are primarily designed for attracting large industrial development, not for building communities. For the

[61] U.S. Centers for Disease Control and Prevention, "1990 Census Data by Tract and Block Group Documentation". https://www2.cdc.gov/nceh/lead/census90/house11/housdesc.htm
[62] City of Seattle. Seattle Open Data. Accessed March 20, 2023. https://data.seattle.gov/

explanatory variables in the model, cross-sectional data at the Census tract level is collected and matched with the corresponding village. Since not all Census tracts fit neatly within urban village boundaries, tracts that have some overlap with urban villages are included as part of the village with which they share the greatest overlap. Those tracts that do not have any overlap are included as candidates for the control group.

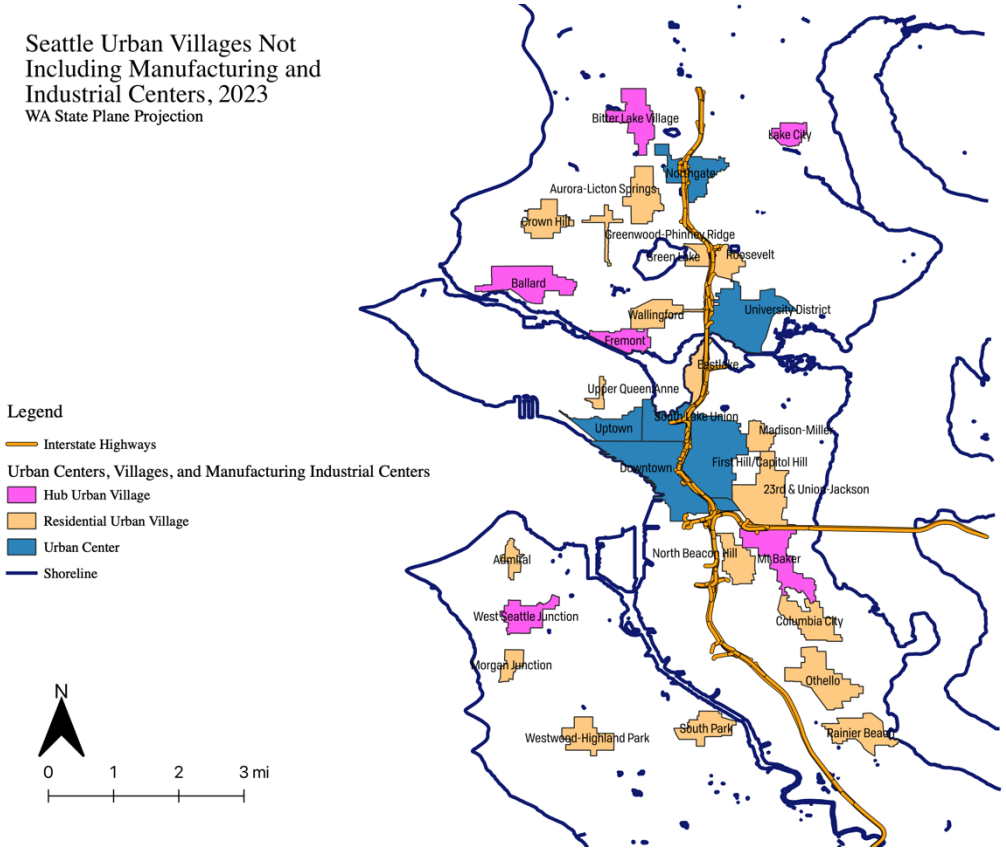

Figure 12: Treatment groups in this study—residential urban villages, hub urban villages, and urban centers

For the dependent variables in the model, the analysis uses an adjusted version of the Race and Social Equity Composite Index (RSECI) published by the city of Seattle's Office of Planning and Community Development. The RSECI is a continuous index variable that takes any value between 0 and 1, with 1 representing the highest level of social and racial

inequity.[63] The components of the RSECI include (1) race, English language, and origin data, (2) socioeconomic disadvantage data, such as the share of income below 200 percent of the poverty level and educational attainment rates, and (3) health disadvantage data, including levels of asthma and life expectancies.[64] Based on the literature review of past equity planning techniques in Chapter 2.2, each of these components of the RSECI match a key pillar uncovered by past researchers. Krumholz's focus on disadvantaged residents in the city is present throughout the index. Neutens et al.'s discussion of accessibility relating to fixed-time activities, such as education and jobs, is implicit in the second component of the RSECI, while Mayaud et al.'s focus on healthcare access is reflected greatly in the health disadvantage component.

One issue encountered during data collection was that the division and consolidation of Census tracts over thirty years prevented a perfect 1:1 match of 1990, 2010, and 2020 tracts. Census tracts typically hold between 2,500 to 8,000 citizens at a time. When a tract grows beyond that level, it splits into two; when a tract drops below that threshold, it is consolidated into another tract.[65] A cursory glance at the data revealed 43 additional tracts in 2020 compared to 1990. To work around this issue, GIS tools were used to visually identify tracts that differed among the three analysis years and to select the largest, most comprehensive version of the tracts for analysis. In other words, if a 1990 tract had subdivided into two tracts by 2020, the 1990 tract would be used for analysis, and the

[63] City of Seattle. Office of Planning and Community Development. "Racial and Social Equity Index." 2015. https://www.seattle.gov/documents/Departments/SDOT/NSF/Race%20and%20Social%20Equity%20Map.pdf

[64] Ibid.

[65] Liu, Rosie. "2020 Census: Defining Census Tracts and Boundary Changes," *Data Driven Detroit*, September 16, 2021. Accessed April 11, 2023. https://datadrivendetroit.org/blog/2021/09/16/2020-census-tract-changes/

corresponding values in the two 2020 tracts would be summed or averaged as appropriate to recreate combined values for the original tract. If a 1990 tract had been combined into another tract by 2020, the 2020 tract would be used, and the two 1990 tracts would be summed to create combined values. To ensure matching of tracts, a combination of tract number inspection and visual GIS inspection was used. Subdivided tracts carry the same tract number up to the last two digits, which usually transition from '00' to '01' and '02' (etc.), enabling tract number inspection. Combined tracts often result in the creation of a new tract number[66]; in this case, visual GIS inspection was used. In certain cases, the tract number ended with a '99.' These tracts were disregarded and removed from the analysis because they represent crews-of-vessels populations, or people living onboard civilian or military ships.[67] One large tract in central Seattle was also omitted because it is a predominantly industrial area. The total number of Census tracts used in this analysis is 123.

Another major issue encountered during data collection was that the city of Seattle only began using the RSECI in 2017. To work around this issue, a multiple linear regression model was constructed with the 2020 RSECI as the dependent variable and the component index factors, as provided by the city of Seattle and introduced above, as the explanatory variables.[68] The availability of data on the component index factors also varied by year. As a compromise, the four component variables with available data in all three analysis years were used in the regression. Once coefficients were estimated, they were used to generate 1990 and 2010 fitted values for the RSECI. The component parts of the RSECI were

[66] Liu, Rosie. "2020 Census: Defining Census Tracts and Boundary Changes," (2021).
[67] U.S. Census Bureau, "Census Tracts and Block Numbering Areas: Chapter 10."
[68] City of Seattle, RSECI Index Documentation and Guide. https://www.seattle.gov/Documents/Departments/OPCD/Demographics/RacialSocialEquityIndexUsersGuide2023.pdf

extracted from Census tract data in the years 1990 and 2010 and input into the regression model. Chapter 4.4 contains a more detailed breakdown of this RSECI regression and the procedure for obtaining fitted values.

4.3 Control Group Selection and Parallel Trends

To select the control groups for DID analysis, this study divides the city of Seattle into five sectors, each corresponding to different regions of the study area: North, Downtown, East, South, and West (Figure 13). It is assumed, for the purposes of increasing the micro-level accuracy of the model, that villages in each of the different sectors of the city are subject to varied baseline conditions. As described in Chapter 4.2, candidate tracts for the control groups do not overlap with any urban village; therefore, the candidate control groups are those tracts in each sector that are not designated as an urban village. It is assumed that these control groups, given the proximity of tracts and the similar conditions within each sector, are representative of the baseline conditions in each village as well.

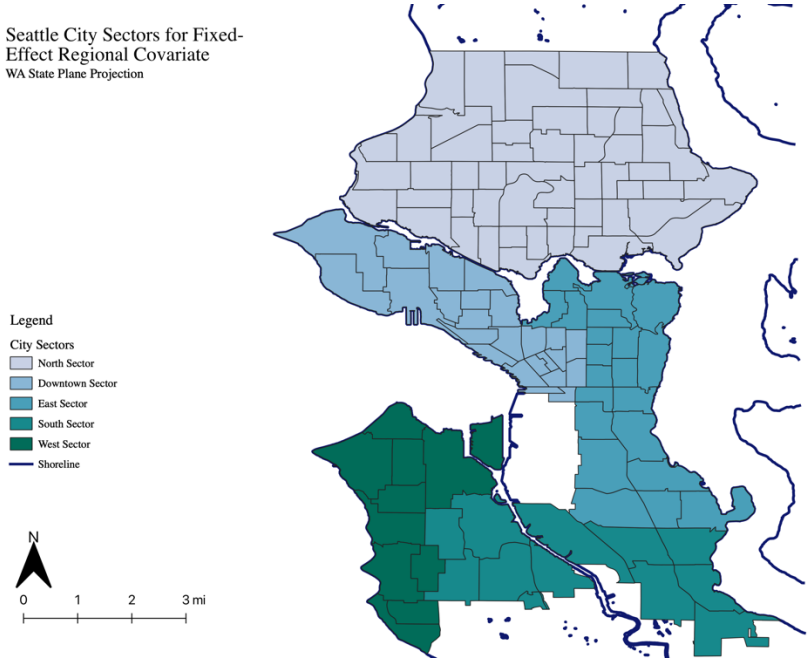

Figure 13: Seattle city sectors for fixed-effect regional covariates. The large section south of the Downtown sector is omitted due to its industrial nature

Chapter 2.5 also established that the parallel trends assumption is paramount in studies involving DID inference. The parallel trends assumption implies that the control groups must mirror the conditions in the treatment groups in the pre-treatment phase. Because this analysis is designed to match control group adjusted RSECI conditions to the corresponding treatment group conditions in each sector and at the pre-treatment time, this analysis assumes that parallel trends *would indeed* reasonably exist between the control and treatment groups over time if the Urban Village Element had not been implemented. Though there are only three periods of data in this analysis, which prevents the data from appearing smooth over time in Figure 14, the two graphical diagnostic tests for parallel trends appear to show similar trends prior to the implementation of urban villages in 1994. However, the lack of data prior to 1990 is a limitation on the surety of the parallel trends assumption—this is discussed more fully in Chapter 6.

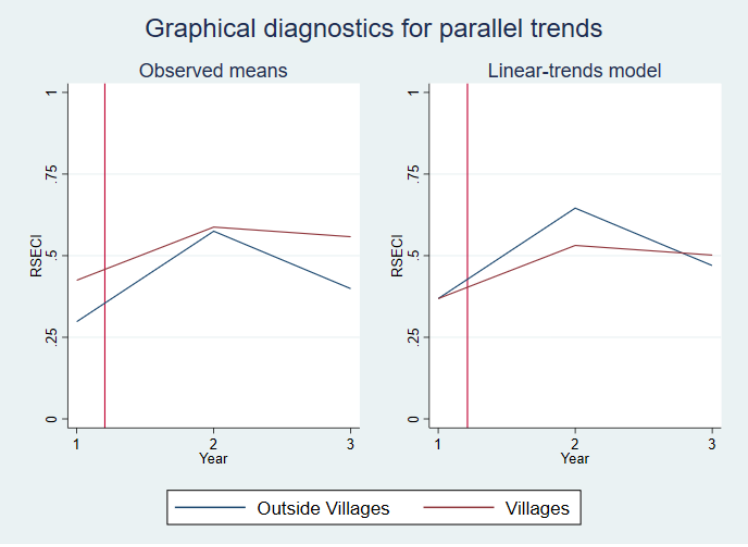

Figure 14: Graphical diagnosis for parallel trends assumption

4.4 Obtaining RSECI Fitted Values for 1990 and 2010

To work around the issue posed by the lack of RSECI data prior to 2017, the following regression was used on available 2020 RSECI data to obtain coefficients for each of the covariates:

$$Q_{it=2020} = \beta_0 + \beta_1 BIPOC_{it=2020} + \beta_2 D_{it=2020} + \beta_3 G_{it=2020} + \beta_4 X_{it=2020} + \varepsilon_{it=2020}$$

$Q_{it=2020}$ is equal to the RSECI in tract *i* in 2020, $BIPOC_{it=2020}$ is the percentage of the residents in tract *i* that identify as BIPOC in 2020, $D_{it=2020}$ is the percentage of residents in tract *i* with an educational attainment status of less than a bachelor's degree in 2020, $G_{it=2020}$ is the percentage of residents in tract *i* that speak English less than very well in 2020, $X_{it=2020}$ is the average life expectancy of residents in tract *i* in 2020, and $\varepsilon_{it=2020}$ is the error term. The following table reports the coefficients and t-statistics of each covariate in the 2020 regression:

Table 1: Coefficients of the 2020 RSECI Index Component Regression (N=123)

Independent Variable	***Coefficient (β)***	***R²***
BIPOC	1.0951*** (10.53)	0.8792
D	0.8497*** (7.60)	
G	–0.9576*** (–3.71)	
X	–0.0097** (–2.52)	

Note: *t*-values are reported in parenthesis; β_0=0.6491; *p<0.05; **p<0.025; ***p<0.005

After obtaining the coefficients on each of the four RSECI component items, RSECI fitted values were calculated using 1990 and 2010 component data in the following equation:

$$\widehat{Q_{it}} = 0.6491 + (1.0951)BIPOC_{it} + (0.8497)D_{it} + (-0.9576)G_{it} + (-0.0097)X_{it}$$

$\widehat{Q_{it}}$ represents the fitted RSECI values for 1990 and 2010 data.

4.5 Model Specification

Two different models are used in this analysis. The primary model is a DID regression with two binary indicator variables, an interaction term between the two indicators (Figure 9), interaction terms indicating whether the village is a treated hub urban village or urban center, and two fixed-effects covariates controlling for the temporal and local effects:

$$Q_{it} = \beta_0 + \beta_1 U_i + \beta_2 P_{it} + \beta_3 U_i P_{it} + \beta_4 HUV_{it} + \beta_5 CTR_{it} + \beta_6 Y_t + \beta_7 S_i + u_{it}$$

In the primary model, Q_{it} is equal to the RSECI in tract *i* at time *t*, U_i is a binary indicator that takes the value of 1 if tract *i* is wholly or partly within an urban village, P_{it} is a binary indicator that takes the value of 1 if time *t* is post-implementation of the Urban Village Element for tract *i,* and $U_i P_{it}$ is the interaction term equal to 1 if tract *i* is wholly or partly within a village and is in the post-implementation phase of the Urban Village Element. HUV_{it} and CTR_{it} are interaction terms indicating whether tract *i* is a post-treated hub urban village or urban center, respectively. The primary model incorporates fixed-effects variables to reduce the number of covariates in the regression. In situations where there are macro-level factors in which other possible covariates exist (i.e., the macro impact of geography on a host of other, micro variables), it is often more efficient to use these larger factors that do not change in the long run.[69] Y_t is a fixed-effects variable for year *t* to account for temporal effects, and S_i is a fixed-effects variable for the sector of tract *i* to account for local spatial

[69] Huntington-Klein, Nick. "The Effect: An Introduction to Research Design and Causality – Chapter 16: Fixed Effects," https://theeffectbook.net/ch-FixedEffects.html

effects; the sector does not change between 1990 and 2020. u_{it} is an error term, and the β values represent the coefficients of the explanatory variables.

The secondary model is a non-DID, reduced form regression with four lagged covariates added to exploratively increase the predictive power of the model and observe the resulting effect on the significance of urban village interaction variables:

$$Q_{it} = \beta_0 + \beta_1 U_i + \beta_2 P_{it} + \beta_3 U_i P_{it} + \beta_4 Y_t + \beta_5 S_i + \beta_6 BIPOC_{it-1} + \beta_7 D_{it-1} + \beta_8 G_{it-1} + \beta_9 X_{it-1} + u_{it}$$

In this model, all of the primary model variables' definitions hold. $BIPOC_{it-1}$, D_{it-1}, G_{it-1}, and X_{it-1} are each the lagged variables on $BIPOC_{it}$, D_{it}, G_{it}, and X_{it}, respectively, representing data from the previous period (i.e., if the current time *t* is 2010, the lagged variable represents data from 1990). The use of lagged variables eliminates the direct collinearity between $BIPOC_{it}$, D_{it}, G_{it}, and X_{it} on the fitted RSECI data in the model from 1990 and 2010.

Each model is one-tail-tested in multiple scenarios, as implied in Chapter 3.3. First, the models are run at the city level with no sector-level control groups. Second, the models are run at the five individual sector levels to incorporate the sector-level control groups. Running the models at the city level offers a broad picture for how urban villages are doing across the city, while running the models locally highlights how the urban villages are performing against the more localized control groups described in Chapter 4.3. In both models, particular attention is paid to the significance and sign of the coefficient, β_3, on the interaction term, $U_i P_{it}$, as this coefficient is the crux of the DID inference model. If the coefficient on the interaction term is significant and the given model has strong explanatory power, a significant treatment effect of urban villages on the treated is implied. If the sign of

a significant coefficient is negative, a significant *positive* impact on equity is implied, as RSECI increases when inequity increases. If the sign of a significant coefficient is positive, however, a significant *negative* impact on equity is implied. Attention is also paid to the coefficients on the hub urban village and urban center interaction terms (β_4 and β_5) to test for differing statistical significance of the treatment effects of various urban village types.

5 Chapter 5: Results

Tables 2 and 3 report the results for the primary model runs, respectively. The regression in Table 2 uses robust standard errors at both the city and sector levels; the regression in Table 3 uses clustered standard errors, with village and non-village tracts forming the two clusters, at the city level. Table 4 reports the results for the secondary model runs at both the city and sector levels using robust standard errors. Covariates were automatically omitted accordingly from regressions in which collinearity was an issue.

Table 2: Coefficients of the Primary DID Model with Robust SE

Region	***N***	***U***	***P***	***UP***	***HUV***	***CTR***	***R²***
City of Seattle	366	0.1338*** (4.19)	0.3309*** (7.60)	–0.0591 (–1.28)	0.0073 (0.17)	0.0510 (1.38)	0.2720
North	159	0.0658*** (2.64)	0.5233*** (10.66)	–0.0632 (–1.37)	0.0559 (0.99)	0.1946*** (3.51)	0.5337
Downtown	72	0.1815*** (3.46)	0.3179*** (4.16)	–0.1734 (–1.51)	omitted	–0.0868* (–1.78)	0.3123
East	63	0.3086*** (2.47)	0.4247*** (3.06)	–0.0587 (–0.42)	–0.0320 (–0.36)	–0.1947** (–2.08)	0.3811
South	42	0.1380*** (2.87)	–0.4081*** (–3.58)	–0.0857 (–1.24)	omitted	omitted	0.6221
West	30	–0.0416 (–0.97)	0.1866*** (2.74)	–0.0299 (–0.43)	0.1157*** (2.54)	omitted	0.2702

Note: *t*-values are reported in parenthesis; *p<0.10; **p<0.05; ***p<0.025

Table 3: Coefficients of the Primary DID Model with Cluster SE

Region	*N*	*U*	*P*	*UP*	*HUV*	*CTR*	R^2
City of Seattle	366	0.1338*** [162.22]	0.3309 [3.02]	–0.0591** [–22.38]	0.0073 [1.26]	0.0510* [11.44]	0.2720

Note: *t*-values are reported in brackets; *p<0.10; **p<0.05; ***p<0.025

Table 4: Coefficients of the Secondary Reduced Form Model with Robust SE

Region	*N*	*UP*	*HUV*	*CTR*	R^2
City of Seattle	244	0.0005 (–0.03)	0.0215 (0.91)	0.0400 (1.65)	0.7391
North	106	0.0012 (0.05)	–0.0152 (–0.56)	0.0638 (1.20)	0.7592
Downtown	48	0.0492 (0.74)	omitted	0.0204 (0.30)	0.7106
East	42	0.0595* (1.92)	–0.0078 (–0.17)	–0.0341 (–0.58)	0.9169
South	28	–0.0151 (–0.30)	omitted	omitted	0.8050
West	20	–0.0015 (–0.03)	0.0868 (1.44)	omitted	0.6821

Note: *t*-values are reported in parenthesis; *p<0.10; **p<0.05; ***p<0.025

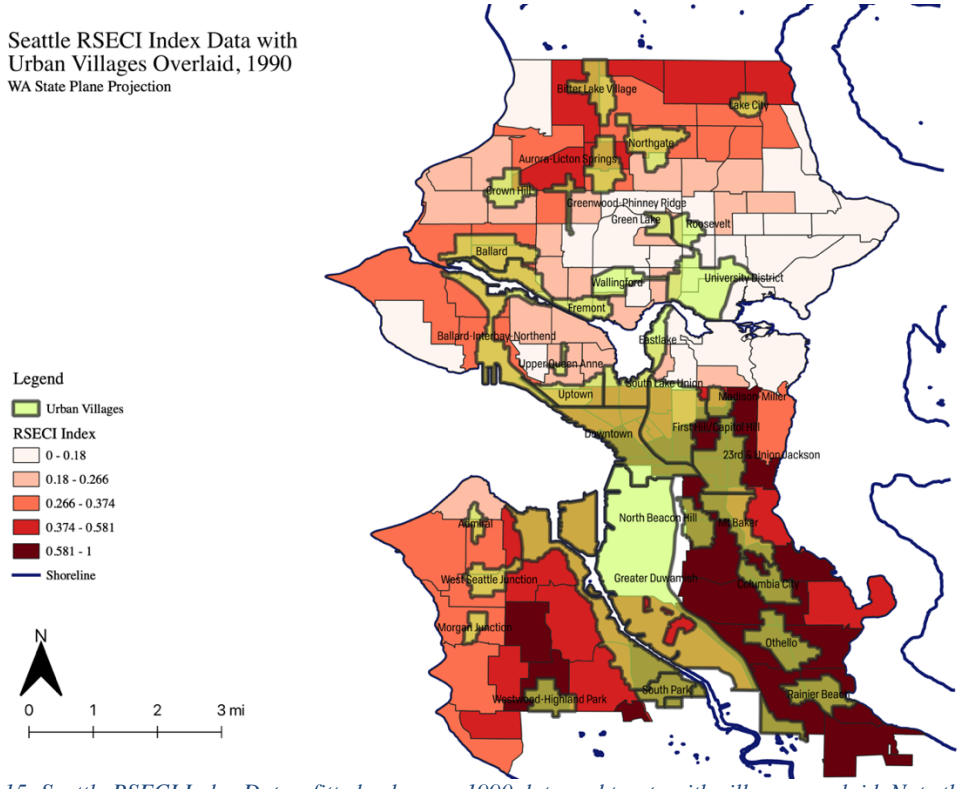

Figure 15: Seattle RSECI Index Data—fitted values on 1990 data and tracts with villages overlaid. Note that 1990 is pre-implementation of the Urban Village Element, so this map is hypothetical.

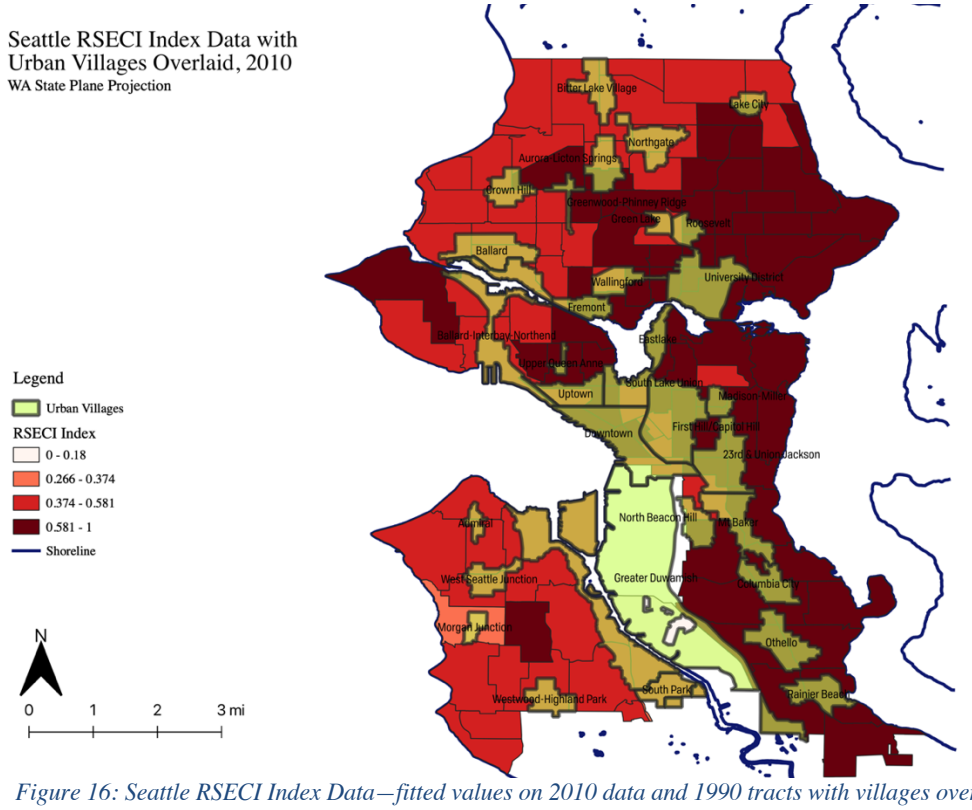

Figure 16: Seattle RSECI Index Data—fitted values on 2010 data and 1990 tracts with villages overlaid

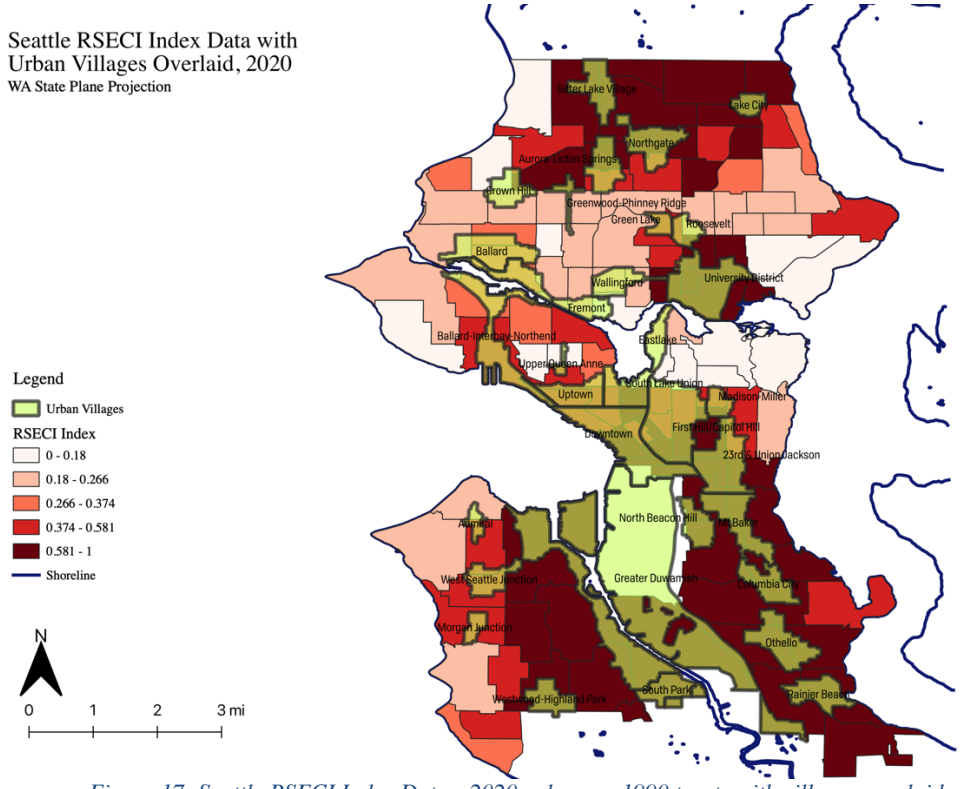

Figure 17: Seattle RSECI Index Data—2020 values on 1990 tracts with villages overlaid

The urban village indicator variable in the primary regression (Tables 2-3) is highly significant to the 1% level in nearly every situation, and the post-treatment indicator variable in the primary regression is highly significant in every scenario given by Table 2. However, the interaction term indicating the treatment effect is not statistically significant in any model scenario under robust standard errors (though it is strongly significant in the city-level cluster standard errors model). Interestingly, at least one of the village-specific interaction terms, the hub urban village interaction indicator or the urban center interaction indicator, is significant in each sector-level regression. On the R-squared front, the more comprehensive secondary reduced form model leads, as expected, to higher R-squared values, meaning that the model explains more variance in the RSECI than the primary model. Also of note, the R-squared values varied considerably by sector in the primary model, with the strongest explanatory power in the North and South sectors.

The above maps (Figures 15-17) show the results of the RSECI fitted values procedure and the consolidation of tracts from all years into one universal set of the largest available tract sizes. To enable visual comparison between each of the three study years, the same RSECI index quantiles are used in each map. Based on the maps, it appears that the RSECI index has generally increased since 1990, with new regions of high RSECI index values in the North and South sectors of the city apparent in 2010 and 2020. Much of the East sector, West sector, and parts of the Downtown sector appear to be more consistent in their RSECI values over time.

6 Chapter 6: Discussion

6.1 Discussion of Results

Based on the results of the primary and secondary models, this study offers evidence that the Urban Village Element has negatively impacted equity in the city of Seattle in certain cases. However, that impact is nuanced and limited, depending on several factors including the sector, the year, and the standard error technique. The results of the primary DID model with robust standard errors, given that all DID assumptions—such as parallel trends—hold, imply a strongly significant treatment effect that increased the RSECI (decreased equity) in the hub urban villages in the West sector and for the urban centers in the North sector relative to the respective sector control groups. The primary model also implies a weak-to-medium significance of a treatment effect that decreased the RSECI (increased equity) in the urban centers in the Downtown and East sectors.

Three major insights arise out of the model results. First, the strong significance and positive sign of the coefficient on the urban village indicator, U_i, in nearly all variations of the primary DID model suggests a link between urban villages and higher RSECI index values. As discussed in Chapter 2.1, urban village designations were granted to either (1) well-connected, well-endowed neighborhoods that were and are poised to capture future population growth or (2) distressed areas that the designation-induced increase in planning attention and investment could uplift.[70] The urban village-RSECI correlation could result from the designation of areas that were *already* inequitable in 1990, the increased separation between villages receiving city attention and investment and the outside-village areas that are not, or both. Related to the latter of the two explanations, as Wei et al. suggested, the

[70] City of Seattle, "Urban Village Element," (1994): 1.3-1.6.

positive urban village-RSECI link could be an example of market-driven changes stemming from urban containment that have led to pricing-out issues addressed in Chapter 2.1.[71] Because Wei et al. found that urban village designations had a net negative effect on land redevelopment between 2010 and 2020, it is plausible that these villages have become both more expensive with rising housing demand and stagnant housing supply as well as more appealing due to increased amenities as urban villages.[72] Outside-village areas, by nature of the Urban Village Element, likely did not receive similar improvements in amenities over the study period, driving the equity divide.

Second, and related to the previous points, the significance levels and signs of the coefficients on the urban village, hub urban village, and urban center interaction variables at the sector level suggest that regional context plays a significant role in the policy's effectiveness. In the primary DID model, the coefficients on the interaction terms are a measure of the average treatment effect on the treated (ATET) of the Urban Village Element. The hub urban village and urban center coefficients have varied significant directional effects on the RSECI index based on the city sector in question but are positive overall in the city-level regression (albeit not significant). In downtown Seattle, where the neighborhoods designated as urban centers were already urban in nature in 1990, the coefficient (and ATET) for the urban center interaction term is weakly significant and negative, which suggests a potential increase in equity in urban villages located downtown—a welcome development. However, the marginal increase in equity downtown is countered by the strongly significant decrease in equity seen in urban centers and hub

[71] Shields, Chloe. "A False Promise?" (2020): 9.
[72] Wei et al. "Planning and Markets at Work: Seattle under Growth Management and Economic Pressure," (2021): 14-15.

urban villages outside of downtown, such as in the North and West sectors for the urban center and hub urban village interactions, respectively. In these sectors, relatively distant from downtown, it is likely that these village type designations fit the idea of "uplifting areas," such as Bitter Lake Village, or, alternatively, consolidating investment in already-privileged areas, such as Ballard. Along this vein, the significance and signs of the coefficients suggest that the "uplifting" pillar of the Urban Village Element has been less successful than planned. Indeed, this is consistent with Wei et al.'s findings on parcel redevelopment, a proxy for urban growth, suggesting that uplifting through village-induced investment and redevelopment is not occurring.[73]

Third, the insights from Neutens et al. and Mayaud et al. are also confirmed from the variation in explanatory power between models. The inclusion of equity-determining characteristics from previous research, including the focus of Neutens et al. on education and jobs[74] and of Mayaud et al. on healthcare factors and transit access,[75] in the secondary reduced form model increased the explanatory power of those models (in terms of R-squared) relative to the primary DID model. Figures 15-17 show visually that many areas with higher RSECI index values are not only designated as villages but are also far from the central business district. As a result, residents in these villages require longer transit or car trips to arrive at activities or amenities downtown. The North, East, and South sectors have appeared to bear the burden of greater inequity over the last 30 years based on their distance

[73] Wei et al., "Planning and Markets and Work: Seattle under Growth Management and Economic Pressure," (2021): 14.
[74] Neutens et al., "Equity of Urban Service Delivery," (2015): 1624-1627.
[75] Mayaud et al., "An urban data framework for assessing equity in cities: Comparing accessibility to healthcare facilities in Cascadia," (2019): 3-4.

from downtown; it is likely not a coincidence that many of these areas perform more poorly along the Neutens et al. and Mayaud et al. equity-determining factors.

6.2 Implications for the 15-Minute City

Based on the analysis in Chapter 2.4, urban villages and 15-Minute Cities share many similar characteristics, suggesting that insights from this study on equity in urban villages are transferrable to the 15-Minute City. The 15-Minute City, with its dense and mixed-use character, closely resembles the hub urban village type. Findings from the primary model suggest that the hub urban village ATET was insignificantly positive across the entire city, but strongly significantly positive (decreased equity) in the West sector of the city. Overall, this suggests that the current design of the 15-Minute City may slightly contribute to increased inequity. In regions resembling the West sector, however, the contribution may be more significant. This particular part of the city is physically separated from the Downtown sector central business district by a large industrial tract and the Puget Sound. Car trips to the Downtown sector are about fifteen minutes without traffic by car, but nearly an hour by transit, which means it both violates the fifteen-minute rule *and* neglects Mayaud et al.'s preference for robust transit access to the central business district.[76] According to Figure 15, tracts in the West sector of the city also started with relatively high RSECI index values in 1990, suggesting that its baseline level of inequity was already higher than normal. To ensure that 15-Minute Cities are successful and equitable as desired, it is imperative that transit access in the area is robust and efficient, equity conditions are better than average in the city, proper safeguards against resident displacement are in place,

[76] Mayaud et al., "An urban data framework for assessing equity in cities: Comparing accessibility to healthcare facilities in Cascadia," (2019): 3-4.

and that the 15-Minute City is not designed, as some urban villages originally were, for the sole purpose of uplifting a distressed area. It is also imperative that city planners take extra precautions to prevent the reinforcement of existing spatial biases, including transit inequities, in 15-Minute Cities and/or any policy that simply "designates" areas for market-led development similar to urban villages.

6.3 Study Limitations

As with all models, there are several important limitations to note on the values and significance levels of covariates. First, causal inference based on the results of the primary and secondary models is challenging because there are many steps at which this analysis relies on assumptions and estimations. Starting from the conceptualization phase, the use of tracts as the unit of analysis, despite being the smallest possible measurement areas for which RSECI component data was available, meant compromising on geographic precision when estimating for villages in the model. Urban village boundaries are not synchronized with Census tract boundaries except at shorelines; while some villages are well-represented by tracts, most villages straddle the borders of two or three different tracts and constitute only a small area within those tracts. The resulting geographical re-creation of villages, through the urban village indicator variable for each tract, is for an area much larger than the 17% of Seattle's land area realistically covered by the villages. Furthermore, tract sizes and tract populations change each time the Census is taken. The dynamic nature of Census tracts impacts not only the primary model's accuracy, but also the accuracy of using lagged variables in the secondary model, as lagged statistics from 10 or 20 years prior to the analysis year are likely less relevant than expected in a rapidly growing city like Seattle.

With respect to the RSECI data and model results, the estimation error from analyzing an area larger than the villages could result in understated levels of significance for the urban village interaction term and the other component, particularly because the underlying assumption is that villages have hyper-localized effects. One redeeming aspect of using the relatively larger tract unit with respect to the localized effects, however, is that the edge effects of relatively smaller urban villages—the error that arises when a boundary between two spatial units is not physically real and does not impact accessibility or equity for residents living directly on the other side of a boundary—likely affect the model to a lesser extent.[77]

Given that the RSECI values were fitted for 1990 and 2010 based on 2020 data, there could be unaccounted-for error in the RSECI data. Additionally, the fact that only four component statistics in the RSECI are publicly available for all three study years limits the extent to which the modeled RSECI values are a true representation of all of the components used in the city's own calculations. The fitted values model in Chapter 4.4 has high R-squared value of 0.8792, meaning that those four component covariates explain a vast majority of the variance in the RSECI data; however, the unexplained 12% of the variance in the data implies a non-negligible estimation error.

The study design also likely makes clustered standard errors less accurate. In most studies with clustered standard errors, the ATET is being measured on individuals, rather than on the average statistics of larger geographical units, such as tracts or neighborhoods. Primary model results from Table 3 with clustered standard errors likely overstate the

[77] Gao, Fei; Kihal, Wahida; Le Meur, Nolwenn; Souris, Marc; Deguen, Séverine. "Does the edge effect impact on the measure of spatial accessibility to healthcare providers?" *International Journal of Health Geographics*, Vol. 16, No. 46 (2017): 2-3.

significance of the urban village interaction term and ATET. As a result, the robust standard errors and significance levels in Table 2 are likely more valid. A future model that improves on this study design would embrace "big data" principles and assign each *individual* in the population of each tract to a set of equity and/or amenity accessibility scores similar to the RSECI or its components. For example, individual k in tract i may have, say, a 30-minute commute to work, a household income of $80,000, and may speak English less than very well, leading to an individual-level RSECI of Q_{ki}. This data could either be calculated as fitted values extrapolated from another individual-level statistic or as real data obtained from sampling. To obtain individual level data, the city and/or researchers would either need to build more purposeful, individual-level equity surveys for individuals that could be extrapolated to the entire population of Seattle or assign individuals randomly along a distribution of neighborhood- or tract-level data. This research design would make it possible to use DID inference with cluster standard errors, clustering individuals by urban village.

Lastly, the use of only three analysis years limits the certainty with which the parallel trends assumption is applied. As shown in Figure 14, parallel trends are difficult to discern graphically because only one year is used in the pre-treatment phase: 1990. Much attention was given in Chapter 4.3 to qualitatively arguing that the parallel trends assumption holds based on the citywide trends throughout the late-20th century. Additionally, the use of sector-level sorting in the primary and secondary model likely increases the strength of the parallel trends assumption because of the inclusion of more localized trends. However, given the unknown quantitative accuracy of the parallel trends assumption, adding an additional analysis year prior to the application of treatment could help rectify this concern. The lack of

online data for RSECI components prior to 1990 makes it difficult to expand the analysis; going forward, the city ought to maintain robust component data to enable continuous monitoring of the RSECI.

7 Chapter 7: Conclusion

The goal of this study is to assess the economic and social equity impacts of the 1994 Urban Village Element of *Towards a Sustainable Seattle* using a spatial DID inference method to estimate the ATET, assuming that the urban village designation (and associated planning attention) is a "treatment." To that end, this study has worked to answer the guiding questions proposed in Chapter 1.3:

- **Question 1:** What effect has Seattle's urban villages policy had on the city's social and economic equity?
- **Answer 1:** Seattle's urban villages policy has had mixed effects on the city's social and economic equity. In the Downtown and East sectors, a positive effect on equity of weak-to-medium significance is observed while in the North and West sectors, a negative effect on equity of strong significance is observed. The significance level and sign of the equity effects depends on the sector of the city and the type of village, discussed in Chapter 6.
    - Based on qualitative and quantitative analyses, has the policy lived up to its stated goals from 1994?
        - Answer: Because the policy has negatively contributed to equity in some circumstances, the policy has failed on at least one key element of its plan to improve equity in Seattle.
    - What might a holistic consideration of equity impacts and factors look like in the city?

        - Answer: A holistic consideration of equity impacts in the city would combine the many factors assessed in past literature into an individual- or village-level study as proposed in Chapter 6.

- **Question 2:** If the urban villages policy has had a negative impact on equity in Seattle, what are the implications of this finding for other cities that may implement villages or 15-Minute Cities in the future?
- **Answer 2:** Cities that implement 15-Minute City policies should be cognizant of their expected impacts on equity factors and should take extra precautions to ensure that policies do not reinforce existing biases or exclusionary living patterns. Particularly because many communities also serve as enclaves (such as for immigrants and ethnic communities), it is also critical that 15-Minute Cities do not impair the character and affordability of these enclaves. 15-Minute Cities and urban villages must improve their ability to accommodate disadvantaged communities and correct economic failures (i.e., affordability caused by stagnant supply or excessive demand, lack of government action, etc.) within their market-driven redevelopment approach.
    - Are urban villages fundamentally similar to 15-Minute Cities?
        - Answer: Hub urban villages in particular share many similarities to 15-Minute Cities, as they are both envisioned as self-sustaining, transit-rich, and dense communities that capitalize on the economic and social benefits of urban density and proximity.
    - How can Seattle (and other cities) mitigate negative equity impacts resulting from these novel forms of planning?

- Answer: This question should be the focus of future studies and analyses, particularly as cities examine their own comprehensive plans. Based on the results of the model in this thesis, Seattle (and other cities) can mitigate negative equity impacts resulting from urban villages and/or 15-Minute Cities by paying particular attention to issues of affordability, transit access, healthcare access, and job access when designing communities. Cities must also continuously monitor the effects of their planning policies on equity by collecting robust data through community-level surveys at a much more regular interval than currently done.

Reviewing the past literature on equity in the urban planning context, dating back to Krumholz's pioneering focus on spatially and socially disadvantaged groups in Cleveland, revealed important findings about variables that matter in equity planning analyses as well as methods that work well for various research questions. Accounting for disadvantaged groups, access to jobs and education,[78] healthcare metrics, and transit proximity,[79] the model uses the RSECI as the proxy dependent variable for equity to ensure a holistic approach. Both the primary DID model and the exploratory secondary reduced form model were used to regress the RSECI pre- and post-treatment on urban village interaction terms and other covariates. The primary DID model follows a similar design to Heckert and Mennis' evaluation of the treatment effect on adjacent land values from greening vacant lots in Philadelphia.[80]

[78] Neutens et al., "Equity of Urban Service Delivery," (2015): 1617-1624.
[79] Mayaud et al., "An urban data framework for assessing equity in cities: Comparing accessibility to healthcare facilities in Cascadia," (2019): 3-4.
[80] Heckert et al., "The economic impact of greening urban vacant land," 2012: 3015-3016.

While the secondary model benefits from the use of lagged variables to increase the explanatory power of the model on the RSECI, it is the primary DID model with robust standard errors that generated the most pertinent insights. Assuming that the necessary DID assumptions are valid, the model implies a causal and strongly significant ATET of the hub urban village and urban center designations that decreased equity in the North and West sectors of the city, while a more modestly significant ATET of the urban center designation increased inequity in the Downtown and East sectors of the city. Furthermore, the model implies a strongly significant and positive correlation between urban villages and higher RSECI (decrease equity) values both pre- and post-treatment. This finding suggests that urban villages could be perpetuating existing inequities, driving increased inequities in planning investment between villages and non-villages, or simply not succeeding at "uplifting" disadvantaged communities.

Though both models are subject to limitations and the findings differ by city sector, there is significant evidence that urban village designations have decreased equity in the city of Seattle in certain areas. It is important to note also that the lack of significant ATET findings in other areas of the city does not necessarily mean that the policy has had no adverse equity impact in these areas. Aside from the limitations on the accuracy of the study and the RSECI as a proxy, the ground-level reports of residents about gentrification and displacement in their own neighborhoods is evidence that the policy's effects are reaching the lives of individuals in the city.[81] These findings are important for the 15-Minute City movement as well; similarities between hub urban villages and the 15-Minute City mean

[81] Beason, Tyrone. "Central District's shrinking Black community wonders what's next," *The Seattle Times*, May 28, 2016. Accessed September 1, 2022. https://www.seattletimes.com/seattle-news/central-districts-shrinking-black-community-wonders-whats-next/

that the leaders of the 15-Minute City movement must continue to recognize the equity impacts of using market forces (i.e., density and UGBs) without proper aid to marginalized populations. 15-Minute Cities can also avoid the equity pitfalls of urban villages through more regular monitoring of its equity impacts and by taking extra care in implementing 15-Minute City policies in already-disadvantaged areas.

Going forward, Seattle faces a choice as it hopes to live up to its ideals of social equity, a strong economy, and environmental stewardship. The city and its residents recognize that the Urban Village Element of the 1994 comprehensive plan requires a modern update in order to function better along all three elements of the Planner's Triangle. Seattle is currently in the environmental review and scoping process to update its comprehensive plan into a 2024 edition: *One Seattle*.[82] The scoping process, which commenced in 2022, has identified five alternatives for the city's urban growth management plan ranging from preserving the current urban villages strategy, to creating a new corridor-based strategy near transit hubs and amenities, to some hybrid of the five options.[83] Based on the findings of this analysis, each option carries risks for displacement and increasing the RSECI because they are anchored in areas that will be transit- and amenity-rich. A more holistic approach that does not prioritize one neighborhood over another for all investment and planning decisions could likely work better. Finally, to better track its performance along the social equity vein, Seattle must continue its work in producing the RSECI and ensure that it collects pre- and post-treatment data on its new *One Seattle* growth strategy. If Seattle keeps these factors and

[82] City of Seattle Office of Planning and Community Development, "One Seattle Comprehensive Plan: EIS Scoping Fact Sheet," June 2022. https://www.seattle.gov/documents/Departments/OPCD/SeattlePlan/OneSeattlePlanEISScopingFactSheet.pdf

[83] Ibid., 3-4.

considerations for its next planning policy in mind, the residents and planners in the Emerald City would be better positioned for a sustainable, equitable, and economically viable future.

EPILOGUE

The research and data analysis process for this paper has combined methods and insights from my concurrent degree program in Economics and Urban and Regional Studies into a final product that reflects both courses of study. In economics, my coursework in Intermediate Microeconomics, Econometrics I, and Cross Section and Panel Econometrics informed the creation of a model based on standard practice in policy and economic analysis. In urban and regional studies, my coursework in Methods of Planning Analysis, Geographic Information Systems, and Urban Economics informed the use of standard GIS and spatial tools to surgically clean datasets for proper usage, build logical contingency approaches when data was unavailable, and think critically about past, present, and future urban issues. When an issue of data availability or compatibility arose, these skills helped me move forward in using alternative approaches on-the-fly.

As I have written this thesis, I have gained a new appreciation for the "stacking" effect that precedes every new innovation or insight—every insight builds on the work of previous researchers, giving credence to the term "standing on the shoulder of giants." This paper, while only an undergraduate thesis, builds on the giants of econometric and urban planning research, once again coalescing two great fields in their own right into an idea greater than each field alone. In looking ahead to the next step in my academic and career journey, I always aim to remember my roots in these two fields, and to remember that the best innovations are the ones that bring insights and contributions together from multiple disciplines. Over the course of my Cornell career, the power of making connections between both different fields of study and different generations of study has become clear.

Much like my own journey in writing this thesis, it is important that cities around the world adopt a mentality that drives the coalescing of innovative ideas from many disciplines. As a freshman in my advisor Professor John Carruthers' Development Economics for Planners course in Spring 2020, I distinctly remember the reading recommendation given to us on the first day: the prologue of community activist and President Obama-inspirer Saul Alinsky's *Rules for Radicals*. The most poignant insight I have taken from that brief prologue is the idea of making change by working within the given political, economic, and social systems we inhabit. While urban planners, policymakers, economists, business leaders, and activists often work against each other in practice (and, on occasion, even scoff at the work and/or motives of the other), each group can inform the other in creating a more just, equitable, and sustainable future. No one discipline is less important than the others, but no one discipline is better, more informed, more skilled, or smarter than the others. Urban planners, activists, and—to some extent—policymakers often work against business leaders and economists, but in reality, the forces of economics, justice, and policy ought to work in tandem to tackle the big challenges ahead.

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