Do Complete Streets Make a Difference?

The Influence of Complete Streets on Attracting People and Jobs, Changing Commuting Patterns, and Creating Multifamily Rent Premiums with Implications for Leveraging the Infrastructure Investment and Jobs Act

Arthur C. Nelson and Robert Hibberd

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16. Abstract

Complete Streets are a new approach to transportation and land use planning. For one thing, they put people first. For another, they focus on expanding mobility especially for walking and biking. They also create human scale streets through streetscapes and landscaping, wider sidewalks, slower traffic, and often fewer travel lanes.

Among many promises made by advocates of Complete Streets is that they will attract people and jobs, change commuting patterns, and improve real estate values. But do they?

This report presents the first comprehensive assessment of whether Complete Streets make a difference in these respects. Statistical analysis is applied to 26 Complete Streets in 17 central counties (those hosting the largest cities in a metropolitan areas) of 16 metropolitan areas. We estimate that these Complete Streets total 48 kilometers in distance. We defined Complete Street corridors as 100 meters on either side of the centerline, comprising about 12 square kilometers in area. This is equivalent to about two one-thousandths or 0.02 percent of the urbanized land area of the central counties.

Implication for transportation planning and policy are offered especially for leveraging the Infrastructure Investment and Hobs Act.

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DEDICATION

To mentors who cringe whenever transportation investments do not maximize benefits to society and whose insights guide continuing explorations of this work:

Ken Dueker and Jim Strathman

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EXECUTIVE SUMMARY

Complete Streets are a new approach to transportation and land use planning. For one thing, they put people first. For another, they focus on expanding mobility especially for walking and biking. They also create human scale streets through streetscapes and landscaping, wider sidewalks, slower traffic, and often fewer travel lanes.

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This report presents the first comprehensive assessment of whether Complete Streets make a difference in these respects. Statistical analysis is applied to 26 Complete Streets in 17 central counties (those hosting the largest cities in a metropolitan areas) of 16 metropolitan areas. We estimate that these Complete Streets total 48 kilometers in distance. We defined Complete Street corridors as 100 meters on either side of the centerline, comprising about 12 square kilometers in area. This is equivalent to about two one-thousandths or 0.02 percent of the urbanized land area of the central counties.

We offer the following key research findings and conclusions.

Do Complete Streets Make a Difference for People?

Among several findings reported in Chapter 4 relating to people and households are these:

- Complete Streets grew at a faster pace than their central counties between 2013 and 2019: 16.4 percent compared to 9.5 percent. In addition, the minority share of Complete Street population also grew faster: 25.4 percent compared to 16.7 percent.

- Between 2013 and 2019, the number of households along Complete Street corridors increased by 16.1 percent or nearly double that of central counties which grew at 8.4 percent.

- Households with children along Complete Streets corridors grew at a rate more than double that of central counties: 6.7 percent compared to 3.1 percent.

- The median incomes of Complete Streets households rose at a faster pace between 2013 and 2019 compared to central counties—32.8 percent compared to 23.5 percent. While in 2013, Complete Streets households' income was about 88 percent of central county households, this narrowed to 94 percent by 2019 but remained lower than central counties.

- Inasmuch as Complete Streets attracted 2.5 percent of all new households in their host central counties on just 0.02 percent of the urban land area, they attracted 125 times more households than proportionate to their land area.

We conclude that Complete Streets attract people and households to them.

Do Complete Streets Make a Difference for Jobs?

With respect to jobs and jobs by wage group, we offer these findings from Chapter 5:

- Overall, Complete Streets added jobs at about the same pace as their central counties. This is impressive because nearly by definition, Complete Streets serve substantially built out areas. The implication is that Complete Streets are areas of substantial infill and redevelopment.

- Perhaps confirming the role of Complete Streets as places of improved accessibility and amenities, they added jobs in office and knowledge economic groups at a much faster pace than central counties: 15.3 percent compared to 11.0 percent and 23.8 percent compared to 17.7 percent, respectively.

- Perhaps also confirming the role of Complete Streets as places of amenities, jobs in the arts-entertainment-recreation economic group were added at a pace nearly half again higher than central counties at 30.3 percent compared to 22.3 percent, respectively.

- On the other hand, Complete Streets did not attract jobs in the knowledge group as quickly as central counties, and actually lost jobs in the education economic group.

- Although there are no explicit expectations about the kinds of jobs by lower, middle, and upper wage categories that would be attracted to Complete Streets, we found that they tended to attract middle and upper wage jobs at a faster pace than central counties but added lower wage jobs at a slower pace.

- Inasmuch as Complete Streets attracted 4.7 percent of all new jobs in their host central counties on just 0.02 percent of the urbanized land area, they attracted 235 times more jobs than proportionate to their land area.

We conclude that Complete Streets attract jobs to them.

Do Complete Streets Change Commuting Patterns?

Chapter 6 addresses whether Complete Streets change commuting patterns, finding that:

- Commuting by automobile accounted for about a third (34 percent) of the change in commuting mode along Complete Street Corridors compared to nearly three quarters (73 percent) for central counties.

- Walking and biking to work along Complete Streets accounted for about a third (32 percent) of the change in commuting compared to just 5 percent for central counties.

- The share of change of workers working from home along Complete Streets during the pre-pandemic study period (2013-2019) was about a quarter higher than for central counties, 17 percent compared to 14 percent.

Overall, we find that two-thirds (66 percent) of the change in workers living along Complete Street corridors used modes other than the automobile in their commute to work. We conclude that Complete Streets make a difference in changing commuting patterns.

Do Complete Streets Make a Difference in Multifamily Residential Rent?

One of the promises of Complete Streets is improving real estate value along and near them. Evidence of this is assessed by evaluating the variation in multifamily rents with respect to Complete Street proximity.

In Chapter 7, we indeed find that for properties within 30 meters and then between 30 and 100 meters of Complete Streets, the rent premium range is 17.8 percent to 29.1 percent and 13.2 percent and 24.5 percent, respectively.

We conclude that Complete Streets make a difference in influencing real estate value with respect to multifamily rents.

The Market Demands More Complete Streets

Given how the market responds to the presence of Complete Streets, we surmise that the market needs more of them. We also suspect that the value-added by Complete Streets can be leveraged to help finance new ones. In Chapter 8, we estimated:

- New real estate investment was in the order of $10 billion along the 48 kilometers of Complete Streets that were studied or about ***$200 million in new investment per kilometer***.

- Assuming a national average effective property tax rate of 1.0 percent, we estimate that there are ***$2 million per kilometer in new property taxes per year***.

- New jobs generated about $4 billion in new payroll per year along the 48 kilometers of Complete Street corridors or about ***$80 million in new payroll per kilometer***.

Some of these new revenues may be tapped to help leverage the construction of new Complete Streets. After all, national surveys suggest an unmet demand for tens of millions of Americans who want to have the opportunity to live along or near Complete Streets.

We remind readers of two things. First, the Complete Streets in our study comprised just 0.02 percent of the urbanized land area of their central counties. Second, our findings reflect only the period 2013-2019 for people and 2013-2018 for jobs. One could extrapolate results many decades into the future to estimate the total potential magnitude of people and jobs that could be attracted to them over time.

Our findings may help transportation and economic development planning and public officials to leverage resources made available through the Infrastructure Investment and Jobs Act to expand Complete Streets.

INTRODUCTION

In 1971, over the objections of highway interests as well as the Oregon Department of Transportation and the state's then pro-land use planning Governor, Tom McCall, Oregon enacted the "Bike Bill" that became the first Complete Streets-like policy in the United States. The current version of this state law requires that new or rebuilt roads accommodate bicycles and pedestrians. ODOT also works with local governments to fund bicycle and pedestrian facilities in the public rights-of-ways. It helps that one percent of the state's highway budget is earmarked for this purpose.

Fast forward to 2003 when David Goldberg, formerly of the *Atlanta Journal-Constitution*, coined the phrase "complete streets" to characterize a kind of street that serves people first and expands mobility. Indeed, the term has emerged to become a proper noun and hence capitalized as Complete Streets. Today, more than 1,600 communities across the U.S. have formally adopted Complete Streets plans and policies that are in various stages of implementation.

While a dozen or so states that have Complete Street statutes, California may capture best their purpose as "a balanced, multimodal transportation network that meets the needs of all users of streets, roads, and highways [including bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, public transportation, and seniors] for safe and convenient travel in a manner that is suitable to the rural, suburban, or urban context."[1]

Although there is no inventory of Complete Streets, and indeed there is no single template for what constitutes a Complete Street, there are likely hundreds of them across the U.S. But do they make a difference?

This report is the first to report research into whether Complete Streets make a difference for people, jobs, commuting patterns, and real estate values. We start with describing what Complete Streets are in Chapter 1. We identify Complete Street promises in Chapter 2 that we apply to those Complete Streets introduced in Chapter 3.

The next four chapters assess the extent to which Complete Streets attract people (Chapter 4) and jobs (Chapter 5), change commuting patterns (Chapter 6), and influence real estate values through the variation in multifamily rent with respect to Complete Street proximity (Chapter 7).

We conclude in Chapter 8 with a call to leverage value-added created by Complete Streets to increase their supply to help address unmet market demand.

[1] State of California, Assembly Bill No. 1358, 2008.

1
WHAT ARE COMPLETE STREETS?

Complete Streets are a new approach in multi-modal transportation corridor and associated land use planning. In this opening section, we review what Complete Streets are and their basic design objectives.

Early advocates of Complete Streets, John LaPlante and Barbara McCann (2008), described them as follows:

> A complete street is a road that is designed to be safe for drivers; bicyclists; transit vehicles and users; and pedestrians of all ages and abilities. The Complete Streets concept focuses not just on individual roads but on changing the decision-making and design process so that all users are routinely considered during the planning, designing, building and operating of all roadways. It is about policy and institutional change.

The National Complete Streets Coalition (NCSC nd) describes Complete Streets as roadways that are safe for people of all ages and abilities—particularly vulnerable users—that balance the needs of different modes and supporting local land uses, economies, cultures, and the natural environment.

Complete Streets are driven (pun intended) through local planning, policymaking, and design. The NCSC (2018) offers 10 elements comprising what it calls an "ideal" Complete Streets policy:

> ***Vision and intent***
> Includes an equitable vision for how and why the community wants to complete its streets. Specifies need to create complete, connected, network and specifies at least four modes, two of which must be biking or walking.
>
> ***Diverse users***
> Benefits all users equitably, particularly vulnerable users and the most underinvested and underserved communities.
>
> ***Commitment in all projects and phases***
> Applies to new, retrofit/reconstruction, maintenance, and ongoing projects.
>
> ***Clear, accountable exceptions***
> Makes any exceptions specific and sets a clear procedure that requires high-level approval and public notice prior to exceptions being granted.
>
> ***Jurisdiction***
> Requires interagency coordination between government departments and partner agencies on Complete Streets.

Design
Directs the use of the latest and best design criteria and guidelines and sets a time frame for their implementation.

Land use and context sensitivity
Considers the surrounding community's current and expected land use and transportation needs.

Performance measures
Establishes performance standards that are specific, equitable, and available to the public.

Project selection criteria
Provides specific criteria to encourage funding prioritization for Complete Streets implementation.

Implementation steps
Includes specific next steps for implementation of the policy.

Complete Streets vary considerably in their purposes, planning and design based on individual community objectives. Broadly, there are four areas of Complete Street design that are considered (Litman 2015):

Pedestrian Infrastructure
This includes sidewalks, traditional and raised crosswalks, and median crossing islands. Other design considerations address ADA (Americans with Disabilities Act of 1990) features such as audible signals for people with low vision, crosswalk push buttons that are reachable by people in wheelchairs, curb cuts, and curb extensions.

Traffic Calming
Traffic calming features are designed to reduce the speed of automobiles we well as define the edges of vehicular travel lanes. Design elements can include road diet schemes, shorter curb corner turning radii, eliminating free-flow right-turn lanes, angled and face-out parking, street trees, planter strips, and ground cover among others.

Bicycle Accommodations
Complete Streets usually include a range of bicycle accommodations such as protected or dedicated bicycle lanes, neighborhood green-painted (greenway) lanes, wide paved shoulders, and bicycle parking.

Public Transit
Local serving public transit design features are often included for bus rapid transit, bus pullouts, transit signal priority, bus shelters, and dedicated bus lanes. Heavy rail (often called third rail) and commuter rail transit is usually not built into Complete Streets.

A visual example of a Complete Street conversion is illustrated in Figure 1.1.

Figure 1.1
Complete Street conversion in Great Neck, New York.
Source: https://www.dot.ny.gov/programs/completestreets/best-practices

If they are successful, Complete Streets should attract people who want to live along or near them as well as firms that want to benefit from improved economic opportunities along them. And, almost by definition, Complete Streets should also change commuting modes by encouraging transit, walking, and biking as well as working from home. Taken together, successful Complete Streets efforts should also be reflected in the real estate market though higher values and rents especially for multifamily housing with respect to Complete Street proximity.

We explore key promises of Complete Streets next.

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2
WHAT ARE THE PROMISES OF COMPLETE STREETS?

In this chapter, we identify those promises of Complete Streets that we evaluate, namely attracting people, attracting jobs, changing commuting mode patterns, and influencing multifamily real estate rents.

Attracting People

According to the NCSC, Complete Streets provide many benefits to the surrounding community such as (NCSC 2016a):

> Wide, attractive sidewalks and well-defined bike routes, where appropriate to community context, encourage healthy and active lifestyles among residents of all ages;
>
> Opportunities for children to reach nearby destinations in a safe and supportive environment;
>
> A variety of transportation options allow everyone – particularly people with disabilities and older adults – to get out and stay connected to the community;
>
> Multi-modal transportation networks help communities provide alternatives to sitting in traffic;
>
> A better integration of land use and transportation through a Complete Streets process creates an attractive combination of buildings – houses, offices, shops – and street designs; and
>
> Designing a street with pedestrians in mind – sidewalks, raised medians, better bus stop placement, traffic-calming measures, and treatments for travelers with disabilities; and

Indeed, more than half of Americans want to live in a walkable community (National Association of Realtors 2020). Moreover, an overwhelming number of Americans support policies that would make their communities more livable by reducing traffic speed, providing more mobility options, and especially by creating safer pedestrian environments (National Association of Realtors 2017).

The bottom line for Complete Streets is to create livable communities, as noted by the NCSC:

> The streets of our cities and towns are an important part of the livability of our communities. They ought to be for everyone, whether young or old, motorist or bicyclist, walker or wheelchair user, bus rider or shopkeeper. But too many streets are designed only for speeding cars, or worse, creeping traffic jams. They are unsafe for people on foot or bike – and unpleasant for everybody. (NCSC 2016a.)

Put differently, “incomplete streets” deny citizens the choice of living where walking and cycling are possible, and safe. Instead, metropolitan America has become a sea of sprawling, low density communities linked by busy and often congested multi-lane roadways (Golob & Brownstone 2005). Even where working, shopping and other destinations are close to home, incomplete streets make them inaccessible for other than driving. And even where some streets offer a safe pedestrian environment, the absence of benches, landscaping, and storefronts do little to encourage walking. (Alfonzo & Boarnet 2008).

Moreover, lower income households including younger households, transportation disadvantaged persons, and persons of color are less likely to own cars and more likely to rely on public transportation, being particularly affected by incomplete streets and constrained mobility choices. The cost of owning a car with its purchase cost, maintenance, registration fees, fuel, and other expenses, hits hardest on working families (Sanchez & Brenman 2008; Brenman & Sanchez 2012; (NCSC 2016b).

These factors lead us to hypothesize that ***Complete Streets will attract people generally*** and ***people of color, younger people, and lower income households*** especially.

Attracting Jobs

Complete Streets can attract jobs by making it easier for residents and visitors to access businesses via transit, walking, or biking. The total savings from non-auto trips can create a “green dividend” allowing to spend more money on stores, services, restaurants, and entertainment that keep money circulating in the local economy (NCSC 2016c).

Moreover, implementing Complete Streets policies can have economic benefits even before the projects are finished. Road, sidewalk, bike lane and transit improvement projects create more jobs during construction than those that are only designed for vehicles (NCSC 2016c).

Multiplier effects also accrue to the local economy. During the Great Recession, each stimulus dollar invested in a public transportation project created twice as many jobs as one spent on a highway project (Nelson et al. 2009). In other words, the investment in implementing Complete Streets can stimulate sizeable private investment, especially in retail districts, downtowns, and busy commercial strips where pedestrians, cyclists, and transit users are welcomed.

Because of these considerations, we hypothesize that ***Complete Streets will attract jobs***.

Changing Commuting Mode Patterns

Complete Streets should change commuting mode choice and patterns in two ways, first by encouraging people to leave their cars and second by increasing the use of transit, walking and biking (NCSA 2016d).

Incomplete streets discourage getting out of the car
The National Household Transportation Survey shows that about half of all metropolitan trips are three miles or less and more than a quarter are one mile or less, which are distances easily traversed by foot or bicycle. Yet about two-thirds metropolitan trips under one mile are made by automobile. One reason may be incomplete streets that make it dangerous or unpleasant to walk, bicycle, or take transit (NCSA 2016d).

Surveys have also found that lacking sidewalks and safe places to bike, people choose not to walk or bike and use their car instead (Wilbur Smith Associates 2007). Additionally, a national poll found that 47 percent of Americans over 50 say they could not cross main roads near their home safely. Nearly 40 percent said their neighborhoods do not have adequate sidewalks, while more than half (55 percent) reported no bike lanes or paths, and nearly half (48 percent) reported no comfortable place to wait for the bus (AARP 2008; NCSA 2016d).

Complete Streets increase use of public transportation, bicycling, and walking.
As Complete Streets make walking, bicycling, and public transportation safer, people begin to leave their cars at home (NCSA 2016d). Moreover, children are more likely to walk or bike to school when walkways are present, when there are safe street crossings, and when reduced vehicle speed are enforced in school zones. (Ewing, Schroener, & Greene 2004). Indeed, one element of many Complete Street programs are Safe Routes to Schools.

Influencing Real Estate Values

By improving options for walking, biking, and using transit, expenses for automobiles will fall. These savings will be capitalized into higher residential values and rents (NCSA 2016c). In addition to capitalized transportation cost savings, Complete Streets confer a range of amenities that will also be capitalized in real estate value and rents.

Summary of Expectations

If they are successful, Complete Streets should attract people who want to live along or near them as well as firms that want to benefit from improved economic opportunities along them. And, almost by definition, Complete Streets should also influence commuting modes by encouraging transit, walking, and biking as well as working from home. These benefits will increase the market value of properties along Complete Streets, especially multifamily residential rents. In this report, we will evaluate whether and the extent to which these outcomes are evident.

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3
The Framework to Address Whether Complete Streets Make a Difference

Ours is an evidence-based, data-driven, analysis of whether and the extent to which Complete Streets make a difference along numerous dimensions. Although the National Center for Complete Streets (NCSC) keeps an inventory of state and local Complete Streets policies, no organization maintains an inventory of existing or proposed Complete Streets, their design features, land uses, performance, and so forth. This leads us to call for an entity to do so.

Our study includes those Complete Streets in existence throughout most of the study period based on case studies included in the NCSC's *Safer Streets, Stronger Economies* (Anderson and Searfos 2015), Mark Schlossberg et al.'s *Rethinking Streets: An Evidence-Based Guide to 25 Complete Street Transformations* (2013) and others in those metropolitan areas with transit systems we have studied for the National Institute of Transportation and Communities (Nelson et al. 2015, Nelson & Ganning 2015, Nelson et al. 2019, 2021). In all, we identified 26 Complete Streets in 17 central counties of 16 metropolitan areas. They are listed in Table 3.1 and their locations illustrated in Figure 3.1.

Our analysis is limited to assessing change in key indicators over time with respect to the Complete Streets aggregated as a group. Future research will evaluate outcomes with individual Complete Streets.

Mechanically, we compare changes along Complete Streets to changes of the "central county," defined by the census within which it is located. In other words, relative to the central county, are the effects of Complete Streets greater, smaller, or about the same?

For most of our analyses, we compare change along 100-meter wide Complete Street corridors, based roughly on census block group (CBD) boundaries (chapters 4, 5, and 6). For our real estate analysis, we used multiple distance bands from the Complete Street centerline outward, as described in Chapter 7.

It is important to know that the total land area within 100-meters of the centerline of Complete Streets accounts for only two hundredths of one percent (0.02 percent) of the total urban land area of the central counties within which they are located. We discuss implications of this on several chapters.

We proceed to assess whether Complete Streets make a difference in attracting households.

Table 3.1
List of Complete Streets Projects Studied

Complete Street Project Name (Alphabetical)	Metropolitan Statistical Area	Central County	Length in Kilometers	Length in Miles
Alder Street - Eugene, OR Complete Street Project	Eugene	Lane	1.2	0.7
Barracks Row - 8th Street SE Washington D.C. CS project	Washington, DC	District of Columbia	0.8	0.5
Bell Street Park (Woonerf) Complete Street Project	Seattle	King	0.4	0.2
Brighton Blvd. CS Project Denver, CO	Denver	Denver	3.4	2.1
Broad Street Pedestrian Plaza Complete Street Project	Atlanta	Fulton	0.1	0.1
College Avenue CS Project - Tempe, AZ	Phoenix	Maricopa	3.4	2.1
Decatur Street CS Project - New Orleans, LA	New Orleans	Orleans	1.0	0.6
East Blvd. Charlotte, NC CS project	Charlotte	Mecklenburg	2.3	1.4
Edgewater Drive CS Project - Orlando, FL	Orlando	Orange	2.4	1.5
Esplanade Ave. CS Project - New Orleans, LA	New Orleans	Orleans	2.6	1.6
Euclid Avenue Complete Street - Cleveland, Ohio	Cleveland	Cuyahoga	7.0	4.4
15th Street NW Complete Street Project - Wash. DC	Washington, DC	District of Columbia	1.9	1.2
Franklin Avenue - Minneapolis Complete Street Project	Minneapolis-St. Paul	Hennepin	0.8	0.5
La Jolla Blvd Complete Street	San Diego	San Diego	0.9	0.6
Mill Avenue CS project - Tempe, AZ	Phoenix	Maricopa	0.7	0.4
Multnomah Street Complete Street Project	Portland	Multnomah	1.8	1.1
NE 125th Street CS Project - Seattle, WAS	Seattle	King	1.4	0.9
Nebraska Avenue Complete Street Project (North of Interstate) - Tampa, FL	Tampa-St. Petersburg	Hillsborough	1.5	0.9
Nickerson St. CS project - Seattle, WA	Seattle	King	1.7	1.0
North Williams Ave. Complete Street - Portland, OR	Portland	Multnomah	3.1	1.9
S. Carrolton Ave. New Orleans, LA Complete Street Project	New Orleans	Orleans	1.7	1.1
Stone Way N. CS Project Seattle, WA	Seattle	King	1.8	1.1
SW 5th and 6th Avenues CS Project Portland, OR	Portland	Multnomah	2.3	1.4
Tennyson Street Complete Street Project - Denver, CO	Denver	Denver	0.8	0.5

Table 3.1
List of Complete Streets Projects Studied—continued

Complete Street Project Name (Alphabetical)	Metropolitan Statistical Area	Central County	Length in Kilometers	Length in Miles
Wells Avenue CS Project - Reno, NV	Reno	Washoe	1.3	0.8
West Magnolia Ave. Fort Worth, TX CS Project	Dallas	Tarrant	1.6	1.0
Total Complete Street Length			48.0	29.8
Mean Complete Street Length			1.6	1.1
			Land Area in Square Kilometers	**Land Area in Square Miles**
Census Block (CB) land area for CBs falling within 100 meters of centerline			7.5	4.7
Census Block Group (CBG) land area for CBs falling within 100 meters of centerline			12.0	7.5

Note: The land area figures include those portions of census bocks and census block groups falling outside the 100-meter centerline buffer which is estimated to add about 25 percent more land area.

Figure 3.1
Metropolitan areas from which Complete Streets were selected for analysis
Note: Dallas and Fort Worth are separated into their central counties while several metropolitan areas have multiple Complete Streets in the same central county.

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4
DO COMPLETE STREETS MAKE A DIFFERENCE FOR PEOPLE?

Overview

Complete Streets offer many promises that if fulfilled will attract people and households to locate along or near them. However, there is no research assessing whether and the extent to which this is occurs. There has been research, however, assessing the extent to which transit station proximity attracts people and households, which we can use as a guide for this analysis. Some studies address mostly individual station areas but not of metropolitan areas as a whole (Cervero & Seskin 1995; Cervero et al. 2004; Chapple & Loukaitou-Sideris 2019; Kolko 2011). We use insights from those studies to design ours.

We also find that studies of the extent to which light rail transit (LRT), bus rapid transit (BRT), streetcar transit (SCT), and heavy rail transit (HRT) systems attract population and households provide important research design insights that we also use here (Cervero et al. 2004; Chapple & Loukaitou-Sideris 2019; Belzer et al. 2007; Belzer & Poticha 2009; Belzer, Srivastava, & Austin 2011; Dawkins & Buehler 2010; Dawkins & Moeckel 2016; Center for Transit Oriented Development 2014). For the most part, those studies found that people and households are attracted to transit stations (see especially Nelson & Hibberd 2021). The question of course is whether people and households are attracted to Complete Streets.

There is also the concern that successful Complete Streets can lead to displacement and gentrification (Dawkins & Moeckel 2016; Padeiro, Louro & da Costa 2019; Rayle 2015; Zuk et al. 2018). There is the over-arching policy concern that by emphasizing economic growth, vulnerable populations may be displaced from areas converted into transit-oriented developments (TODs) and by extension Complete Streets (Culver 2017; Olesen 2020). On the other hand, aside from anecdotes, there seems to be little empirical evidence that transit station area development leads to large scale displacement though some certainly occurs (Delmelle et al. 2021).

We proceed with our research questions and design, analytic applications, and implications for transit station area planning.

Research Questions and Design

We are interested in knowing how the demographic composition of the population and households have changed over time with respect to Complete Street proximity. We are also interested in knowing whether there is evidence of displacement and gentrification associated with Complete Street proximity. We are guided by these two research questions:

1. Over time and compared to their regions, does the demographic composition of people and households change over time with respect to Complete Street?

2. If so, does this change signal displacement or gentrification?

The research questions lend themselves to descriptive longitudinal, quasi-experimental design. Data and study period, study areas, and our analytic strategy are reviewed next.

American Community Survey (ACS) data are used for this analysis. It includes reasonably detailed demographic data down to the block group (BG) level through its 5-year survey increments. We selected the 2013 5-year survey as the starting point for analysis because it is comprised mostly of data collected after the Great Recession. We selected the 2019 5-year survey as our ending point because it was the most recent survey available for analysis and it also happens to be the only 5-year survey that excludes potential complications of the Covid-19 pandemic that affected American (and global) housing markets from 2020 through at least 2022.

We apply our analysis to those Complete Streets identified in Chapter 3 for the study period, 2013-2019.

Because this is mostly an exploratory analysis that compares changes among several ACS demographic variables, we use descriptive analysis of change between 2013 and 2019 along Complete Street corridors by themselves and compared to central counties. Our analysis focuses on the first 100-meters along both sides of Complete Streets. We use a nearest point assignment whereby a block group (BG) is assigned to the closest 100-meter buffer.

To confirm the use of the 100-meter distance band for analysis, we calculated the share of the central county change in households for all central counties listed in Table 3.1 by 100-meter distanced band to 1.0 kilometer for all Complete Street on that list. We see that the first 100-meter distance band accounted for more than 2.50 percent of the central county share of household change over the study period where all the other hands accounted for less than 1.0 percent. Figure 4.1 confirms that the first 100-meter distance band is appropriate for this analysis.

Table 4.1 reports the ACS variables and computed variables we use for analysis.

Our analysis uses two sets of calculations. The first is calculating the percent change in demographic or housing tenure feature for all central counties combined, and all Complete Streets for the first 100-meter distance band combined. The second calculates the share of central county change attributable to the first 100-meter distance band along Complete Streets.

What follows are results are reported for:

Population and Minority Persons
Households by Type
Households by Age
Housing Tenure
Household Income

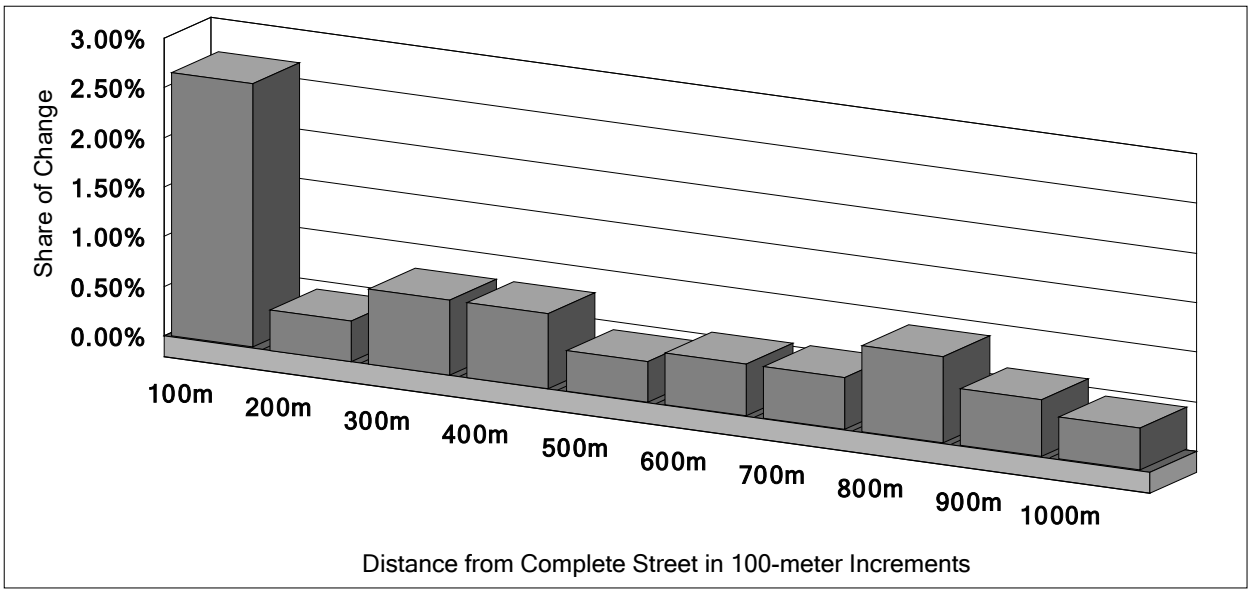

Figure 4.1
Share of Central County Household Change 2013-2019 by 100-meter Distance Band from Complete Streets
Notice the largest share of change is attributable to the first 100-meter distance band.

Table 4.1
American Community Survey and Other Variables Used

Variables	Source
Population	
Total Population	ACS
Minority Population	ACS
Households	
Total Households	ACS
Households with Children	ACS
One-Person Households	ACS
Householders Under 25	ACS
Householders 65 or over	ACS
Housing Tenure	
Owner Households	ACS
Renter Households	ACS
Household Income	
Median Household Income	ACS
Median Household Income Ratio*	Computed
Geography	
Station distance Bands in 100-meter increments*	Computed

*See text for computational details.

Results

Table 4.2 reports how changes in the demographic composition of Complete Streets compares to their central counties as a whole with respect to population and minority persons, households by type, householders by age, housing tenure, and household income. We report several interesting trends.

Population and Minority Persons

To be sure, Complete Streets comprise a tiny share of their central county's urbanized land area. Because CBGs are larger than the CBs used for the employment analysis above, we estimate that the land area of the Complete Streets in our study is about 12 square kilometers (about 7.5 square miles). Between 2013 and 2019, this land area accounted for nearly 35,000 new residents, accounting for about 1.8 percent of their central counties' growth. Despite its small land area, where growth is likely comprised mostly of urban infill and redevelopment, Complete Streets grew at a faster pace than their central counties: 16.4 percent compared to 9.5 percent. The minority share of Complete Street population also grew faster: 25.4 percent compared to 16.7 percent. On the other hand, as seen in Table 4.3, whereas minority persons accounted for 80 percent of total central county population change, they were only 52 percent of the Complete Street corridor change.

Households by Type

Table 4.2 shows that although the number of households added to Complete Streets accounts for only 2.5 percent of the central county growth, the composition of change is nonetheless notable. Because Complete Street households have smaller household sizes than central counties—and that central county household sizes actually increased—Complete Streets have more demand for housing than central counties. Between 2013 and 2019, the number of households along Complete Street corridors increased by 16.1 percent or nearly double that of central counties which grew at 8.4 percent. One of the reasons is the addition of single person households who accounted for 13.2 percent of their change in households compared to 7.4 percent for central counties. Also, households without children grew by 17.8 percent in Complete Streets corridors compared to 10.9 percent for central counties.

All this does not mean Complete Streets are shifting away from households with children. Just the opposite: Households with children in Complete Streets corridors grew at a rate more than double that of central counties: 6.7 percent compared to 3.1 percent (see Table 4.2).

Householders by Age

New Complete Streets householders are also decidedly younger than those of central counties. While the number of central county householders under 25 years of age actually fell, they increased in Complete Street corridors. Indeed, mathematically, Complete Streets accounted for all the increase in those householders and hence "100% in Table 4.2. Among the older age groups, householders between 25 and 44 years of age increased by 20.6 percent and those between 45 and 64 years of age increased by 8.8 percent compared to 5.7 percent and 5.4 percent respectively for central counties. Only among householders 65 years of age or older was there little difference between Complete Streets and central counties.

Table 4.2
Change in People by Minority Classification, Households by Type and Householders by Age, and Housing Tenure within 100 Meters of Complete Streets as Share of Central County Change, 2013-2018

Demographic Feature	Central Counties 2013	Central Counties 2019	Central County Change	Central County Percent Change	100-Meter Complete Street Corridor 2013	100-Meter Complete Street Corridor 2019	100-Meter Complete Street Corridor Change	100-Meter Complete Street Corridor Percent Change	Share of Central County Change
People									
Total Population	20,594,206	22,440,996	1,954,956	9.5%	213,134	248,031	34,897	16.4%	1.8%
Minority Persons	9,398,060	10,917,623	1,568,840	16.7%	71,677	89,894	18,217	25.4%	1.2%
Households									
Total Households	7,763,695	8,366,151	650,360	8.4%	99,570	115,623	16,053	16.1%	2.5%
Average Household Size	2.65	2.68		1.1%	2.14	2.15		0.2%	
Households with Children	2,520,666	2,594,728	77,582	3.1%	14,956	15,963	1,007	6.7%	1.3%
Households without Children	5,243,029	5,771,423	572,778	10.9%	84,614	99,660	15,046	17.8%	2.7%
One Person Households	2,290,737	2,443,297	170,593	7.4%	49,420	55,921	6,501	13.2%	4.0%
Householders under 25 years of age	365,535	309,137	(56,064)	-15.3%	11,222	11,751	529	4.7%	100.0%
Householders 25 to 44 years of age	2,973,637	3,116,778	169,429	5.7%	45,148	54,459	9,311	20.6%	5.8%
Householders 45 to 64 years of age	2,940,855	3,092,845	158,544	5.4%	28,531	31,044	2,513	8.8%	1.6%
Householders 65 years of age and older	1,483,668	1,847,391	378,451	25.5%	14,669	18,369	3,700	25.2%	1.0%
Housing Tenure									
Owner Households	4,592,019	4,866,650	285,855	6.2%	35,947	38,157	2,210	6.1%	0.8%
Ownership Rate	59.1%	58.2%		-1.7%	36.1%	33.0%		-8.6%	
Renter Households	3,171,676	3,499,501	364,505	11.5%	63,623	77,466	13,843	21.8%	3.9%
Income									
Median Household Income	$63,032	$77,833		23.5%	$55,320	$73,470		32.8%	

Table 4.3
Percent Change in People by Minority Classification, Households by Type and Householders by Age, and Housing Tenure within 100 Meters of Complete Streets as Share of Central County Change, 2013-2018

Demographic Feature	Central Counties 2013	Central Counties 2019	Central County Change	100-Meter Complete Street Corridor 2013	100-Meter Complete Street Corridor 2019	100-Meter Complete Street Corridor Change
Distribution of Change						
Minority Persons	46%	49%	80%	34%	36%	52%
Households with Children	32%	31%	12%	15%	14%	6%
Households without Children	68%	69%	88%	85%	86%	94%
One Person Households	30%	29%	26%	50%	48%	40%
Householders under 25 years of age	5%	4%	-9%	11%	10%	3%
Householders 25 to 44 years of age	38%	37%	26%	45%	47%	58%
Householders 45 to 64 years of age	38%	37%	24%	29%	27%	16%
Householders 65 years of age and older	19%	22%	58%	15%	16%	23%
Owner Households	59%	58%	44%	36%	33%	14%
Renter Households	41%	42%	56%	64%	67%	86%

Housing Tenure
A dominant feature of Complete Streets is that households are substantially renters and becoming more so over time as home the ownership fell from 36.1 percent in 2013 to 33.0 percent in 2019, as seen in Table 4.2. Moreover, as illustrated in Table 4.3, of those who moved to Complete Streets during that period, 86 percent were renters. In contrast, most households in central counties own their homes and the rate remained stable during the study period.

Median Household Income
Although Complete Streets households tend to be younger and more likely to rent than households in central counties as a whole, the median incomes of Complete Streets households are rising at a faster pace in nominal terms, 32.8 percent compared to 23.5 percent, as seen in Table 4.2. We note that in 2013, Complete Streets households' income was about 88 percent of central county households, but this narrowed to 94 percent by 2019, as shown in Table 4.3

Key Findings

Although Complete Streets are attracting population growth at a faster pace than their central counties, they actually lagged central counties in terms of share of minority growth. Moreover, Complete Streets' growth in households was double that of central counties overall with the very interesting surprise being that households with children were attracted to Complete Streets at a rate much larger than central counties. Also, compared to their central counties, Complete Streets are becoming more renter occupied.

The question of gentrification is not conclusively addressed in our analysis. While on the one hand the change in minority population along Complete Streets lagged that of their central counties, the key indicator of change in income is mixed. For one thing, household incomes along Complete Streets lagged their central counties in both 2013 and 2919. Although incomes rose at a faster pace along Complete Streets than central counties, they remained below the mean in 2019.

While Complete Streets accounted for small shares of the overall change in their central counties, we remind readers that their land area accounts for only two hundredths of one percent (0.02 percent) of the total urban land area. Note that in Table 4.3 that Complete Streets accounted for 2.5 percent of the change in central county households. While small numerically, it is very impressive proportionately because growth along Complete Street corridors was about 125 times proportionately higher than for the urban land area of central counties:

Household Growth Share =	2.5%
Complete Street Corridor Land Area =	0.02%
Proportionate Share based on Land Area =	125 times

We conclude that Complete Streets make a difference in attracting people and households arguably to a proportionately greater extent than the central counties within which they are located.

We turn next to assess whether Complete Streets make a difference in attracting jobs.

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5
DO COMPLETE STREETS MAKE A DIFFERENCE FOR JOBS?

Overview

Prior research, albeit limited to just a few case studies with no cross-section analysis, has addressed whether Complete Streets are associated with attracting jobs and firms, especially those related to retail and the food industry, with mostly positive results (Liu and Shi 2020). There are also numerous anecdotal, nonscientific case studies suggesting that Complete Streets increase private sector investment and add jobs (Anderson & Searfoss 2015). In this chapter, we begin with a review of relevant research leading us to the research question. This leads to the research design followed by results.

Prior Relevant Research

We call this section "prior relevant research" because there is no rigorous research directly addressing the extent to which Complete Streets attract jobs. However, research on the association between transit station proximity and job changes helps guide this research.

Urban areas are formed and grow in large part by creating agglomeration economies (Glaeser, 2011). Anas, Arnott and Small define the term as "the decline in average cost as more production occurs within a specified geographical area" (1998, p. 1427). As more firms in related sectors cluster together, costs of production fall as productivity increases. These economies can spill over into complementary sectors (Holmes, 1999). Cities can become ever larger as economies of agglomeration are exploited (Ciccone and Hall, 1996). Transportation improvements make it possible to reduce transportation times, increasing the size of market areas and the effective size of industrial clusters. If cities get too large, however, transportation congestion may have a counter-productive force, encouraging the relocation of firms (Bogart, 1998). Highway projects have been shown to induce this change in metropolitan form, and at a net cost to society (Boarnet, 1997; Boarnet and Haughwout, 2000). More recent research shows that the degree of suburbanization significantly varies within metropolitan regions, in accordance to both variations in the levels of population de-concentration drivers and due to sub-regional fixed effects (Ganning and McCall, 2012). Thus, the preservation and creation of new agglomeration economies within metropolitan regions varies considerably and in ways that may be influenced by policy decisions.

A key role of transit is to facilitate agglomeration economies by mitigating transportation congestion effects of automobile traffic induced by agglomeration. This is because, as Voith (1998) notes, public transit is essentially "noncongestible" and is best suited to sustaining agglomeration economies in high density nodes as well as along the corridors that connect them. Nonetheless, not all economic sectors benefit from agglomeration economies and/or density.

In part because of their role in facilitating agglomeration economies, there is a growing body of research showing that transit systems enhance economic development (see Nelson et al., 2009). Transit improves accessibility between people and their destinations by reducing travel time

relative to alternatives (Littman, 2009). At the metropolitan scale, adding FGT systems in built-up urban areas increases aggregate economic activity (Graham, 2007). There is another aspect of agglomeration economies identified by Chatman and Noland (2011). Although transit systems can lead to higher-density development by shifting new jobs and population to station areas, it could lead instead to the redistribution of existing development even in the absence of growth, as in the case of Detroit (Galster, 2012).

Transit station-related agglomeration effects should be seen as a larger share of regional jobs closer to transit stations than elsewhere in the region. At the time research began leading to this chapter, there were only four studies assessing job change near transit stations. The first, Belzer et al. (2011), measured only the change in jobs by economic sector from 2002 to 2008 within one-half mile of transition stations and not the change in share of regional jobs. In the second, Nelson et al. (2013) evaluated the change in share of jobs by sector within one-eighth mile and one-quarter mile of Eugene-Springfield BRT stations between 2004 and 2010. The third and fourth studies (Nelson et al. 2015) evaluated several LRT, BRT, SCT and CRT systems in one-quarter mile distance band increments from transit stations to track shifts in the share of jobs by economic group (see Table 5.2) before and during the recession. A key finding for LRT systems is that while station areas lost regional share of jobs before the Great Recession (2004 through 2007), they gained share during it (Nelson, Stoker and Hibberd 2018), though results for other modes were mixed (see Nelson et al. 2015).

We assume that Complete Streets are analogous to transit systems from the perspective of attracting jobs. As such, our research is guided by this question:

> Is there an association between existing Complete Streets and job growth over time generally as well as by economic group with special reference to sectors that Complete Streets may intend to attract?

We proceed with a discussion of our research design followed by results and key findings.

Research Design

The research question lends itself to assessment through longitudinal, quasi-experimental design where Complete Streets are the treatment, and the balance of a larger area is the control. We offer details of our research design with respect to cases and study areas, time periods, and data next.

Data

The Longitudinal Employment-Household Dynamics (LEHD) data for 2013 and 2018 address change in jobs over time. These data are reported at the census block (CB) level. These data were the most current as of this writing. Because Complete Streets are often short, extending a few kilometers or less, the number of CB observations is limited. We use the pool of all Complete Street CBs as the basis for analysis. Table 5.1 reports the variables we use.

Analytic Approach

This is a descriptive analysis that compares change in economic variables over time with respect to (a) the census geographic units nearest Complete Street centerlines, (b) distance from Complete Streets in 100-meter units to 1.0 kilometer, and (c) the difference in percentage changes between the innermost, 100-meter distance band and the balance of the central county. This approach will reveal trends both numerically and graphically. For the jobs analysis we use the 2013 and 2018 LEHD samples assigned to CBs to the nearest point to the Complete Street in 100-meter buffer units.

We apply LEHD data to the North American Industrial Classification System (NAICS). The full 2-digit coding for all 20 industrial sectors is shown in Table 5.2. Since we are interested in evaluating employment change based on broad land use classes, we assemble the NAICS into eight "economic groups" highlighted in Table 5.2. These economic groups are used for one part of the analysis which is outlined below. We then allocate NAICS jobs to wage groups in the manner shown in Table 5.3. We will discuss how this is used below.

To get an impression of any distance-decay function between Complete Street proximity and change in share of central county jobs associated with 100-meter distance bands, we created Figure 5.1. Here we see that the first 100-meter distance band from Complete Streets accounts for by far the largest share of change of all distance bands compared to central counties. Logically, if Complete Streets influence development patterns, they would do so near them.

In review, inasmuch as the literature is small and mostly non-existent on the association between Complete Streets and the attraction of jobs and people and on commuting patterns, ours is an exploratory analysis.

Table 5.1
American Community Survey (ACS), Longitudinal Employment-Household Dynamics (LEHD) and Other Variables Used

Variables	Source
Employment	
Total Jobs	LEHD
Jobs by Economic Group	LEHD
Employment Wages	
Jobs by Wage Group	Computed
Geography	
Station distance Bands in 100-meter increments*	Computed

*See text for computational details.

Table 5.2
Combinations of NAICS Sectors into Land Use Economic Groups for Analysis

NAICS Code	NAICS Sector Title and Economic Group Name
	Industrial
31-33	Manufacturing
22	Utilities
	Light Industrial
42	Wholesale Trade
48-49	Transportation and Warehousing
	Retail-Food-Lodging
44-45	Retail Trade
72	Accommodation and Food Services
	Knowledge
51	Information
54	Professional, Scientific, and Technical Services
	Office
52	Finance and Insurance
53	Real Estate and Rental and Leasing
55	Management of Companies and Enterprises
56	Administrative and Support, Waste Management, Remediation
81	Other Services (except Public Administration)
92	Public Administration
	Education
61	Educational Services
	Health
62	Health Care and Social Assistance
	Arts-Entertainment-Recreation
71	Arts, Entertainment, and Recreation

Source: Adapted from the North American Industrial Classification System by Arthur C. Nelson and Robert Hibberd, University of Arizona.
Note: Phrases in quotations and italics labels for the respective economic groups.

Table 5.3
Allocation of Workers by Lower-, Middle- and Upper-Wage Groups

NAICS	Description	Mean Annual Wages, 2013	Wage Group	Share of Workers
44	Retail Trade	$25,779	Lower	
56	Administrative, Support, Waste Mgmt., Remediation	$35,931	Lower	
61	Educational Services	$35,427	Lower	
71	Arts, Entertainment and Recreation	$32,188	Lower	
72	Accommodation and Food Services	$17,453	Lower	
81	Other Services (except Public Administration)	$29,021	Lower	
	Weighted National Share of Workers			***~33%***
48	Transportation and Warehousing	$45,171	Middle	
53	Real Estate and Rental and Leasing	$46,813	Middle	
62	Health Care and Social Assistance	$44,751	Middle	
92	Public Administration	$51,340	Middle	
	Weighted National Share of Workers			***~33%***
22	Utilities	$94,239	Upper	
31	Manufacturing	$54,258	Upper	
42	Wholesale Trade	$65,385	Upper	
51	Information	$83,677	Upper	
52	Finance and Insurance	$88,677	Upper	
54	Professional, Scientific and Technical Services	$75,890	Upper	
55	Management of Companies and Enterprises	$105,138	Upper	
	Weighted National Share of Workers			***~34%***

Source: Calculated by the authors from County Business Patterns.

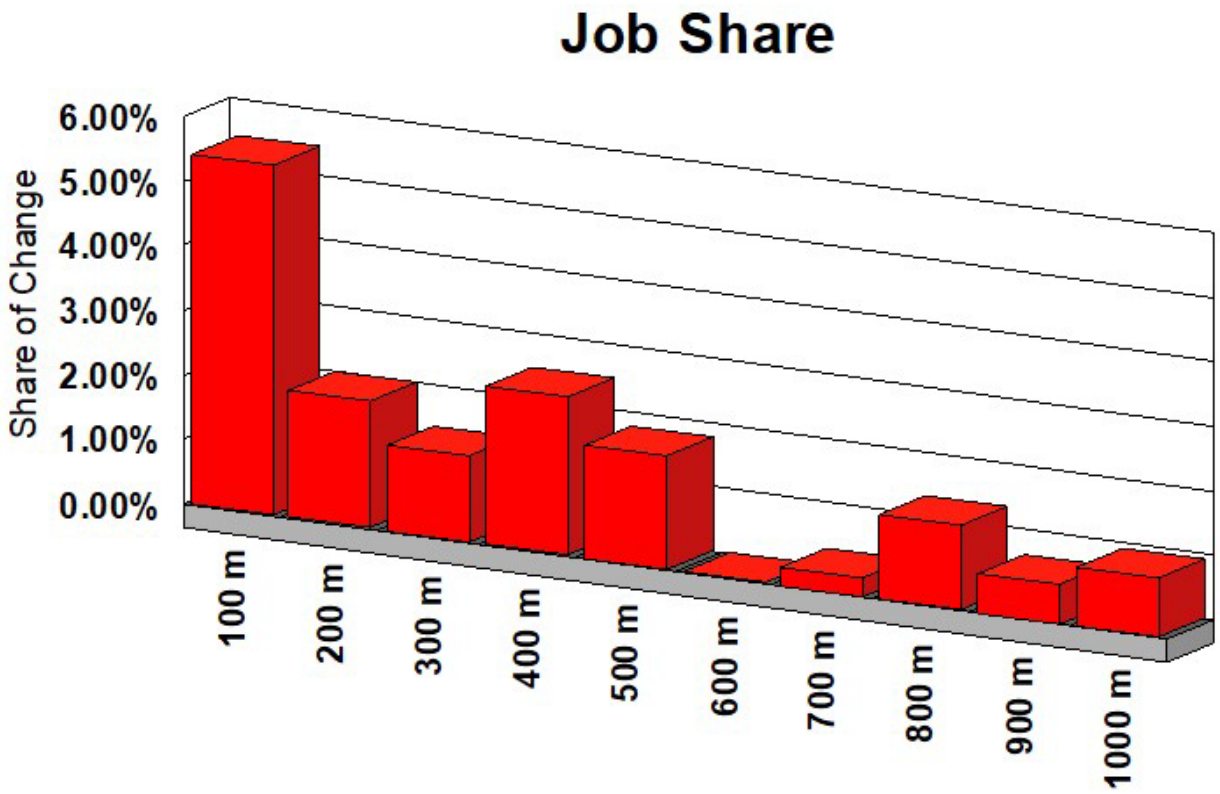

Figure 5.1
Distribution of the share of the central county household (top panel) and job (bottom panel) change attributable to 100-meter distance bands from Complete Streets in selected metropolitan areas.
Notice the largest share of change is attributable to the first 100-meter distance band.

Results

Results are presented first with respect to the distribution in the change of jobs and then with respect to the change in jobs by wage category.

Distribution of Job Change by Economic Group

Table 5.4 presents the distribution of change in jobs within 100 meters of Complete Streets by economic group between 2013 and 2018, which is also between the Great Recession and the Covid-19 pandemic. The table shows the change in jobs for the central county as a whole and then the change in jobs near Complete Streets.

Overall, Complete Streets added jobs at about the same pace as their central counties, 13.6 percent and 13.9 percent respectively. We are impressed because nearly by definition, Complete Streets serve substantially build out areas (see Schlossberg et al. 2013). The implication is that Complete Streets are areas of substantial infill and redevelopment.

Equally impressive is that the pace of jobs added in manufacturing, light industrial and retail-food-lodging were similar between Complete Streets and central counties (see Table 5.4). While retail-food-lodging may not be too surprising, we note that individual economic sectors within the manufacturing and light industrial economic groups include such activities as breweries that are often attached to restaurants, production of food products such as bakeries, coffee roasters and wholesalers, local packaging/shipping stores and so forth.

Perhaps confirming the role of Complete Streets as places of improved accessibility, they added jobs in office and knowledge economic groups at a much faster pace than central counties: 15.3 percent compared to 11.0 percent and 23.8 percent compared to 17.7 percent, respectively.

And perhaps confirming the role of Complete Streets as places of amenities, arts-entertainment-recreation jobs were added at a pace nearly half again higher than central counties at 30.3 percent compared to 22.3 percent, respectively.

However, jobs in the health economic group grew at a slower pace than central counties, 12.8 percent compared to 16.6 percent respectively. We surmise that health care is increasingly clustered near hospitals which are often located on large, institutional campus-like settings not normally associated with Complete Streets.

On the other hand, we note that jobs in the education economic group fell. One reason may be that Complete Streets are in mature urban landscapes where the demand for schools is smaller than it was in prior decades.

We turn now to the change in jobs by wage group with respect to jobs attracted to Complete Streets.

Distribution of Job Change by Wage Group

Literature does not predict whether lower- or upper-wage jobs will be attracted to Complete Streets. For reasons noted above, however, we expect that Complete Streets jobs will tend

toward the middle- and upper-wage groups. Table 5.5 confirms this rather starkly. Whereas lower-wage jobs dominated the change in jobs by wage group for central counties as a whole at 39 percent, Complete Streets jobs were a third less at 26 percent. In contrast, 43 percent of new Complete Streets jobs were in the upper-wage group compared to 28 percent for central counties, or about a third less. We suspect that Complete Streets advocates may not be aware that Complete Streets attracts jobs in the higher wage groups on the whole.

Key Findings

Complete Streets added jobs overall and in many sectors at about the same rate as central counties. The change in office jobs favors Complete Streets Complete Streets lost jobs in the education group. And while Complete Streets gained share among knowledge and arts-entertain-recreation economic groups, they lost share I the health economic sector.

In Chapter 4, we noted that Complete Streets not only added population and households at a faster pace than central counties, but that growth occurred on just two hundredths of one percent (0.02 percent) of the total urban land area. Equally impressive is the number of jobs added to the same land area. In the case of jobs, we calculate that growth along Complete Street corridors was about 235 times proportionately higher than for the urban land area of central counties:

Job Growth Share =	4.7%
Complete Street Corridor Land Area =	0.02%
Proportionate Share based on Land Area =	235 times

We conclude that Complete Streets make a difference in attracting jobs including jobs overall and in many economic groups people proportionately to if not greater than the central counties within which they are located.

We turn next to assess whether Complete Streets make a difference in changing commuting patterns.

Table 5.4
Change in Jobs by Economic Group Within 100 Meters of Complete Streets as Share of Central County Change, 2013-2018

Economic Group	Central Counties 2013	Central Counties 2018	Central County Change	Central County Percent Change	100-Meter Complete Street Corridor 2013	100-Meter Complete Street Corridor 2018	100-Meter Complete Street Corridor Change	100-Meter Complete Street Corridor Percent Change	Share of County Change
Total Jobs	11,824,253	13,468,879	1,644,626	13.9%	565,760	642,948	77,188	13.6%	4.7%
Manufacturing	765,892	802,192	36,300	4.7%	8,546	8,950	404	4.7%	1.1%
Light Industrial	1,065,316	1,182,596	117,279	11.0%	16,587	18,501	1,914	11.5%	1.6%
Retail-Food-Lodging	2,289,329	2,649,687	360,358	15.7%	82,969	95,507	12,538	15.1%	3.5%
Office	3,034,550	3,368,347	333,797	11.0%	148,259	170,919	22,660	15.3%	6.8%
Knowledge	1,377,329	1,620,465	243,136	17.7%	88,344	109,336	20,992	23.8%	8.6%
Health	1,515,322	1,767,575	252,253	16.6%	127,657	143,997	16,340	12.8%	6.5%
Education	956,219	1,011,900	55,681	5.8%	65,771	61,683	(4,088)	-6.2%	na
Arts-Ent-Rec[a]	294,638	360,275	65,637	22.3%	15,448	20,126	4,678	30.3%	7.1%

a Means arts-entertainment-recreation.

Note: Total jobs may be higher than the sum of those assigned to the economic groups reported above because they may be in agriculture, forest, fishing, mining, or other natural resource economic sectors.

Table 5.5
Change in Jobs by Wage Group within 100 Meters of Complete Streets as Share of Central County Change, 2013-2018

Wage Group	Central County Change	100-Meter Complete Street Corridor Change	Complete Street Corridor Share of County Change
Numerical Change			
Lower Wage	643,051	20,064	3%
Middle Wage	367,931	22,246	6%
Upper Wage	453,459	33,128	7%
Change in Share			
Lower Wage	39%	26%	na
Middle Wage	22%	29%	na
Upper Wage	28%	43%	na

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6
DO COMPLETE STREETS CHANGE COMMUTING PATTERNS?

Overview

There is no research into the extent to which Complete Streets influence commuting patterns. Nonetheless, literature on transit station proximity research suggests that people living near Complete Streets should be more likely to walk, bike, or use transit in their journey to work than people living farther away (Ewing et al., 2017; Renne, 2009).

A separate issue that has not been addressed in literature is whether a higher share of people who work at home live near Complete Streets than elsewhere in the region. For these people, accessing transit for trips other than commuting to work improves their transport options. Again, there is no research on this.

Complete Streets aim to improve infrastructure and advance multi-modalism but do they? We address this issue in Table 6.1, noting some striking trends:

- Commuting by automobile, including carpooling, accounted for only 34 percent of the change in commuting mode along Complete Street Corridors compared to 73 percent for central counties.

- While transit accounted for only 13 percent of the change in commuting mode share along Complete Streets, walking and biking accounted for nearly a third at 32 percent. Central counties' shares were 5 percent for each.

- The share of change of workers working from home during the pre-pandemic study period (2013-2019) was 17 percent for Complete Streets or about a quarter higher than for central counties which was 14 percent.

Overall, we find that two-thirds (66 percent) of the change in workers living along Complete Streets corridors used modes other than the automobile in their commute to work, with walking and biking to work accounting for about half the change. Ongoing research focuses on the extent to which commuters live in the Complete Street corridors in which they work.

We conclude that Complete Streets make a difference in changing commuting patterns.

We turn next to the association between multifamily rents and proximity to Complete Streets.

Table 6.1
Change in Commuting Mode within 100 Meters of Complete Streets as Share of Central County Change, 2013-2019

Commute Mode	Central County Change	100-Meter Complete Street Corridor Change	Share of Central County Change
Total Workers	1,613,581	29,437	1.8%
	Numerical Change		
Auto including carpooling	1,180,404	10,150	0.9%
Transit	86,440	3,821	4.4%
Walked/Biked	83,810	9,278	11.1%
Worked at Home	224,555	5,015	2.2%
	Change in Share		
Auto including carpooling	73%	34%	na
Transit	5%	13%	na
Walked/Biked	5%	32%	na
Worked at Home	14%	17%	na

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7
DO COMPLETE STREETS MAKE A DIFFERENCE IN MULTIFAMILY RESIDENTIAL RENT?

Overview

There is no research into the relationship between Complete Street proximity and the value of real estate. In this chapter, we evaluate this relationship with respect to multifamily rents, per square foot. As we noted in Chapter 2, if they are successful, Complete Streets should attract households who want to live along or near them. An indicator of this preference is whether multifamily rents are influenced by proximity to Complete Streets. We begin with theory, followed by our modeling, results, and a summary of key findings.

Theoretical Foundations

It was von Thünen (1826) who first formalized the relationship between the center of cities and land value: as distance is reduced land values rise because land capitalizes both transportation cost savings and that higher densities lead to more economic exchange. More than a century later, a trio of urban economists adapted von Thünen's theory to create modern urban location theory: Alonso (1964), Mills (1967) and Muth (1969). By assuming that all jobs are in the central business district (CBD) the "AMM theory" shows that as transportation costs increase from the CBD, land values fall at a declining rate. In the CBD, where transportation costs are the lowest, land prices are thus the highest. Only those land uses that can outbid others secure land in the center, forcing losing bidders to locate farther away in a process known as urban land use invasion and succession (Park et al. 1925).

But urban areas are not "monocentric." As one relaxes the constraints of the AMM monocentric city model, it is possible to imagine the same principles work only at smaller scales (Hajrasouliha and Hamidi 2017; Bogart 1998). For instance, in our case, Complete Streets can serve as a mini-downtown. If so, their effect on real estate markets should be such that the closer property is to a Complete Street, the higher its value, ceteris paribus (Al-Mosaind et al. 1993; Cervero 1984; Cervero and Duncan 2002; Debrezion et al. 2007; Hamidi et al. 2016; Mulley et al. 2016; Nelson and McClesky 1990; Nelson 1992; Nelson et al. 2015). However, there can be negative proximity effects as well. For instance, suppose a transit station is unattractive—maybe surrounded by parking garages, brownfields, and the like. Real estate values would fall with respect to transit station proximity (Li and Brown 1980; Golub et al. 2012; Nelson and McClesky 1990; Nelson 1992).

Model for Estimating the Multifamily Rent Premium for Complete Street Proximity

In this section we present the model for addressing whether multifamily rents command a premium along and near Complete Streets. We use CoStar rent data for multifamily real estate for this analysis. Using these theoretical and research design foundations as a guide, we develop the following general model for empirical application (Nelson 2017).

$$\mathbf{R}_i = \mathbf{f}(\mathbf{S}_i, \mathbf{SES}_i, \mathbf{C}_i, \mathbf{M}_i, \mathbf{PT}_i, \mathbf{DB}_i) \quad (1)$$

Where:

R is the asking rent per square foot for property *i*;

S is the set of structural attributes of property *i*;

SES is the set of socioeconomic characteristics of the vicinity of property *i*;

C is a set of centrality attributes of property *i* in this case being distance to the nearest freeway/expressway ramps because distance to downtown is included as a dimension leading to the Place Type (**PT**) variable described below;

M is the metropolitan area within which property *i* is located—as metropolitan area conditions and markets vary between them, identifying the location of property *i* within its respective market helps control for metropolitan-specific influences;

PT is the Place Typology based on cluster analysis using such factors as measures of urban form of the vicinity of property *i* and distance to +downtown; and

DB is the distance band (see below for specification details) of property *i* to a transit station.

Dependent Variable

R is the ***Asking Rent per Square Foot*** for property *i* reported by CoStar during 2019 for office and multifamily. (CoStar has the largest, national commercial property database where data are collected using a standardized protocol.) The study includes the universe of all commercial properties from which all data are available as reported by CoStar in our study area. As CoStar data come from real estate brokerages participating in its network, the data exclude non-participating brokerages or entities and properties not for rent such as owner-occupied properties. By logging the dependent variable, the semi-log model allows for coefficients to be interpreted reasonably as the percent change in rent attributable to a one-unit change in an independent variable such as an individual distance band (Statistical Data Services 2018).

Control Variables
S is the bundle of structure and lease restriction attributes for property *i* reported by CoStar including:

> ***Gross Leasable Area*** in units of 100 square meters with the expectation that there will be a positive association between office and multifamily building area and rent because larger buildings presumably include more amenities than smaller ones.
>
> ***Effective Year Built*** which is the later of year of construction or year of renovation as reported by CoStar with the expectation that newer buildings will command more rent than older ones.
>
> ***Vacancy Rate*** as reported by CoStar with the expectation that the higher the vacant rate the lower the rent. However, this may not always be the case as high demand markets could result in high vacancy rates as owners wait for higher paying tenants. Accordingly, signs may not be predictable especially considering that the study area is comprised of stable to rapidly growing central counties.
>
> The number of ***Stories*** is also included with the expectation that the taller the building the higher the mean rent.

The **SES** dimension is comprised of ***Median Household Income*** from the five-year sample of the 2018 American Community Survey (ACS) for the block group within which a CoStar property is located, for which a positive association is expected with respect to rent (Xiao 2016).

Because the **PT** (Place Typology) variable (see below) includes distance from downtown, one variable comprises the **C** dimension in this application: ***Distance to Freeway***. This is defined as distance to the nearest freeway or expressway ramp in kilometers. Because freeway ramps can be considered nuisances in addition to accessibility benefits, no signs of association are predicted.

The **M** dimension is comprised of the individual metropolitan areas within which the transit stations that we studied are located. As these are controls which account for idiosyncrasies of metropolitan markets, no direction of associations is predicted.

Place Typology
We use the Place Typology (**PT**) protocol developed by Nelson et al. (2021). This is an index variable characterizing the urban landscape milieu that is comprised of:

> Jobs per acre
> Proportion of jobs that are retail and arts
> Total population per acre
> Total households per acre
> Percent of households with no kids
> Percent of owner-occupied housing
> Intersections per square mile
> Proportion of intersections with 3 to 4 vertices

The method uses LEHD (Longitudinal Employment-Household Dynamics) and census data applied at the block group (BG) level, producing these statistically unique place types which also conform to *a priori* expectations.

> High Mixed-Use/Accessibility (***High-MA***) Centers such as downtowns, suburban nodes, and other areas with high concentrations of jobs and people, high land use, and high levels of accessibility;
>
> Moderate Mixed-Use/Accessibility (***Moderate-MA***) areas such as large combinations of BGs with modest mixes of jobs and people and lower connectivity between land uses, and often surrounding High-MA centers;
>
> Low Mixed-Use/Accessibility (***Low-MA***) areas which are usually low density, residential areas that some might characterize as urban sprawl, and which are usually found between Moderate-MA and Poor-MA areas; and
>
> Poor Mixed-Use/Accessibility (***Poor-MA***) areas which are dominated by very low-density residential development with no employment centers and the lowest levels of accessibility between land uses. *Poor-MA* will be used as the referent in analysis meaning that the variation in rents attributable to Place Typology will be estimated with respect to this variable, all other factors considered.

We predict that controlling for all factors, rents along a continuum will be highest in the *High-MA* places and lowest in the *Poor-MA* places.

While all the above variables are the controls, **DB** or distance band is the treatment variable. From Figure 4.1, we see there is a decided break in the share of households locating near Complete Streets between the 400- and 500-meter distance bands. We also know from literature that the about two-thirds of transit riders walk 400 meters or less to access transit (Guerra 2012). We thus narrow our study are to 400 meters from Complete Street centerlines. We use 100-meter distance bands because they are roughly the width of typical urban blocks though of course the range varies from half that (such as for downtown Portland, Oregon) to more than double (such as for downtown Salt Lake City, Utah). However, we also include a Complete Street front distance band that includes parcels within 30 meters of Complete Street centerlines, which we deem as essentially frontage properties. The area beyond 400 meters is the referent.

Table 7.1 summarizes our control and treatment variables, sources of data, measures, and predicted signs.

Table 7.1
Variables, Data Sources, Measurement Type, and Predicted Association with Respect to Rent Premium

Variable	Data Source	Measure	Predicted Sign
	Dependent Variable		
Rent			
Monthly Rent per Square Meter (logged)	CoStar	Continuous	na
	Control Variables		
Structure Controls			
Gross Leasable Area ($100m^2$)	CoStar	Continuous	+
Mean Unit Size ($100m^2$)	CoStar	Continuous	
Stories	CoStar	Continuous	+
Effective Year Built	CoStar	Continuous	+
Vacancy Rate	CoStar	Continuous	-
Socioeconomic Control			
Median Household (HH) Income ($1,000)	Census ACS	Continuous	+
Location Control			
Distance Freeway Ramp (per kilometer)	Computed	Continuous	-
Metropolitan Control			
Metropolitan Area Location	Assigned	Binary	na
Place Typology Control			
High Mix/Accessibility	Computed	Binary	+
Moderate Mix/Accessibility	Computed	Binary	+
Low Mix/Accessibility	Computed	Binary	+
Poor Mix/Accessibility	Computed	Binary	Referent
	Treatment Variables		
Distance Band			
30-, 30-100-, 200-, 300- and 400- meter bands	Computed	Binary	*See text*
Beyond 400 meters	Computed	Binary	Referent

Results and Key Findings

With nearly 14,000 cases, our model includes many times more data than used in most prior studies (Higgins & Kanaroglou 2016.). While we have no *a priori* expectations of goodness of fit outcomes, literature suggests that ordinary least squares hedonic (regression) analysis usually explain about one fifth to two-thirds of the variation in the observed rent for cases. We note that while some analysts may be preoccupied with achieving high levels of regression model explanation, too many variables can lead to over-specification. It is best to emphasize the variables most relevant to the question along with relevant controls are sufficient to avoid serious omitted variable bias (a form of endogeneity) in the model.

Table 7.2 presents regression results while Figure 7.1 illustrates rent premium estimates with respect to Complete Street proximity. We discuss the results next and then offer a discussion on implications for Complete Street policy and land use planning. We discuss results first with respect to Place Typology and then with respect to Complete Street proximity rent premiums.

The Place Typology controls are an index of the milieu of urban areas from the most integrated and mixed (High-MA) to the least (Poor-MA). Multifamily rent premiums within High-MA places clearly dominate, commanding 12.7 percent more than the mean for Poor-MA places, the referent. Indeed, the High-MA premium is also considerably higher than that for Moderate-MA places. One can imagine the premium the market is willing to pay to rent a residential unit in an area rich with amenities, services and mobility options compared to a more sterile one.

Of particular interest are the rent premium results. Controlling for all other factors, rent premiums are 16.4 percent higher in the 30-meter distance band along Complete Streets than the mean for central counties, and 11.8 percent higher in the 30- to 70- meter distance band), just a short distance away. The premium falls to 6.8 percent in the 200-meter distance band, rises anomalously to 10.0 percent in the 300-meter distance band before falling to 4.4 percent in the last distance band.

The Place Typology and Complete Street proximity premiums may also be additive. For instance, the rental premium for multifamily real estate that is both in a High-MA Place and along a Complete Street may be 29.1 percent higher than the mean for central counties. The rent premium for multifamily real estate in the Moderate-MA Place located in the 400-meter distance band may be more than 10 percent.

For the 30-meter and 30- to 100-meter distance bands combined with Place Typology, the rent premium range is 17.8 percent to 29.1 percent and 13.2 percent and 24.5 percent, respectively.

We conclude that proximity to Complete Streets makes a difference in influencing multifamily residential rents in expected way.

These results and those from other chapters lead to our concluding discussion on implications for Complete Street policy and land use planning in the final section.

Table 7.2
Regression Results with Respect to Complete Street Proximity Premium for Multifamily Real Estate

Variables	Coefficients	T-Score
Constant	-3.647000	-15.869
Gross Leasable Area (100m2)	**0.000015**	6.591
Mean Unit Size (100m2)	**0.000000**	-32.993
Stories	**0.023000**	23.09
Effective Year Built	**0.002000**	18.394
Vacancy Rate	**0.004000**	10.813
Median HH Income	**0.003213**	31.67
Freeway Distance (km)	**-0.017776**	-12.253
Atlanta	-0.440000	-24.552
Charlotte	-0.480000	-24.55
Cleveland	-0.579000	-31.598
Dallas-Fort Worth	-0.529000	-30.188
Denver	-0.173000	-9.966
Eugene	-0.353000	-10.531
Minneapolis-St. Paul	-0.352000	-21.226
New Orleans	1.812000	5.774
Orlando	-0.358000	-16.858
Phoenix	-0.431000	-26.939
Portland	-0.249000	-16.708
Reno	-0.377000	-15.04
San Diego	-0.025000	-1.668
Seattle	-0.039000	-2.623
Tampa-St. Petersburg	-0.439000	-22.365
Low MA	**1.4%**	1.09
Moderate MA	**5.7%**	4.237
High MA	**12.7%**	8.517
<=30 meters	**16.4%**	4.36
>30 meters to <=100 meters	**11.8%**	2.578
>100 meters to <=200 meters	**6.8%**	1.817
>200 meters to <= 300 meters	**10.0%**	3.195
>300 meters to <= 400 meters	**4.4%**	1.312
Model Metrics		
Mean Monthly Rent per Square Meter	$17.95	
Cases, Adjusted R^2	13,736	0.499
Standard Error. F-Ratio	0.313	442.781

Note: Bold coefficients are $p < 0.05$. No significance determination is made for metropolitan controls since signs of association are not predicted. Coefficients for Place Typology and Distance Band variables converted into percentages for ease of interpretation.

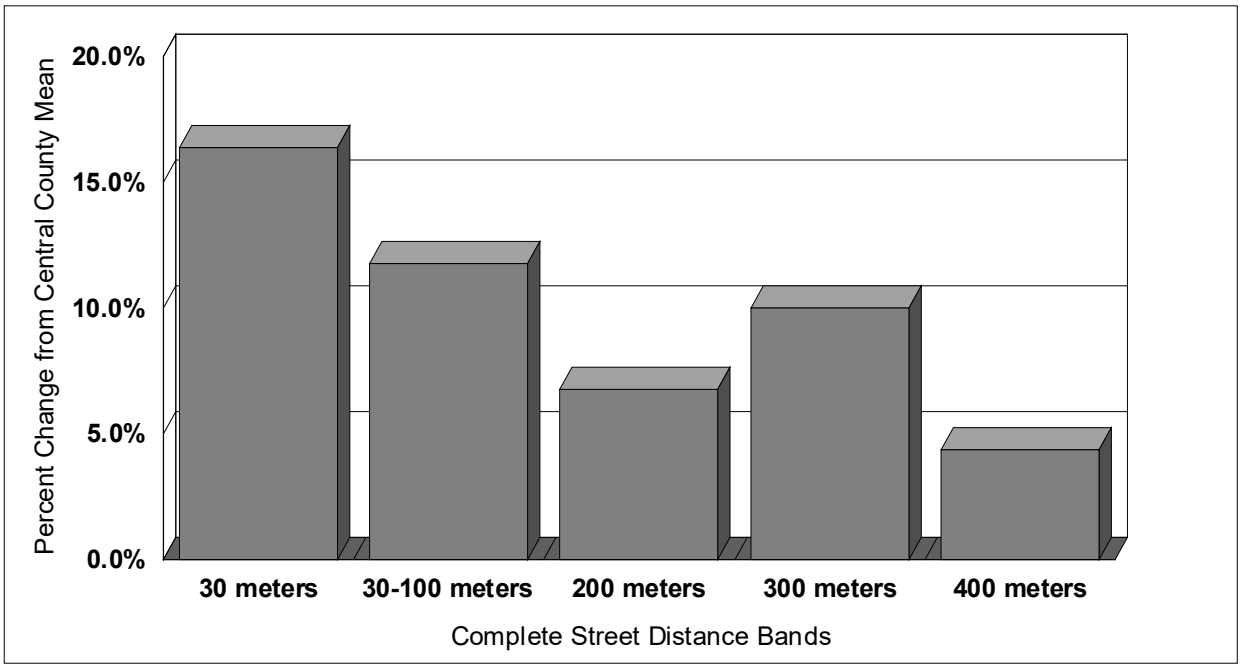

Figure 7.1
Rent premiums with respect to distance from Complete Street centerlines

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8
LEVERAGING COMPLETE STREET VALUE-ADDED TO EXPAND THE SUPPLY OF COMPLETE STREETS

There seems to be an article of faith that, among other things, Complete Streets will attract people and jobs, and further that proximity to them will change commuting patterns and confer rent premiums. Our study confirms this. This concluding chapter will highlight key findings and offer implications for Complete Street and land use planning. It also outlines continuing explorations that will lead to a second edition of this work.

Key Findings

The evidence shows that indeed Complete Streets make a difference in attracting people and jobs, and changing commuting patterns favorably, and influencing multifamily real estate rents also favorably. In this concluding chapter, we offer several insights and implications.

First of all, Complete Streets appear to attract many times more jobs than people or households. During the 5-year period 2013 through 2018, more than 77,000 jobs were added to Complete Street corridors compared to 35,000 new residents and 16,000 new households added during the 6-year period 2013-2019. Of these new residents, roughly 28,000 are of labor force age (16 through 64). In other words, about three jobs were added for every new member of the labor force in Complete Streets corridors. Given that many Complete Streets are established commercial centers, this should not be too surprising.

What is surprising is that the ratio of new jobs to new residents may be shifting. From the jobs analysis, we find overall that the increase in jobs along Complete Street corridors very nearly matched the increase among central counties. In contrast, Complete Streets added households at a rate nearly twice that of central counties. In effect, people and households are being attracted to Complete Streets at a faster pace than jobs. Many of those new residents may be attracted to jobs added to Complete Streets, and perhaps new jobs are added to Complete Streets because of increasing market opportunities and access to labor. This is a topic of ongoing research.

Secondly, the accessibility to jobs, either because they are on Complete Streets or Complete Streets are near other jobs centers, appears to change commute modes considerably. While some Complete Streets include transit modes such as light rail, streetcar, and bus rapid transit, we find that, at 13 percent, transit accounts for a modest share of change in the choice of commuting mode between 2013 and 2019. At 32 percent, walking and biking are far more important. Working from home, at 17 percent, is also important. While many of those workers might be free to live anywhere, Complete Streets might give them the amenities they want when choosing between neighborhoods. After all, many people who work from home do their business in “third workplaces” that are social gathering places in the neighborhood.

Moreover, while the change in households and jobs along the Complete Streets we studied is small in the overall scheme of change in their central counties, it is not trivial. We estimate that at 12.0 square kilometers (about 7.5 square miles), the first 100-meter distance band accounts for just two hundredths of one percent (0.02 percent) of the urban land area of the cost central

counties. Put differently, new households were added at a density of about 1,340 per square kilometer (2,150 per square mile) of urban land. New jobs were added at a density of about 6,400 per square kilometer (10,500 per square mile). The economic value-added implications of this scale of development will be discussed below.

Implications for Complete Street and Land Use Planning

The Complete Streets movement is consistent with the emerging literature on the role of walkable communities, transit accessible communities, and "missing middle housing" communities to meet pent up market demand (Nelson 2012, 2013, 2020; Parolek with Nelson 2020). Using community preference studies by the National Association of Realtors, these studies show that about a quarter of all American households want the opportunity to live in these kinds of places. Unfortunately, these opportunities may only be available to a bit more than 10 percent (Koschinsky & Talen 2015).

As we are encouraged by Complete Streets efforts, noting that evidence is growing about their market attractiveness including ours, we remain concerned that efforts sustain their long-term success are needed along several land use planning dimension. Firstly, at the larger scale, local efforts are needed to increase land use diversity, likely through zoning, that also integrates walking and biking between different land use types (Koschinsky & Talen 2015).

Second, a strong mix of pedestrian-friendly investments are needed to make entire cities and broader urban areas more walkable. These can include converting portions of existing streets into more walkable and bikeable places, which Complete Streets do, but these efforts are needed on a much grander scale than just Complete Streets. From a purely market perspective, the scale of new jobs and the size of the rent premiums we discovered in our research suggests pent up market demand for this opportunity. The rise of the 15-minute city movement comes to mind (The 15-Minute City 2021).

Thirdly, local governments need to make their current housing stock more nimble in meeting changing market needs. This can be done through changes in land use regulations that allow, for instance, non-discretionary conversion of existing residential homes into ones that provide accessory dwelling units or other living quarters (Nelson & Hibberd 2019).

Fourth, financial incentives may be needed to both preserve affordable housing stock and expand its supply, especially in places, such as Complete Streets, that attract new households who may displace existing ones (Boarnet et al. 2017).

Fifth, there may be a value capture opportunity presented by Complete Streets. Rent premiums reflect private returns to public investment. A portion of the new property and sales taxes generated by Complete Streets could be captured and used to leverage new Complete Street investments, as well as efforts to offset displacement outcomes (Germán & Bernstein 2018).

The value-added benefit is explored here. We acknowledge that building Compete Streets can be expensive in costing millions or even tens of millions of dollars per kilometer even though they average between one and two kilometers in length. What is the payoff? This is another area of

ongoing research. Aside from savings associated with improved safety and reduced pollution, we offer preliminary and very broad estimates of economic outcomes here. Using national average wages and real estate investments, and knowing that local markets vary considerably, we hazard these outcomes in Table 8.1 with all figures rounded.

Although more detailed analysis is needed, our cursory analysis suggests that between 2013 and the end of the decade, new real estate investment may have been in the order of $10 billion built along 48 kilometers of Complete Streets (see Table 3.1), 100 meters on either side of the centerline. This cones to about $200 million per linear kilometer. We estimate new payroll at about $4 billion per year or more than $80 million per linear kilometer.

Although Complete Streets in urban areas may be expensive, the return on investment may warrant investments into more of them. Doing so would help meet unmet market demand.

Table 8.1
Hypothetical Value-Added Impacts of Complete Streets

Metric	Description
$6 billion	77,000 jobs at 35 square meters per job times $2,200 per square meter excluding land[a]
$4 billion	16,000 new residential units at $250,000 per unit excluding land[b]
$10 billion	Total magnitude of real estate investment
$200 million	Per linear kilometer, 48 kilometers, 100-meters on either side
$100 million	Total annual property tax revenue at 1% effective tax rate
$2 million	Total annual property tax revenue per kilometer
$4 billion/year	77,000 jobs with wages at $52,000 per job[c]
$80 million	Per linear kilometer, 48 kilometers, 100-meters on either side

Figures rounded.

Notes:
a See https://www.buildingjournal.com/construction-estimating.html.
b See https://www.forbes.com/advisor/home-improvement/cost-to-build-a-house/.
c See https://policyadvice.net/insurance/insights/average-american-income/.

Finally, we suspect, based on demographic trends, that Complete Streets may be recreating an old household life cycle pattern based on urban and urbane streets. In *The Death and Life of Great American Cities*, Jane Jacobs lamented the upheaval to social structure caused by the redevelopment of established neighborhoods, not to mention the sterility of suburban life (Jacobs 1961). In many cities throughout the world, children are raised, form their own households, raise their families, and pass through all stages of life along or near the same streets. What we have found is that Complete Streets may attract younger and one-person person households who decide to stay when they have children and then age in place. Could it be that Complete Streets might help re-establish this opportunity as a place for people and families to live their entire lives?

We remind readers of two things. First, the Complete Streets in our study comprised just two thousandths or 0.02 percent of the total urbanized land area of their central counties.

Second, our findings reflect only the period 2013-2019 for people and 2013-2018 for jobs. One could extrapolate results many decades into the future to estimate the total potential magnitude of people and jobs that could be attracted to them over time.

Our analysis shows that Complete Streets make a difference in the location of people and jobs, shift commuting modes away from automobiles, and create communities which command a premium in the market. It seems that the market demand for Complete Streets is substantial. Although Complete Streets in urban areas may be expensive, the return on investment may warrant investments into more of them.

Our findings may help transportation and economic development planning and public officials to leverage resources made available through the Infrastructure Investment and Jobs Act (IIJA) to expand Complete Streets. The bipartisan IIJA passed in 2021 provides nearly one half trillion dollars in new funding for roads, transportation safety and public transit.[2] Many elements of Complete Streets qualify for IIJA funding.

Continuing Explorations

This is the first comprehensive assessment of whether and the extent to which Complete Streets make a difference across several dimensions. Refinements leading to an updated analysis are underway focusing chiefly on before-and-after associations between Complete Street investments and changes in population including socioeconomic and household features, and jobs focusing on major economic groups as well as jobs by wage category.

[2] For details, see https://www.congress.gov/bill/117th-congress/house-bill/3684 and https://en.wikipedia.org/wiki/Infrastructure_Investment_and_Jobs_Act.

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