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Bikes Mean Business: The Creative Class, the Urban Growth Coalition, and the Community in Bicycle Policymaking

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By
Derek T. Burk

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Abstract

Automobile transportation is among the leading sources of greenhouse gas emissions in the United States, and reducing vehicle miles traveled must be part of our climate change mitigation efforts. One recent trend that, if accelerated, could aid in this effort is the increase in bicycling for transportation in large US cities since 1990. Rates of commuting to work by bicycle have increased in more than three-quarters of large US cities since 1990, and the average rate has nearly doubled. At the same time, cities have been adopting more bicycle friendly policies, such as the construction of dedicated bicycle traffic lanes and mixed-use bicycle paths. The correlation of these two trends suggests that policy may be able to influence travel behavior, and in this dissertation I find strong evidence of such a relationship. Given the efficacy of bicycle friendly policies, it is imperative that we understand the political arrangements that have led to their adoption. How do we explain the general upward trend in bicycle friendly policies in US cities, and how do we explain variation between cities in the adoption of such policies?

While understanding the politics of bicycle friendly policies has practical implications for climate change mitigation efforts, it also has theoretical implications for the sociology of urban and environmental politics. Among urban sociologists, there is widespread consensus that a "growth coalition" of wealthy business and real estate actors dominate urban policymaking. The growth coalition thesis, however, also predicts that these powerful actors will tend to oppose environmental protections as a drag on growth. While researchers have found no evidence that the power of the growth coalition has diminished, cities' increasing — if selective — adoption of environmentally friendly policies, including bicycle friendly policies, calls for a reevaluation of the growth coalition's role in efforts to address environmental problems such as climate change.

In this dissertation, I make three central claims. First, I argue that the advent and growing influence of what I term "Creative Class discourse" has persuaded the wealthy business and real estate actors that make up the growth coalition, and their allies in city hall, that bicycle friendly policies serve their interests. This discourse emphasizes the importance of attracting a highly-skilled workforce for sustaining economic growth, and the importance of lifestyle amenities in attracting such a workforce. Second, I argue that variation in the level of support from growth coalition actors, over time and between cities, explains both the general rise of bicycle friendly policies and variation between cities in their adoption. Third, I argue that the involvement of growth coalition actors in bicycle policymaking produces particular kinds of bicycle friendly policies: capital-intensive, place-making projects that offer profit-potential for developers. While these projects can create excitement and momentum for bicycling, they also create greater risk of gentrification and displacement than incremental, geographically dispersed projects. Greater integration of community organizations into bicycle advocacy reduces growth coalition involvement, resulting in policies that are more sensitive to gentrification concerns, but produce less dramatic transformations of the built environment and potentially less excitement for bicycling. I support these claims with a regression analysis of the adoption of bicycle friendly policies in 60 large US cities and analysis of interviews with participants in the bicycle politics of four case cities. My conclusions suggest that the political power of the growth coalition can be harnessed to environmental ends, but that the resulting policies risk disrupting the lives of poor, working-class, and racial minority urban residents if no provisions are made to avoid such harms.

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In the course of researching and writing this dissertation, I sometimes fell prey to feelings of aimlessness, or felt overwhelmed by the scale and open-endedness of the endeavor. The best antidote for these feelings, I think, was to ask for help and feedback from my mentors and colleagues. I was always glad when I did this, because their ideas and feedback helped refresh the material in my mind, and just as importantly, helped formulate clear tasks to keep the project moving forward. My only regret is not having asked for help more often.

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Dedication

For George and Gerry Burk, and Bob and Barb Krugler.

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Chapter 1

Bicycling in a changing urban climate

> Two facts in the last year. Coincidence? I think not. One, the city of Chicago moved from tenth to fifth of most bike-friendly cities in the country [according to Bicycling magazine] in one year... In the same year the city of Chicago moved from fifteenth to tenth worldwide in startup economy... You cannot be for a startup, high-tech economy and not be pro-bike.
> *— Former Chicago Mayor Rahm Emanuel, December 14, 2012, quoted in Greenfield (2012)*

> I mean, you go to Silicon Valley and Palo Alto and places like that, like you know, Google is doing its own bike plan, or something like that. I've just kind of seen articles about it. The people that work at these tech companies want to live in places where they can ride their bike around and like, you know ... Here we call it gentrification. Like that's the term that my community uses to describe that.
> *— Transportation official in Santa Ana, California, personal interview*

Automobile transportation is a significant contributor to global climate change. In the United States, transportation is the second largest source of greenhouse gas (GHG) emissions, accounting for 26% of all emissions in 2015 (U.S. Environmental Protection Agency 2016). Almost two-thirds of these transportation emissions come from passenger cars, small trucks, SUVs, and vans.

Meeting the emissions targets required to avoid catastrophic climate change will require a combination of improved fuel efficiency, increased use of alternative fuel, and reductions in vehicle miles traveled (VMT). With limited political and financial resources available to combat climate change, it

is important that we pursue policies that can cost-effectively reduce greenhouse gas emissions. One strategy for picking cost-effective climate change mitigation policies is to bolster social trends that are already moving travel behavior in more sustainable directions.

One such trend is the increase in bicycling for transportation that has occurred in US cities in recent decades. Average rates of bicycling to work in large US cities have nearly doubled since 1990, and in several cities they have increased six-fold. Cities experiencing the most dramatic increases in bicycling have been those who have adopted more bicycle friendly policies, such as dedicated bicycle traffic lanes, bicycle sharing systems, and campaigns and events to increase awareness of bicyclists' right to the road. The increase in both bicycling and bicycle friendly policies in North American cities has been termed a "bicycling renaissance" by one prominent transportation scholar (Pucher et al. 2011).

This bicycling renaissance presents us with two empirical puzzles. The first puzzle concerns the *general* rise in bicycling and bicycle friendly policies across large US cities as a whole. Out of 57 large US cities included in at least one Alliance for Biking and Walking (ABW) Benchmarking report, 46 (81%) experienced an increase in the rate of bicycle commuting between 1990 and 2017, and the average rate nearly doubled over that period, as noted above. Similarly, out of the 33 large cities with data for both 2000 and 2014, 29 (88%) added 70 or more miles of bicycle infrastructure between those two years, and 23 (70%) added 100 or more miles. The fact that we observe increases in bicycling practice and policies across so many cities suggests that the bicycling renaissance results in part from forces operating on a national or international scale, as opposed to dynamics affecting only a handful of cities. Identifying these large-scale forces can help us forecast the future prospects for bicycling in large US cities. Are these forces still operative, or are they confined to a bygone era?

Within the context of this general bicycling renaissance, however, we also see substantial variation between cities in the magnitude of increases in bicycle friendly policies and bicycling for transportation. This is the second empirical puzzle, and it provides leverage for a comparative analysis. Despite the wide variation in cities' adoption of bicycle friendly policies, little research has examined the political arrangements that underlie these policies. In particular, we know little about the role of powerful

business and real estate actors, whom past research has shown to wield inordinate influence over urban policymaking, in the adoption of such policies. Understanding the role of these actors in urban bicycle policymaking, whether as supporters or as opponents, has implications not only for efforts to reduce VMT by increasing bicycling, but also for efforts to overcome the historical opposition of business actors to environmental protections more generally. Business interests are widely viewed as one of the key roadblocks to the adoption of policies to mitigate climate change, and the rise of bicycle friendly policies in US cities, where these interests tend to predominate, suggests that bicycling advocates in some cities have found a way to either blunt the influence of business opposition to sustainability policies, or to win the support of business actors for such policies.

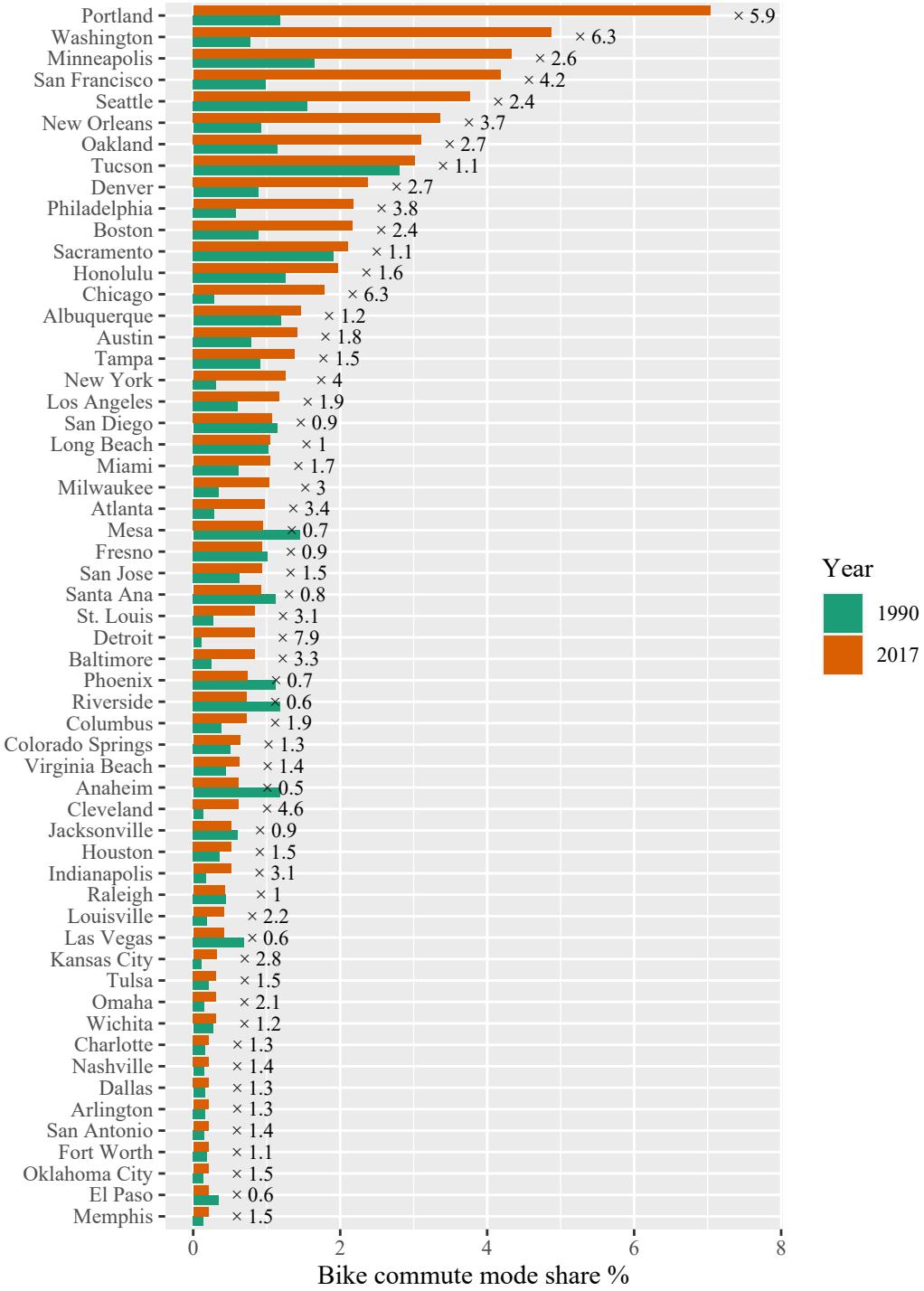
In this dissertation, I examine the role of business and real estate actors in the adoption of bicycle friendly policies in US cities. In doing so, I offer insights into how we can increase bicycling to reduce GHG emissions, and more generally how we can encourage the adoption of policies to reduce GHG emissions in a polity where business interests hold outsize influence. My analysis is focused on the second puzzle identified above — explaining variation between cities — but my findings also have implications for the first puzzle, in that the factors explaining variation between cities act by modulating the local influence of wider trends that have contributed to the general bicycling renaissance. I find, in brief, that business interests will support bicycle friendly policies when they believe those policies will contribute to economic growth. The discourse that connects bicycling to economic growth is a relatively recent phenomenon, and helps explain the general rise in bicycle friendly policies, but the local currency of this discourse is modulated by political and economic conditions. Importantly, I also find that the types of bicycle friendly policies favored by business actors differ from those promoted by more community-oriented coalitions. Business and real estate actors support capital-intensive, place-making bicycle projects, as opposed to more incremental and geographically dispersed ones. These large-scale projects can create excitement about bicycling in a city and create momentum for further bicycle friendly policies, but they also increase the risk of gentrification and displacement, and may face a political backlash for this reason.

The rest of this introductory chapter proceeds as follows. In the next section, I present statistics on the rise of bicycling and bicycle infrastructure in large US cities, showing both a general increase across cities and wide variation between cities. In the following two sections, I explain why understanding the political dynamics of the rise of bicycling has significant implications, first, for climate change mitigation efforts, and second, for sociological theories of urban politics and of the environment. Next, I summarize the historical context of the bicycle's recent renaissance, highlighting key trends that provide the context for my explanation of this phenomenon. In the penultimate section of the chapter, I articulate my argument in broad conceptual terms, and in the final section, I present a roadmap for the rest of the dissertation.

1.1 Charting the urban bicycling renaissance

In the last three decades, bicycling has experienced a dramatic revival in many large US cities. One indication of this revival is an increase in bicycle commuting rates in the nation's largest cities. From 1990 to 2017, the mean bike commuting rate in 57 of the nation's largest cities increased from 0.68% to 1.32%, and the median rate increased from 0.58% to 0.84%. Thus, bike commute rates nearly doubled on average. The increase in bike commuting was even more marked in some cities, as shown in Figure 1.1. The rate of bike commuting increased more than five-fold in cities such as Detroit, Chicago, Washington, D.C., and Portland, and more than four-fold in San Francisco, New York, and Cleveland.

At the same time that rates of biking have risen, there has been an increase in cities adopting bicycle friendly policies. One prominent example of such policies is bicycle infrastructure, in the form of dedicated bicycle traffic lanes and shared-use bicycle and pedestrian paths. Reliable comparative data on such infrastructure does not exist for time periods prior to 2000, but between 2000 and 2014, the average centerline mileage of such infrastructure in 33 of the nation's largest cities for which comparable data are available increased from 96 to 296 miles, which amounts to an increase from 0.56 to 1.97 miles per square mile of city area. Figure 1.2 shows these trends for cities with comparable data.



Source: 1990 Census and American Community Survey 2013-2017 estimates

Figure 1.1: Bike commute mode share in large US cities, 1990 and 2017 (numeric labels indicate growth factor from 1990 to 2017)

As is the case with bike commuting rates, some cities had especially notable increases in bicycle infrastructure. Minneapolis, Boston, and Fresno all added more than three miles of bicycle infrastructure per square mile, while Philadelphia, San Jose, Washington, D.C., Mesa, Denver, and Honolulu all added more than two miles per square mile.

In sum, despite the fact that most commuters still don't bike and most roads still don't include dedicated bicycle infrastructure, biking and bicycle infrastructure in large US cities have increased notably in recent decades, and quite dramatically in a few select cities. One set of questions this raises regards the causal relationships between the rise of bicycle friendly policies and increased rates of bicycling: have policies induced biking, has (demand for) biking induced policy adoption, or have both effects been operative? I address these questions in chapter 3 with fixed-effects and structural equation models, and find evidence for effects in both directions. Thus, there is evidence that bicycle friendly policies are consequential for increasing bicycling rates, and that increased bicycling rates can induce expansion of such policies. However, neither factor fully explains the other, which leaves plenty of room for further exploration of why bicycling rates have increased, and why cities have expanded their bicycle friendly policies. This dissertation focuses on the latter question, in part based on the proposition that bicycle friendly policies induce bicycling moreso than the reverse effect, and in part because of the greater implications of that question for broader questions of sociological interest regarding urban environmental policymaking and who wields power in contemporary US cities.

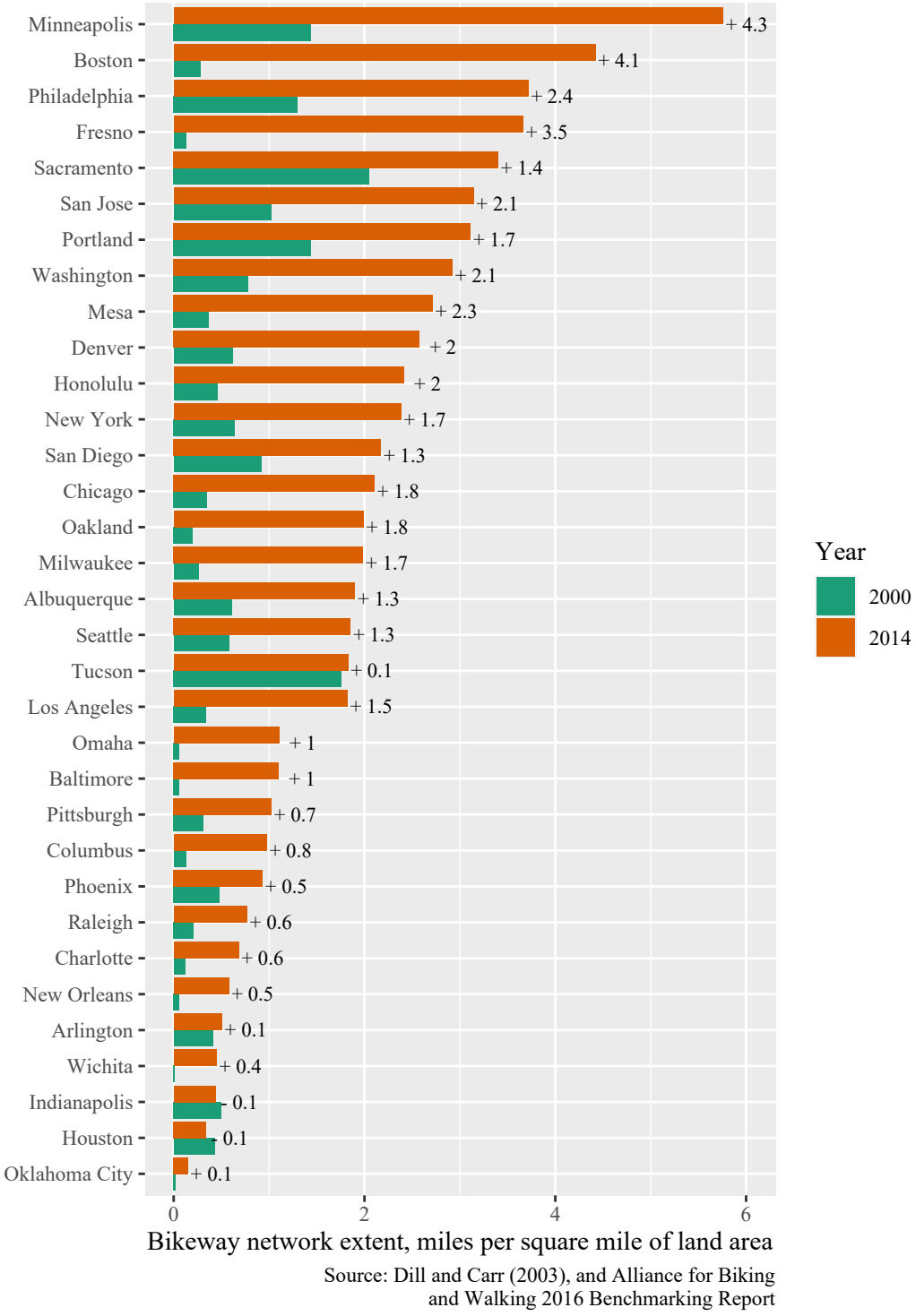


Figure 1.2: Extent of bikeway network in large US cities, 2000 and 2014 (numeric labels indicate difference between 2014 and 2000)

1.2 Does bicycling matter for climate change?

Promoting bicycling could potentially reduce GHG emissions by reducing VMT and associated emissions from burning fossil fuels, but it is seldom listed among the primary climate mitigation strategies. Promotion of bicycling may even be viewed cynically as a symbolic gesture, a way to signal a commitment to fighting climate change without actually doing so. What are the arguments against bicycling promotion as a strategy to reduce GHG emissions, and can these be refuted? Is there evidence that promoting bicycling is a legitimate strategy for combating climate change, worthy of the investment of scarce resources? In this section, I'll list and evaluate some arguments against promotion of bicycling as a climate mitigation strategy.

1. Personal automobile transportation is not a major contributor to GHG emissions. Given the level of attention to high profile targets such as coal-fired power plants as causes of GHG emissions, some people may assume that transportation is not a major source of GHG emissions, or that most transportation emissions result from freight trucks or air travel. In fact, while the electricity-generation sector is indeed the single largest source of GHG emissions in the US at 30% of total emissions, the transportation sector is a close second at 26% (U.S. Environmental Protection Agency 2016). Moreover, the majority of transportation emissions (61%) come from passenger cars and light duty trucks, whereas freight trucks and commercial aircraft account for only 23% and 6%, respectively. In other words, travel by personal automobile accounts for 16% of total US emissions. Thus, reducing emissions from personal automobile transportation could have a significant effect on overall emissions.

2. Bicycling is too slow to be a substitute for driving. Cars can easily travel at speeds of 60 miles per hour or more, whereas the typical travel speed of a bicycle (depending on the model and operator) is 12-15 mph. At these respective speeds, a 10-mile trip that takes 10 minutes by car would take at least 40 minutes by bicycle. Framed in this way, it seems unlikely that many people would be willing to forgo the time-savings offered by the car over the bicycle.

However, research shows that about 53% of trips taken by US urban dwellers in 2009 were 3 miles or

less (USDOT 2009). A 3-mile trip can be completed by bicycle in 20 minutes or less, and depending on traffic and parking availability, might take 10-20 minutes by car. Even though bicycles can compete with cars for travel time on such trips, only 5% of trips 3 miles or less were completed by bicycle, whereas cars were used for 72% of such trips. Excluding trips under 1 mile, which are completed by walking about half the time, 86% of trips 1-3 miles long are completed by car (USDOT 2009). Thus, even if bicycles were used only for short trips where they can compete with cars on travel time, they could absorb a large portion of trips currently traveled by car. Moreover, bicycling and walking encourage compact, mixed-use development, such that increases in bicycling would further shorten average trip distances.

3. Funds spent to promote bicycling would be better spent on public transportation. Despite the aforementioned fact that about half of all urban trips are short enough to be completed by bicycle without undue time or effort, many longer trips may seem impractical for bicycling, and thus public transit (PT) may seem a more comprehensive substitute for car travel. PT also offers better protection from the elements than bicycling, and can serve the elderly, persons with disabilities, and others who can't use a bicycle.

Certainly, good PT is crucial to reducing car dependence, but investment in bicycling and PT are complementary. In fact, increased rates of bicycle use, in conjunction with bicycle accommodations at transit stops and on transit vehicles, enhances PT by making a given transit stop accessible to a wider area. Since bicyclists travel about four times as fast as pedestrians, the radius of people who can reach a transit stop in a given time is four times as great for bicyclists as for pedestrians. Moreover, bicycle infrastructure tends to be cheaper than other methods of increasing access to PT, such as adding new bus routes or building new train lines. Conversely, better PT makes bicycling more attractive by extending the range of travel for combined bicycle-PT trips, and by offering an alternative travel mode in case of inclement weather.

4. Efforts to change American car culture are futile. Perhaps underlying all critiques of bicycling promotion as a strategy of climate change mitigation in the US is the notion that bicycling is incom-

patible with American culture. This notion is supported by a comparison of bicycling rates in the US to those in northern Europe, where bicycling is as common as driving and PT use in some cities. This wide disparity suggests that there is something fundamentally different about those countries or their citizens that makes them more amenable to bicycling.

In fact, many northern European countries do have a history of bicycling for transportation in the first half of the 20th century, which contrasts with the American experience of rapid and widespread automobilization during that period. However, nearly all those northern European countries pursued automobilization in the post-WWII era, and rates of bicycling plummeted in the 1950s and '60s to levels substantially lower than they are today. It was only through the efforts of activists that governments in those countries shifted course in the 1970s, and it was only through consistent government support for bicycling from the 1970s onward that the trend in bicycling rates reversed.

These countries indeed benefit from a stronger history and culture of bicycling compared to the US, but it is only by active government promotion of bicycling, especially through provision of infrastructure, that they still have relatively high rates of bicycling today. For instance, in Groningen, Netherlands, where bicycles were used for around 40% of all trips in 2007, the local government spent an average of $16 per resident annually to support bicycling between 1989 and 2006, mostly through expansion of separate bicycle infrastructure (Gotschi and Mills 2008). Similarly, Amsterdam, Netherlands and Copenhagen, Denmark spend an average of $39 and $13 per resident annually on bicycling, and enjoy bicycling rates of 35% and 20%, respectively (Gotschi and Mills 2008).

The relatively low rates of bicycling in the US correspond to low spending levels in support of bicycling. Federal funding for bicycling and walking between 1992 and 2006 averaged around $1 per capita (USDOT 2018). By spending just $3.50 per capita annually on bicycling infrastructure and related programs between 1991 and 2006, the city of Portland, OR was able to increase bicycling mode share for the journey to work from 1.2% to 6% (Gotschi and Mills 2008). All this suggests that government support is essential to increase bicycling, in northern Europe as much as in the US, and that the unequal government support has just as much to do with different levels of bicycling as do cultural differences.

In sum, each prominent critique of bicycling as a strategy for reducing GHG emissions rests on mistaken assumptions or a lack of attention to the interconnectedness of travel behaviors. In response to the argument that reducing personal car travel wouldn't make a dent in climate change, I showed that such travel in fact is a significant contributor to GHG emissions. Next, I addressed the argument that bicycling is too slow to replace car travel, finding that a large portion of urban trips currently completed by car are short enough that travel time by bicycle would be comparable to that by car, and that increased bicycling would shorten trips further by encouraging compact development. Third, I raised the argument that promotion of bicycling distracts from investment in public transportation (PT). In contradiction of this argument, I noted that better accommodations for bicycling enhances the accessibility of PT, and that better PT supports bicycling. Finally, I addressed the argument that the strength of car culture and lack of a bicycling tradition in the US make it impossible to achieve rates of bicycling comparable to northern European cities. On closer examination, however, I found that substantial, sustained government support for bicycling was crucial to achieving the high rates of bicycling observed in cities like Amsterdam, and that when US cities such as Portland have provided even relatively modest support for bicycling over an extended period, bicycling rates have increased significantly.

1.3 Does bicycling matter for sociology?

Understanding the political dynamics behind the recent bicycling renaissance has important implications for questions of broad sociological significance. One such question is whether and how US cities can contribute climate change mitigation efforts, and more specifically, whether the business and real estate interests that tend to dominate urban policy might actually push for environmental protection. Classic accounts of the relationship between capitalist business interests and environmental protection have found them to be antithetical due to the capitalist need for continual growth, which requires consumption of ever-more natural resources (Molotch 1976; Schnaiberg 1980). However, the shift of urban economies away from industrial production and toward consumption complicates this account for the

urban capitalist class. Moreover, several influential contemporary urbanists argue that enhancing quality of life as a means to attract geographically-mobile knowledge workers — what one such commentator has termed the "Creative Class" — has become the central lever by which cities can encourage economic growth (Florida 2002; Glaeser 2012). In many cases, the quality of life enhancements recommended by such urbanists have environmental benefits: preservation and expansion of urban greenspace; dense, mixed-use development; and policies to facilitate alternatives to car transportation, such as public transit, walking, and bicycling. Molotch's (1976) influential account of the urban growth machine rests on the presumption of an opposition between the use value and exchange value of land, but contemporary quality of life policies promise to deliver both. With these issues in mind, I explore in subsequent chapters the role of business actors in contemporary urban bicycle politics, and whether bicycle policy offers a model for winning business support for environmental protection.

A second, related question concerns the implications of urban politics and policy for urbanites from marginalized groups. What does the rise of bicycle friendly policies reveal about the political influence of marginalized groups, such as poor and working-class residents and racial minorities, and the possibilities for adopting urban policies that work better for these groups? Most accounts of urban growth and development suggest that the dominance of pro-growth interests has particularly detrimental effects for lower-income and racial minority communities, through patterns of development-driven displacement (such as the construction of freeways through poor and minority neighborhoods) and of siting undesirable land uses in and around these communities (Brulle and Pellow 2006; Pellow and Nyseth Brehm 2013). Moreover, federal support for US cities has fallen significantly since the 1980s, forcing cities to become more entrepreneurial in seeking out investment and revenue sources and to cut many social expenditures that might have benefited marginalized groups (Hackworth 2007; Harvey 1989).

Nonetheless, increased investment in and promotion of car-alternative transportation modes seems like a potentially beneficial development for lower-income and minority urbanites. Owning and operating a car is much more expensive than alternatives like public transit, walking, and bicycling, and enhancements to support these latter, cheaper modes makes them more viable options for lower-income

residents. Morever, a reduction in cars makes roads safer for walking and bicycling (which are often used in conjunction with public transit), so lower-income persons who already use these modes will be safer from the dangers of car traffic.

On the other hand, if enhancements for car-alternative modes follow well-worn patterns of inequitable development, they could offer little or no benefit to lower-income and minority communities and even exacerbate urban inequality. This could occur either through lower investment in enhancements in lower-income and minority communities, or through the pairing of such enhancements with development projects that threaten to displace people in those communities. This is the concern referenced by the Santa Ana transportation official in the quote at the beginning of this chapter: that bicycle enhancements are only made in lower-income and minority communities to pave the way for an influx of high-tech workers and other privileged groups. This concern is especially pressing given the "back to the city" trend whereby central cities are increasingly gaining population at faster rates than their surrounding suburbs.

Thus, this dissertation sets out to answer four central questions of sociological import. First, to what degree have business leaders been instrumental in the rise of bicycle friendly policies in US cities since 1990? Second, to the extent that business leaders have been instrumental, do the politics of bicycle friendly policymaking offer lessons for how business influence could be harnessed in support of other policies to mitigate climate change? Third, to what degree have marginalized groups been involved in promoting bicycle friendly policies? And fourth, to the extent that marginalized groups have been involved, what does their involvement reveal about the influence of these groups in contemporary urban politics?

1.4 Historical context of the bicycling renaissance

There are several notable trends that have occurred in US cities in recent decades that have likely shaped the rise of bicycling and bicycle-friendly policy. In this section, I examine four such trends. First, I

summarize changes in federal transportation policy relevant to bicycling since 1990. Second, I review figures on the "back-to-the-city" movement — the growth of central cities relative to their surrounding suburbs. Third, I briefly analyze the rising adoption of policies promoting environmental protection, and particularly climate change mitigation, by US cities. Finally, I discuss some major economic shifts affecting urban development since the post World War II era. These trends provide the context for my arguments about the political dynamics that have shaped urban bicycle policymaking in recent decades.

1.4.1 Bicycle policy since 1990

One of the most important events in understanding the rise of bicycle friendly policies in US cities is the passage of the federal Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. This was the first federal transportation bill to formally recognize the completion of the federal highway system, and thus represented a new perspective for the role of the federal government and the state and local governments in transportation planning (Schweppe 2001). One of the most significant aspects of the bill was the expanded authority it gave to metropolitan planning organizations (MPOs), relative to state departments of transportation, in urban transportation planning. This expanded role for MPOs responded to advocacy from a broad range of urban and metropolitan interests, as well as environmental and social justice activists, in favor of greater self-determination for urban areas and their residents (Goldman and Deakin 2000). Along with this shift in authority, ISTEA also expanded the types of projects funded with federal transportation dollars, providing dedicated (as well as flexible) funding for bicycle and pedestrian projects. As a result of ISTEA and its 1998 successor, the Transportation Equity Act for the 21st Century (TEA-21), federal funding for bicycle and and pedestrian projects increased from less than $7 million annually before ISTEA to over $400 million annually by 2003 (Handy and McCann 2010).

While ISTEA greatly increased the federal support available for bicycle and pedestrian projects, it did not mandate spending on such projects. As a result, there was a great deal of variation in spending levels on such projects in the post-ISTEA era. One study of metropolitan areas with population

over one million found that spending ranged from $0.18 to $2.30 per capita per year (Handy et al. 2009). One major factor that explains this variation is the decision-making of state departments of transportation, which still retained substantial authority despite the stronger role for MPOs. States in which departments of transportation elected to "sub-allocate" active transportation funding, effectively giving MPOs complete control over how that funding was used, exhibited higher levels of spending on bicycle and pedestrian projects (Handy and McCann 2010).

One indicator of city's and MPO's increased commitment to bicycle policy in the wake of ISTEA was the increased prevalence and publication frequency of bicycle plans. For instance, the city of Atlanta, Georgia adopted a Commuter On-Street Bike Plan in 1995; the city of Houston, Texas adopted a Comprehensive Bikeway Plan in 1993; the city of Santa Ana, California adopted a Bikeway Master Plan in 1995; and the city of Raleigh, North Carolina adopted a Bicycle Plan in 1991. The centerpieces of these plans were planned networks of dedicated or shared bicycle infrastructure, and in particular, bike lanes demarcated by painted lines adjacent to car traffic lanes. Quotes from Atlanta's 1995 plan and Houston's 1993 plan provide a sampling of the stated motivations for improving bicycle amenities:

> The Atlanta Commuter On-Street Bike Plan is intended to improve the overall quality of life in Atlanta by reducing traffic congestion, improving air quality, reducing noise, conserving natural resources, and providing facilities for a fun and healthy mode of transportation (City of Atlanta 1995).

> The primary focus for development of this plan is to facilitate bicycle commuting in order to respond to increasing auto congestion, air quality issues, and mandates from the federal government to reduce reliance on the single occupant automobile (City of Houston 1993).

The tone and emphasis of these plans shifted notably over time, with greater emphasis on equity and economic development evident in the 2017 Atlanta Transportation Plan and the 2017 Houston Bike Plan.

> The [Atlanta City Design] document contemplates the near tripling of the City's population. While this growth sounds like a lot, the resulting density is still well below many of

> Atlanta's peers. However, these peer cities have many affordable and convenient mobility options that provide people with choices for how to get around. By organizing growth in already dense areas like Downtown, Midtown and Buckhead and along strategic corridors like the BeltLine, we can invest in ways that make that growth good for us. More people to support grocery stores and dry cleaners closer to our homes can make lives easier, as long as we have safe and affordable ways to move around (City of Atlanta 2017).

> The Houston Bike Plan presents a transformative opportunity for the City and implementation has the potential to create great improvement in mobility and access, health and safety, equity and access to opportunity, and economic development (City of Houston 2017).

1.4.2 Population trends in urban areas

In conjunction with the rise of bicycle friendly policies since 1990, U.S. cities have experienced rising rates of population growth in central city areas relative to suburban areas. In 2010-11, for the first time since the 1920s, the major cities of the largest metropolitan areas grew faster than their surrounding suburbs (Frey 2012). Some of the forces that explain this shift were temporary, such as the effects of the 2008 recession on suburban housing markets and unemployment. Indeed, while primary city growth exceeded suburban growth in each year between 2010-11 and 2014-15, suburbs grew faster than primary cities in 2015-16 (Frey 2017).

However, the so-called "back-to-the-city" movement can also be partly attributed to shifting generational residential preferences, with members of the Millennial generation (defined as those born between 1981 and 2000) more likely to live in or near the city center than previous generations at the same life course stage (ages 25 to 34) (Lee 2020). While past data on trends over the life course indicates that many Millennials will move out of the central city as they age, some more or less stable characteristics of that generation, such as greater racial and ethnic diversity, delayed age at marriage and higher rates of non-marriage, and higher levels of education, might predispose them to remain in central cities at higher rates than previous generations (Lee 2020). Moreover, Millennials drive less than previous generations at the same life course stages, and there is some evidence that this behavior is partially driven by preferences to forgo travel or use car-alternative modes that could carry forward across the life course

(McDonald 2015). Thus, even if some Millennials move farther out of the city, they may choose to live in suburban communities with good access to amenities and non-car transportation options (Myers 2016).

Rising population growth in urban centers has put upward pressure on housing prices in many US cities, and has contributed to increasing concerns about gentrification (Brown-Saracino 2013). Though there may be increasing demand for central-city living, there is also a supply-side explanation whereby developers exploit a "rent gap" in disinvested central city areas to buy low and sell higher (Smith 1979). This process of "upgrading" neighborhoods with new housing and amenities can attract more affluent residents and drive out less privileged existing residents. Some scholars have argued that in recent years, developers and their allies in city government have used "green-washing" to justify upgrading of central city neighborhoods in terms of improving sustainability (Anguelovski et al. 2019; Checker 2011), and in some cases, bicycle amenities may be used to provide this sort of cover (Stehlin 2015b). Neighborhood activists in Atlanta and Chicago, among other cities, have used new, high-profile shared use walking and bicycling trails in their respective cities as rallying points to draw attention to how changes in their neighborhoods threaten to push out working class residents (McWhirter 2018; Vivanco 2016).

1.4.3 Urban environmental policy

With the U.S. federal government failing to take significant action to combat climate change, some states and cities have stepped up as leaders in climate policy. Engel (2009, p. 434) describes some of the initiatives undertaken by US cities:

> In ever greater numbers, cities are installing energy-efficient lighting, developing and enforcing energy efficient building codes, incorporating climate change concerns into "smart growth" land use planning, investing in mass transit and transportation planning, encourageing employer carpooling and bicycle commuting programs, and adopting solid waste management programs that use less energy and recover landfill gases.

At first glance, it seems counterintuitive that states and cities would expend political and financial resources to reduce their own greenhouse gas emissions, given that climate change is a global problem

and any given locality is unlikely to see direct benefits from a reduction in its own emissions. However, on closer consideration, there are a number of rational reasons for state and local governments to pursue climate change mitigation. For one, participation in larger agreements between cities and states holds the promise of reducing emissions outside one's jurisdiction, which could yield measurable local benefits if participation is sufficiently widespread. Another motivation for public officials is the chance to claim credit or gain publicity on an issue of international importance. Cities and states can also reduce their own energy costs, in some cases, by adopting more energy efficient technologies, and their are often other "co-benefits" to emissions-reduction policies, such as the possibility to reduce traffic congestion and air pollution by investing in car-alternative transportation modes. Being a leader in promoting renewable technologies can attract investment to a state or city, and position them to influence future federal policies in ways that favor them (Engel 2009).

Thus, it is possible that US cities have adopted bicycle friendly policies as an emissions reduction strategy, but not all of the motivations described in the literature for pursuing climate change mitigation apply well to bicycle policies. Bicycle friendly policies do offer potential for reduced traffic congestion and air pollution, and possibly for credit-claiming and publicity, but not necessarily for leadership in an emerging industry comparable to renewable energy.

Moreover, the growing adoption of policies viewed as environmentally-friendly does not necessarily indicate a fundamental shift in the politics of urban development. Even as localities face increased pressure and incentives to reduce negative ecological impacts, they also face pressure to attract increasingly mobile private capital investment, as corporate consolidation has eroded the power and prevalence of locally-owned businesses and policy changes have reduced federal support for cities (Hackworth 2007; Pacewicz 2015). These often competing pressures are likely to be resolved by *selective* incorporation of environmentally friendly policies that do not threaten to scare off any potential investment or development, along with a shift toward a "greening" discourse (While et al. 2004).

The emphasis on selective incorporation of environmentally friendly policies turns our attention to the variation amongst such policies in terms of their compatibility with attracting business investment

and economic development. Nathan Glaeser and Richard Florida, two of the most influential public intellectuals in the realm of urban development in recent decades, both argue that the key to urban success is attracting and retaining highly-skilled people (Glaeser 2012; Florida 2002). Though both figures acknowledge that there are a variety of strategies for achieving that goal, a common theme is that cities must enhance the quality of life available to residents to attract those with the means to choose where to live. Thus, environmental policies that can plausibly be argued to improve quality of life may gain support from groups concerned primarily with economic development, including the powerful business interests that often dominate city politics (Molotch 1976).

The pressure for cities to become (or at least appear to become) more environmentally friendly, combined with the elevated pressure to attract economic development and the notion that economic growth derives from attracting and retaining highly-skilled people, may align political forces behind efforts to redevelop cities to fit the tastes of privileged groups in the name of sustainability. Thus, the rising political currency of environmentalism could actually play into the dynamics of "green gentrification" mentioned above, whereby redevelopment that serves the interests of developers and more privileged urban dwellers, but threatens the housing security of lower-income residents, is justified in terms of urban sustainability.

1.4.4 Shifting growth strategies

The contemporary "back-to-the-city" movement has reversed the flight from US central cities that has been ongoing since at least the 1920s, and which intensified since World War II. One major reason for this mass exodus from cities was their industrial character, which often made them unpleasant places to live. Since the 1970s, however, the manufacturing presence in US cities has declined precipitously. This created an economic crisis for many cities, as they lost an important source of tax revenue and employment, but it also created the opportunity for cities to become centers of consumption rather than production. Thus, scholars increasingly assess cities' success in terms of their ability to create *amenities* that will attract residents and tourists and fuel a consumption-based economy (Clark et al. 2002).

Relevant amenities include cultural characteristics such as vibrant art, music, and culinary scenes, but also physical amenities such as greenspace, and to some extent, active transportation infrastructure that supports walking and bicycling. Influential thought-leaders in urban policy have turned this observation into a prescription that city leaders must cultivate these cultural and physical amenities in order to compete for the skilled workforce, or "Creative Class", that drives regional growth (Florida 2002; Glaeser 2012). Among transportation modes, bicycling may be particularly associated with cities as centers of consumption, as it is more closely associated with recreation than other modes such as driving, public transit, or even walking, and indeed, bicycling is mentioned explicitly by Richard Florida in his accounts of Creative Class tastes (2002).

Urban deindustrialization and the shift toward cities as centers of consumption created potentially profitable opportunities for real estate developers. The departure of many manufacturing operations from US cities not only left a gap in revenue and employment, but also left a surplus of disused physical space. As cities increasingly focus on attracting consumption, former industrial spaces are often renovated and repurposed as bars, restaurants, music venues, and upscale rental housing, at great profit to developers able to exploit the aforementioned "rent gap" (Smith 1979). A striking example of this type of development is the mammoth Ponce City Market in Atlanta. Until 1979, the building was a Sears, Roebuck retail store, warehouse, and regional office, but it now houses a wildly popular mixed-use development that includes shopping, restaurants, office space, and residential units. Notably, the Ponce City Market is immediately adjacent to the Atlanta BeltLine mixed-use walking and bicycling trail discussed in chapter 5, and many visitors to the Market arrive by bicycle (Pendergrast 2017).

1.5 Conceptualizing the urban bicycling renaissance

The trends outlined in previous sections provide context for my argument about the political dynamics of the rise of bicycle friendly policy in large US cities. Past research on urban politics teaches us to begin, at least provisionally, with the assumption that urban policy is shaped by well-resourced actors with an

interest in increasing land values through population and economic growth — the so-called "growth coalition" (Molotch 1976). When evaluated in the light of this assumption, the trends discussed above suggest a compelling narrative about the rise of bicycle-friendly policies. The means by which US cities create and sustain growth have shifted fundamentally since World War II. In previous decades, growth coalition actors might have pushed city officials to provide tax breaks and incentives to attract a manufacturing plant which would command higher rents than other land uses, while also attracting population growth to the area by providing employment. The decline of manufacturing in most US cities rendered this growth strategy ineffective, and the departure of many middle- and upper-class urbanites to surrounding suburbs further depressed land values and left many vacant or underutilized parcels in central cities. The decline of manufacturing jobs was accompanied by the rise of lower-paid service jobs as well as higher-paid knowledge-worker jobs in business and financial services (Sassen 2019). A new growth strategy that emerged from these larger economic shifts was to reinvent cities as consumption playgrounds that would attract these higher-paid knowledge workers. In this dissertation, I argue that US cities and the powerful business and real estate interests that dominate their politics have increasingly embraced bicycle friendly policies as part of a broader strategy to attract growth by improving quality of life. I find support for this argument in interviews with the people and organizations lobbying for bicycle friendly policies. These informants report that in many cases, powerful business and real estate actors not only tolerate bicycle friendly policies but are directly involved in promoting them.

To promote bicycle friendly policies, these powerful business and real estate actors ally with and support bicycle advocacy organizations, who are a valuable source of legitimacy and knowledge about bicycle policy. However, given the US bicycle advocacy movement's historical grounding in progressive and environmental movements (Reid 2017), this type of alliance can lead to conflicts. If bicycle advocates go along with their business and real estate allies in supporting bicycle policies that primarily benefit privileged groups, or that contribute (or are perceived to contribute) to gentrification and displacement, these advocates face backlash from within their own largely progressive ranks, and from other progressive groups focused more on tenants' rights and housing affordability. These other pro-

gressive advocates sometimes view bicycle advocates as complicit in supporting urban development policies that negatively impact lower-income and minority residents.

As stated above, I focus in this dissertation on explaining variation between cities in the adoption of bicycle friendly policies, but my findings also have implications for understanding the general rise in such policies across US cities. Figures 1.3 and 1.4 illustrate, in broad conceptual terms, the argument of my dissertation regarding both the causes of the general rise in bicycle friendly policies and bicycling for transportation in large US cities — the "bicycling renaissance" — and the causes of variation between cities in those outcomes. Each box in these diagrams represents a concept, and the arrows represent the relationships between those concepts, with the arrow heads indicating the direction of causal influence. Each relationship is labeled with a number for ease of reference, and following each number is either a plus sign ("+") or minus sign ("-"), which indicate a positive or a negative relationship, respectively. These models are not intended to serve as exhaustive accounts of all the causes of bicycle friendly policies and bicycling for transportation, but rather are meant to highlight the major causes of those outcomes.

Turning first to Figure 1.3, we see the central importance of the rise of what I call the "Creative Class discourse" in the general rise of bicycle friendly policies. By "Creative Class discourse", I mean the influential arguments of Richard Florida, Nathan Glaeser, and others that the key to contemporary urban economic growth is the geographic concentration of highly skilled, entrepreneurial knowledge workers, and thus that cities must focus on attracting and retaining such workers to sustain economic growth. The primary mechanism by which this trend has influenced bicycle friendly policies is illustrated by relationship 1+: the rise of the Creative Class discourse has positively affected growth coalition actors' support of and involvement in bicycle friendly policy coalitions (relationship 4+). The flip side of this dynamic is shown in relationship 2-: the rise of the Creative Class discourse has negatively affected anti-growth actors' support of and involvement in bicycle friendly policy coalitions (relationship 5+).

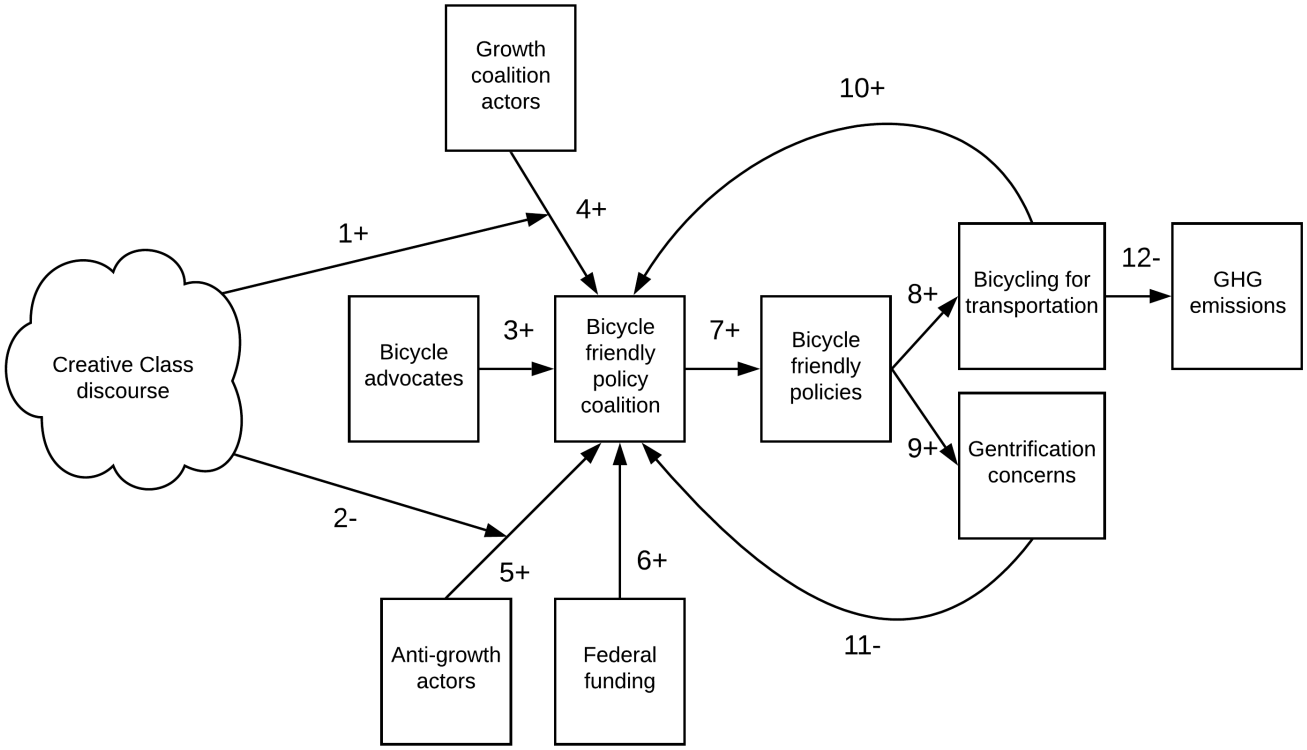


Figure 1.3: Conceptual model explaining the general rise of bicycle friendly policies and bicycling for transportation

With the term "anti-growth actors", I refer to groups typically opposed to intensive urban development projects, such as community organizations and affordable housing advocates. Given the roots of much contemporary bicycle advocacy in the counterculture and environmental movements of the 1960s and '70s, bicycle advocates have historically been more closely aligned with actors opposed to the growth coalition agenda. As the Creative Class discourse has gained currency, however, bicycle advocates have increasingly allied with growth coalition actors, and increasingly diverged from the priorities of anti-growth groups. By trading a less politically powerful ally (anti-growth actors) for a relatively more powerful one (growth coalition actors), bicycle advocates in many US cities have formed more powerful bicycle friendly policy coalitions. In chapter 5, I provide evidence of relationships 1-5 from interviews with actors involved in bicycle policymaking in four US cities.

While the rise of the Creative Class discourse, and accompanying shift in the composition of bicycle friendly policy coalitions, has been one major factor in the general rise of bicycle friendly policies and bicycling for transportation, the advent and growth of federal funding for bicycling and walking has perhaps been equally important, as indicated by relationship 6+ in Figure 1.3. Significant federal support for bicycle friendly policies began after the 1991 passage of ISTEA, and such funding has generally increased with each new federal transportation bill since then. ISTEA spurred many cities to develop or update their bicycle and pedestrian master plans during the 1990s, and to form bicycle and pedestrian advisory committees that were required to receive certain types of funding. In this way, federal funding has increased the political power of bicycle advocates and bicycle friendly policy coalitions in US cities.

Thus, Figure 1.3 illustrates how the rise of the Creative Class discourse — by encouraging greater support for bicycle amenities among growth coalition actors — and the increase in federal funding for bicycle projects both strengthened bicycle friendly policy coalitions in many US cities. Relationship 7+ indicates that these increasingly powerful policy coalitions had a positive effect on the number and ambitiousness of bicycle friendly policies in those cities. Relationship 7+ also signifies the effect of the changed *composition* of bicycle policy coalitions — stronger representation of growth coalition interests and weaker representation of community interests — on the *type* of bicycle policies adopted —

more capital-intensive, place-making policies. The figure also highlights two effects of the increasing volume and shifting character of bicycle friendly policies. Those policies had a positive influence on both bicycling for transportation (relationship 8+) and, in some cases, on the prevalence of concerns about gentrification in city's political discourse (relationship 9+). I provide evidence for relationship 8+ in in chapter 3, where I use fixed-effects regression to show that the construction of bicycle infrastructure positively affects rates of bicycle commuting. I find evidence for relationship 9+ in chapter 5, with several participants in bicycle politics commenting on a growing backlash against bicycle friendly policies linked to their role in gentrifying development patterns.

Figure 1.3 also shows two feedback loops springing from the rise of bicycling for transportation and increased gentrification concerns. The growing prevalence of bicycling for transportation, itself in part an effect of increasingly strong bicycle policy coalitions, also serves to strengthen those coalitions further by expanding the constituency for bicycle friendly policies (relationship 10+). My analysis in chapter 3 reveals this effect using structural equation models that allow me to weigh the bidirectional effects of bicycle infrastructure and bicycle commuting on one another, and which show that increased bicycle commuting does indeed lead to the construction of more bicycle infrastructure, not just the other way around. On the other hand, relationship 11- depicts the negative influence of gentrification concerns on the strength of bicycle friendly policy coalitions. In chapter 5, some of my interviewees describe how concerns about gentrification have led to delays in or abandonment of planned bicycle friendly projects.

Finally, relationship 12- in Figure 1.3 represents the negative influence of bicycling for transportation on greenhouse gas (GHG) emissions. As I have argued above, replacing car trips with bicycle trips, or even combined bicycle and public transit trips, has significant potential for reducing the GHG emissions that contribute to climate change. This potential provides much of the substantive motivation for my dissertation, given the pressing concerns of climate change.

Whereas Figure 1.3 depicts a conceptual model to explain the bicycle renaissance — the general rise in bicycle friendly policies and bicycling for transportation in US cities — Figure 1.4 offers a con-

ceptual model to explain variation in bicycle policy and practice between cities. Once again, this figure highlights the centrality of the Creative Class discourse in my argument. Relationships 2+ and 3+ in this figure mirror relationships 1+ and 4+ in Figure 1.3: the currency of the Creative Class discourse is positively associated with the support of growth coalition actors for bicycle friendly policies. However, in Figure 1.4, I highlight the fact that, while the general currency of the Creative Class discourse increased across US cities during the 2000s and 2010s, that discourse became particularly influential in some cities relative to others. The primary factor influencing the level of currency of that discourse in any given city, as indicated by relationship 1+, is what I term the *importance* of Creative Class occupations in the city. Creative Class occupations, as defined by Richard Florida (Florida 2002), are those classified in the categories of management, business, science, and arts. By *importance*, I mean to signify the weight city leaders give to these occupations in their strategies for sustaining and expanding economic growth. The importance, in this sense, of these occupations to a city is closely related to their prevalence, and it is unlikely that a city with very low prevalence of such occupations will place high importance on them. However, importance is not completely determined by prevalence, and a city in which the prevalence of these occupations is only moderate may place a high importance on them as part of an effort to increase prevalence, especially if cities they view as their peers or competitors have a high prevalence of Creative Class occupations. In chapter 4, I use prevalence as an indicator of importance, and find that the proportion of the workforce in Creative Class occupations is positively related to an index of bicycle friendly policies. Figure 1.4 illustrates the conceptual path of that effect, through relationships 1+, 2+, 3+, and 6+.

Thus, Figure 1.4 visually conveys my argument that variation between cities in the importance of Creative Class occupations is a primary determinant of variation in bicycle friendly policies and bicycling for transportation. The other key determinants of variation that I highlight in the figure are population density and bicycling tradition. Higher residential population density is associated with shorter trip distances, greater automobile traffic congestion, and better public transit, all of which strengthen

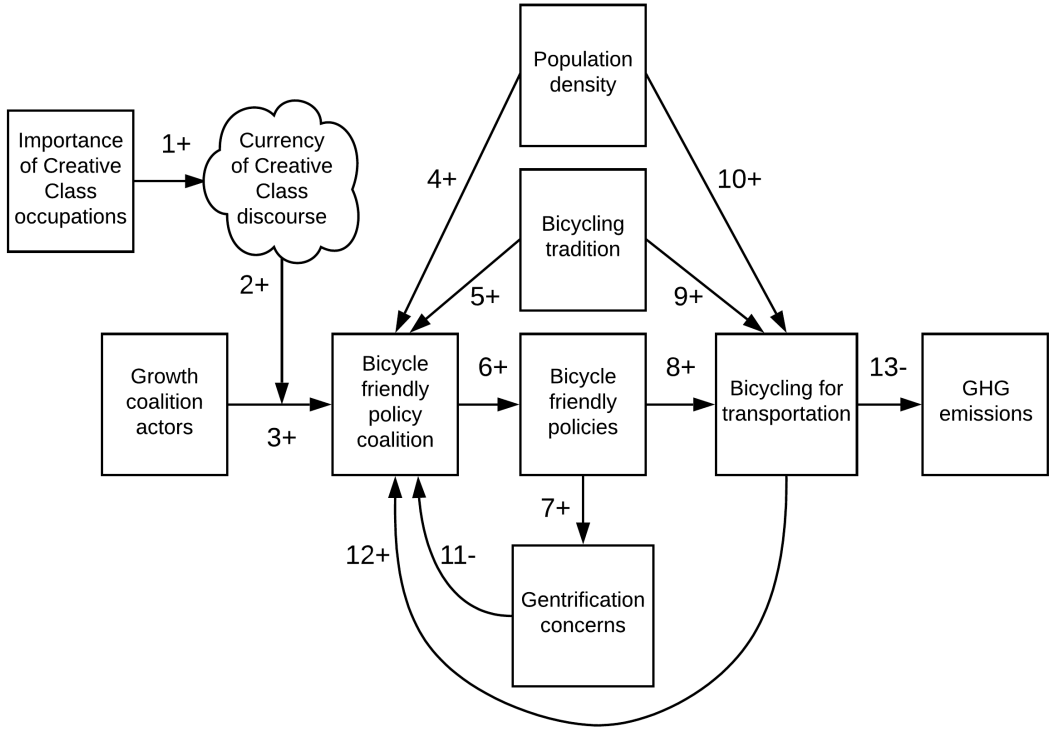


Figure 1.4: Conceptual model explaining variation between cities in bicycle friendly policies and bicycling for transportation

the political case for bicycle friendly policies (relationship 4+) and enhance the attractiveness of bicycling as a travel mode (relationship 10+). The concept of bicycling tradition captures the fact that there was variation between cities in bicycle policy and bicycling prevalence that predates the post-1990 era of ISTEA and the Creative Class discourse, and which should be considered exogenous to this model. Variation in bicycling tradition thus helps explain observed variation in levels of both bicycle friendly policy (relationship 5+) and in bicycling for transportation (relationship 9+). In chapter 3, I control for the influence of population density and bicycling tradition on bicycle commuting by using a fixed-effects regression model, and in chapter 4, I show that both of these factors are positively correlated with an index of bicycle friendly policies.

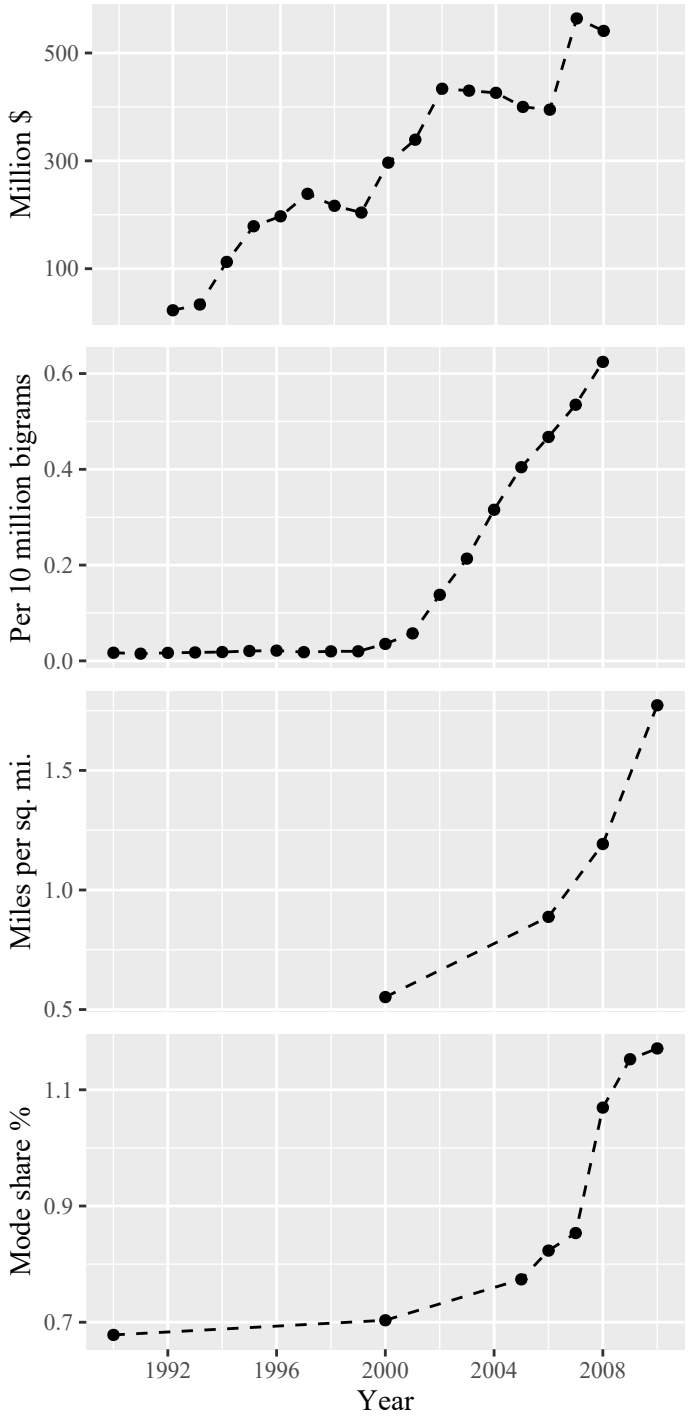
The rest of the relationships portrayed in Figure 1.4 are redundant with respect to Figure 1.3, since they capture the effects of variation in the same outcomes (bicycle friendly policies and bicycling for transportation). Relationships 6+, 7+, 8+, 11-, 12+, and 13- in Figure 1.4 correspond to relationships 7+, 9+, 8+, 11-, 10+, and 12- in Figure 1.3.

In describing Figures 1.3 and 1.4, I have included pointers to the chapters that provide evidence for most of the relationships depicted. However, given my focus on explaining variation between cities, I do not in this dissertation provide rigorous evidence for some of the dynamics that I argue have caused the general rise in bicycling and bicycle friendly policies. In particular, I do not provide evidence of a causal relationship between the general prevalence of the Creative Class discourse and the national level of growth coalition support for bicycle friendly policies (relationship 1+ in Figure 1.3), nor for the relationship between federal funding for bicycle and pedestrian projects and the national extent of bicycle friendly policies (relationship 6+ in Figure 1.3). However, empirical trends are broadly consistent with these explanations, as shown in Figure 1.5. This figure displays trends between 1990 and 2010 in federal funding for bicycle and pedestrian projects; the usage of the phrase “creative class” in books digitized by Google (retrieved using the `ngram` function from R package **ngramr** (Carmody 2013)); the extent of bicycle infrastructure in the 24 large cities with comparable data for 2000, 2006, 2008, and 2010; and the mode share of bicycle commuting in the 57 large cities that appear in any of the ABW

Benchmarking reports.

As these graphs show, federal funding for bicycle and pedestrian infrastructure rose more or less steadily from 1992 to 2008 (I have excluded 2009-10 because funding for these years is inflated by the inclusion of federal stimulus dollars), while usage of the term "creative class" only began to increase after 2000 (Florida's first book using this term was published in 2002). Data on bicycle infrastructure is not available until 2000, but even if we imagined that there was no bicycle infrastructure in these 24 cities in 1990, the growth of infrastructure during the 2000s would still be more than double that of the preceding decade. Thus, the construction of bicycle infrastructure clearly accelerated during the 2000s, at the same time that the Creative Class discourse was gaining influence. Growth in bicycle commuting also accelerated during the 2000s, particularly after 2007.

Figure 1.5 only shows a correlation between the Creative Class discourse and bicycle infrastructure, and does not offer insight into the mechanism of any causal relationship between these two trends. However, in chapter 5, I show that the Creative Class discourse was an important part of arguments in favor of bicycle infrastructure and other bicycle friendly policies, particularly in winning the support of local growth coalition actors. Together, the broad trends and the fine-grained qualitative accounts provide strongly suggestive evidence in support of my argument, as depicted in Figures 1.3 and 1.4, that the currency of the Creative Class discourse is an important factor in explaining both the general rise and variation between cities in bicycle friendly policies.



Federal bike-ped funding (Source: US FHWA)

Usage of term "creative class" (Source: Michel et al. 2011)

Bicycle infrastructure (Source: Dill and Carr 2003, ABW Benchmarking Reports)

Bicycle commuting (Source: US Census Bureau)

Figure 1.5: Federal bike-ped funding and the Creative Class discourse as contributors to the bicycling renaissance

1.6 A roadmap for the dissertation

The rest of the dissertation is organized as follows. In chapter 2, I review the sociological literature on urban land-use politics. This literature suggests that in most US cities, land-use policies are strongly influenced by a "growth coalition" of actors whose livelihood depends on regional population and economic growth that will sustain and drive up land values. This literature also identifies common challenger groups that often oppose the policies of the growth coalition: middle- and upper-class homeowners, working-class and lower-income residents, and environmental activists. However, the oppositions between these groups that are highlighted in past research have not been fully reevaluated in light of the changing economic and political context in which US cities operate. Specifically, recent developments suggest the possibility of an alliance between growth coalition actors, middle- and upper-class residents, and environmental activists around a quality of life agenda.

In chapter 3, I address the question of whether the rise of bicycle friendly policies is mostly a mechanistic response to rising rates of bicycling. If bicycle friendly policies merely track demand for bicycle travel, as an economistic model of urban transportation development would suggest, then a political explanation for these policies would be unnecesssary. The analysis in chapter 2 also assesses the degree to which one class of bicycle friendly policies, bikeway infrastructure, actually induces bicycling. This analysis finds that bicycle infrastucture does, to a degree, follow demand for bicycle travel, but that far from being mechanistic, this relationship is significantly mediated by the political context, as assessed by the density of environmental organizations in a city. Thus, a political analysis of bicycle friendly policy is important, not only to explain variation not explained by travel demand, but even to understand the relationship between demand and policy. The analysis in chapter 3 also finds that any causal effects of bicycle infrastructure on rates of bicycle travel are also mediated by the same indicator of socio-political context. Thus, bicycle policy is consequential for promoting bicycling, but its effectiveness varies by context.

In chapter 4, I perform a quantitative analysis of bicycle friendly policies in US cities to identify the

broad factors that explain variation in the adoption of such policies. This analysis allows me to identify a set of case cities that allow for a robust test of my claim that the the importance of Creative Class occupations is a primary cause of variation in bicycle friendly policies.

Chapter 5 analyzes data from interviews with bicycle advocates, city officials, and housing and neighborhood activists in my four chosen case cities. This analysis indicates that business actors and pro-growth discourses are indeed prevalent in bicycle advocacy in case cities with higher-than-expected adoption of bicycle friendly policies. It also provides an example of an alternative model of bicycle advocacy that consciously seeks to avoid alliances with pro-growth actors.

In the concluding chapter of the dissertation, I summarize my findings and attempt to extrapolate from them to put forth provisional answers to the new questions raised by my analysis. Specifically, I speculate on whether the alliances I find between pro-growth actors and bicycle advocates are sustainable and will lead to steady progress in urban bicycle friendliness, bringing US cities closer to European cities whose policies have made biking a safe and widely-used transportation option. Additionally, I assess the relative feasibility and effectiveness of growth-oriented and community-oriented bicycle policy coalitions as models for climate change mitigation efforts more generally.

Chapter 2

Literature review

Enacting a policy agenda requires political power. The recent rise of bicycle friendly policies in US cities indicates that bicycling enjoys the support of powerful actors. Research in urban politics tells us that the most powerful actors in US cities are business leaders, banks, and large landholders, who stand more or less united in favor of policies that encourage economic and population growth. However, this research also predicts that these powerful actors will oppose environmental protections as undesirable constraints on growth. After all, it was this coalition of powerful actors, together with federal transportation and housing policy, that brought us the sprawling, car-dependent metropolitan areas that we have today. This car-centric system of urban transportation is a leading contributor to climate change. The affinity between cars and growth is obvious — designing for cars makes it easy to accommodate metropolitan population growth by building ever outward. Bicycling, in contrast, has often been promoted for its environmental benefits, and it is less clear how bicycling might fit into the growth agenda of powerful urban actors. Does bicycle friendly policy enjoy the support of business, banking, and real estate leaders, and if so, why?

In developing my argument in answer to this question, I draw on work in the sociology of urban politics. This field developed through debates between "pluralists", who emphasize the dispersal of political power in a democratic system, and "elitists", who emphasize the concentration of power in the

hands of the wealthy and well-connected. However, it is now dominated by the largely elitist perspectives of growth machine (Molotch 1976) and urban regime (Stone 1989) theories. Both of these perspectives predict that power in urban policymaking will be concentrated in the hands of relatively few wealthy and well-connected actors, though the two theories diverge subtly on why that is the case and why exceptions to this rule occur when they do. The large degree of empirical support for these perspectives suggests that if we observe an increase in bicycle-friendly policies across many US cities, as we have in recent decades, it is likely that these policies are supported by members of the growth coalition.

Nontheless, these dominant theories of urban politics also recognize the existence of political resistance to the policymaking agenda of wealthy urban elites, which tends to privilege business and real estate interests. Scholars identify three groups in particular as common political opponents of elite, growth-oriented regimes: middle-class homeowners, working-class and poor residents, and environmental activists. These groups each oppose certain types of growth and development, and in some cases their interests coincide. Moreover, and relevant to the current study, each of these groups has a plausible interest in promoting bicycling. Thus, it is conceivable that the observed rise in bicycle-friendly policies is attributable to the efforts of one or more of these groups, with little or no support from growth-oriented elites. On the other hand, the theories predict that these groups are unlikely to mobilize an effective resistance to growth-oriented regimes due to divergence in interests between and within each group (owing to differences in social and geographic location) and due to the greater resources controlled by elites. If the efforts of these challenger groups have brought about the recent bicycling renaissance, it is likely that they have done so through alliances amongst these groups or between one or more of them and growth-oriented elites.

Adding to the uncertainty around the origins of the current bicycling boom is a lack of research on how changes in the national and international constraints and opportunities facing cities in recent decades have affected the dominance of growth-oriented actors and the political influence of challengers. Corporate consolidation, deindustrialization, the increasing mobility of capital, and the withdrawal of many kinds of federal support for US cities have forced cities to become “entrepreneurial” (Harvey

1989) in their efforts to attract investment and growth. On their surface, these changes would seem to merely strengthen the position of local growth-oriented elites, but empirical investigation suggests a more complex picture (see, e.g., Molotch and Logan 1984; Pacewicz 2015). More recently, we have witnessed growing pressure for cities to take action on climate change (Engel 2006). In the context of these competing pressures, urbanist discourses that promise to deliver economic growth, quality of life, and environmental sustainability through *smart growth* development patterns and the creation of *green amenities* have become increasingly influential (Florida 2002; Krueger and Gibbs 2008; Clark et al. 2002; Glaeser 2012). Given that opposition to the growth agenda is thought to arise from the conflict between the *use value* and the *exchange value* of land, the notion that quality of life is a key engine of economic growth calls into question the traditional formulation of growth and its discontents.

In short, I argue that, while growth machine theory's contention that urban policymaking is dominated by a pro-growth agenda still holds true, its claims about challengers to that agenda are out of date in an era of smart growth and consumption-centered cities. By increasingly adopting the discourse of sustainability and quality of life, growth machine actors have deftly aligned themselves with the interests of many of their would-be challengers among the ranks of middle-class professionals and the environmentally-concerned. Progressives who want to rebuild cities to privilege car-alternative transportation modes increasingly find allies among the growth coalition, but the projects that emerge from these alliances deliver green infrastructure (such as bike lanes and paths) as part of larger development schemes aimed at profiting on rent gaps. By bundling green infrastructure with for-profit development, these projects can put a progressive sheen on developments that contribute to gentrification and displacement of poor and working-class residents. Scholars of "green gentrification" have recognized this pattern and rightly raised the alarm. But that scholarship has not addressed the difficult question of whether there are realistic alternative paths to less car-dependent cities, given the dominance of the growth agenda. Is smart growth development, adapted to minimize the harm to poor and working-class residents, the only way forward toward less car-dependent cities, or are there alternative political arrangements that can offer a better trade-off between environmental benefits and equity? In addition

to bringing together and building on growth machine theory and green gentrification research, my approach also adds to the growing body of work on the consequences of the growth agenda for urban inequality (Logan et al. 1997; Adua and Lobao 2019).

Figure 2.1 illustrates the focus of this chapter in the context of my larger argument about the general rise of bicycle friendly policies and bicycling for transportation. My critique and synthesis of growth machine and green gentrification literature highlights how the changing strategies of growth, embodied in the Creative Class discourse, have increasingly aligned growth coalition actors with the interests of bicycle advocates, who draw their ranks largely from progressive middle- and upper-class urbanites who are concerned with environmental problems.

The rest of the chapter proceeds as follows. I first provide an overview of growth machine and urban regimes theories as traditionally formulated, including each theory's perspective on challenges to the dominant governance coalition from middle-class homeowners, working-class and poor residents, and environmental activists. Next, I review research on how the political and economic conditions facing US cities have changed since these theories were formulated, and consider how these changes are likely to have affected the interests and strategic position of each challenger group *vis-à-vis* the interests and strategic position of the dominant governance coalition. Finally, I will review empirical research on the efforts and success of these challenger groups in shaping urban policymaking over time. I will conclude by summarizing my argument about the role of the dominant coalition and each of the challenger groups in the U.S. urban biking renaissance.

2.1 Growth machine and urban regimes theories

Sociological theories of urban politics developed out of debates between "elitists" and "pluralists". Elitists argued that cities are controlled by relatively close-knit networks of economic elites, both through

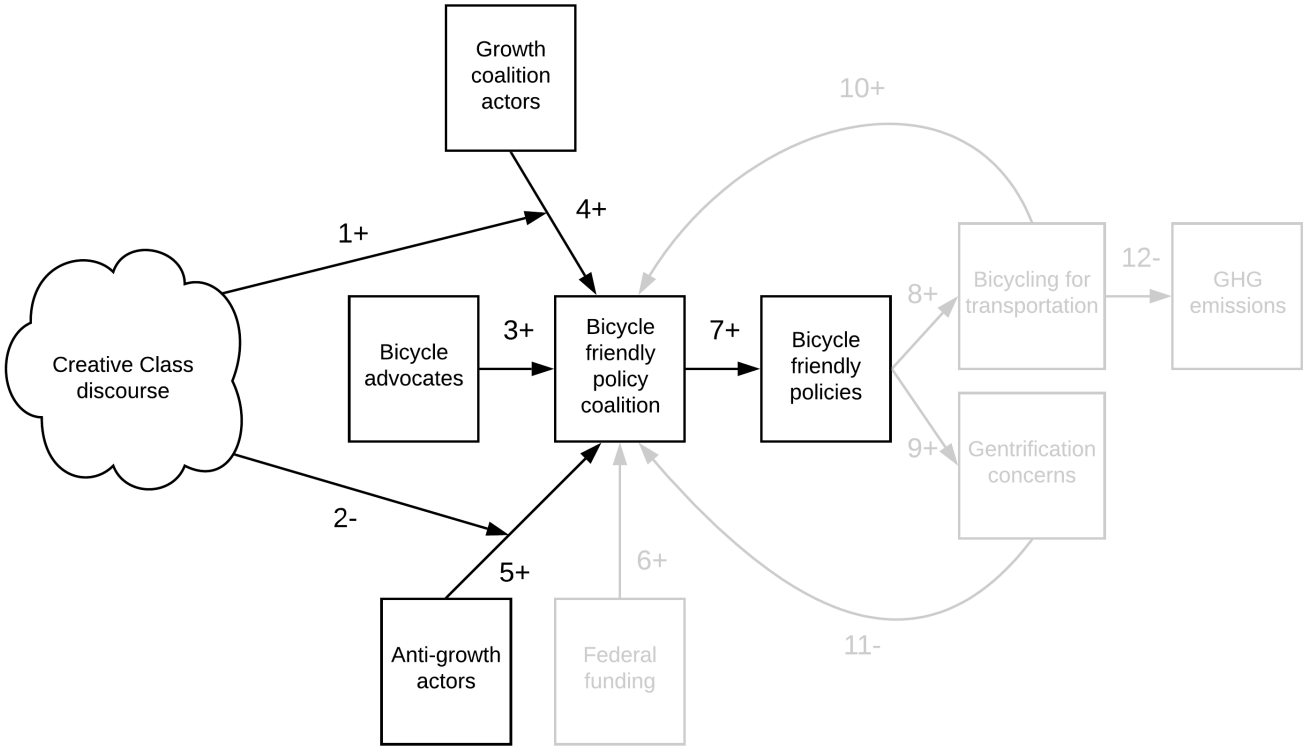


Figure 2.1: Conceptual focus of chapter 2

direct control of elected offices and close ties with and influence over elected officials (Hunter 1953; Mills 1956). Pluralists countered that occupying key institutional positions was not a guarantee of control over government policy. Pluralists advocated for an approach that examined the outcomes of *open political conflicts*, and found, as in Dahl's study of New Haven (1961), that a well-organized, broad-based coalition of non-business actors can defeat powerful business interests on issues of popular importance.

Bachrach and Baratz (1962) criticized pluralists for focusing exclusively on open political conflicts and electoral politics, to the exclusion of less visible processes of agenda setting and "nondecision making". Two influential traditions extended this insight to offer alternatives to pluralism. First, growth coalition theorists refined the "elitist" arguments of community power structure scholars. These theorists posited that a certain segment of urban capitalists, namely, large landowners, share an interest in increasing their city's land values by attracting new development, businesses, and residents to the city, and that these landowners and their allies often unite to wield tremendous influence over city policies (Molotch 1976). Growth coalitions realize their policy goals by seeking to depoliticize development issues, framing them as technical issues of little public interest, and by arguing that growth creates jobs and benefits all city residents (Gendron and Domhoff 2008).

The other tradition that built on the notion of nondecision making is urban regime theory. Regime theory's fundamental assumption is that city governments do not have the capacity on their own to perform all their governance functions, and that local state actors rely on alliances with non-state actors and organizations to develop and implement policy (Stone 1989). Local historical context shapes what types of actors are useful partners for the state, but the substantial resources controlled by local business leaders, particularly financial institutions, makes them common partners in local regimes (Stone 1988).

Despite differences in the supposed mechanism of business power, both growth coalition and urban regime theory predict that wealthy capitalists will wield outsize influence in US cities, and this prediction has been largely borne out in empirical studies. A review of research in urban politics finds strong support for the hypothesis that "local politics in the United States revolves around land development,

and is dominated by a progrowth coalition" (Logan et al. 1997, 605), but calls for more research into the consequences of this dominance for city policy, speculating that a focus on development and growth may crowd out attention to *redistributive* policies. Thus, there is a substantial degree of consensus in the urban politics literature that something like a "growth coalition" is the dominant political force in most US cities (Levine 2017).

Growth machine theory predicts that middle-class homeowners, working-class and poor residents, and environmental activists will each oppose certain types of growth projects. Logan and Molotch's (2007) binary of use versus exchange value is central to their understanding of middle-class homeowners' opposition to growth. Homeowners view their neighborhoods as a place to make their lives, and tend to prize low to moderate density, green spaces, and environmental amenities like clean air and water and low noise levels. Developers, on the other hand, view urban land primarily in terms of exchange value, and will prefer high-density residential or commercial and industrial projects that generate more rent per square foot. Not only do such projects negatively impact some of the quality-of-life amenities desired by homeowners, but homeowners may also fear that such projects will negatively impact home values — to the extent that homeowners do care about exchange values, their interests still tend to be opposed to those of developers. Homeowner opposition to these types of projects in their neighborhoods can generate "NIMBY" (not in my backyard) mobilization. Even if such mobilization is successful, however, it may not end up actually preventing development, but rather may simply push development into other parts of the city. This dynamic of homeowners opposing growth and development in their own neighborhoods rather than the city as a whole is one reason it is difficult to build a coalition to challenge the growth agenda more broadly, and it also leads to undesirable development projects being concentrated in neighborhoods with the least political capital to oppose them, which tend to be working-class and poor neighborhoods (Logan and Molotch 2007).

Growth machine theory predicts that working-class and poor residents will oppose certain growth projects for much the same reasons as middle-class homeowners – they too want clean air and water, for example. What differs between middle-class homeowners and working-class and poor residents is

the urgency of various concerns given their current living conditions and life chances, and the types of projects that are proposed in their neighborhoods. Working class and poor residents may be more willing to trade-off some additional density, for example, if a new development promises an increase in the supply of safe and affordable housing. Similarly, working class and poor residents may be more likely to welcome retail, commercial, or even certain types of industrial development in or near their neighborhoods if such development promises better access to goods and services or employment opportunities. However, given the aforementioned dynamic of NIMBYism, working-class and poor neighborhoods are often faced with undesirable development projects that diminish quality of life without providing counterbalancing benefits. Toxic waste storage sites and heavy-polluting industrial plants have historically been sited disproportionately in or near working-class and poor neighborhoods, especially those with a high proportion of racial minority residents (Brulle and Pellow 2006). Recognition of such inequities has led to the rise of "environmental justice" movements. Other historical inequities have led to the displacement of working-class and poor residents through projects such as freeway construction, and more recently, gentrification. Thus, working class and poor residents are especially attuned to the threat of direct or price-based displacement, and will tend to oppose development projects that pose such a risk.

Finally, growth machine theory predicts that environmental activists will oppose development projects that cause ecological harm. The same intensification of land use that promises higher rents to large landowners and developers is also associated with higher levels of pollution and depletion of environmental resources. Environmental activists, however, come in many stripes. Environmental activists may come from the ranks of middle-class homeowners or working-class and poor residents, and the types of mobilization in which they engage may reflect these backgrounds in ways described above. A key question is the scale of environmentalist organizations — neighborhood-based organizations, even if successful, may play into NIMBYist dynamics, while broader-based coalitions could be more effective in opposing growth more generally, but are harder to sustain.

2.2 The changing strategies of growth

If anything, the neoliberal economic and governmental changes of recent decades have strengthened cities' focus on economic growth. In the U.S., declines in federal discretionary grants to cities since the 1970s have forced cities to rely increasingly on bond markets for funding, heightening the influence of bond rating agencies on city policy. The oversight of bond rating agencies effectively enforces austerity on city governments, in a dynamic similar to that between the IMF and World Bank on one hand and governments in developing countries on the other (Hackworth 2007). Cash-strapped cities are thus led to rely even moreso on public-private partnerships to supplement city resources, and these partnerships tend to serve the interests of developers (*ibid.*).

As federal discretionary block grants to cities have fallen, the funding that is available is increasingly in the form of smaller, competitive grants offered for specific types of projects (including bicycle and pedestrian projects). Moreover, financial deregulation and the corporate merger movement advanced the concentration of capital in national and multinational companies, leaving cities with fewer locally-owned businesses and increasing intercity competition for mobile investments (Harvey 1989). Competing for these varied grants and capital investments requires building partnerships between actors that would have been at odds in the era of block grants (which were divvied up through local politics), such as leaders in the business and nonprofit communities and labor unions, further depoliticizing local development (Pacewicz 2015). These changes have also empowered local public-private economic development agencies and development professionals, who are given tremendous leeway by elected officials to do what it takes to attract businesses and investment. These development professionals have expanded the use of financial innovations such as tax increment financing (TIF) despite growing evidence that such tactics often do not yield expected returns (Pacewicz 2012). The increasing use of TIF seems to be driven more by the professionalization efforts of development experts, and by city officials' motivation to maximize discretionary revenue than by its effectiveness at increasing total city revenue (Pacewicz 2016).

While growth has remained, in most cases, the primary objective of urban governing coalitions, the strategies used to stimulate growth have changed. As discussed above, the agenda pursued by the growth coalition, as traditionally formulated, is thought to be contrary to quality of life for the middle class, the working class, the poor, and to environmental protection (Molotch 1976). Moreover, work in environmental sociology highlights the contradictions between capitalist growth and sustainability (Foster 2012; Gould et al. 2015; Schnaiberg 1980). The primary exception is ecological modernization theory, which argues economic growth enables the development of technology to increasingly minimize its own ecological impact (Mol and Spaargaren 2000; Mol 1995).

However, the notion that urban growth and sustainability are incompatible is called into question by urban theorists whose ideas have gained substantial traction among policy makers. In particular, Richard Florida's writings on the "Creative Class" (Florida 2002) and Edward Glaeser's advocacy for urbanization as the antidote to all manner of social ills (Glaeser 2012) have shaped the thinking of urban leaders (Peck 2016). Both urban theorists argue for the primacy of attracting talented, creative people to your city as the engine of sustained economic growth, and both advocate for compact development and against sprawl and car-dependence.

In his 2002 book, *The Rise of the Creative Class: And how it's Transforming Work, Leisure, Community and Everyday Life*, Richard Florida argues that we are living in a new economic age in which human creativity has become the single most important force for economic growth, and in which more occupations than ever (about 30% of the workforce in the US) require creativity. Because the cultivation of creativity requires exposure to diverse experiences and people, these creative workers seek out places that enable a "creative" lifestyle, places that, in the words of one of Florida's focus-group participants, "have all kinds of amenities, [that] have outdoor sports, extreme sports, rollerblading, cycling, art scene, music scene" (quoted in Dreher 2002, p. 2). According to Florida, these creative types reject the suburban lifestyle, along with chain stores and shopping malls, in favor of "authentic" central city neighborhoods amenable to the interweaving of work and play. It is this shared lifestyle, not merely shared occupational characteristics, that justifies their characterization as not just creative

workers, but a Creative Class.

The implication of Florida's argument for city leaders is that they need to develop the types of places that this Creative Class desires, or their cities will face a shortage of creativity, the key ingredient for sustained economic growth. In the words of one journalist, Florida's book implies that "cities must attract the new 'creative class' with hip neighborhoods, an arts scene and a gay-friendly atmosphere – or they'll go the way of Detroit" (Dreher 2002, p. 1). Florida's argument has two key implications for the relationship between growth and sustainability. First and foremost, it suggests that cities should abandon car-dependent, sprawling development in favor of dense, urban infill that creates walkable, bikeable neighborhoods with a vibrant street life and a mixing of work and play spaces. Second, it erases cities' incentives to compromise the urban environment in deference to the needs of ecologically-harmful industries. If (creative) workers, rather than industrial capital, are the primary source of economic growth, then cities must cater to the desires of these workers, who care more about the use value of urban space, rather than capitalists, who care only about exchange value.

In his 2012 book *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* (2012), Edward Glaeser echoes Florida's argument that cities generate economic development by bringing talented people into close proximity, spurring innovation. Glaeser highlights not only the economic but also the environmental benefits of dense urban living, pointing to the lower energy use of urban dwellers for both home heating and transportation, and criticizing the misguided environmentalists who seek to live close to nature. He calls for cities to build more high-rise residential developments to encourage innovation and sustainability. Both Glaeser and Florida take inspiration from the work of the urban planner Jane Jacobs, who valorized dense, mixed-use neighborhoods and was a fierce critic of car-centered development (Jacobs 1961).

The work of Florida and Glaeser has had a profound and well-documented influence on urban policy makers (Peck 2005, 2016). One sign of the influence of these thinkers has been increased investment in high-profile urban green spaces, providing a potential example of compatibility between growth, ecological protection, and quality of life. However, research on projects such as New York City's widely-lauded

High Line linear park and Chicago's Millenium Park suggest that these high-profile park investments may actually contribute to gentrification and serve to enrich land-owners more than the general public (Halle and Tiso 2014; Loughran 2014).

The rise of bicycle-friendly policy in US cities has been generally viewed as a positive development (Pucher et al. 2011), with concerns over the actual effects of the changing urban landscapes, of which bike infrastructure is a part, left unaddressed. However, in the case of San Francisco, Stehlin (2015a; 2015b) finds that bicycle advocates have increasingly allied with development interests, which has led to great success in implementing bicycle infrastructure projects and unprecedented influence for the advocates, but also has raised concerns about cloaking development policies that contribute to gentrification and displacement in the mantle of progressive policy. San Francisco, however, may be an exceptional case, due to its status as a center of both environmentalism and high-tech economic growth. Do we see similar alliances between bicycle advocates and growth coalitions in other US cities, and does the degree of pro-growth orientation in local bicyle politics shape the types of policies enacted? These are the unanswered questions I will address in subsequent chapters.

2.3 The changing opponents of growth

While there is a high degree of consensus on the political power of growth coalition actors in most US cities, it is also widely acknowledged in the sociological literature that the growth-friendly policies pursued by growth machine actors have can have interrelated negative consequences for (1) home affordability (negatively affecting lower-income persons), (2) quality-of-life (negatively affecting all residents, including middle- and upper-income residents, who are often homeowners), and (3) urban ecological conditions, such as air and water quality, as well as global environmental problems such as climate change. These negative consequences have created counter-constituencies that have sought to derail the growth agenda, with varying levels of success.

Resistance to the growth agenda has been complicated by conflicts of interest between middle-

and upper-income residents and lower-income residents: NIMBYism among middle- and upper-income residents represents a form of resistance to the growth agenda, but to the extent this type of resistance is successful, it can simply result in a displacement of the negative effects of growth and development onto lower-income residents (or it may prevent lower-income residents from taking advantage of the benefits of growth, as when NIMBYism prevents new housing from being built and keeps housing prices high). For instance, middle- and upper-income residents may successfully resist the siting of land uses that pollute the air and water in their neighborhoods, but this may result in the siting of those land uses in or near lower-income neighborhoods. Conversely, middle- and upper-income residents may welcome or flock to new developments (such as parks developed through public-private partnerships) that enhance their quality of life, but rising demand for such amenities may push out or price out lower-income persons, reducing their access to environmental "goods". Similarly, the interests of various environmental activist groups may align or clash with the interests of middle-class and working-class or poor residents. For example, efforts to clean up the heavily polluted Gowanus Canal in Brooklyn have attracted upscale condiminium development geared toward the "sustainability class", with the potential to price out long-term residents and pack more people and development into the flood-prone waterfront (Gould and Lewis 2018).

The Gowanus Canal example demonstrates the complex interplay of interests between growth-coalition actors and the residents and environmentalists who have been the traditional opponents of growth, but it also hints at a tendency for these conflicts to resolve in a manner that gives short shrift to lower-income residents. Harvey (1989) argues that entrepreneurial cities focus on creating *places* rather than on directly improving conditions across wider territories. Facing pressure to become more sustainable, urban growth machines may simply create *green places*. Whether the supposed environmental benefits of these green places are real or illusory, they are necessarily geographically limited, and to the extent that they are successful in attracting new residents and development, they tend to become less accessible to working-class and poor residents.

2.3.1 Middle-class homeowners

Stone (1989) shows how groups other than business elites can influence urban governance, but his analysis also shows that these non-elites are more likely to be middle-class than lower-income groups, and that their influence benefits the middle class moreso than the working class and poor (see also Whittemore 2012; Logan et al. 1997). Similarly, many studies suggest that higher-income cities with sustained land-use activism are the most likely to resist development projects and enact growth controls (Baldassare and Protash 1982; Molotch and Logan 1984; Warner and Molotch 2000).

For example, Whittemore (2012) argues that Los Angeles' growth coalition saw its power diminished in the 1980s by political decisions to limit growth. These decisions, however, arose through pressure from middle-class homeowners, who sought to avoid dense development in their neighborhoods. Ironically, this political ascendance of homeowners, embodied in neighborhood councils, did little to slow the development of downtown Los Angeles, and in fact may have contributed to a shift of power from the public bureaucracy to private developers (Deener et al. 2013). Though in some parts of Los Angeles, such as Venice, an alliance between progressive activists and homeowners successfully slowed development in the 1980s and 1990s, these alliances began to fray as homeowners shifted to a "quality of life" agenda that privileged middle-class interests (Deener et al. 2013).

Corporate consolidation, which accelerated in the late 1970s and 1980s, has changed the dynamics between capital and the local "rentier" class that forms the core of growth coalitions, such that rentiers sometimes join with resident and environmentalist groups in opposition to certain forms of development investment from outside capital that is not viewed as beneficial to local growth interests (Molotch and Logan 1984). However, this has not typically led to displacement of a pro-growth agenda, but rather toward greater selectivity in the kinds of development projects supported by rentiers. For instance, San Francisco's heavy reliance on tourism, which enhances land values for rentiers, helps explain the city's rejection of new freeway projects in the 1960s. This alignment between growth interests and the middle- and upper-class has become increasingly common as urban economies have come to rely more

on consumption, and as discourses valorizing the Creative Class have gained influence (Florida 2002).

2.3.2 Working-class and poor residents

While the studies above conclude that effective resistance to growth is most likely to come from middle- and upper-class residents, other scholars have argued that working class coalitions can effectively challenge growth coalition power, particularly by uniting community organizations and labor unions, and leveraging immigrant worker populations (Saito 2019; Clavel 2013; Pastor et al. 2015; Milkman 2006; DeLeon 1992; Gendron and Domhoff 2008; Camou 2014; Jones-Correa and Wong 2015; Saito and Truong 2015). Despite scholarly debate as to the extent of and harm caused by gentrification (Brown-Saracino 2017), many cities have been confronted by increasingly vocal movements against income inequality, gentrification, and housing affordability (Brown-Saracino 2010; Brown-Saracino Japonica 2016). However, managing tensions amongst different progressive factions in these coalitions can be difficult and lead to political failures (DeLeon 1992; Gendron and Domhoff 2008). DeLeon identifies three distinct "subcultures" in the progressive coalition that won impressive victories in San Francisco in the 1980s: liberals (favoring redistribution, which could be part of development), environmentalists (favoring slow growth and preservation of land and aesthetics of the city), and populists (favoring the prevention of encroachment of development into neighborhoods) (DeLeon 1992). Moreover, some progressive efforts are limited to minimizing the worst harms of unchecked development, rather than offering an alternative governance regime (see, e.g., the discussion of housing activism in Jones-Correa and Wong 2015).

Camou (2014) argues that labor-community coalitions can build enough power to constitute a "regime" in Stone's (1989) terminology, but that empirically, the change brought about by these coalitions has been modest and incremental. In contrast to Stone, who argues that the effectiveness of progressive groups is limited by cooptation, Camou attributes these limited outcomes to ideological constraints on these groups in a milieu of capitalist hegemony. The agenda of these labor-community coalitions typically consists of demands for "high-road" development that attaches provisions to

development projects designed to provide community benefits (such as mandates for local hiring, living wages, and training), and advancement of civil rights for immigrants and people of color (through such policies as immigration reform and voting rights protections) (Camou 2014).

One particularly relevant example of the headway made by labor-community coalitions is the 1996 victory of the Los Angeles Bus Riders Union (BRU) highlighted by Soja (2013). The BRU and its allies filed suit against the Los Angeles Metropolitan Transit Authority (MTA), alleging that the MTA's emphasis on rail transit represented discrimination against bus riders, who were more likely to be poor, racial minorities, and central city residents compared to rail transit users. The court's decision in the BRU's favor forced the MTA to largely abandon its plans to expand rail service, and instead focus its efforts and resources on better-serving its bus-dependent customers (Soja 2013). The MTA's emphasis on rail transit was driven by powerful downtown and suburban interests, who wanted both to facilitate the movement of people between the suburbs and downtown, and to heighten LA's reputation as a global city with a state-of-the-art transit system. Thus, the court's decision represented a significant blow to the growth coalition's agenda.

In sum, contemporary research on poor and working-class resistance to the growth agenda suggests that that resistance has increasingly centered on concerns over gentrification. Rising concerns over gentrification are the flip-side of the growing alignment of the growth agenda with the interests of middle- and upper-class residents. Moreover, this research demonstrates two strategies that poor and working-class residents might take to minimize the harms of the growth agenda. First, they can lend their support to development projects contingent on provisions that will ensure that they share in the benefits of those projects, as with community benefits agreements. Second, and alternatively, they can mobilize in direct opposition to growth interests, as the Los Angeles BRU did in opposition to proposed rail transit plans, and propose alternative policies that better serve their interests (Soja 2013). These two strategies have analogues in the realm of bicycle infrastructure development: should working-class and poor residents lend their support to the capital-intensive, place-making bicycle projects favored by the growth coalition, conditional on provisions to protect their interests, or should they mobilize in opposition to these

projects and devise their own bicycle policy agenda? I return to this question in the concluding section of this chapter and in subsequent chapters.

2.3.3 Environmental activists

Logan and Molotch (Logan and Molotch 2007) identify environmentalist groups as one of the key constituencies opposed to growth. However, as the nature of development in US cities has increasingly shifted away from heavy industry and toward projects such as luxury parks and green spaces, it is harder to take this opposition for granted. If economic development is driven by quality of life, the traditional formulation of use value versus exchange value no longer applies so neatly.

Cities increasingly face pressure to enact policies promoting environmental sustainability (While et al. 2004), and many have embraced the concept of sustainability and publicly committed to pursue it (Sharp et al. 2011). Cities often demonstrate their commitment to environmental causes such as climate change mitigation by becoming members of climate agreements such as the U.S. Conference of Mayors Climate Protection Agreement (Krause 2011), but many have also made measurable policy changes (Hawkins et al. 2016; Jepson 2004; Portney and Berry 2016, 2010). In fact, relative to the inaction of the U.S. federal government, many have pointed to state and local politics as the main arena of action in U.S. climate policy (Engel 2006; Gore and Robinson 2009; Rabe 2008).

There are also indications that urban growth coalitions may selectively embrace pro-environmental protections as part of a "sustainability fix" that helps to legitimate and create new opportunities for continued urban redevelopment (While et al. 2004). Moreover, work that examines sustainability policies on the ground in cities such as Austin, Texas find that these policies tend to balance environmental and economic goals at the expense of social equity (Long 2016; Tretter 2013). These findings echo the arguments of the "green gentrification" literature that many urban development projects labeled as "green" or "sustainable" end up creating enclaves of environmental amenities that benefit well-off residents and visitors but that are less accessible to marginalized groups, exacerbating inequalities in access to environmental "goods" and exposure to environmental "bads" (Anguelovski et al. 2019; Dooling 2009).

Like scholars of green gentrification, environmental sociologists have drawn attention to the question of who benefits from green policies with the concept of environmental justice. Environmental sociologists view environmental injustice as the product of the growth imperative of capitalist economies, paired with institutional racism and other forms of institutional inequality (Brulle and Pellow 2006; Schnaiberg 1980). Profits accumulate disproportionately to wealthy capitalists, while the risks and hazards that result from economic production accumulate disproportionately to poor and racial minority communities (Beck et al. 1992).

This research illuminates the fact that "environmental activists" are not a unitary political group, but rather that the salience of various environmental concerns is influenced by socio-economic status. It also illustrates the shift, though by no means complete, from concerns about the siting of environmental "bads" associated with growth to concerns about who has access to the environmental "goods" associated with the development of "green amenities". Thus, the notion advanced by growth machine theory (Molotch 1976) that environmentalists will oppose the growth agenda is not entirely wrong, but must be refined in light of advances in our understanding of the heterogeneity of environmental activism and the shifting strategies of growth outlined above.

2.4 Retooling growth machine theory

The dominance of the growth coalition in urban governance in the post World War II U.S. helped to create the auto-dependent urban centers that we live in today (Adler 1987; Molotch 1976; Vivanco 2013). Thus, it is counterintuitive to think that that same coalition of actors pursuing urban growth for their own enrichment is responsible for the rise in bicycle-friendly policies in recent decades. However, such an argument becomes plausible when we consider the changing strategies employed to pursue urban growth. As many cities have shifted from being centers of production to centers of consumption, tourism, and service-provision, enhancing quality of life has become a mantra of growth promotion, and bicycle-friendliness is often seen as part of that package. This alignment between growth promotion

and quality of life, to the extent that it has occurred, problematizes growth machine theory's binary of use versus exchange value (Logan and Molotch 2007), and raises the possibility that the traditional oppositions between growth coalition actors and middle-class homeowners, working-class and poor residents, and environmental activists have been reordered.

As cities have increasingly become centers of culture and recreation rather than of industry, middle- and upper-class residential preferences have shifted to some extent toward more densely-populated neighborhoods closer to amenities of the urban core (Frey 2012). Public-private partnerships in many cities have established luxury parks that help preserve urban greenspace, potentially winning the support of urban environmentalists. While new high-end residential and greenspace development in the urban core can have negative impacts on existing working-class and poor residents (Anguelovski et al. 2019; Dooling 2009), mobilization of labor-community coalitions has also led to community benefits agreements, whereby working-class and poor residents agree to support new developments as long as they are promised access to new jobs that pay a living wage and to affordable housing, among other benefits (Saito and Truong 2015).

As discussed above, each of these groups has a plausible interest in promoting bicycling, and changing economic conditions have opened the door to new types of alliances among these groups, even between growth coalition actors and their traditional opponents. However, the balance of past research points to an alliance between growth interests, middle- and upper-class residents, and at least some environmental activists as the most likely coalition behind the recent rise of bike-friendly policies. Attracting middle- and higher-income residents into the urban core with high-end housing development, and at least nominally "green" amenities such as parks and bike lanes and trails is highly lucrative for real estate developers, and is in line with influential ideologies of urban economic development (Florida 2002; Glaeser 2012). Alliances with working-class and poor residents are likely to be less lucrative for growth coalition actors, and such residents themselves may often have less interest in bike infrastructure given their more pressing concerns with employment, access to goods and services, and housing affordability. Morever, working-class and poor residents typically have less cultural capital, fewer fi-

nancial resources, and more time constraints than more affluent residents, which makes mobilization more difficult. In some cases, mobilization of these groups has yielded remarkable successes (e.g., Soja 2013), but these successes are more the exception than the rule.

In sum, the changing economic and political realities facing cities, along with the growing influence of new growth-promotion discourses, have created new strategies of urban growth that call into question the claims of growth machine theory regarding the opponents of growth. The new growth agenda focuses on enhancing the quality of life and consumption environment of cities, and projects promoted by growth coalitions often promise to reshape cities in ways that facilitate alternatives to car transportation such as walking, bicycling, and public transit. This new growth agenda is often well-aligned with the interests of middle- and upper-class urbanites, and of those who would like to reduce the carbon footprint of urban transportation systems. Morever, the quality of life and environmental benefits of these new, "smart growth" projects go disproportionately to middle- and upper-class residents, because the development patterns of which these projects are a part are designed to create profit by catering to the tastes of those with the means to pay. These patterns have contributed to the phenomenon of "green gentrification", as well as a growing wariness among affordable housing and tenants' rights advocates of development projects promising environmental benefits.

The concept of green gentrification aptly summarizes both the allure — for environmentally-minded middle- and upper-class residents — and the costs — borne by poor and working-class residents — of the new growth agenda that has reshuffled the promoters and opponents of growth. Scholars of green gentrification, however, would no doubt agree that the urban built environment must be transformed as part of broader climate change mitigation efforts. The question that these scholars have yet to answer, and that I seek to address in subsequent chapters, is whether there is a politically-conceivable alternative means to accomplish that transformation, or whether the new growth agenda, adapted to minimize harms to poor and working-class urban residents, is our best hope in a polity where the growth imperative is as strong as ever.

Chapter 3

If you build it, will they bike?

As stated in the introductory chapter of this dissertation, automobile transportation is a major contributor to global climate change. It bears repeating that, in the United States, transportation is the second largest source of greenhouse gas (GHG) emissions, accounting for 26% of all emissions in 2015 (U.S. Environmental Protection Agency 2016), and that almost two-thirds of these transportation emissions come from passenger cars, small trucks, SUVs, and vans.

Meeting emissions targets will require a combination of improved fuel efficiency, increased use of alternative fuel, and reductions in vehicle-miles traveled. However, automobile travel is bound up with other practices, cultural meanings, technology, infrastructure, and economic interests, which together constitute a mutually-reinforcing "system of automobility" (Urry 2004). Automobile, petroleum, and related industries are politically influential given their size and contribution to US economic activity. Americans are attached to their cars and the practice of driving in ways tied up with identity, status, and comfortable habit. US cities are sprawling, with development extending far from the city center, facilitated by freeway networks that make autonomous long-distance travel possible. Land uses are often segregated, lengthening trips to shopping and work.

Faced with this system of interlocking forces that sustains the car-dependent travel patterns that prevail in almost all US cities, it is easy to wonder whether policies to encourage alternative modes

such as bicycling can actually induce behavior change. The premise of this dissertation is that policy does matter, and in this chapter I test this premise by examining the quantitative relationship between policy adoption and bicycling practice. Figure 3.1 shows how this analysis fits into my larger argument about the sources of variation between US cities in the adoption of bicycle friendly policies and rates of bicycling for transportation. In particular, this chapter is concerned with the relationship between bicycle friendly policies and bicycling for transportation: does policy shape practice (relationship 8+ in Figure 3.1), does practice shape policy (through relationships 12+ and 6+), or does influence run in both directions?

In addition to providing a justification for my attention to policy adoption in the rest of the dissertation, my findings in this chapter also help bridge the disconnect between the sociological roots of practices that contribute to climate change and the policies designed to change those practices. Despite the complex social character of automobile travel and other carbon-intensive practices, many policies meant to change these practices rely on an asocial conception of behavior, in part because of the failure of sociological research to engage with questions relevant to inducing change in social practice (Shove 2010). As Szerszynski and Urry (2010) observe,

> …the argument of the science itself is that human practices are utterly central to [climate change] and that the only possible way of "mitigating" potentially catastrophic change, apart from vast and improbable geo-engineering projects, is through transformed human practices. So the social is both central and yet pretty well invisible (3).

Efforts to move beyond automobility must understand the connections between its parts. Because the system is self-reproducing, it cannot be displaced through isolated change in any one part. However, Urry (2004) points to emerging developments that could combine to create a "tipping point" and usher in a new system. One such development is the shift away from transport planning policies that built ever more roads in anticipation of increased driving. Instead, planners seek to slow demand for roads, including through improvement of facilities for walking and bicycling.

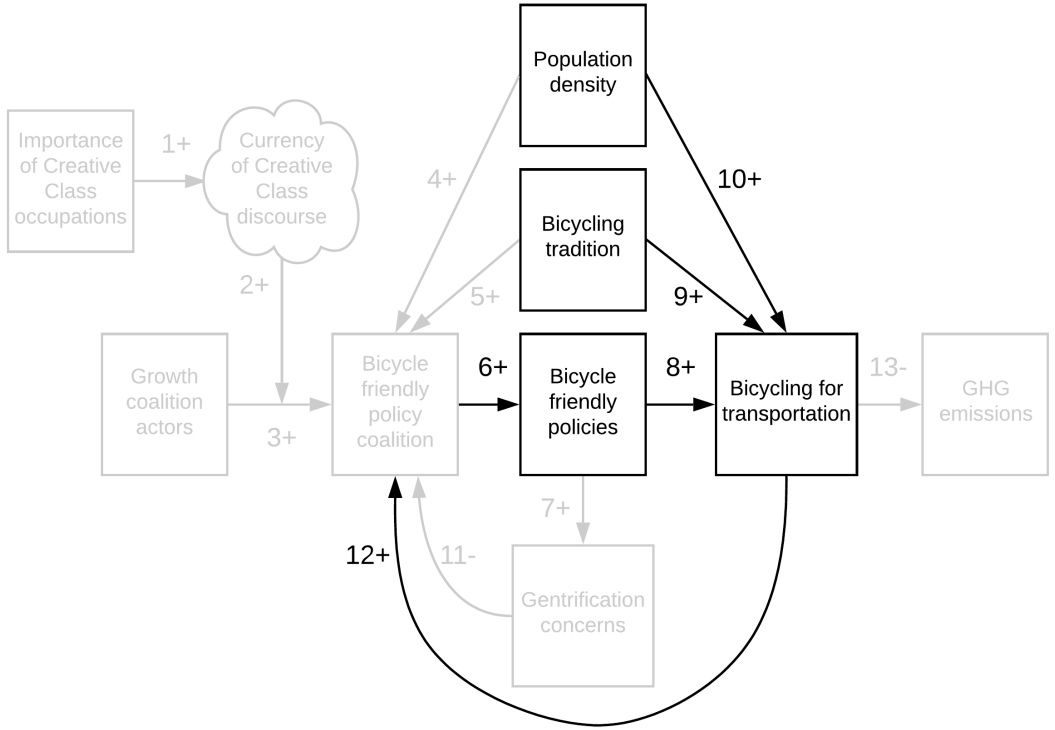


Figure 3.1: Conceptual focus of chapter 3

These "demand-reduction" policies offer an opportunity to examine the relationship between transportation infrastructure and travel practices. Transportation researchers have begun to show how the built environment affects travel behavior (Cervero 2003; Ewing and Cervero 2010), but little work investigates how built environments are shaped, and in particular the influence of practice itself on policy decisions. Does infrastructure induce or rather respond to changes in practice, or are both effects operative?

In this chapter, I use longitudinal data on bicycle-commuting and bicycle infrastructure in 62 large US cities to analyze the relationship between travel practices, infrastructure, and other place characteristics. The analysis uses fixed-effects regression to control for unmeasured, time-invariant characteristics of cities, as well as a technique proposed by Allison and colleagues (2017) that controls for potential reciprocal effects between bicycle-commuting and bicycle infrastructure. In the next section, I review research on the relationship between infrastructure and behavior. This research suggests three hypotheses, which I state in the subsequent section. Next, I review methodological issues in research on transportation infrastructure and behavior, and describe the dataset and statistical analyses. Finally, I describe the results and conclude by discussing implications for automobility.

3.1 Theories of infrastructure and social practice

For much of the twentieth century, the sociological study of urban development was dominated by the human ecology perspective, which posited that urban land and land uses are allocated by free-market competition between social groups, and that the resulting allocation tends to be optimal, providing the greatest good for the greatest number. This perspective is shared by many economists who study urban transportation development. Underlying this perspective is an economistic understanding of humans as rational utility maximizers, and an assumption of a relatively level playing field. Thus, scholars taking this free-market perspective on urban transportation development argue that the transportation systems of US cities came to be auto-centric because car-travel was the mode of transportation preferred by urban

residents, which in turn was because cars facilitated the optimal distribution of land users and uses. In other words, automobile transportation won out through free-market competition. These scholars view efforts to promote non-car modes of transportation (such as public transit and biking) in cities as interference in the market, and point to the failures of some such efforts as evidence that travel behavior cannot be shaped by infrastructure policy that is out of step with consumer preferences.

In the later part of the twentieth century, the "new urban sociology" perspective challenged the dominance of human ecology in urban sociology. In particular, the new urban sociology challenged the notion that competition for urban land use operated on a level playing field. This new research showed large power imbalances between various actors competing for urban land, with local governments often working to advance the agenda of wealthy capitalists and developers. From this perspective, the auto-centric transportation systems of US cities developed not because they provided the greatest good for the greatest number, but because they served the financial interests of those with the power to shape urban transportation policy. This perspective implies a more malleable understanding of human behavior, in which infrastructure policy decisions can have substantial and durable effects on travel behavior.

Past research on urban transportation development spans the fields of urban sociology, social studies of technology, economics, transportation planning, and geography. Nonetheless, research on these topics coalesces around two opposing viewpoints. The free-market perspective is that infrastructure is shaped by consumer preference and the state of technological development. Consumers have desires, technological development enables the increasingly efficient satisfaction of those desires, and infrastructure is built to facilitate social practices that use the best available technology for satisfying those desires. The political perspective disputes the notion that infrastructure is shaped by consumer preferences, arguing instead that infrastructure is shaped by political processes, which often favor elite interests. According to this view, infrastructure is not a mere reflection of social practice, but is one of the factors that influence recruitment to and defection from particular practices. The free-market perspective predicts that bike infrastructure will be built to the extent that there is demand for it — biking will induce the creation of bike infrastructure. The political perspective predicts that the creation of

bike infrastructure can induce biking, but that the influence of infrastructure on social practice — and vice versa — depends on contingent political factors.

3.1.1 Free-market theories

The schools of research that elaborate a free-market approach to infrastructure are united by the assumption of strong biological imperatives. As living organisms, human beings have a relatively fixed set of needs, and we strive, individually and collectively, to satisfy those needs in the most efficient manner possible. This position is argued persuasively by economists George Stigler and Gary Becker, who maintain that apparent variation in consumer tastes, between individuals and over time, is better understood as variation in prices and incomes relevant to satisfying tastes which do not vary between individuals and over time (Stigler and Becker 1977).

Human ecologists apply this assumption of strong biological imperatives to the level of the population. A social system is first and foremost a "producer of sustenance… the entire system in all of its aspects is a producer of the wherewithal for life" (Hawley 1986, pp. 8-9). Just as human beings pursue the efficient satisfaction of needs and desires, populations seek to grow "to the maximum size and complexity afforded by the technology of transportation and communication" they possess (Hawley 1986, p. 7). For economists and human ecologists, technological progress is a central dynamic force in social change, as new technologies allow more efficient satisfaction of needs and expansion of human populations. The ends are fixed by individual and population-level imperatives, and technology provides the means of achieving those ends.

Moreover, human ecologists share with economists the assumption that a free market allocates space in a manner that results in the greatest good for the greatest number (Logan and Molotch 2007). Free competition for urban land ensures that the actors or organizations that can put a parcel of land to its best use will be willing to pay the highest price for that land. For instance, maritime shipping operations can make the best use of oceanside parcels, so they will pay a higher price for such parcels than would, say, a manufacturer, and subsequently, that parcel will be as productive as it can be, yielding benefits to

the shipping operator as well as the community as a whole, which benefits from greater productivity.

This perspective is exemplified by Adams' (1970) influential analysis of urban morphology. By examining historical construction records, Adams shows that the boundary of development in the Minneapolis, MN urban area was roughly circular during the "walking and horse carriage" and "recreational automobile" eras of transportation technology, but exhibited irregular shapes during the "electric streetcar" and "freeway" eras, influenced by the locations of streetcar lines and freeways, respectively. Adams' interprets this finding in terms of residents' desire to move farther out of the city while still being able to access its employment and amenities, with each successive transportation technology enabling the expansion of housing development. In this narrative, infrastructure is shaped by market forces. In fact, during the streetcar era, streetcar lines were built by private companies to enable profitable housing development on the cheap land at the urban fringe (Muller 1995). As automobiles became more common, road-building was increasingly publicly financed, complicating a simple market narrative. However, scholars in the free-market camp argue that such publicly-funded road construction merely facilitated the exercise of consumer preference for automobiles: "The automobile competed successfully with mass transit… it did this mainly by providing, speed, privacy, and convenience, although it was also facilitated by an active program of building and upgrading public roads" (Anas et al. 1998, p. 1429).

Of course, much modern infrastructure is created by public agencies, not private firms, and these public actors may be insulated from market forces. According to the free-market view, politics is a corrupting influence on the provision of infrastructure, and can lead to the squandering of resources on non-viable projects. Thus, the political attractiveness of rail transit in the 1970s and '80s — the "Desire Named Streetcar", as one researcher quipped (Pickrell 1992) — led to costly new rail lines which failed to meet ridership projections (Meyer and Gomez-Ibanez 1981; Fielding 1995). The very failure of these projects to attract sufficient usage is taken as evidence of their political origins. From the free-market perspective, infrastructure not designed in accordance with consumer preferences will be unsustainable, because infrastructure has little if any power to change the needs and desires that drive behavior.

Given the relatively fixed concept of human motivation undergirding the free-market perspective, technological development serves as the main source of social change. Social change follows the course of technological development along the lines of increasing logic and efficiency in satisfying human needs (Bimber 1994). Thus, technology is seen as structuring much of social life, but technological development is itself structured by human needs. The technologies that most efficiently satisfy those needs win out and come into widespread use, creating demand for infrastructure that facilitates use of those technologies. Thus, changes in infrastructure do not cause changes in practice, but are a result of such changes.

3.1.2 Political theories

The free-market perspective on transportation development, as defined here, rests on three propositions: (1) Behavior is driven by relatively fixed human needs; (2) Technological development follows a path of increasingly efficient satisfaction of human needs; and (3) Infrastructure tends toward the facilitation of social practices which use the most efficient technologies available; infrastructure that does not do so is unsustainable. Proponents of the political perspective on infrastructure dispute all three of these propositions. They view the relationship between human needs and behavior as malleable and socially-negotiated, and they view technological development and infrastructure design as contingent results of political processes, and thus strongly shaped by political power. These opposing propositions regarding human motivations and technological development lead to an opposing view of the relationship between infrastructure and behavior. Because behavior, technology, and infrastructure are not inevitable byproducts of human needs but rather contingent results of socio-political processes, infrastructure can have an independent and lasting influence on behavior.

Under the free-market perspective on infrastructure, human behavior is seen as primarily guided by internal states: the needs of the individual organism. The understanding of behavior that prevails under the political view of infrastructure is more social. It is indisputable that humans have biological needs, but the way that these internal states come to be expressed in behavior is fundamentally mediated

by social context. In fact, behavior is viewed as the performance of "social practices" (Schatzki 1996; Warde 2005; Shove et al. 2012; Bourdieu 1977). Understandings of why one performs a given practice and what the practice symbolizes, the cognitive and embodied knowledge of how to perform it, and the material artifacts and contexts with which one performs it are all socially learned and negotiated. Thus, individual behavior is itself political. Individuals have limited time and resources with which to perform social practices, and groups with investments in competing ideas or beliefs, skills, and technologies have interests tied to people continuing to perform particular practices. Scholars of social practice thus speak of "recruitment" to and "defection" from social practices as processes influential in shaping social life and allocation of resources (Shove et al. 2012; Watson 2013).

Behavioral economists have developed a compatible view of behavior using economic terminology. Like social practice theorists, they dispute the notion that behavior is determined straightforwardly by needs and desires. Whereas social practice theorists might point to the importance of cultural "meaning-making" processes in linking particular behaviors to felt needs, behavioral economists emphasize "information constraints" and "logical fallacies" that influence the perceived costs and benefits of behavioral alternatives (Kahneman 2011; Thaler and Sunstein 2008). Though the terminology is different, both approaches imply that behavior is malleable. In their influential book Nudge (2008), Thaler and Sunstein argue that policy-makers and other "choice architects" can non-coercively influence behavior by making some options more visible and highlighting hidden costs and benefits of various behaviors. For Thaler and Sunstein, choice environments are never "neutral", so those who design those environments must do so thoughtfully.

A logical consequence of this political understanding of behavior is a political understanding of technological development. Often, competing technologies embody different understandings of the dominant symbolic meanings or purposes of a social practice. When there is disagreement over the purpose of a practice, technical efficiency cannot be the guiding force, because the question "efficiency at achieving what end?" is not yet resolved.

The social construction of technology (SCOT) school of research, in particular the work of Bijker

(1997) and Pinch (2009), rejects the notion that technology progresses according to natural laws of efficiency. These scholars argue that the success or failure of a particular technology cannot be explained by its objective, technical superiority. Rather, success or failure results from political struggles between groups with competing visions of the meaning, purpose, and specifications of the artifact.

For example, a casual observer might surmise that the "Safety" bicycle, one of the earliest designs with all the main features of the modern bicycle, won out over the high-front-wheeled "Ordinary" model because of its greater technical efficiency. However, Bijker's analysis shows that early cyclists had a different understanding of cycling and what made a good bicycle, favoring the speed, thrill, and "grandness" of the Ordinary (1997). Thus, before the Safety bicycle could become dominant, there had to be a collective agreement not only on the technical specifications, but on the very criteria for assessing the quality of a design.

Just as a political understanding of behavior implies a political understanding of technological development, so too do both of these views imply a political understanding of infrastructure. According to this perspective, infrastructure is not merely a reflection of the most efficient physical arrangement to satisfy objective social needs, or even the desires of a democratic majority. Rather, the shape of the built environment emerges from political struggles involving citizens, organizations, professional experts, and state bureaucrats. Moreover, as with technology, the settlement of these struggles and the emergence of a victorious design reverberates into the social world, as social relations and practices are rearranged.

Sociological research on transportation and infrastructure thus focuses on how infrastructure shapes social life, and on the political processes that shape infrastructure itself. Scholars studying infrastructural effects have demonstrated the influence of transportation infrastructure such as roads and airports on various aspects of social life. Highway expansion shapes migration patterns, especially in suburban areas, and road-building patterns in the Amazon shape development, with substantial environmental implications (Chi 2010; Perz et al. 2008). As air travel continues to grow, airports have become increasingly influential in shaping economic dynamics, including regional talent share (Chen et al. 2018)

and inter-city economic ties (Neal 2011) with some observers predicting a drastic reorientation of cities around airports (Kasarda and Lindsay 2011; Appold and Kasarda 2013).

Accounts of the political processes that shape infrastructure emphasize coalition-building and power. Despite relatively low rates of automobile ownership in the U.S. before 1920, proponents of highway construction pushed through road projects in the first two decades of the twentieth century by building a coalition of automobile enthusiasts, political Progressives concerned with urban overcrowding, professionalizing highway engineers, and farmers (Ling 1992). The success of these early road-building projects quite literally laid the groundwork for the subsequent explosion of auto-ownership and driving.

In the case of urban infrastructure, the political approach focuses on the question of who holds political power. Often throughout U.S. urban history, the answer to this question has been large business interests, and in particular, landowners and their allies with an interest in intensifying the use and profitability of their holdings (Molotch 1976; Logan and Molotch 2007; Feagin 1985; Gottdiener and Feagin 1988). These politically-powerful urban landowners were able to push an agenda of growth – in population, size and economic activity – by arguing that growth benefited everyone by creating jobs and prosperity, despite subsequent evidence that rapid growth actually diminishes environmental quality and livability and has little effect on employment security (Molotch 1976). More recent research on the influence of these "growth machine" actors finds that their power is associated with cutbacks in social spending and public sector hiring across U.S. counties (Adua and Lobao 2019).

Attention to powerful elites yields an alternative to the narrative that automobiles won out over mass transit merely by better-satisfying the needs of consumers. Some have argued that actors in the highly concentrated automobile, oil, and rubber industries engaged in coordinated campaigns to undermine mass transit from the 1920s onward (Whitt and Yago 1985; Snell 1974). For instance, Snell (1974) argued in a report presented to Congress that General Motors got involved in the urban rail transit industry in order to buy rail operators and convert their operations to bus service. However, a more robust analysis of the Los Angeles case cited by Snell indicates that the Pacific Electric Railway was

already failing by the time General Motors became involved in LA area transit (Adler 1991). This failure was due in part to the fact that the PE Railway was owned by Southern Pacific, which neglected its passenger rail service in favor of more profitable freight rail operations, but in a larger sense it was due to the lack of regional coordination and planning (Adler 1991; Whitt 1982; Yago 1984; Whitt and Yago 1985). Regional transportation development was shaped by competition between downtown landowners, who favored radial rail transit to funnel suburbanites into downtown and enhance the value of their holdings, and the owners of suburban business parks, who favored a road transportation system that would allow more autonomous travel patterns (Adler 1991). As Adler (1991) argues, the issue was not that government actors were uninvolved in transportation planning, but rather that the various government actors involved were each allied with particular geographical interests, rather than pursuing the interests of the region as a whole.

Scholarship on infrastructure from the political perspective suggests that the coalitions favoring growth and urban sprawl have begun to decline in influence. In fact, by the 1970s, "anti-growth" political coalitions were gaining strength in some cities and states, and had begun to put into place urban growth boundaries to check automobile-enabled sprawl (Molotch 1976). The success of these coalitions was especially pronounced in places with "high amenity value" and strong environmental groups such as Oregon, where Governor Tom McCall railed against "the ravenous rampage of suburbia in the Willamette Valley [that] threatens to mock Oregon's status as the environmental model for the nation" (Tri-County Metropolitan Transportation District of Oregon 2015). Oregon enacted urban-growth boundaries for Portland in 1974, and the city rejected a planned freeway expansion in that same year.

This shifting perspective on growth and urban development also gained traction among "place professionals" (Gieryn 2000), who gradually shifted their focus from building new roads to accommodate car travel toward efforts at "demand reduction." This included renewed efforts to improve public transportation in some cities, and after the passage of the federal Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, efforts to improve walking and biking facilities.

ISTEA offers an illustration of how infrastructural projects can be loosely coupled with local con-

ditions, and thus be a potential influence on social practice. The act set aside funding for projects that would improve facilities for pedestrians and bicyclists, providing an incentive for localities to build such infrastructure even if their citizens were not actively demanding it. The infrastructure created through this political victory at the federal level may lend legitimacy to biking and reshape social practice (Law 1992; Winner 1993), but only if it is integrated with local elements, through the performance of practices, into "configurations that work" (Shove et al. 2012; Shove and Pantzar 2005). Characteristics of place influence whether and how "foreign" infrastructures or technologies reshape social practice (Orlikowski 1992; Barley 1986; Gieryn 2000; Molotch et al. 2000). Environmentalist ideas helped shift the orientation of American transportation and land-use planning, culminating in the passage of ISTEA, but local levels of environmentalism vary. If environmental movement organizations indeed act as cultivators of an "ecological habitus" (Haluza-DeLay 2008), their local prevalence may moderate the influence of new infrastructure on practices marked as environmentally-relevant such as biking.

3.2 Hypotheses

The free-market and political perspectives on infrastructure suggest divergent hypotheses regarding the relationship between bicycling behavior and bicycle infrastructure. The free-market perspective suggests that infrastructure will reflect the preferred practices of the public, and thus will follow trends in behavior more than it determines them.

> H1a: Increases in bicycle-commuting in a city will induce the creation of additional bicycle infrastructure.

The political perspective on infrastructure, in contrast, does not suppose that infrastructure will be built that reflects trends in behavior. Rather, this perspective views infrastructural decisions as results of contingent political processes, in which opinion and behavioral trends are but one factor. Thus, the influence of social practice on infrastructure will depend on political context. Given the role of environmentalism in shifting transportation planning toward "demand reduction," and environmental move-

ment organizations' potential to cultivate an ecological habitus (Haluza-DeLay 2008), the prevalence of environmental organizations in a city may be an important contextual factor.

> H1b: The effect of bicycle-commuting levels on subsequent creation of bicycle infrastructure will depend on the prevalence of environmental organizations in a city.

Whereas the free-market perspective views behavior as determined by fixed drives, the political perspective views preferences and behavior as malleable. Behavior is subject to political processes, wherein "practitioners" are "recruited" to new practices and "defect" from others. Changing infrastructure can influence these processes, making some practices more attractive and legitimate and others less so. Thus, the political perspective expects that infrastructural decisions will shape behavior as much as the reverse.

However, just as the political perspective views infrastructural decisions as contingent, so too does it view the effects of infrastructural changes as contingent on contextual factors. Infrastructure is an influence on social practice, but it is not the only influence. Whereas the free-market perspective views practice as a product of human needs and the technologies available to satisfy those needs, the political understanding implies that "demand" for practices is shaped by socio-cultural processes. Infrastructure can increase the visibility and legitimacy of a practice, but the extent of its influence may depend on whether proponents can connect the practice to locally resonant cultural frames. Again, environmental advocacy may play a role in this process.

> H2: The effect of additional bicycle infrastructure on bicycle-commuting will depend on the prevalence of environmental organizations in a city.

3.3 Data and methods

3.3.1 Empirical research on the built environment and travel

The empirical research on the built environment and travel, while extensive, is limited by two key methodological difficulties. The first is the possibility of spurious correlation driven by unmeasured factors. For instance, some cities may have a strong historical tradition of bicycling, and this tradition might explain both its bicycle facilities and high bicycling rate. Such place characteristics are hard to quantify, but they can be partialed out using longitudinal data and fixed effects. Unfortunately, few studies of the built environment and travel use longitudinal data.

A second methodological difficulty is uncertainty over the direction of causality. Cross-sectional studies have found a positive correlation between the volume of bikeways and cycling rates (Buehler and Pucher 2012; Dill and Carr 2003; LeClerc 2002; Nelson and Allen 1997; Parkin et al. 2008). However, the direction of causality cannot be ascertained with cross-sectional data, and few studies make use of longitudinal data.

One of the few studies using longitudinal data found increased bicycle-commuting between 1990 and 2000 among residents living near newly constructed bikeways in Minneapolis-St. Paul, MN (Krizek et al. 2009). However, a second study which applied the same methodology to six additional US cities concluded that the effect of new bicycle infrastructure depended on publicity for the new facilities, their placement along common utilitarian travel routes, and the overall connectivity of the bikeway network (Cleaveland and Douma 2009). These mixed findings suggest that the effects of infrastructure depend on contextual factors.

3.3.2 Present analysis

Data sources and variables

Table 3.1 describes the variables included in the analysis, and provides descriptive statistics. Variables are measured at the level of the city rather than metropolitan area whenever possible – exceptions are

noted in the descriptions of variables below.

Bicycle-Commuting and Bikeways Variables. The two main variables of interest in my analyses are the percent of commuters traveling by bicycle and the density of bikeways. Data on bicycle-commuting come from the Decennial Census and the American Community Survey, both administered by the US Census Bureau. Respondents were asked, "How did you usually get to work last week?", and were instructed to pick one mode as primary if they used more than one. I excluded individuals who reported working at home from the total in calculating the percent commuting by bicycle.

For this analysis, the term "bikeways" refers to two types of bicycle infrastructure: bicycle lanes and bicycle paths. Bicycle lanes are on-street facilities that demarcate road space for exclusive use of bicyclists with painted lane lines. Bicycle lanes may or may not be painted in a bright color to increase their visibility, and they may or may not be separated from car traffic by a buffer, vertical barriers, or a parking lane. Bicycle lanes are distinct from "bicycle routes", which are designated only by street signs with no pavement markings, and from "sharrows", which are designated by signs and pavement markings reminding motorists to share the road with cyclists, but which do not demarcate a lane for exclusive use of cyclists. Bicycle paths are off-street facilities designed for mixed-use by cyclists and pedestrians. Bicycle paths offer more separation from car traffic than bicycle lanes, but are often built for recreation rather than transportation, and may be less accessible and offer less direct routes than on-street bicycle lanes.

Past research has found a positive association between bicycling rates and both bicycle lanes and paths, with similar effect sizes (Buehler and Pucher 2012; Krizek et al. 2009). For this analysis, I combine bicycle lanes and paths into a single "bikeways" variable because I am interested in the relationship between bicycle-dedicated infrastructure and bicycling in general, rather than in the relative influence of different types of bicycle infrastructure. In an auxiliary analysis, I found that bicycle lanes and paths have comparably-sized effects on bicycle-commuting.

Table 3.1: Descriptions and sources of variables, with summary statistics

Description	Source	Min	Q1	Median	Q3	Max
Pct commuters traveling by bicycle	US Census Bureau	0.00	0.31	0.63	1.21	7.79
Bicycle lanes & paths, miles/square mile	Dill and Carr (2003), Alliance for Bicycling and Walking Benchmarking Reports	0.00	0.33	0.65	1.25	5.76
Pop. density, residents/square mile	US Census Bureau	799.63	2447.38	3813.93	6425.72	28234.99
Public transit supply, regional annual vehicle miles per 1,000 population	National Transit Database (USDOT)	2.38	9.68	13.75	19.44	51.83
Gas price, dollars, state avg.	US Department of Energy	0.73	1.63	2.12	2.48	3.28
Cyclist fatalities per 10K bicycle commuters, statewide	NHTSA annual data	0.00	6.99	11.58	19.51	86.22
Average daily precipitation, inches	National Climatic Data Center	0.00	0.05	0.10	0.13	0.32
Pct days under 32°F	National Climatic Data Center	0.00	0.00	0.29	5.04	25.21
Pct days over 90°F	National Climatic Data Center	0.00	2.20	7.67	20.22	45.14
Pct adults w/ bachelor's degree or more	US Census Bureau	9.12	23.41	28.58	34.97	59.80
Pct of pop. that is college students	US Census Bureau	3.82	6.68	7.95	9.62	18.13
Pct of pop. aged 25-34	US Census Bureau	9.30	14.80	16.03	17.67	24.80
Advocacy strength	Alliance for Bicycling and Walking Benchmarking Reports	-0.49	-0.44	-0.32	-0.01	12.05
City bicycle-ped staff per 100K pop.	Alliance for Bicycling and Walking Benchmarking Reports	0.00	0.16	0.39	0.85	5.58
Pct voting for Democratic presidential candidate	County-level voting data from CQ Voting and Elections Collection	17.09	46.32	55.78	65.73	92.95
Environmental nonprofits per 100K pop., 2000	National Center for Charitable Statistics	0.00	1.11	2.20	4.32	22.20

Data on extent of bikeways come from Dill and Carr (2003) for the year 2000, and from five Alliance for Bicycling and Walking (ABW) Benchmarking Reports (Alliance for Biking and Walking 2010, 2012, 2014, 2016; Thunderhead Alliance 2007). Together, these sources provide at least one measurement of bikeways for 62 large US cities, including all of the 50 most populous cities in the 2010 Census. Each source gathered data directly from city officials on the centerline miles of bicycle lanes and bicycle paths in their city. These sources provide measurements of the extent of bikeways in each city at the end of the years 2000, 2006, 2008, 2010, 2012, and 2014. To measure the density of bikeways, I divided the miles of bikeways by city land area in square miles. I obtained data on land area from the 2000 and 2010 Censuses, linearly interpolated values for the intervening years, and used the 2010 value for years 2011-14.

There were some missing data for bikeways, mostly due to shifts in the set of cities present in Dill and Carr's study and each year of the ABW reports. The final dataset contained 286 city-year observations of bicycle lanes and 285 city-year observations of bicycle paths, out of 372 possible city-years (62 cities at 6 time points). However, I deleted five city-year observations for bicycle lanes, and one for bicycle paths, because of the implausible year-to-year fluctuations they implied (e.g., a 95-mile reduction in bicycle lanes over two years). This resulted in 281 valid observations for bicycle lanes and 284 for bicycle paths, which amounts to 24.4% missingness on lanes and 23.7% on paths.

Control Variables. Other independent variables consisted of standard controls in studies of bicycle mode share (e.g., Buehler and Pucher 2012), as well as a few more novel control variables. Bicycling levels tend to be higher in densely populated areas with mixed land uses and grid-pattern streets (Ewing and Cervero 2010; Litman 2008; Parkin et al. 2008; Pucher and Buehler 2006; Zahran et al. 2008a). To compute population density, I used data on land area described above, and interpolated population values for 2001-2004 based on figures from the 2000 Census and 2005 ACS. I allowed one exception to these rules for Louisville, KY, which merged with surrounding Jefferson County in 2003, quintupling its land area and doubling its population. For Louisville, I assumed constant population and land area from 2000-2002 (before the city-county merger), constant population from 2003-2005, and constant

land area from 2003-2014.

The supply of public transportation may influence bicycling positively or negatively. Public transport may complement bicycling by allowing for combined bicycle-PT trips and offering a non-car backup mode in case of inclement weather (Brons et al. 2009; Martens 2007; Pucher and Buehler 2009). On the other hand, public transport may compete with bicycling (Fietsberaad 2009; Heinen et al. 2010; Pucher and Buehler 2007). To measure supply of public transport I used data from the National Transit Database on the annual vehicle miles per 1,000 population at the metropolitan level, because the service areas of most transit agencies extend beyond central city boundaries.

Higher gas prices reduce driving, increase traffic safety, and influence residential relocation decisions (Buehler 2010; Chi et al. 2010; Chi and Boydstun 2017; Hanly et al. 2002; Litman 2008), all of which could influence bicycle-commuting. Data on gas prices were not available at the city level, so I used state-level data on annual average gas prices from the US Department of Energy. Similarly, city-level data on bicyclist fatalities were unavailable. Instead, I used state-level data on the annual number of cyclist fatalities from the National Highway Transportation Safety Administration, standardized by the number of bicycle commuters in the state as measured by the Census Bureau. Perceived risk of injury and death influences cycling rates (Alliance for Biking and Walking 2010; Fietsberaad 2009; Jacobsen et al. 2009; Pucher and Buehler 2008; Pedestrian and Bicycle Information Center 2010). However, according to the "safety in numbers" phenomenon, increased bicycling increases safety by raising driver's awareness of bicyclists (Elvik 2009; Jacobsen 2003; Robinson 2005). To ensure that any observed relationship runs from bicycle safety to bicycle rates, not vice versa, I used a lagged measure of cyclist fatality, the average for the previous two years, as a predictor of bicycle-commuting rates.

Car ownership is negatively related to bicycling (Heinen et al. 2010; Pucher and Buehler 2006), so I include the percent of households not owning a car from Census and ACS data as a control variable. A number of studies have found that rain and cold or hot weather can deter bicycling (Baltes 1996; Dill and Carr 2003; Gatersleben and Appleton 2007; Heinen et al. 2010; Winters et al. 2007). To control for the effect of weather, I included as controls the average daily precipitation, the percent of days with a

high temperature under 32°F, and the percent with a high temperature over 90°F. These data come from the National Climatic Data Center.

I included several demographic control variables from the Census and ACS. College students have higher rates of cycling (Baltes 1996; Dill and Carr 2003; Ryley 2006), so I included percentage of college students in the population. I also included the percentage of adults aged 25 and over with a bachelor's degree or greater education and the percentage of a city's population aged 25-34 to capture in- and out-migration of young professionals. The work of Richard Florida on the "Creative Class" suggests that young professionals seek out cities with lifestyle amenities such as walkable and bikeable neighborhoods (Florida 2002, 2008).

Strong bicycle advocacy groups may boost a city's bikeway building efforts, while at the same time increasing recruitment to bicycling. This could create a spurious correlation between bikeways and bicycle-commuting. To control for this possibility, I included an index of advocacy strength that combines three measures of a city's advocacy organizations belonging to the ABW: number of members, number of staff, and organizational income. I combined these measures by standardizing each component, summing them, and standardizing the result, such that a one-unit change in advocacy strength reflects a change of one standard deviation. The number of city staff devoted to bicycle and pedestrian issues may also be associated with both bikeways and bicycling, and data on such staff are provided in the ABW reports, so I included this variable as well.

Finally, research on the history of US transportation policy suggests an association between environmentalism and the transportation policies of cities. The percent of voters in the surrounding county voting for the Democratic presidential candidate, interpolated between election years, and the number of environmental nonprofits in the year 2000, a time-constant predictor, are included as indicators of environmentalism. Political party identification is one the most reliable predictors of concern for climate change (Hamilton et al. 2013). The measure of partisan voting serves as a control for within-city changes in environmentalism during the study period, whereas the prevalence of environmental organizations in 2000 captures between-city variation in environmentalism to be included as an interaction

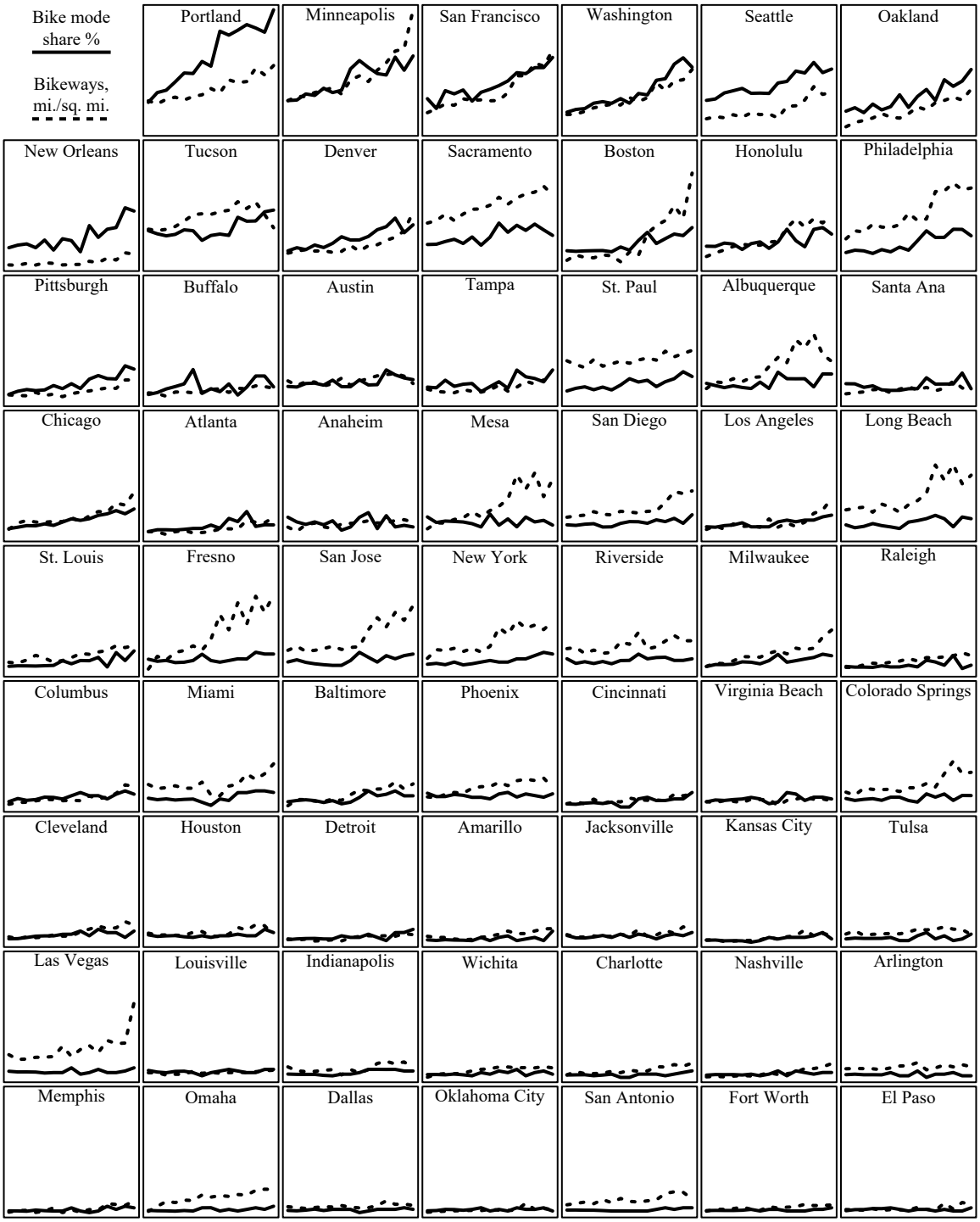
term to test Hypotheses 1b and 2.

Figure 3.2 shows the trend in bicycle commute mode share and extent of bikeways for each city. For the imputation and analysis, I performed a logit transformation on variables with percentage units, and a natural-log transformation on variables with positively skewed distributions, to better satisfy assumptions of normality. I note transformations in the results tables.

Imputation of missing data

Table 3.2 shows the year-by-year availability of each variable. The inconsistent availability of variables across the years of my study period (2000-2014), along with missing data for the three variables derived from ABW reports (bikeways, advocacy strength, and city bike-ped staff), posed a challenge for the analysis. Traditional approaches to missing data simply delete cases with missing values, or fill in those missing values with the sample mean, interpolated or regression-fitted values, or educated guesses. However, case-wise deletion leads to biased coefficient estimates, and single imputation of values biases estimates of uncertainty (Rubin 1987; Rubin and Little 2002). In recent decades, multiple imputation has emerged as the preferred method for dealing with missing data. In multiple imputation, the analyst uses all available data to construct a distribution for missing values conditional on the observed data, then takes multiple draws from those distributions to create several complete datasets. He or she then performs the analysis on each complete dataset, and combines the results. This process preserves the uncertainty caused by the missing values without discarding any available information.

In order to leverage the longitudinal structure of my dataset, I used the Amelia II package for R (Honaker et al. 2011). This program is designed for multiple imputation of panel datasets in which variables are thought to follow relatively smooth trends within cross section units over time. The Amelia II package also allows the specification of priors for missing values based on substantive knowledge, so I used linear interpolation within cities over time to fill in priors. I then created five imputed datasets, ran my analyses with each dataset, and combined the results using the rules formulated by Rubin (1987).



Source: US Census Bureau (bike mode share); Dill and Carr 2003 and ABW Benchmarking Reports (bikeways)

Figure 3.2: Plot of bicycle commute mode share and bikeways by city, 2000–2014

Table 3.2: Variable availability by year

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Public Transit Supply	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gas Price	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bicyclist Fatality Rate	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Avg. Precipitation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pct Cold Days	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pct Hot Days	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bicycle Rate	X					X	X	X	X	X	X	X	X	X	X
Population Density	X					X	X	X	X	X	X	X	X	X	X
Pct Adults w/ Bachelor's Degree	X					X	X	X	X	X	X	X	X	X	X
Pct College Students	X					X	X	X	X	X	X	X	X	X	X
Pct 25-34 Year-Olds	X					X	X	X	X	X	X	X	X	X	X
Lanes & Paths	X						X		X		X		X		X
Advocacy Strength							X		X		X		X		
City Bicycle-Ped Staff							X		X		X		X		X
Pct Voting Dem. for Pres.	X				X				X				X		
Environmental Nonprofits, 2000	X														

Within the methodological literature on multiple imputation, there is debate over how to handle missing values of a dependent variable. Von Hippel (2007) argues both analytically and with a simulation study that cases with missing values on the dependent variable should be included in the imputation, but that including them in the analysis often just adds noise to coefficient estimates. On the other hand, Young and Johnson (2010) find that including cases with missing values on the dependent variable is unlikely to affect substantive conclusions. Moreover, Von Hippel (2007) acknowledges that including cases with missing values on a dependent variable may improve analysis estimates when "auxiliary variables" are included in the imputation step that are not independent variables in the analysis but that are related to the dependent variable. In the present analysis, past and future values of the dependent variable can act as "auxiliary variables" in the sense described, and can improve imputations substantially, especially when time-trends can be plausibly approximated with polynomial splines (Honaker and King 2010; van Buuren 2012).

Given the consensus that multiple imputation performs as well as, and usually better than, alternative methods for handling missing data, it was clear that I should use this approach to handle my missing data. The trickier question was whether to include in the analysis cases with imputed values on the dependent variable. I opted to include such cases for three reasons. First, the longitudinal structure of my dataset allowed me to use past and future values of bicycle-commuting rate and bikeways as "auxiliary variables" to impute missing values. Second, both bicycle-commuting and bikeways are treated as dependent variables in the structural equation modeling phase of the analysis, and excluding cases with missing values on either variable would have greatly reduced the cases available for analysis. Finally, the structural equation model used below relies on lagged values to allow for reciprocal effects between bicycle-commuting and bikeways, and the use of this model would be greatly complicated by an unbalanced time series. The risk of including these imputed values of the dependent variable is that they will add noise to the models, so my results can be considered conservative estimates of the statistical significance of observed relationships.

Methods of analysis

I used two methods of analysis. First, I computed a fixed-effects regression model. Fixed-effects regression only models change within cross-sectional units over time, allowing the analyst to control for the influence of time-invariant characteristics. However, fixed-effects regression cannot typically model a reciprocal causal relationship between two variables, such as that which may exist between rates of bicycle-commuting and bicycle infrastructure. To allow for a possible reciprocal relationship, I used structural equation modeling software to estimate a model with both fixed effects and a reciprocal relationship, as described by Allison (2017) and implemented by England, Allison, and Wu (2007).

3.4 Results

3.4.1 Fixed-effects model

Table 3.3 shows the results of the fixed-effects regression, which I performed using the function `plm` from the R package **plm** (Croissant and Millo 2018). I added predictors in three blocks. The first block consists of variables directly affecting the costs and benefits of bicycling in terms of time, money, and comfort. The second block is composed of demographic variables. The third block adds political and ideological variables and the interaction between environmental organizations and bikeway infrastructure. The main effect of environmental organizations is not included because this variable is time-invariant, and fixed-effects only models change over time within cross-sectional units.

To aid interpretation and comparison of effect sizes, I computed the expected change in the number of bicycle commuters caused by a shift of one interquartile range (IQR) in the predictor. For this computation, I held other predictors at their mean values, and I calculated effect sizes for a city with an average bicycle-commuting rate of 0.66% (the sample average) across the study period. I converted the bicycle-commuting rate to number of bicycle commuters by scaling to the sample average number of

Table 3.3: Fixed-effects regression of logit bicycle-commute mode share, 2000–2014

	Cost-Benefit	Demographics	Political	Reduced
Coefficients				
Bikeways, miles/sq. mile[a]	0.463 (5.379)**	0.244 (2.802)**	0.058 (0.552)	0.06 (0.58)
Pop. density[a]	0.174 (0.993)	-0.039 (-0.222)	-0.102 (-0.545)	
Public transit supply[a]	-0.047 (-0.52)	-0.011 (-0.126)	0.003 (0.032)	
Gas price	0.117 (4.166)**	0.113 (3.549)**	0.09 (2.353)*	0.109 (3.392)**
Cyclist fatality rate[a]	-0.178 (-3.184)**	-0.078 (-1.442)	-0.076 (-1.396)	-0.077 (-1.429)
Pct HHs w/o a car	0.029 (0.256)	0.137 (1.278)	0.11 (1.061)	
Avg daily precipitation[a]	-0.14 (-0.256)	-0.387 (-0.733)	-0.37 (-0.687)	
Pct days under 32°F[b]	0.051 (2.401)*	0.041 (1.987)*	0.039 (1.956)+	0.039 (1.932)+
Pct days over 90°F[b]	0.01 (0.707)	0.007 (0.536)	0.009 (0.633)	
Pct adults w/ bachelor's degree[b]		0.481 (3.502)**	0.381 (2.702)**	0.396 (2.886)**
Pct college students in pop[b]		0.278 (2.527)*	0.25 (2.091)*	0.295 (2.743)**
Pct pop. age 25-34[b]		0.718 (5.32)**	0.652 (4.628)**	0.654 (4.772)**
Pct voting for Democratic pres. candidate[b]			0.118 (1.087)	
Bicycle-ped advocacy strength[a]			0.058 (0.757)	
City bicycle-ped staff[a]			0.083 (0.844)	
Bikeways[a] * environmental orgs[a]			0.135 (1.824)+	0.167 (2.239)*
Model Fit				
Adjusted R^2	0.272	0.331	0.34	0.334
F-Statistic	39.899**	40.158**	31.496**	60.916**

Note: *t*-scores shown in parentheses.
Signif: $^{**}p < .01$ $^{*}p < .05$ $+p < .1$
[a]Log-transformed variable
[b]Logit-transformed variable

total commuters, which is 356,000. A 0.66% rate of bicycle-commuting with 356,000 total commuters amounts to 2,350 bicycle commuters. Effect sizes reported below can be interpreted as swings centered around this value.

Among cost-benefit variables, only bikeways, gas price, cyclist fatality, and percentage of days under 32°F have a statistically significant relationship to bicycle-commuting. In each case except cold weather, the relationship is in the expected direction: bikeways and gas prices are positively associated with bicycle commuting, and the cyclist fatality rate is negatively associated with bicycle commuting. Counter to expectations, bicycle-commuting is positively related to the number days having a high temperature less than 32°F. An increase of one IQR in bikeways is associated with 321 additional bicycle commuters, given the parameters described in the previous paragraph. For gas prices, a comparable increase is associated with 262 additional bicycle commuters. A one-IQR decrease in cyclist fatality predicts 213 additional bicycle commuters, and a one-IQR increase in days under 32°F predicts 43 additional bicycle commuters. The magnitude of these effect sizes points to the importance of using longitudinal data — previous cross-sectional studies estimated that adding one mile of bikeways per square mile was associated with an increase of a full percentage point in the bicycle mode share, which would amount to over 3,500 additional bicyclists in a city with 356,000 commuters (Dill and Carr 2003). Consistent with a recent cross-sectional study (Buehler and Pucher 2012), the supply of public transit and weather variables (excepting cold weather) were not significantly related to rates of bicycle-commuting. In contrast with past cross-sectional analyses, changes in residential population density were not significantly associated with bicycle-commuting, suggesting the cross-sectional relationship may be caused by unmeasured characteristics of cities or a past causal relationship that no longer holds (England et al. 2007).

All three demographic variables in the second block were significantly associated with bicycle commute mode share, controlling for cost-benefit factors. A one IQR increase in the percent of adults with a bachelor's degree or greater is associated with 183 additional bicycle commuters. Equivalent increases in the percent of college students in the population and in the percent of the population aged 25-34 are

associated with 136 and 222 additional bicycle commuters, respectively. The magnitude of the coefficients for bikeways and cyclist fatality rate decline noticeably with the inclusion of these demographic variables. This is consistent with the hypothesis that prospective college students and young, educated adults who enjoy bicycling are attracted to bicycle-friendly cities (Florida 2002, 2008). The magnitude of the coefficient for gas prices is not diminished when we control for these demographic characteristics.

Among political and ideological variables in the third block, support for the Democratic presidential candidate was positively associated with bicycle-commuting, but the coefficient was not statistically significant. As hypothesized, the interaction term between number of environmental organizations per 100,000 population in the year 2000 and growth of bikeways is positive, but is only marginally statistically significant. This suggests that in cities with a greater density of environmental non-profits, installing bikeways has a greater effect on bicycle-commuting. This effect could occur through one or both of two mechanisms. On the one hand, environmental organizations may actively publicize new bikeways and promote their use. On the other hand, the density of environmental organizations may simply indicate high levels of environmental concern in a city, and people with greater environmental concern likely have a greater affinity for bicycling given its low carbon footprint.

Surprisingly, changes in the strength of bicycle and pedestrian advocacy and in the number of city staff working on bicycle and pedestrian issues during this period are not significantly associated with changes in bicycle commuting rates. There are several possible explanations for this lack of association. First, these factors might influence bicycling not in the short term but in the long term. We wouldn't expect an increase in advocacy organizations' or city staff to immediately boost bicycling levels. Second, the influence of growing advocacy and municipal support for bicycling may occur mostly through the growth of the bikeway network, such that controlling for changes in bikeways masks the underlying effect of these factors. Additionally, there were substantial missing data for these variables. The high proportion of multiply imputed values for these variables may have dampened their association with bicycling by adding random noise.

The fourth column of Table 3 shows a reduced model including only variables that are significantly

associated with bicycle-commuting in at least one of the first three models. These coefficients are of similar magnitude to those in the saturated model, though the coefficient for the interaction term has a larger magnitude and is significant at a 0.05 alpha-level.

Figure 3.3 illustrates the interaction between bikeways and environmental organizations, based on the reduced model. The y-axis shows number of bicycle-commuters, scaled to the average number of commuters (356,000) of cities in the sample. The x-axis shows miles of bicycle lanes and paths, scaled to the average land area of cities in the sample (199 square miles). Thus, the figure shows how the effect of bikeways for an average city would differ if that city had a density of environmental organizations at the first or third quartile, fixing all other variables at the sample mean. The within-city IQR of bikeways was 0.46 miles per square mile, or 90 miles for a city of average size. For a city at the first quartile of environmental organizations, this change in bikeways results in 128 additional bicycle commuters. For a city at the third quartile of environmental organizations, the increase is 233 bicycle commuters. For a city with 3.5 million commuters (the number in New York City), the increase in bicycle-commuters would be 1,261 versus 2,292 with environmental organizations at the first and third quartiles, respectively. In other words, the higher density of environmental organizations increases the gains from added bikeways by 82%.

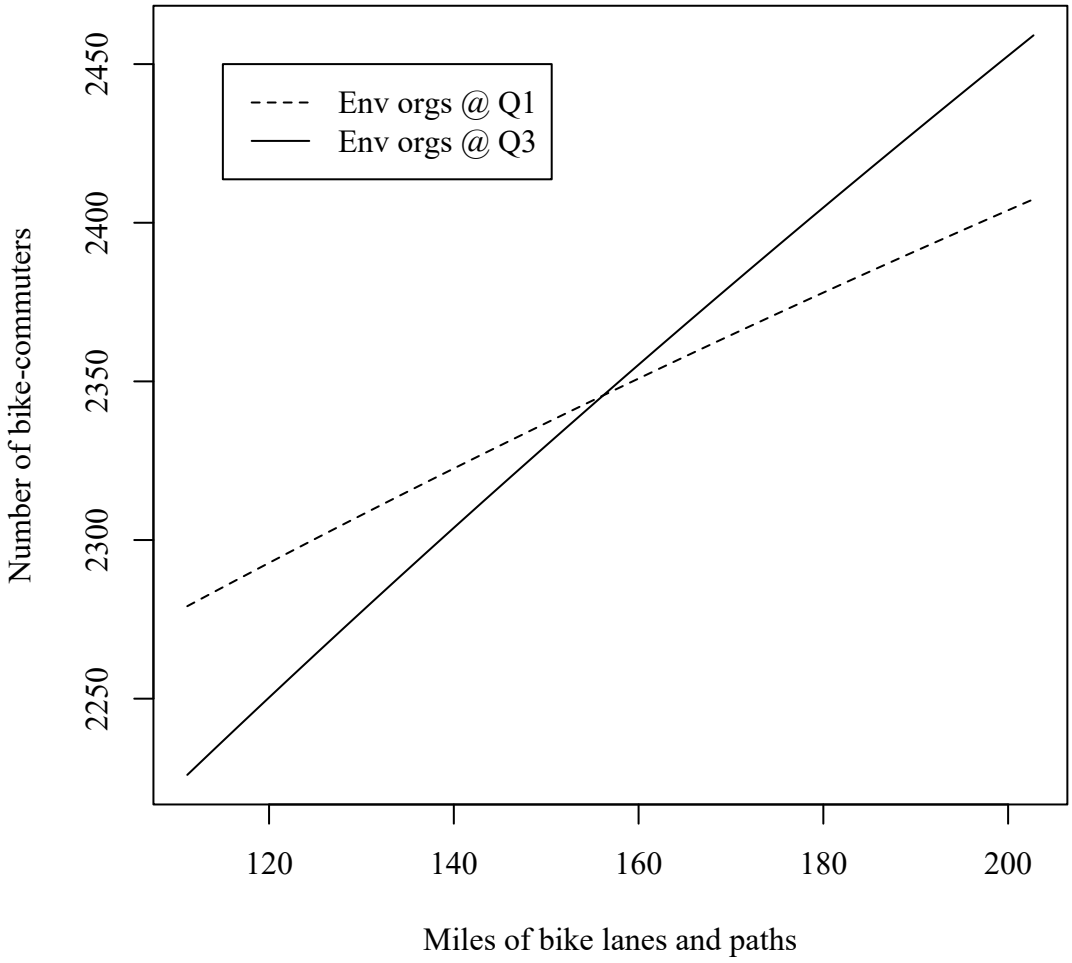


Figure 3.3: Difference in effect of bikeways depending on density of environmental organizations; increase in bicycle commuters when city shifts from first to third (within-city) quartile of bikeway extent, scaled for a city with average number of commuters (356,000) and land area (199 square miles)

3.4.2 Maximum-likelihood structural equation model

Fixed-effects models reduce the chance of omitted-variable bias by controlling for unmeasured time-invariant characteristics. However, fixed-effects models as typically estimated do not allow the analyst to

control for lagged values of the dependent variable, nor to account for possible reciprocal effects between the dependent variable and future values of an independent variable. However, Allison (2017) proposes an estimation technique using maximum likelihood and structural equation modeling (hereafter, ML-SEM) that controls for unobserved, time-invariant characteristics (a la fixed-effects), lagged values of the dependent variable, and reciprocal effects. The inclusion of lagged values of the dependent variable and modeling of reciprocal effects allows for a test of causal relationships that is arguably more conservative than a typical fixed-effects model, such as the one computed in the previous section. Moreover, in our case, it allows for a preliminary test of the causal effect of bicycle-commuting on bikeway construction, given the likely presence of reciprocal effects and the lack of past research on the factors influencing bikeway construction.

One trade-off of the ML-SEM approach is that it requires us to convert the data into wide form, with a separate variable for each year of each quantity measured. As the length of the time series lengthens relative to the number of cross-sectional units, the number of variables in the model quickly approaches the number of observations, and convergence becomes less likely. For this reason, the results shown here include few control variables. This is a clear limitation, and prevents us from drawing strong conclusions from these models. However, given the advantages of these models described above, they provide additional evidence in evaluating the effect of bikeways on bicycle-commuting, and preliminary evidence on the effect of bicycle-commuting on bikeway construction.

Table 3.4 shows the results of ML-SEM predicting bicycle-commuting rate, with varying time lags for the predictors and dependent variable. I fit this model using the function `sem` from R package **lavaan** (Rosseel 2012). In addition to the density of bikeways, predictors include average annual gas price (at the state level), number of environmental organizations per 100,000 residents in 2000 (time-invariant), the interaction between bikeways and environmental organizations, and lagged values of the dependent variable. Because bikeways and gas prices could plausibly have an immediate effect on bicycle-commuting, I tested lag lengths ranging from zero to three years, while the dependent variable was lagged from one to four years in the corresponding models.

The results in Table 3.4 provide additional support for the hypothesis that the effect of bikeways is moderated by the extent of environmental organizations in a city, with the interaction term significant and positive in all four models. These results also provide further evidence for the positive influence of gas prices on bicycle-commuting, and suggest that a change in gas prices takes at least a year to affect commuting behavior.

Table 3.5 shows the results of ML-SEM predicting bikeway construction by the lagged rate of bicycle-commuting. Changes in the rate of bicycle-commuting wouldn't affect bikeway construction immediately. A change in bicycle-commuting levels must be measured and recognized before it can affect bikeway construction, and new bikeways must undergo a planning process that takes months if not years. Similarly, any effect of change in the number of city staff working on bicycle and pedestrian issues is unlikely to occur in less than two years. Thus, I ranged the lag-length of these predictors from two to five years, and used the same lag lengths for lagged values of the dependent variable.

The results in Table 3.5 suggest that bikeway construction is more responsive to bicycle-commuting in cities with more environmental organizations. An interaction term between bicycle-commuting rate and environmental organizations is positive and significant in three out of four models, and marginally significant in the other model. The effects of changes in bicycle-commuting rates and in city staff working on bicycle issues manifest most strongly after three or four years.

Figure 3.4 illustrates the interaction effect between bicycle-commuting rate and environmental organizations, based on the four-year lag model, in which the magnitude of the interaction term is greatest. The y-axis shows the miles of bikeways, scaled to the average square mileage (199) of cities in the sample. The x-axis shows the number of bicycle commuters, scaled to the average total number of commuters, 356,000. The within-city IQR of bicycle-commuting rate was 0.38‰, which for a city with 356,000 commuters, and average bicycle rate at the sample mean (0.66‰), constitutes an increase of 1,340 bicycle commuters (from 1,764 to 3,104). For a city at the first quartile of environmental organizations, this change in bicycle commuting is associated with an increase of only 3 miles in bikeways.

Table 3.4: Maximum likelihood structural equation models of logit bicycle rate with varying time lags

	No lag	t - 1	t - 2	t - 3
Bikeways[a]	0.477 (2.364)**	0.222 (1.818)+	0.072 (0.698)	-0.063 (-0.634)
Gas price	0.044 (0.959)	0.155 (3.34)**	0.202 (6.284)**	0.256 (7.946)**
Environmental orgs per 100,000 residents, 2000[a]	0.049 (0.167)	0.132 (0.437)	0.265 (0.229)	0.241 (0.859)
Bikeways[a] * env. orgs[a]	0.318 (2.819)**	0.267 (3.717)**	0.256 (5.98)**	0.219 (3.406)**
Lagged bicycle rate[b,c]	0.173 (1.606)	0.196 (2.947)**	0.157 (3.217)**	0.15 (-5.441)**

Note: *z*-scores shown in parentheses.
Signif: $^{**}p < .01$ $^{*}p < .05$ $+p < .1$
[a]Log-transformed variable
[b]Logit-transformed variable
[c]Bicycle rate is lagged one more year than other predictors, that is, 1-4 years instead of 0-3.

Table 3.5: Maximum likelihood structural equation models of bikeways, log-miles per square mile, with varying time lags

	t - 2	t - 3	t - 4	t - 5
Bicycle rate[a]	0.052 (0.657)	-0.012 (-0.248)	-0.087 (-1.23)	-0.071 (-0.828)
City bicycle-ped staff per 100,000 residents[b]	0.063 (1.347)	0.11 (2.513)*	0.104 (2.292)*	0.076 (1.193)
Environmental orgs per 100,000 residents, 2000[b]	-0.151 (-0.326)	-0.061 (-0.224)	0.121 (0.521)	-0.108 (-0.501)
Bicycle rate[b] * env. orgs[b]	0.096 (1.684)+	0.095 (3.44)**	0.141 (3.589)**	0.112 (0.032)*
Lagged bikeways	0.564 (29.366)**	0.507 (5.466)**	0.473 (28.052)**	0.451 (7.033)**

Note: *z*-scores shown in parentheses.
Signif: $^{**}p < .01$ $^{*}p < .05$ $^{+}p < .1$
[a]Logit-transformed variable
[b]Log-transformed variable

For a city at the third quartile of environmental organizations, in contrast, the same increase in bicycle commuting is associated with an increase of 25 miles in bikeways. In other terms, a city with the higher density of environmental organizations is expected to build over seven times the extent of new bikeways as a city with fewer such organizations, in response to the same increase in bicycle commuting.

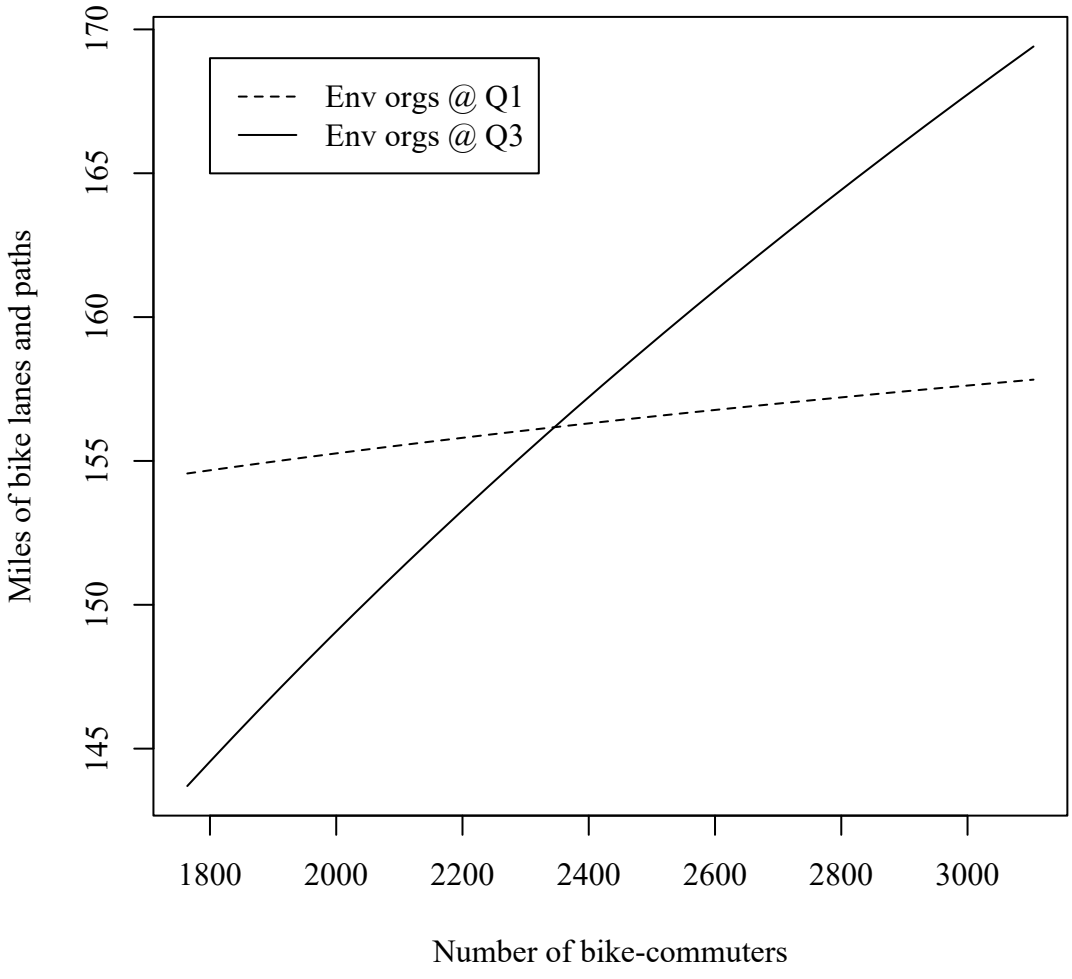


Figure 3.4: The effect of bike-commuting on subsequent bikeway construction is moderated by local environmentalism; increase in miles of bikeways when city shifts from first to third (within-city) quartile of bike commuters, scaled for a city with average number of commuters (356,000) and land area (199 square miles)

3.5 Discussion

The preceding analysis tested three hypotheses relating infrastructure and behavior. Hypothesis 1a, derived from the free-market perspective on infrastructure, posited that increases in bicycle-commuting would induce cities to build more bicycle infrastructure. Hypothesis 1b, derived from the political perspective on infrastructure, added the caveat that the effect of bicycle-commuting on bikeway construction would depend on the density of environmental organizations. The results of my ML-SEM analysis support Hypothesis 1b. The effect of increased bicycle commuting on bikeway construction is negligible in cities with few environmental organizations, but is substantial in cities with many such organizations.

Hypothesis 2 also sprung from the political perspective on infrastructure, predicting that the creation of bicycle infrastructure would induce increases in bicycle-commuting, but that this effect too would depend on the density of environmental organization. Using fixed-effects regression and ML-SEM, I found a significant and positive interaction effect between bikeways and environmental organizations, providing support for Hypothesis 2.

On the one hand, these results add to existing evidence, mostly cross-sectional, that bikeway infrastructure can induce bicycling, even when controlling for unmeasured, time-invariant characteristics and a host of material and demographic factors known to influence bicycling (in the fixed-effects model), and when controlling for lagged values of the dependent variable and possible reciprocal effects between bikeways and bicycle-commuting (in ML-SEM). On the other hand, the significant interaction effect with environmental organizations demonstrates that the effect of building bikeway infrastructure depends on the local political-cultural context.

In cities with relatively few environmental organizations, bikeway infrastructure was a minor influence on bicycle-commuting, relative to control variables, but in cities with many environmental organizations, bikeway infrastructure was among the largest influences on changes in bicycle-commuting from 2000-2014, second in influence only to gas prices. Similarly, increases in bicycle-commuting predicted

substantial new bikeway construction only in cities with high densities of environmental organizations. Thus, this analysis offers strong support for a political conception of social practice and infrastructure. Infrastructure only affects practice when combined with other elements, such as concern for environmental problems, into "configurations that work" (Shove et al. 2012), and the influence of practice on infrastructure is mediated by political processes. For scholars interested in the factors shaping social practices more generally, these findings point to the importance of both material infrastructure and mediating political-cultural factors.

The effect of environmental organizations is consistent with the notion that movement organizations can cultivate an "ecological habitus" that teaches skills and encourages attention to the sustainability of daily practices (Haluza-DeLay 2008). Material elements such as infrastructure or bicycles themselves are crucial to bicycling as a social practice, but meanings that make sense of a practice and practical know-how are equally important, and environmental organizations may help connect these elements. This is especially relevant in the US context, where cycling is viewed primarily as a recreational activity (Pucher et al. 2011). To become a bicycle-commuter, one must view cycling as a viable mode of transportation and acquire different skills and equipment than necessary for recreational cycling. Environmental organizations may introduce recreational cyclists to utilitarian cycling, and teach them about requisite skills and equipment.

Despite the encouraging conclusion that creating bicycle infrastructure can induce more bicycling, my analysis finds relatively small effect sizes for bicycle infrastructure, and the overall mode share of bicycle-commuting in US cities is still quite low. However, there are several reasons to be optimistic about the potential growth of bicycling in US cities. First, the isolated effect of bikeways may be small, but cities that have instituted a package of pro-bicycle policies have achieved rapid growth — in the case of Portland, OR, from 1.8% mode-share in 2000 to 7.9% in 2014. Second, development of bikeway infrastructure in the US is at an early stage, such that even in more bicycle-friendly cities, most trips cannot be completed exclusively on bicycle-dedicated infrastructure. Many potential cyclists may be dissuaded if they must share the road with car traffic at any point in their journey, so growth in

bicycling may accelerate as bikeway-network connectivity increases. Third, planning preferences are shifting toward protected bicycle infrastructure, which could attract riders who demand separation from car traffic. Fourth, growth in bicycling may accelerate due to the "safety in numbers" phenomenon: bicycling becomes demonstrably safer as the number of bicyclists on the road increases (Jacobsen 2003). Finally, the promotion of bicycling in the US has thus far proceeded mostly without efforts to restrict or increase the costs of car travel. Restricting car traffic through measures such as congestion charges may be doubly effective because it pushes some drivers to alternative modes, and simultaneously makes walking and bicycling safer and more pleasant by reducing car traffic (Pucher and Buehler 2008). If the political will can be mustered to make car travel less convenient (an admittedly big "if"), the growth potential of bicycling would increase substantially.

Future research should address the limitations of this analysis. One limitation is the lack of data on key quantities of interest. This includes a general scarcity of longitudinal data on social practices, changes in infrastructure, and political-cultural trends relevant to practices of interest. The ACS provides an increasingly long, reliable, annual time series of data on bicycle-commuting, but data on infrastructure has spottier coverage and is less reliable due to reliance on city self-reports. The construction of bikeways likely increases bicycling for all purposes, but there are currently no city-level data on cycling for non-work purposes. Although the ACS provides data on commute times, it does not measure commute distance, which is doubtless an important determinant of travel mode choices. Moreover, longitudinal data on cultural beliefs, such as environmental concern, at the city or state level is virtually non-existent. Including a direct measure of environmental concern would have allowed us to separate out the effects of individual beliefs from the organizational resources provided by environmental organizations. Finally, studies using disaggregate data on travel behavior will continue to be an important complement to aggregate studies in understanding the effects of cultural beliefs and infrastructure on practice.

For most of the 20th century, many factors aligned to tighten the grip of automobility in the US. In recent decades, some of these factors have shifted in ways that could loosen that grip. Deindus-

trialization and urban revitalization have transformed cities from production to consumption centers, and the growth of suburbs has slowed relative to central cities (Frey 2012; Zukin 1989). Meanwhile, planners have come to view urban sprawl as unsustainable and have shifted from car-dependent fringe development to walkable and bikeable urban-infill development. Creating amenity-rich communities is now seen as crucial to attracting an educated, post-industrial workforce (Florida 2002). Concern about the impact of automobile emissions on climate change has been added to a list of automobile-related concerns such as air and water pollution, public safety, and foreign oil-dependence. The results of the preceding analysis suggest that shifts in transportation infrastructure have a part to play in this larger constellation of changes that may eventually precipitate a "tipping point" and the emergence of a transportation system less dependent on the "steel and petroleum" automobile (Urry 2004). In subsequent chapters, I analyze the political arrangements that explain variation in the adoption of bicycle friendly policies, such as bicycle infrastructure, with the goal of formulating a model for mobilizing the political power necessary to de-center the car in urban transportation.

Chapter 4

Correlates of bicycle friendly policy among large U.S. cities

In the previous chapter, I found that the construction of dedicated bicycle infrastructure does increase rates of bicycling to work, particularly in cities with a high density of environmental organizations. This suggests that building bicycle infrastructure, and adopting other policies that encourage bicycling, can help reduce greenhouse gas emissions by replacing some car trips with lower-emission bicycle trips.

This raises the question of why some cities have invested more resources than others in bicycle infrastructure and other bicycle friendly policies (BFPs). In other words, what are the political factors that explain variation in the adoption of bicycle friendly policies? In particular, I am interested in the role of powerful actors in business, banking, and real estate – members of the "growth coalition" (Molotch 1976) – in the adoption of BFPs.

Figure 4.1 shows how this analysis fits into my larger argument about the sources of variation between US cities in the adoption of bicycle friendly policies. In particular, this analysis provides evidence for the positive relationship between the importance of Creative Class occupations in a city and the adoption of BFPs. Given the lack of quantitative measures of the currency of the Creative Class discourse and of growth-coalition involvement in bicycle friendly policymaking, the analysis of this

chapter does not provide evidence for the mechanism of this relationship, which I argue flows through relationships 1+, 2+, 3+, and 6+ in Figure 4.1. Instead, I will in chapter 5 use a qualitative case study analysis to address the question of *how* the importance of Creative Class occupations influences BFPs. In addition to establishing the correlation between Creative Class occupations and BFPs, the analysis in this chapter provides a means of cases that will provide a balanced test of my claims regarding the mechanism of that relationship.

In contrast to the question of what policies can induce bicycling, which has received a great deal of attention in the transportation literature, the factors explaining variation in the adoption of BFPs are not well-researched. Nonetheless, given that BFPs are generally viewed as environmentally friendly policies, we can draw on past research on predictors of urban environmental policy to build a list of likely correlates of BFPs. In this chapter, I review past work on the correlates of urban environmental policy to facilitate an exploratory quantitative analysis predicting the adoption of BFPs. I then use the results of that exploratory analysis to select cases for qualitative analysis that will allow for a balanced appraisal of the influence of growth-coalition actors and interests in the adoption of BFPs.

4.1 Predictors of urban environmental policymaking

Why do some governmental units take action on certain perceived environmental problems, while others do not? If we seek to understand the policies adopted by local governance units, such as a municipal or county government, we can look internally, at the structure and composition of the governance unit itself, or externally, at the forces seeking to influence its decision-making. External forces can be further subdivided into influence from non-governmental actors, such as interest groups and citizens, and influence from other governmental units. These divisions yield three categories of influence on local environmental policymaking. First, internally, the structure and composition of local governance units,

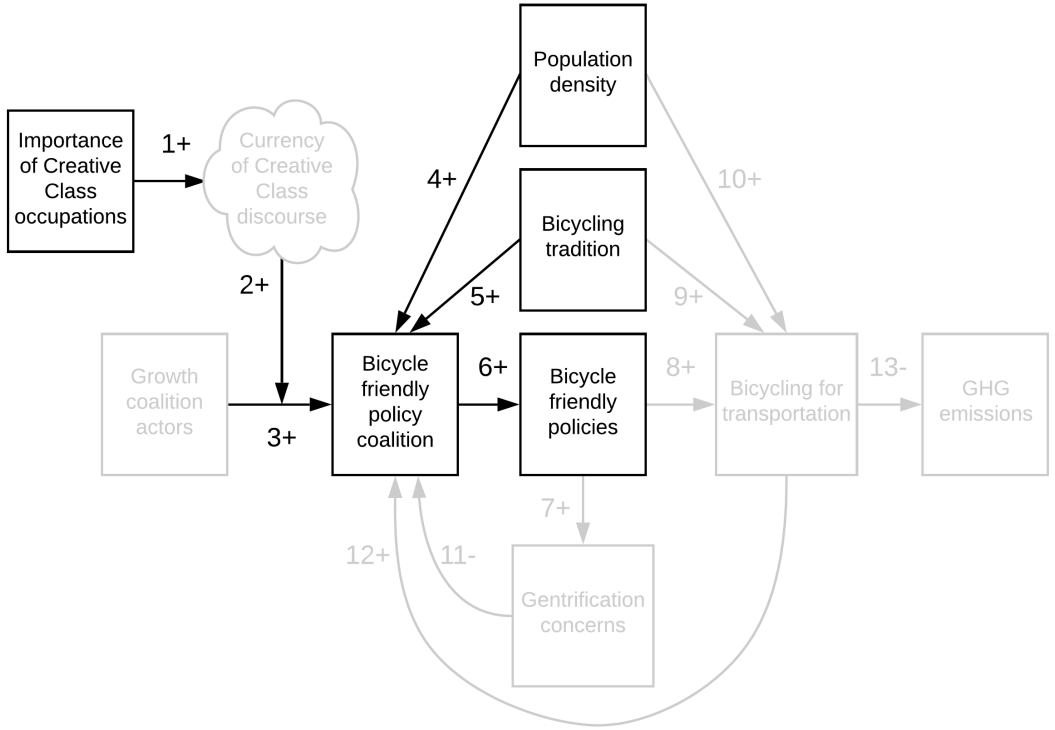


Figure 4.1: Conceptual focus of chapter 4

as well their existing policy commitments, may influence policy. Second, externally, the political environment, including the presence of interest groups lobbying for or against policy change and the demographic characteristics of the population, may influence policy. Finally, local government policies may be influenced by the policies of other governmental units, including through constraints imposed or opportunities provided by higher levels of government as well as through horizontal diffusion of policies from other governments at the same level.

4.1.1 Governance structures, officials, and policy commitments

Just as the political context of a governmental unit can influence the policies it adopts, so too can the structure and composition of the unit itself. Cities with longer-tenured, stronger mayors (Lubell et al. 2009b) or a professional city manager, and those who have devoted more staff to climate and sustainability issues, adopt more climate-related policy initiatives (Simon Rosenthal et al. 2015). Similarly, cities with mayors who agree that cities should take action on climate change, and cities that are signatories of the Mayors' Compact on Climate Change, implement more climate change mitigation activities than those without such characteristics (Wood et al. 2014). In general, it seems that mayors are more responsive to popular opinion than are city managers (Krause 2011).

Jepson (2004) finds that many city planning offices have taken leadership roles in sustainable development, but calls on planners to push for more comprehensive plans for urban sustainability. Planners and other public officials may sometimes act as "policy entrepreneurs" (Kingdon 2013). For instance, cities with staff members or elected officials who advocate for GHG reducing activities tend to engage in more climate change mitigation practices (Krause 2012).

Some cities have addressed climate change by signing one of several agreements by which they pledge to monitor and reduce greenhouse gas (GHG) emissions. Several studies have examined the factors that predict signing of such agreements, and that predict following through on the requirements of those agreements. These studies indicate that cities' risk from climate change (such as coastal location) is not associated with the signing of climate agreements, but dependence on carbon-intensive

industries and practices (such as solo car-commuting), citizens ideology, policy diffusion, and civic capacity (presence of environmental organizations, involvement in other environmental causes, and high income and education) are associated with signing such agreements (Yi and Feiock 2015; Zahran et al. 2008b). While "fiscally strapped" US cities are more likely to sign such agreements, motivated by potential cost-savings, they are also less likely to follow through on the requirements once they have signed (Sharp et al. 2011). Cities with greater fiscal health and higher revenues may be more likely to adopt sustainable policies across a range of policy domains (Krause 2012; Lubell et al. 2009a). Mayors and other proponents of signing climate agreements often emphasize "co-benefits," such as cost-savings and economic development, rather than the direct impact on climate change mitigation. Mayors may act as "policy entrepreneurs" in pushing to join climate agreements, but mayoral leadership may actually inhibit institutionalization of policies to monitor and reduce emissions (Bulkeley and Betsill 2005). However, in cities led by mayors rather than city managers, the prevalence of environmental nonprofits is positively associated with achieving agreement milestones, suggesting that nonprofits may help to implement and institutionalize climate friendly policies (Sharp et al. 2011).

Though in some cases the joining of a climate change agreement may be an effectively symbolic step, there is some evidence that membership may contribute to concrete action. For example, US cities joining USCMCPA issued more green building certificates (Lee and Koski 2012), and membership in USCMCPA or ICLEI was associated with higher investment of human and financial resources in sustainability (Hawkins et al. 2016). On the other hand, termination of ICLEI membership does not seem to significantly change cities sustainability policies (Yi et al. 2016).

Spanish cities' decision to join the European Covenant of Mayors was influenced by population, presence of renewable energy resources, fiscal and environmental stress, citizens' political preferences, contagion from neighboring cities, and levels of unemployment (del P. Pablo-Romero et al. 2015).

4.1.2 Non-governmental actors

Social movement actors and organizations pushing for action on what they perceive as an environmental problem may prompt city officials to act. Cities with higher rates of participation in political and community activities tend to have more extensive sustainability programs (Portney and Berry 2010), as do cities with higher levels of advocacy from environmental and sustainability groups (Portney and Berry 2016). However, the mere presence of social movement organizations seeking redress for an environmental problem does not guarantee action on the issue. Social movement success in inducing action is influenced by many factors, including the choice of political venue. Social movements may engage in "venue shopping" to choose a venue where they have the greatest chance of success, and "vested interests" seeking to preserve the status quo may block access to certain political venues (Ley 2016).

The flip side of social movement organizations are "vested interests," groups that may have been agitators in the past, but now have secured policies favorable to their cause and act as defenders of the status quo (Ley 2016; Moe 2015). In the case of climate change, one group with vested interests in the status quo are firms in carbon intensive industries. The prevalence of manufacturing businesses in a city was not associated with membership in ICLEI's Cities for Climate Protection (CCP) program, but it was negatively associated with achievement of CCP program milestones in cities led by a mayor (rather than a city manager) (Sharp et al. 2011). The prevalence of manufacturing was negatively associated with membership in the US Conference of Mayors Climate Protection Agreement (USCMCPA), but this effect was very small in substantive terms (Krause 2011). The prevalence of development industries was positively related to the sustainability of city policy in California's Central Valley (Lubell et al. 2009a), contrary to expectations that "growth coalition" members would resist environmental protection (Molotch 1976; Molotch and Logan 1984). The strength and nature of government ties to industry shapes the form of regulation of that industry. This is particularly the case with fossil fuels, given the importance of this industry to the economies of regions where fossil fuels are extracted (Carter and Eaton 2016; Davis 2012). More work is needed on which types of businesses mobilize against climate

change mitigation efforts. Similarly, research on policies to promote compact development suggests that developers may be more opposed to some types of policy instruments than others, according to their redistributive consequences (Ramirez de la Cruz 2009).

To the extent that growth-coalition actors are influential in a locality, they are likely to support policies to attract residents, businesses, and tourists to their city. One motivation for a sub-national government to engage in environmental protection is to make their region more attractive to potential residents and employers. Rhetoric that stresses the importance of attracting "creative class" workers and businesses has gained traction among city officials and academics, and this may serve as motivation for environmental protections that make cities safer and more enjoyable places to live (Florida 2002, 2008; Simon Rosenthal et al. 2015). In a study of over 800 US cities, Simon Rosenthal and colleagues find that the only significant state-level predictor of climate policy is tourism spending (2015).

In some cases, external actors may enter into a durable relationship with governance units in administering policies in a certain issue area, a situation conceptualized as a "policy regime" or "governance arrangement". A policy regime is the "set of ideas, interests, and institutions that structures governmental activity in a particular issue area" (McGuinn 2006, p. 206). Policy regimes vary in strength and coherency, and this can shape the form of policy action. The strong policy regime around shale gas extraction in Poland led to the development of specific policies regulating fracking, whereas the weaker policy regime in Bulgaria resulted in a blanket ban on the practice (Goldthau and LaBelle 2016).

A related concept is that of governance arrangements, which captures the "set of arrangements which engage key external non-state actors who provide critical resources, such as expert knowledge and implementation resources, in collaboration with local government actors" (Lee and Painter 2015, p. 568). In a comparative case study of four cities, Lee and Painter (2015) find that well-developed governance arrangements are associated with comprehensive climate change policies.

In addition to the prevalence of various interest groups, the general political and demographic composition of local residents may also influence environmental policy. Many studies have found regional variations in ideology of political elites or the general public to influence policy action on environmental

issues (Bromley-Trujillo et al. 2016; Vasseur 2014). US states and localities that vote more Democratic may be more likely to adopt climate change mitigation policies (Vasseur 2014; Wood et al. 2014), though some studies find no effect (Krause 2012). More Democratic-voting cities may also be more likely to join climate agreements (Krause 2011). Among signatories to the ICLEI's CCP program, cities with more Republican voters were more likely to abandon the agreement later on (Krause et al. 2015), and municipalities in the conservative Dallas-Fort Worth, Texas region that attempted to increase climate protection activities faced pushback that stalled progress (Foss and Howard 2015). More populous cities have consistently been found to engage in more sustainability and climate change mitigation activities (Krause 2012; Lubell et al. 2009a). Cities where residents have higher levels of education and income may also be more likely to make symbolic and real commitments to climate change mitigation (Hawkins et al. 2016; Krause 2011, 2012; Lubell et al. 2009a).

4.1.3 Intergovernmental influence

Environmental policymaking may occur at various levels of government, all the way from the supranational to the local level. In the context of federal systems such as the United States and Canada, there is substantial debate over the extent of influence that state or provincial governments have over local governments. In the case of infrastructure projects for bicyclists and pedestrians, scholars have argued that state transportation agencies exert substantial influence over local governments, with various states acting as obstructionists and others as catalysts (de Zeeuw and Flusche 2011). In the case of climate action plans, however, there seems to be less state influence on cities (Simon Rosenthal et al. 2015; Krause 2011), suggesting that the influence of states may vary for different types of policies.

In the contemporary United States, federal gridlock on environmental issues such as climate change has meant that any action on these issues must take place at the level of state or local governments. Thus, some US cities and states have become leaders in innovative climate change mitigation policies (Katz and Bradley 2013; Rabe 2008). This development is in some ways surprising, given that climate change is a classic "tragedy of the commons" issue, and states and cities are unlikely to see any direct

environmental benefits from reducing their own emissions. However, efforts to reduce emissions can have economic benefits, such as new jobs in the renewable energy sector, and can boost the political profile of local politicians, given the media attention to climate change and the general public's desire for more government action on the issue (Engel 2006). Moreover, some cities are especially vulnerable to the changes that are predicted from climate change, and cities who perceive they have much to lose from climate change may be more likely to take action.

Interestingly, the adoption of local climate change mitigation and adaptation plans is not strongly associated with national plans (Heidrich et al. 2016). However, cities who collaborate with their county governments on sustainability issues tend to commit more resources to those efforts (Hawkins et al. 2016).

Bulkeley and Betsill (2005) argued that municipal action on climate change is best understood through the concept of "multilevel governance," which considers the relations between different levels of government and between spheres of authority that overlap in the governance of certain issues. In the case of the US and Australia, federal inaction on climate change may have actually spurred local action on the issue (Gore and Robinson 2009). At this stage, networked forms of climate governance, through networks such as the ICLEI's Cities for Climate Protection, may be the most important source of guidance and information sharing for cities (Bulkeley and Betsill 2013). Thus, climate change seems to be another domain in which traditional relations between states and subnational governments are being reconfigured.

Policy action may be spurred by diffusion from neighboring governments which have taken action on an issue (Bromley-Trujillo et al. 2016; Krause 2011; Vasseur 2014). The role of diffusion in determining governmental action on environmental issues has focused researchers' attention on "first-movers," who may create a policy template for addressing an issue which will then be emulated by other governments. First-movers may help determine whether states "race to the bottom", prioritizing short-term economic gain over environmental protection, or "race to the top," devising innovative methods to regulate economic activity to protect environmental amenities (Carter and Eaton 2016; Rabe and

Borick 2013).

4.2 Predicting bicycle friendly policies

Since the early 1990s, US cities have enacted a growing number of "bicycle-friendly policies" (BFPs) – policies aimed at promoting bicycling and making it safer and more convenient. Transportation and planning scholars have studied the efficacy of these policies for increasing bicycling rates, but comparatively little is known about the political question of why some cities have pursued such policies more vigorously than others. Given the lack of knowledge on the determinants of BFPs, I turned to related research on the determinants of local environmental policymaking to orient my inquiry into BFPs. Bicycle policymaking may plausibly be related to environmental policy making, given the association of bicycling with "green" behavior and the potential to reduce greenhouse gas emissions by replacing car trips with bicycle trips. On the other hand, bicycle policymaking may diverge from environmental policymaking, both because it may not be a top priority among environmentalists, and because BFPs are also pursued for non-environmental reasons, most notably for benefits in public health, public safety, and traffic congestion.

Keeping in mind the potential for both convergence with and divergence from the dynamics of environmental policymaking, I included in my exploratory analysis of BFPs predictors that are known to influence local environmental policymaking as well as some novel predictors that may influence bicycle policymaking specifically. In addition to the lack of explicit guidance on the factors that influence BFPs, there are two other challenges to this exploratory analysis. First, there are many potential predictors relative to the limited number of observations for which measures of BFPs are available. Second, many of these predictors are highly correlated with each other, making it difficult to disentangle their influence. In response to these challenges, I used the data-mining technique of all-subsets regression, implemented using the `leaps` function from R package **leaps** (Lumley 2020). In this technique, the analyst provides a list of predictor variables, and the procedure finds the best combinations of those

predictors (as measured by a chosen fit statistic, in this case, adjusted R-squared) for every model size, from a one-predictor model to a model including all predictors but one. By exhaustively comparing every possible combination of predictors, this approach avoids the pitfalls of stepwise regression, where the order in which the analyst adds predictors to the model may influence the choice of the best model. Moreover, this technique is helpful when some predictors are highly correlated. When going down the list of best models for a given number of predictors, the analyst can see which predictors act as "substitutes" for one another by noticing which predictors come into the model as the next best predictor when another predictor is removed. The presence of such substitutes also points to the need for qualitative analysis to disentangle the influence of correlated variables.

For my exploratory regression analysis, I included the 60 most populous US cities (technically, census designated places) as of 2015. Table 4.1 lists the predictors included in the all-subsets regression procedure, and Table 4.2 shows the correlations between these variables, with correlations greater in absolute value than 0.5 highlighted in red and those greater than 0.4 highlighted in orange. The first four predictors come straight from the environmental policymaking literature. Research in this area has consistently found that cities with more environmental organizations, and cities where the population is more politically liberal, well-educated, and higher income, tend to pass more policies to protect environmental amenities. Predictors 5, 6, and 7 are measures of the occupational distribution, and by extension, the distribution of various industries, in a city – the percent of the workforce in extraction, manufacturing, and "Creative Class" occupations. All three of these variables have been studied by environmental policy researchers, but not to the extent of the first four variables, and conclusions about their influence have been mixed. Predictors 8 through 12 are all bicycling-specific predictors. More densely populated cities may be better suited to bicycling, and may face more problems with congestion from car traffic. Cities where more households own a car likely face less political pressure to accommodate bicyclists. Cities with a tradition of bicycling that pre-dates the growth of BFPs beginning in the early 1990s may have more BFPs than would otherwise be expected. Young adults are the most likely age group to commute by bicycle, and African Americans are the least likely racial group to bicycle commute, according

Table 4.1: Predictors of bicycle friendly policies included in all-subsets procedure

	Label	Description
1	Liberal Ideology[a]	Average percent voting for Democratic presidential candidate, 2000-2012
2	Environmentalism[b]	Log number of environmental non-profits per log population, 2000
3	Education[c]	Percent of adults 25 and over with a graduate or professional degree
4	Income[c]	Median household income
5	Fossil Fuels[c]	Percent of workforce in extraction occupations
6	Manufacturing[c]	Percent of workforce in manufacturing occupations
7	Creative Class[c]	Percent of workforce in management, business, science, and arts occupations
8	Population Density[c]	Log population per square mile
9	Car Access[c]	Percent of households with at least one vehicle
10	Bicycling Tradition[d]	Logged bicycle commute mode share in 1990
11	Young Adults[c]	Percent of population aged 25 to 34
12	Race[c]	Percent of population identifying as Black or African American alone
13	Population[c]	Log city population

[a]Source: County-level voting data from CQ Voting and Elections Collection
[b]Source: National Center for Charitable Statistics
[c]Source: American Community Survey 2011-15 Estimates
[d]Source: 1990 US Census

to the Census Bureau (McKenzie 2014), and thus the representation of these groups might influence political pressure for BFPs. Finally, total city population is included to control for any influence of city size. Table 4.3 lists the best-fitting models for predicting a composite score of BFPs, ranging the number of predictors from one to seven. Population Density is the best single predictor, explaining 47% of the variation in BFPs. The next five best single predictors (not shown in Table 3) are Young Adults, Environmentalism, Liberal Ideology, Education, and Car Access, in that order, which explain between 32 and 35% of the variation in BFPs. However, the fact that none of these variables appears in the best two-predictor model highlights the fact that they explain much of the same variation explained by Population Density.

Table 4.2: Correlation (scaled from -100 to 100) between predictors included in all-subsets regression (see Table 4.1 for variable number key)

	1	2	3	4	5	6	7	8	9	10	11	12	13
2	59												
3	51	73											
4	11	16	54										
5	-25	-40	-19	5									
6	-24	-44	-68	-36	-4								
7	44	66	96	57	-15	-74							
8	59	35	28	22	-20	1	16						
9	-66	-52	-43	-7	14	24	-33	-70					
10	16	17	27	39	-1	-32	25	34	-3				
11	48	65	79	37	-16	-50	77	39	-42	23			
12	36	22	8	-51	-11	7	3	1	-33	-50	9		
13	23	33	9	8	-14	-9	9	30	-48	-15	17	0	

Table 4.3: Best fitting models with one to seven predictors

Size	Best Model	Adj. R-square	R-square
1	Population Density	0.46	0.47
2	Creative Class + Population Density	0.63	0.64
3	Creative Class + Population Density + Bicycling Tradition	0.64	0.66
4	Income + Creative Class + Population Density + Race	0.69	0.71
5	Liberal Ideology + Income + Creative Class + Population Density + Race	0.70	0.73
6	Income + Creative Class + Population Density + Bicycling Tradition + Race + Population	0.70	0.73
7	Liberal Ideology + Income + Creative Class + Population Density + Bicycling Tradition + Race + Population	0.70	0.74

The best two predictor model again includes Population Density, but adds the Creative Class variable. Together, these two variables explain 64% of the variation in BFPs. The Creative Class variable alone can explain 27% of the variation in BFPs, but some of that variation can also be explained by Population Density, which is why the total variation explained only increases by 17% when Creative Class is added to the model. Population Density is in all of the 10 best two-predictor models, and the second variables in the next four best two-predictor models are all highly correlated with the Creative Class variable: Education, Manufacturing (negatively correlated), Environmentalism, and Young Adults. These four two-predictor models explain between 60 and 63% of the variation in BFPs. Thus, these regression results suggest that some combination of Creative Class, Education, Manufacturing, Environmentalism, and Young Adults are important influences on BFPs, leaving further qualitative analysis to identify exactly which factors have how much influence.

The best three predictor model adds Bicycling Tradition and explains an additional 2% of the variation in BFPs, 66% total. Substituting Environmentalism or Race for Bicycling Tradition yields alternative models also explaining about 66% of total variation, indicating that all three of these variables can explain a small amount of variation not explained by Population Density or Creative Class.

The best four predictor model replaces Bicycling Tradition with Income and Race and explains an additional 6% variation, 72% total. Controlling for other variables in this model, both Income and Race (percent African American) are negatively related to BFPs.

The best five predictor model adds Liberal Ideology (positive coefficient) for an additional 1% of variation explained. The best six predictor model trades Liberal Ideology for Bicycling Tradition and Population and adds less than one percent of variation explained. Finally, the best seven predictor model includes all the variables appearing in any of the smaller best models, and explains 74% of total variation, with the adjusted R-square plateauing at 0.70.

By examining scatterplots of our BFP score and its residuals, we can identify which cities are explained by which predictors, which can aid in the selection of cases. Figure 4.2 shows a plot of BFP score by Population Density, with a regression line corresponding to the best one predictor model. The figure

shows that BFPs are well predicted by population density, though a few unexplained cases stick out, most notably Portland and Minneapolis on the positive side, and Dallas, Arlington, Detroit, Anaheim, and Santa Ana on the negative side.

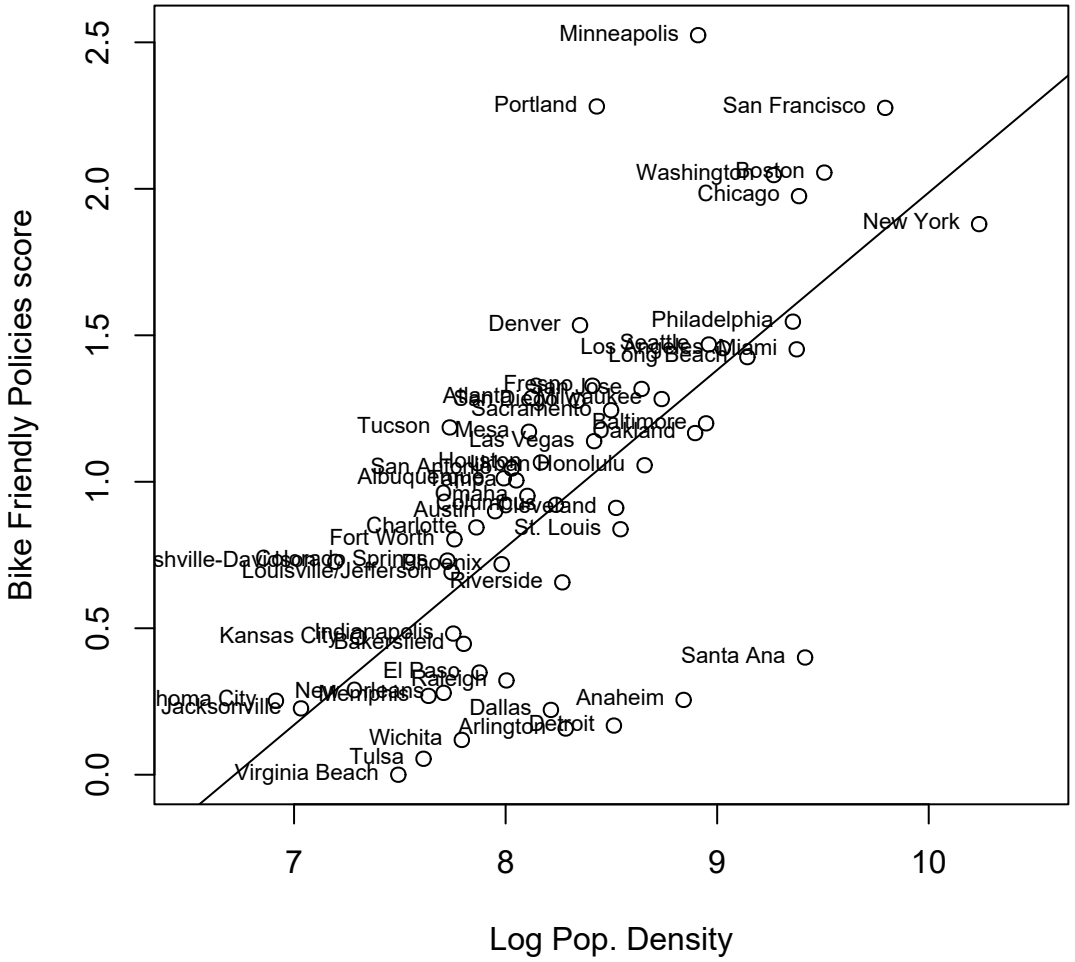


Figure 4.2: BFP Score by Population Density

Figure 4.3 show the residuals from a regression of BFP score on Population Density, plotted against the Creative Class variable. This plot shows that the Creative Class variable helps explain a few cities that were substantially above the regression line in the previous plot, especially Boston, San Francisco,

Atlanta, and Washington, D.C. It also helps explain a few low standout cases from the previous plot, such as Santa Ana, Detroit, and Anaheim, though these cases remain noticeably below even this regression line.

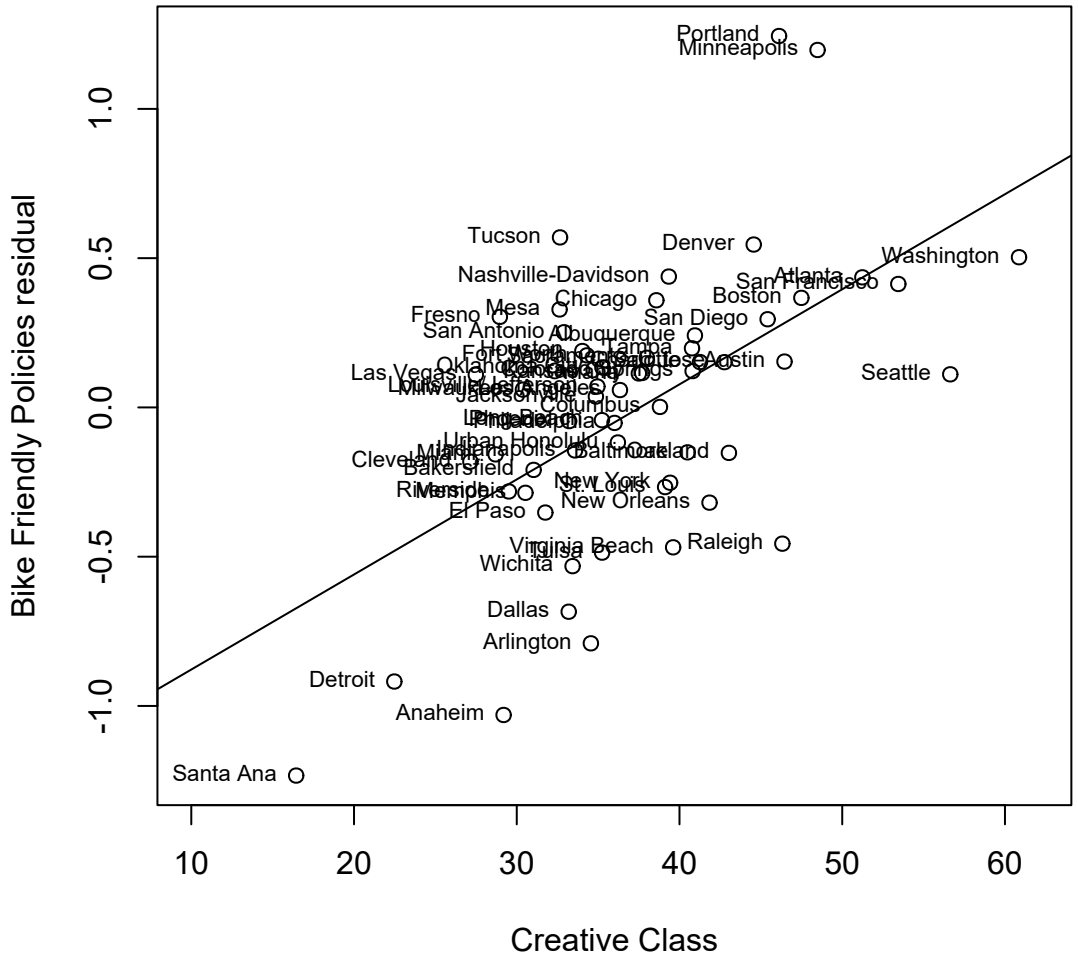


Figure 4.3: BFP Score Residuals by Creative Class

Figure 4.4 shows the residuals from the regression of BFP score on Population Density and Creative Class, plotted against Bicycling Tradition. As we can see, Bicycling Tradition chips away at the unexplained variation for a few high BFP cases such as Tucson, Minneapolis, Mesa, Portland, and Fresno,

all of which were leading bicycle commuting cities in 1990. It also helps explain low BFP city Detroit, but not other unexpectedly low BFP cities such as Santa Ana, Anaheim, and Seattle, all of which had fairly high rates of bicycle commuting in 1990.

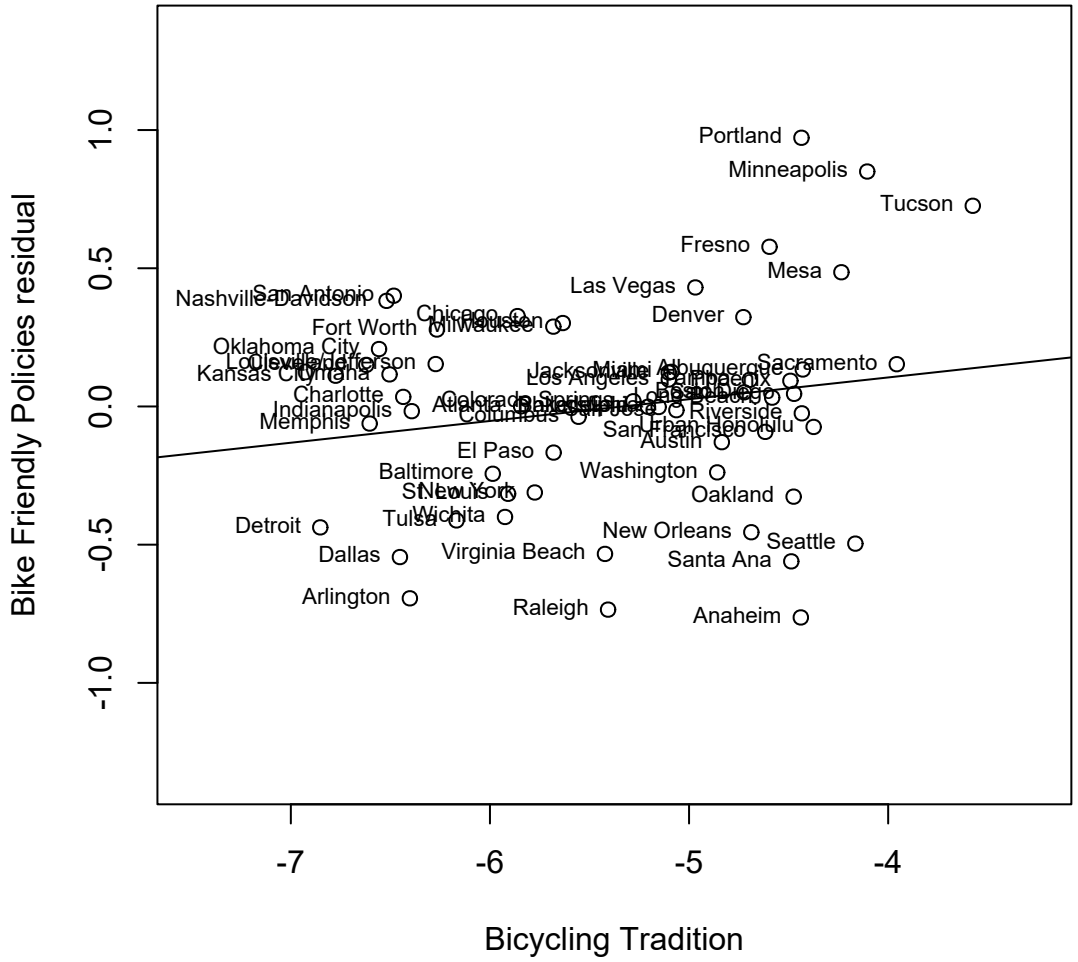


Figure 4.4: BFP Score Residuals by Bicycling Tradition

Although Bicycling Tradition was in the best three predictor model, the best four predictor model features Race and Income instead. Moreover, among three predictor models, Population Density + Creative Class + Race explains almost as much variation as the top model, rounding up to 66%. Thus,

Figure 4.5 shows the residuals from the best two predictor model plotted against Race. This plot is in some ways a mirror image of Figure 4.4, with Mesa, Tucson, Portland, Fresno, and Minneapolis all having relatively low percentages of African-American residents, and Detroit having a high percentage, which helps to explain the BFP scores of these cases.

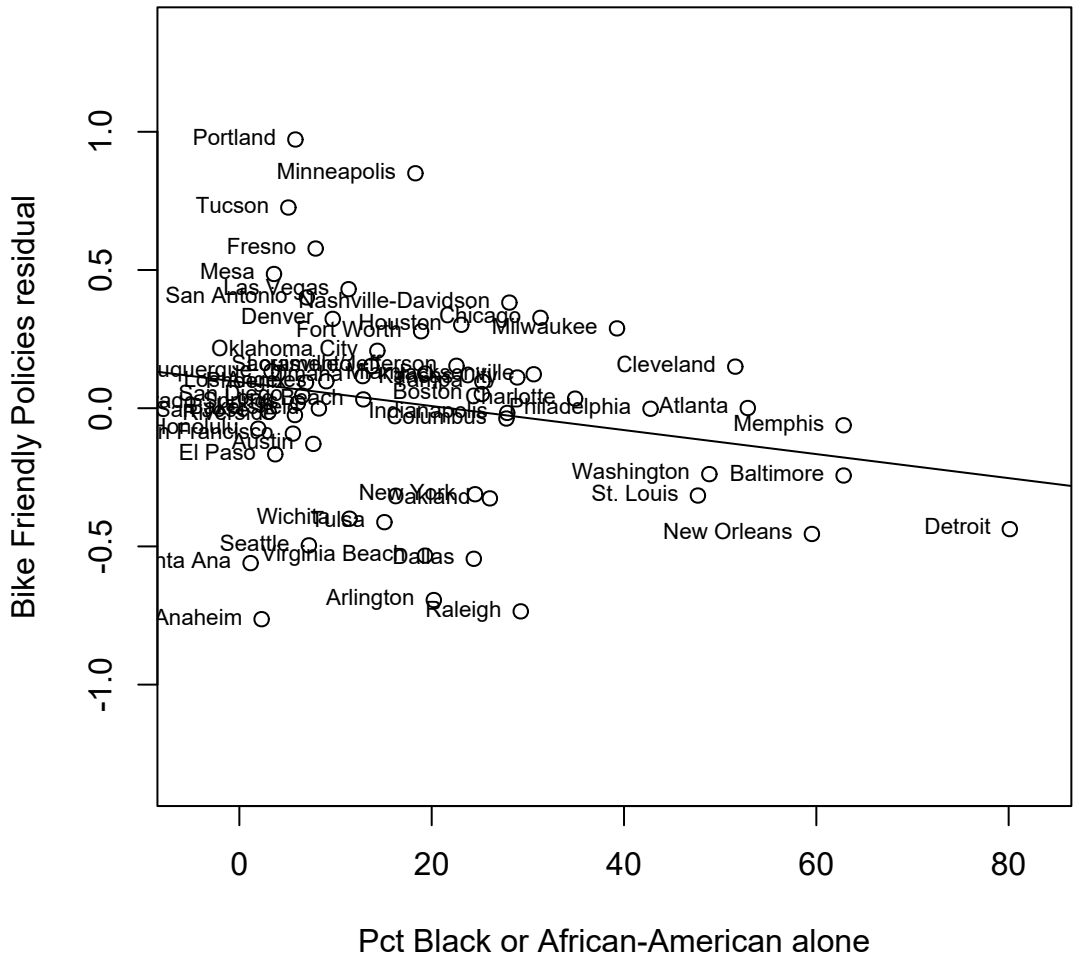


Figure 4.5: BFP Score Residuals by Race

Figure 4.6 shows the residuals from a regression of BFP score on Population Density, Creative Class, and Race plotted against Income. These four predictors make up the best four predictor model,

accounting for 72% of total variation.

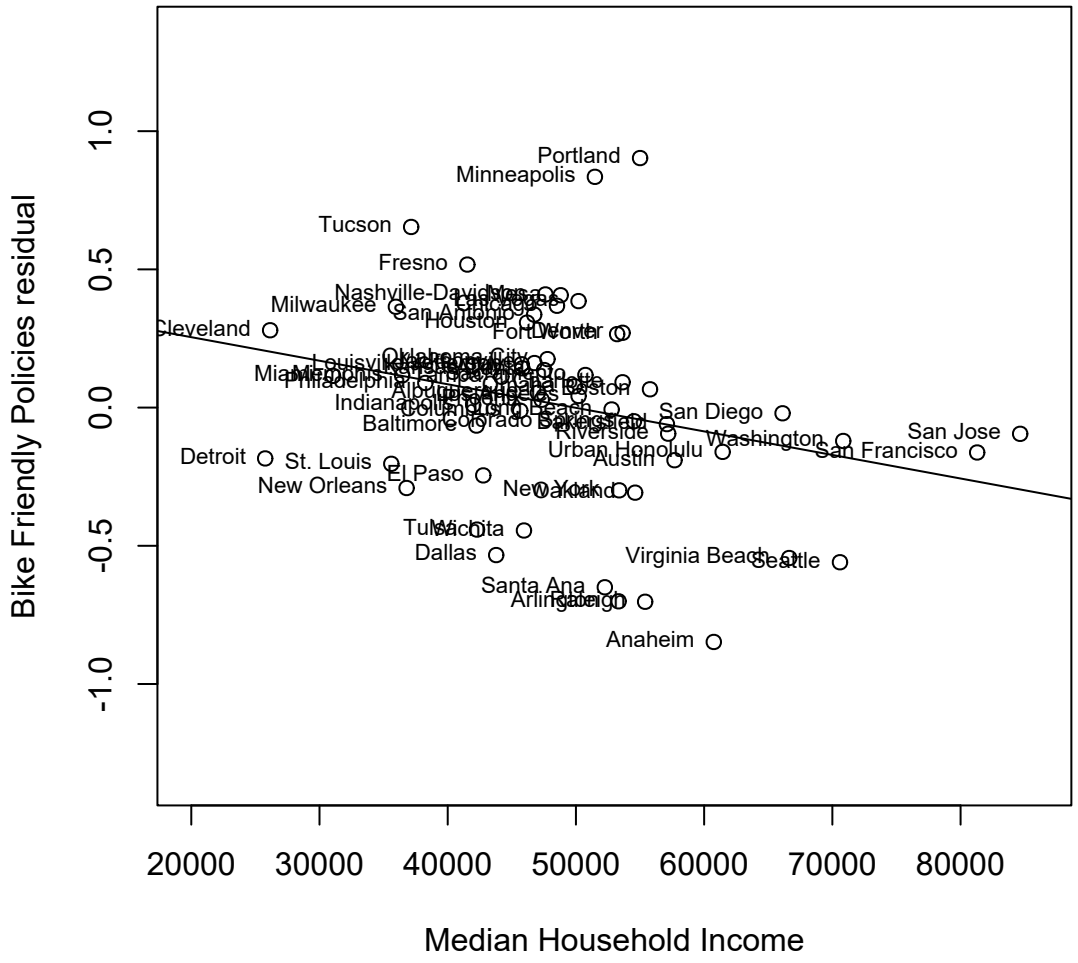


Figure 4.6: BFP Score Residuals by Income

Figure 4.7 plots the residuals from the best four predictor model against Liberal Ideology. As can be seen, this fifth variable explains only a very small amount of additional variance.

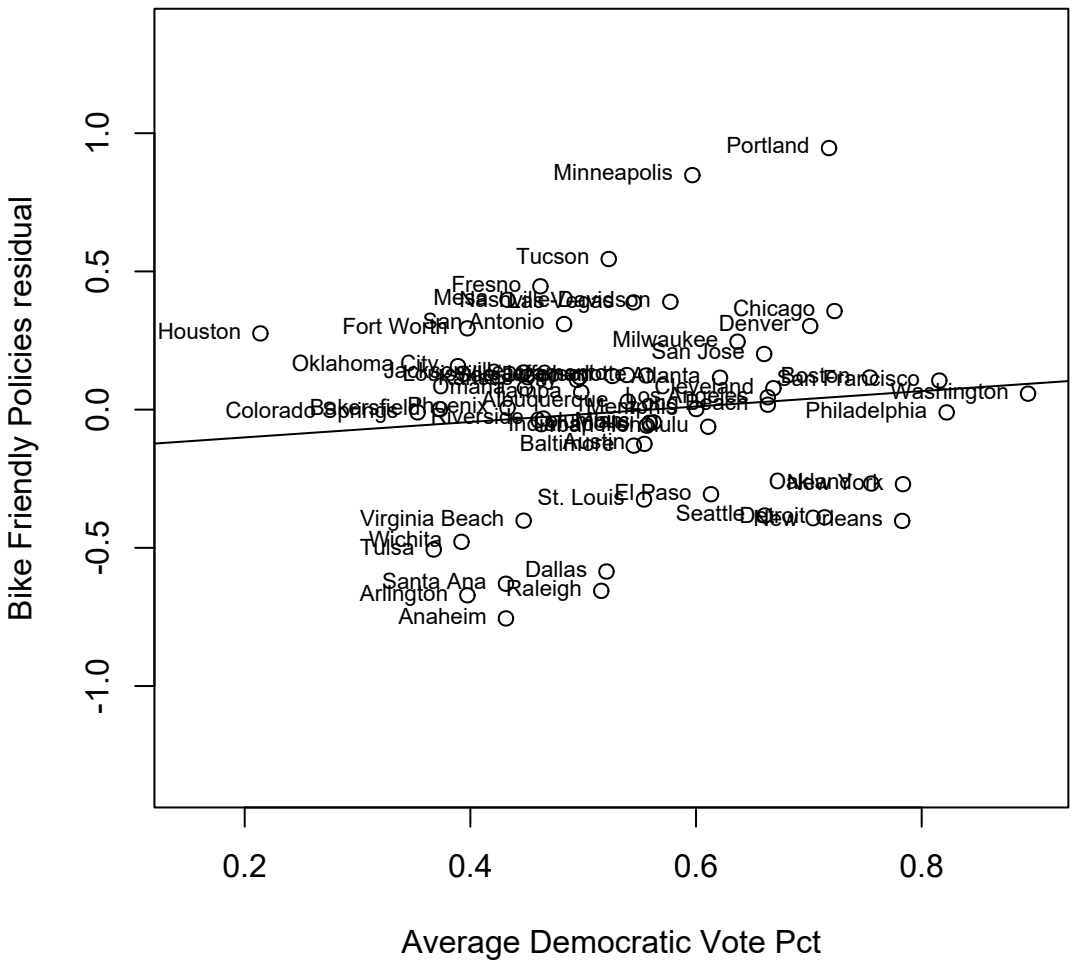


Figure 4.7: BFP Score Residuals by Liberal Ideology

4.3 Case selection

Figure 4.8 shows the residuals by city from a model including the best five-predictor model that doesn't include either Creative Class or Income. These variables are excluded in order to assess the difference made by including the Creative Class variable – Income is highly collinear with Creative Class, so excluding it facilitates this assessment. Thus, this five-predictor model includes Liberal Ideology, Population Density, Bicycling Tradition, Race, and Population. The red bars extending to the left show cities with a lower BFP score than predicted by the regression, and the green bars show cities with higher than predicted BFP scores. The black dots indicate the observed BFP score of each city, centered to have a mean of zero.

Thus, for example, at the bottom of the plot, we see that Minneapolis has a BFP score more than 1.5 points above the mean, but that this five-predictor regression explains some of that variation from the mean, such that the green residual bar extends to about 1.2. In some cases, such as Austin (just above the middle of the plot), the residual bar is actually farther from zero than the the black dot, which indicates that while Austin has slightly lower than average BFP, our predictors lead us to expect it to have a higher than average BFP.

Figure 4.9 shows the same plot once we add the Creative Class variable to the model. The order of cities from top to bottom is unchanged from the previous plot, such that, for instance, if a red bar is shorter than the bars below it, we know that the Creative Class variable explained more variation for that cities with shorter bars below. By comparing these two plots, we can assess two things:

1. Which cities are not well-explained by the five-predictor model, as indicated by a large negative or positive residual in Figure 4.8?
2. Which cities are substantially better-explained when we add the Creative Class variables, as indicated by the magnitude of its residual value shrinking (toward zero) substantially from Figure 4.8 to Figure 4.9?

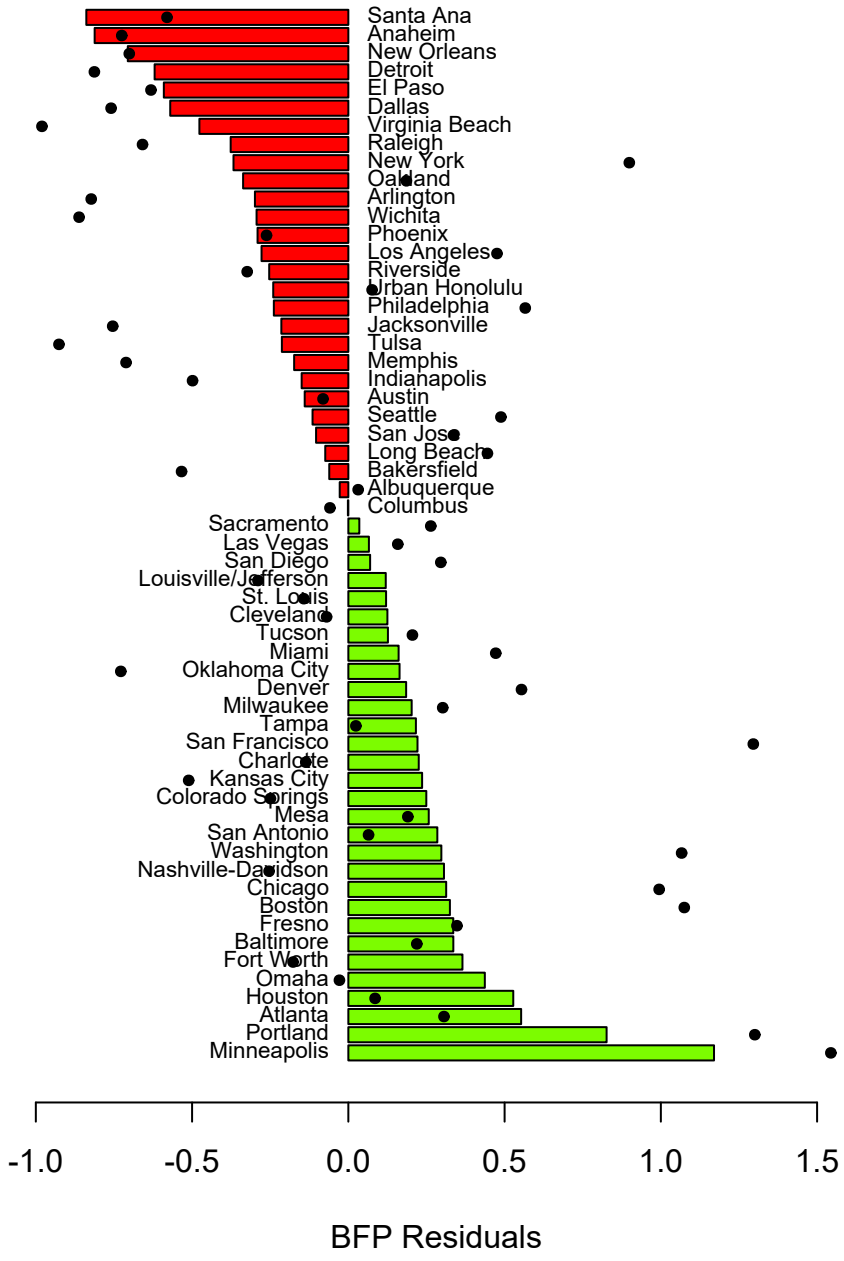


Figure 4.8: Residuals from five-predictor regression of bicycle-friendly policies, excluding Creative Class indicator

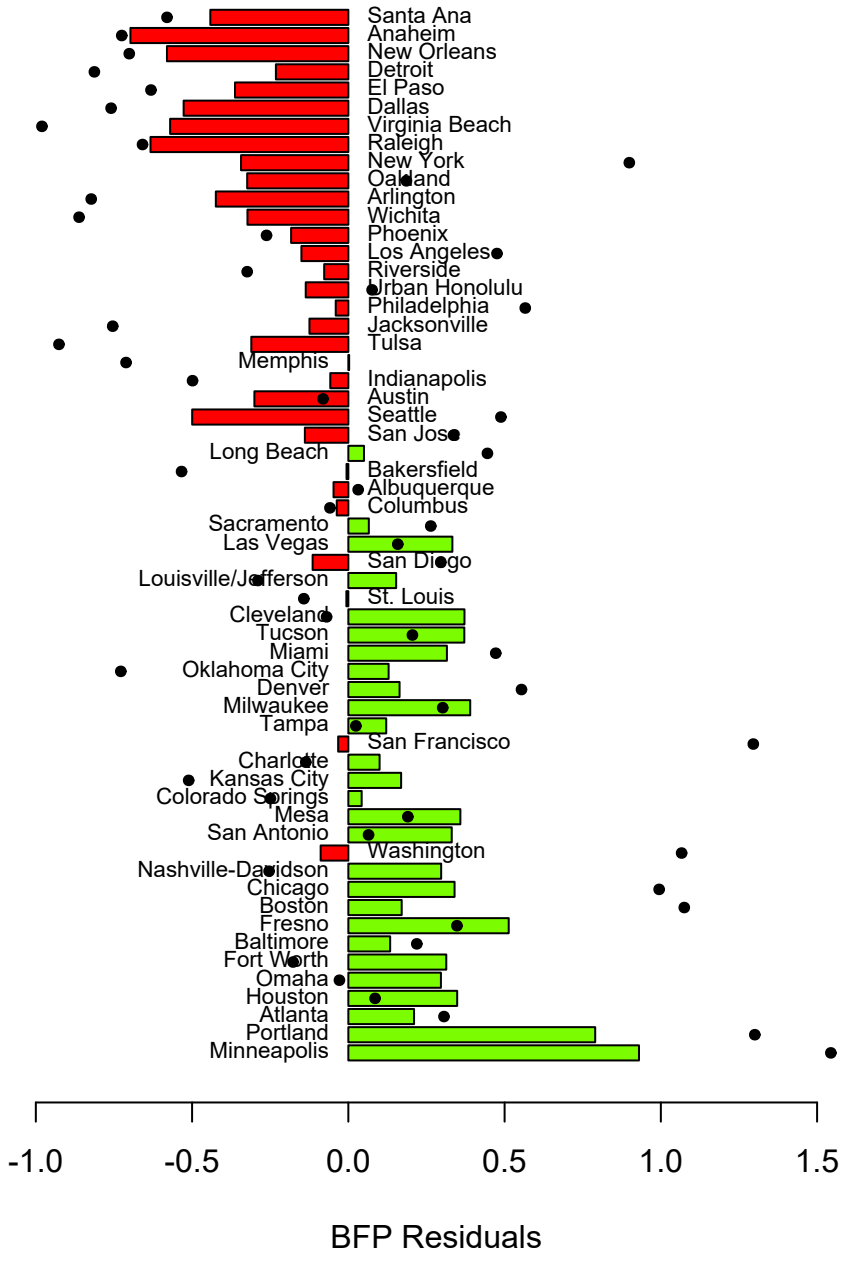


Figure 4.9: Residuals from six-predictor regression of bicycle-friendly policies, including Creative Class indicator

Table 4.4: Case cities, by prevalence of Creative Class occupations and level of bicycle friendly policies

	Low BFPs	High BFPs
Low CC	Santa Ana, California	Houston, Texas
High CC	Raleigh, North Carolina	Atlanta, Georgia

Several cities stand out in this comparison. Santa Ana, California has the most negative residual in Figure 4.8, but once we add the Creative Class variable, its residual becomes substantially closer to zero, such that six other cities have more negative residuals in Figure 4.9. Raleigh, North Carolina already has the eighth most negative residual in Figure 4.8, but adding the Creative Class variable makes its residual even more negative, such that it has the second most negative residual in Figure 4.9. Thus, Santa Ana and Raleigh both have lower-than-expected BFPs, but the Creative Class variable looks to be an important part of the explanation only for Santa Ana, which has a relatively low prevalence of creative class occupations. Raleigh has a relatively high prevalence of such occupations, which makes its relatively low level of BFPs all the more unexpected.

Among cities with higher-than-expected BFPs, two cities that stand out are Houston, Texas, and Atlanta, Georgia. Houston has the fourth-highest positive residual in Figure 4.8, and its residual value is only slightly reduced in Figure 4.9. Atlanta, in contrast, goes from the third-highest positive residual to only the 16th-highest positive residual once we add the Creative Class variable. Thus, the Creative Class variable looks to be an important part of the explanation for Atlanta's high BFP score, but not for Houston's.

Table 4.4 illustrates how my four case cities fit into a two-by-two matrix of the prevalence of creative class occupations (CC) and level of bicycle friendly policies (BFPs).

Chapter 5

A tale of two bicycle policy agendas

The aim of this dissertation is to understand the role of powerful business, banking, and real estate actors in bicycle friendly policymaking in U.S. cities. This is a worthwhile question because, as shown in chapter 3, bicycle friendly policies (BFPs) such as dedicated bicycle infrastructure can increase rates of bicycling and potentially reduce automobile travel. More broadly, the answer to this question has implications for the role that urban power-brokers might play in other policies to reduce greenhouse gas emissions. The research reviewed in chapter 2 indicated that the power of these "growth coalition" actors over urban policymaking is so great that any observed rise in BFPs must at least have their blessing, if not their outright support. Moreover, the influential arguments of urbanist academics such as Richard Florida and Edward Glaeser provide a discourse that makes sense of growth coalition support for bicycle friendly policies. These urbanists argue that attracting talented workers is the key to urban economic development, and that cities must develop dense, mixed-use, walkable and bikeable neighborhoods that fit the lifestyle of this so-called "creative class". By analyzing the correlates of BFP adoption in chapter 4, I identified four cities whose level of adoption of BFPs was not well-explained by available predictors, two of which were consistent with the hypothesis that BFPs are associated with attracting the creative class, and two of which were inconsistent with that hypothesis.

In this chapter, I analyze evidence from interviews with actors involved in bicycle policymaking in

these four cities to assess the degree of growth coalition involvement in and influence over the bicycle policy agenda. Figure 5.1 shows how this analysis fits into my larger argument about the sources of variation between US cities in the adoption of bicycle friendly policies. Whereas in the previous chapter I established the presence of a positive correlation between the prevalence of Creative Class occupations and the adoption of bicycle friendly policies, in this chapter I seek to illuminate the mechanism of that relationship by showing how the currency of the Creative Class discourse in a city positively influences the involvement of growth coalition (GC) actors in bicycle friendly policymaking (relationships 2+ and 3+ in Figure 5.1). Furthermore, this chapter illustrates how the involvement of GC actors not only leads to the adoption of more bicycle friendly policies, but also influences the type of policies that are adopted. GC actors tend to support capital-intensive, place-making projects, as opposed to more incremental and geographically-dispersed bicycle policies. However, these policies are more likely to raise concerns over gentrification (relationship 7+ in Figure 5.1), which can in turn create opposition that may weaken the bicycle friendly policy coalition (relationship 11-).

My findings suggest that Creative Class arguments for BFPs are the norm in urban bicycle politics, as such arguments were common in three of my four case cities. In Atlanta and Houston, where GC actors were directly involved in bicycle policymaking, Creative Class arguments were often cited as the motivation for this involvement, but these arguments were also prevalent in Raleigh, where GC actors were not directly involved. The endorsement of Creative Class arguments in Raleigh among both bicycle advocates and city officials indicates an openness to recruiting growth coalition involvement in bicycle policymaking, even if that involvement had not materialized at the time of my interviews. In contrast to most interviewees in my other case cities, interviewees in Santa Ana explicitly rejected Creative Class arguments, on the basis that the Creative Class perspective encouraged gentrification and displacement. My interviews also revealed that the reason for this rejection was the embeddedness of Santa Ana bicycle advocacy in community organizations, a situation that was unique among my cases. Thus, while GC actors were not directly involved in bicyle policymaking in either Raleigh or Santa Ana, the growth-friendly discourse in Raleigh, enabled by a lack of close ties between bicycle advocates and

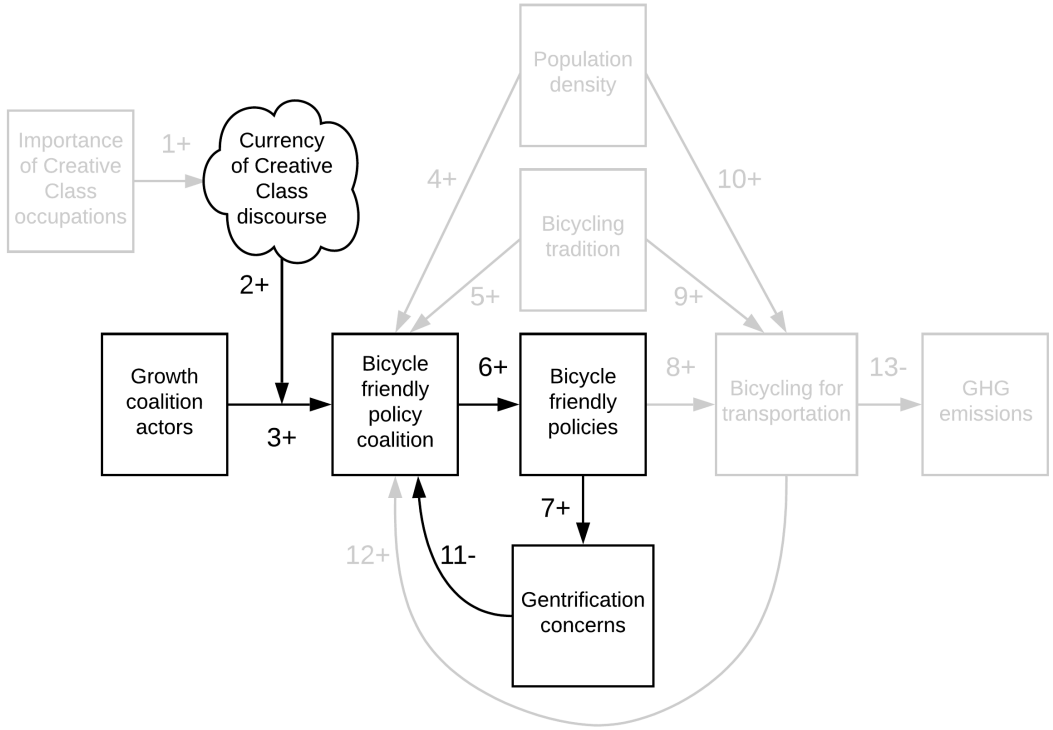


Figure 5.1: Conceptual focus of chapter 5

community organizations, creates an environment that would welcome growth coalition involvement, while participants in Santa Ana's bicycle politics explictly reject such involvement.

These findings regarding the prevalence of Creative Class discourse highlight how the bicycle advocacy community straddles the divide between growth coalition actors and community organizations who often oppose urban redevelopment projects. The bicycle advocacy community can mobilize a variety of different arguments in favor of BFPs, and they will tend do so opportunistically, happily embracing Creative Class arguments to advance their agenda. However, bicycle advocates view themselves as politically progressive, and thus they also leverage arguments for BFP as a tool to improve the lives of marginalized groups. If bicycle advocates ally themselves with community organizations concerned with gentrification and displacement, as they have in Santa Ana, this will tend to foreclose the possibility of mobilizing a Creative Class argument to ally with GC actors. On the other hand, if bicycle advocates embrace Creative Class discourse and ally with growth coalition actors, they risk coming into conflict with housing and community advocates, whom they consider to be their political allies, over gentrification and displacement. Thus we see a proactive concern with gentrification and displacement in Santa Ana, and reactive concern with those issues in Atlanta, where there has been growing criticism of the role of bicycle infrastructure in redevelopment.

Moreover, I find that the involvement of GC actors is associated with a different kind of BFP agenda, characterized by large scale, capital-intensive, place-making bicycle infrastructure projects. These types of projects are absent in the two case cities where I find no evidence of direct involvement of GC actors in bicycle policymaking. Instead the BFP agenda in these cities is characterized by incremental, relatively low-profile changes to street design. Research on "green gentrification" suggests that the place-making agenda of bicycle policymaking in Atlanta and Houston is likely to contribute to gentrification and displacement, and indeed, my interviewees in Atlanta raise such concerns.

In sum, my interviews suggest that GC actors are indeed involved in bicycle policymaking in some U.S. cities. Furthermore, to the extent that my cases are representative of U.S. cities, it is likely that growth coalition involvement will become increasingly common – only Santa Ana exhibited resistance

to such alliances, and the recent implementation of a bike-sharing system in Raleigh, named "Citrix Cycle" after its biggest corporate sponsor, shows signs of increased growth coalition involvement in that city's bicycle policymaking. However, increasing involvement of GC actors and the place-making agenda it entails is likely to increase the real and perceived association between BFPs and gentrification. This will engender increased external opposition to BFPs and internal strife within the bicycle advocacy community as advocates are forced to pick a side in the conflict between those who seek to profit from urban redevelopment and community organizations fighting for residents' right to the city.

5.1 Case profiles

Table 5.1 summarizes characteristics of interest for my selected case cities in terms of their ranking among the 60 most populous U.S. cities. Figures 5.2 - 5.5 display timelines of major events in the bicycle politics of each city. Tables 5.2 - 5.5 summarize the main participants in the bicycle politics of each city. Subsequent subsections highlight some of the quantitative characteristics from 5.1 while also describing some qualitative characteristics of each city.

5.1.1 Houston

In 1990, Houston ranked 35th in bicycle-commuting among my set of 60 largest cities, with a rate of 0.37%. In 2015, Houston ranked 39th out of 60 with a bicycle-commuting rate of 0.52%. In 2000, Houston ranked 23rd out of 43 cities with available data for bicycle infrastructure (47th percentile), with 250 miles of bicycle lanes and paths, spread out across 580 square miles of city area. By 2014, Houston ranked 55th out of 58 in bicycling infrastructure (5th percentile), reporting only 203 miles of bicycle lanes and paths. It is not clear whether this decline in mileage of bicycle lanes and paths is attributable to reporting error or to an actual loss of bicycle facilities, but in either case it is evident that Houston did not expand its bicycle infrastructure substantially during this period.

Table 5.1: Case city rankings (among 60 most populous U.S. cities) on variables of interest

	Atlanta	Houston	Raleigh	Santa Ana
Bike friendly score[a]	17	37	49	40
Bike infrastructure[b]	33	55	36	45
Bike share[c]	28	35	38	38
Open Streets events[c]	5	7	45	23
BFC rating[d]	Bronze	Bronze	Bronze	None
Bike commute pct[e]	28	39	38	27
Population[e]	39	4	43	57
Pop. density[e]	33	32	38	4
Creative Class[e]	4	39	8	60
Adj. median income[e]	35	42	7	45
Pct African American[e]	5	24	14	60
Pct Hispanic or Latino[e]	58	12	42	2
Pct White non-Hispanic[e]	33	55	16	60
Liberal ideology	18	60	37	51
Bicycling tradition	39	35	32	13
Car ownership[e]	43	36	9	15
Environmental orgs	14	7	31	55
Pct with bachelor's degree[e]	5	30	4	60

[a]Composite index of bike infrastructure, bike share, and Open Streets events
[b]Source: Alliance for Bicycling and Walking 2016 Benchmarking Report
[c]Source: Organizational and event websites and media reports
[d]Source: League of American Bicyclists, Bicycle Friendly Communities program
[e]Source: American Community Survey, 2011-15 estimates

Table 5.2: Key participants in bicycle politics of Houston

Type of actor	Description
Bike advocacy orgs	BikeHouston, founded in 1990s, professionalized in 2014. Grew out of recreational bicycle touring community. Central player in Houston bicycle politics. Spearheaded effort to update Bicycle Master Plan.
Community orgs	–
Elected officials	Rodney Ellis, former state senator, and currently a Harris County Commissioner, is a leading advocate for bike friendly policies. He was a leader in the campaign for the Bayou Greenways bond referendum, and his precinct committed $10 million to bikeways in 2018. Current Mayor Sylvester Turner and former Mayor Annise Parker have also been supportive of bike friendly policies.
Business leaders	The families of Richard Kinder and Jeffery Hildebrand, both energy company founders and executives, are major donors to the Bayou Greenways project, and have supported other projects such as Houston's first protected cycle track. Renewable energy business owner Michael Skelly is a leading bicycle advocate, and in particular helped lead the campaign for bond funding for the Bayou Greenways project.
City staff	Amar Mohite, formerly of the City of Houston Planning Department, now working under Harris County Commissioner Rodney Ellis, was a key ally of BikeHouston in securing the adoption of the Houston Bike Plan.
Non-profit orgs	The Houston Parks Board spearheaded the Bayou Greenways project, and the Houston Endowment provided funding to staff BikeHouston and to develop the Houston Bike Plan.
Bike shops	–

Table 5.3: Key participants in bicycle politics of Raleigh

Type of actor	Description
Bike advocacy orgs	Oaks and Spokes, founded in 2013, volunteer-run. Grew out of bike culture festival. Increasingly involved in advocacy for bike infrastructure, and works closely with city planners and engineers in an advisory capacity.
Community orgs	–
Elected officials	–
Business leaders	–
City staff	Eric Lamb is the City of Raleigh's Transportation Planning Manager, and has been key advocate for bicycle and multimodal improvements, including by helping develop the city's 2009 Bicycle Transportation Plan and the 2016 update to that plan. Planning Director Ken Bowers is also supportive of bicycle projects and is himself an active bicyclist.
Non-profit orgs	–
Bike shops	Oak City Cycling Project is an independent bike shop that has helped organize events with Oaks and Spokes.

Table 5.4: Key participants in bicycle politics of Atlanta

Type of actor	Description
Bike advocacy orgs	Atlanta Bicycle Coalition (ABC), founded in 1990s, professionalized in 2007. Grew out of recreational bicycle touring community. Central player in Atlanta bicycle politics, organized popular open streets event starting in 2010 and mayoral candidate forums in 2009 and 2017. The PATH Foundation was also founded in the 1990s, and builds mostly recreational mixed-use paths.
Community orgs	–
Elected officials	Current Mayor Keisha Lance Bottoms, Former Mayor Kasim Reed, and former council members Aaron Watson and Kwanza Hall have been among the leading supporters of bicycling in Atlanta.
Business leaders	James Kennedy, chairman of Cox Enterprises, a media company that owns the Atlanta Journal Constitution, is a board member of the PATH Foundation. The Robert W. Woodruff Foundation, started by the family of the former Coca-Cola executive, made a $3 million contribution to the Atlanta BeltLine. The foundation of Arthur Blank, owner of the Atlanta Falcons football team, donated funds for the city to hire a Chief Bicycle Officer. Coca-Cola was a vocal supporter of the PATH Parkway.
City staff	Becky Katz, Atlanta's first Chief Bicycle Officer, served from 2015 to 2018 and oversaw a period of substantial expansion in Atlanta's bikeway network.
Non-profit orgs	The Atlanta BeltLine Partnership raises private and philanthropic funds for the BeltLine, while Atlanta BeltLine, Inc. oversees the project and secures public funding. Georgia Tech has been supportive of bike projects, including by funding the PATH Parkway with the PATH Foundation.
Bike shops	–

Table 5.5: Key participants in bicycle politics of Santa Ana

Type of actor	Description
Bike advocacy orgs	Santa Ana Active Streets (SAAS), founded in 2013, volunteer-run. Grew out of organizations working to improve community health and safety, and local co-operative bike shop. Central player in Santa Ana bicycle politics. Along with partner community organizations, SAAS is crucial in mobilizing community participation and engagement in the city planning process.
Community orgs	Latino Health Access, a community health organization; NeighborWorks, an affordable housing and community development organization; and KidWorks, an education and community development organization all were involved in the creation of SAAS, and there is continuing participant overlap between these organizations.
Elected officials	City council member Michele Martinez has been a crucial champion of active transportation safety. Her accomplishments include hiring a dedicated Active Transportation Coordinator. Martinez is also executive director of the Alliance for a Healthy Orange County.
Business leaders	–
City staff	Cory Wilkerson was hired as Santa Ana's first Active Transportation Coordinator in 2014, and has helped the city win a number of grants for bicycle and pedestrian improvements. Cory also has a close working relationship with SAAS and its community allies.
Non-profit orgs	–
Bike shops	The Bicycle Tree is a non-profit co-operative bike shop that offers space and training to help community members maintain and repair their bikes. The Bicycle Tree was also a founding member of SAAS and is still a central player in that organization.

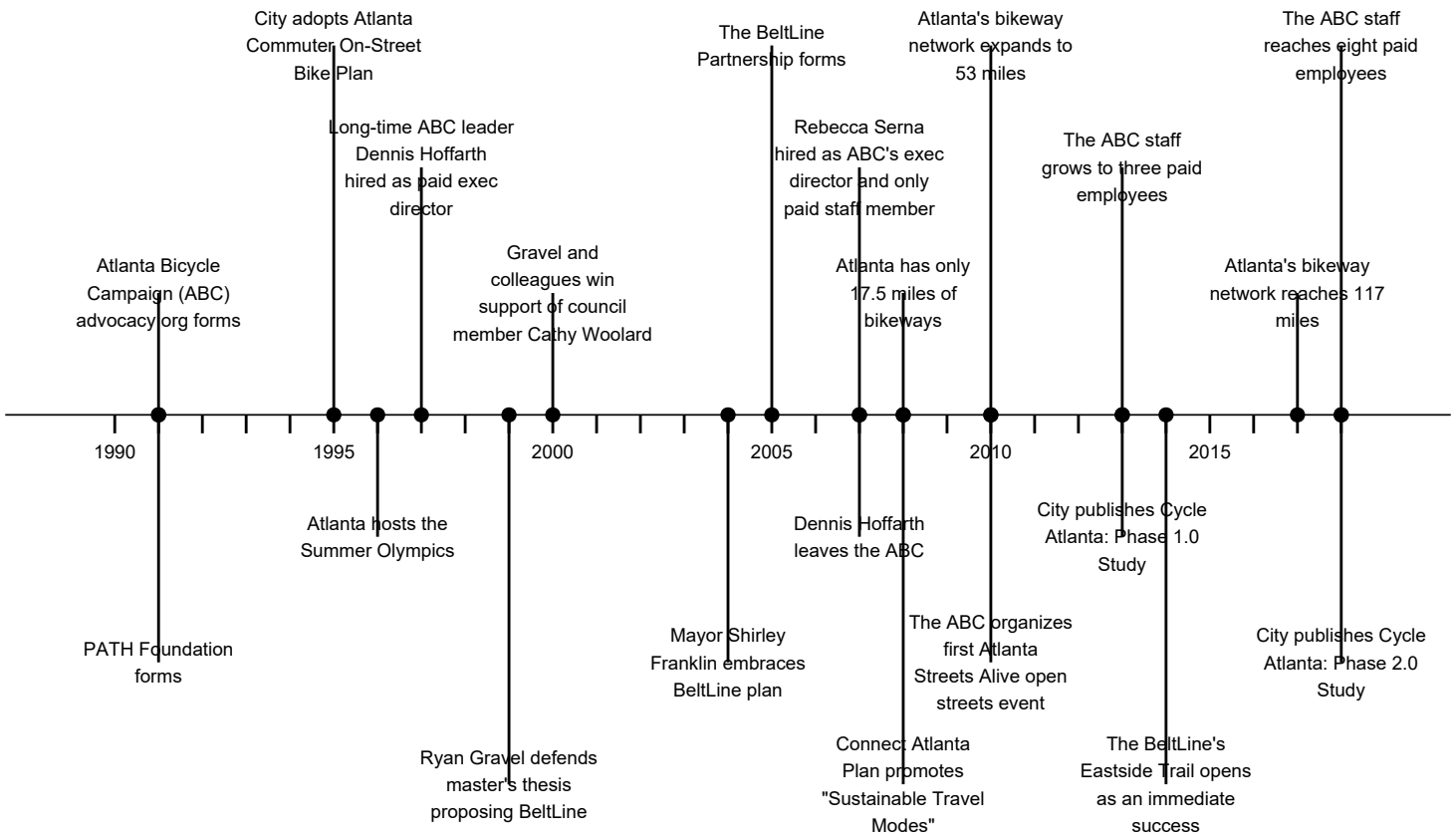


Figure 5.2: Timeline of key events in Atlanta bicycle politics

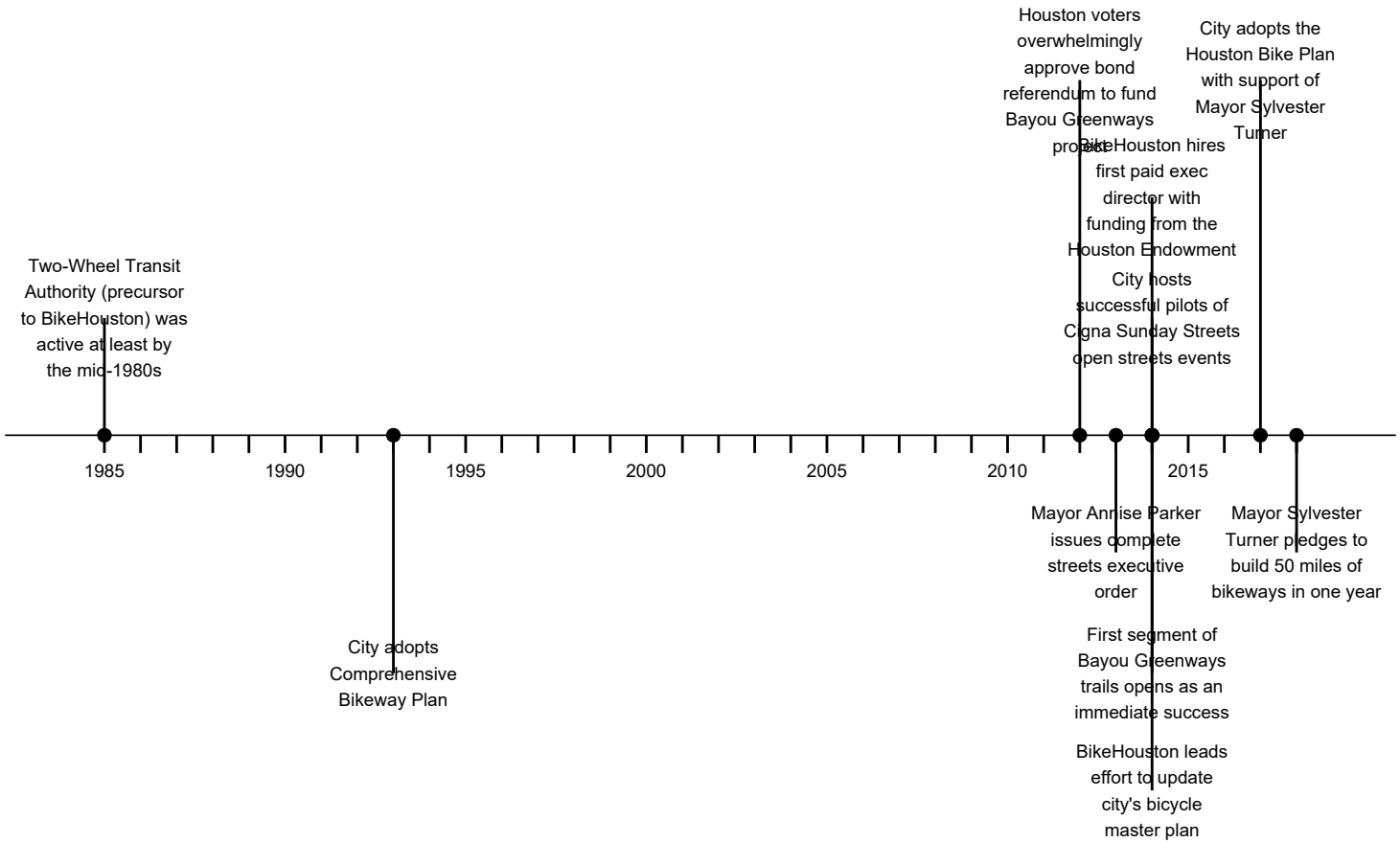


Figure 5.3: Timeline of key events in Houston bicycle politics

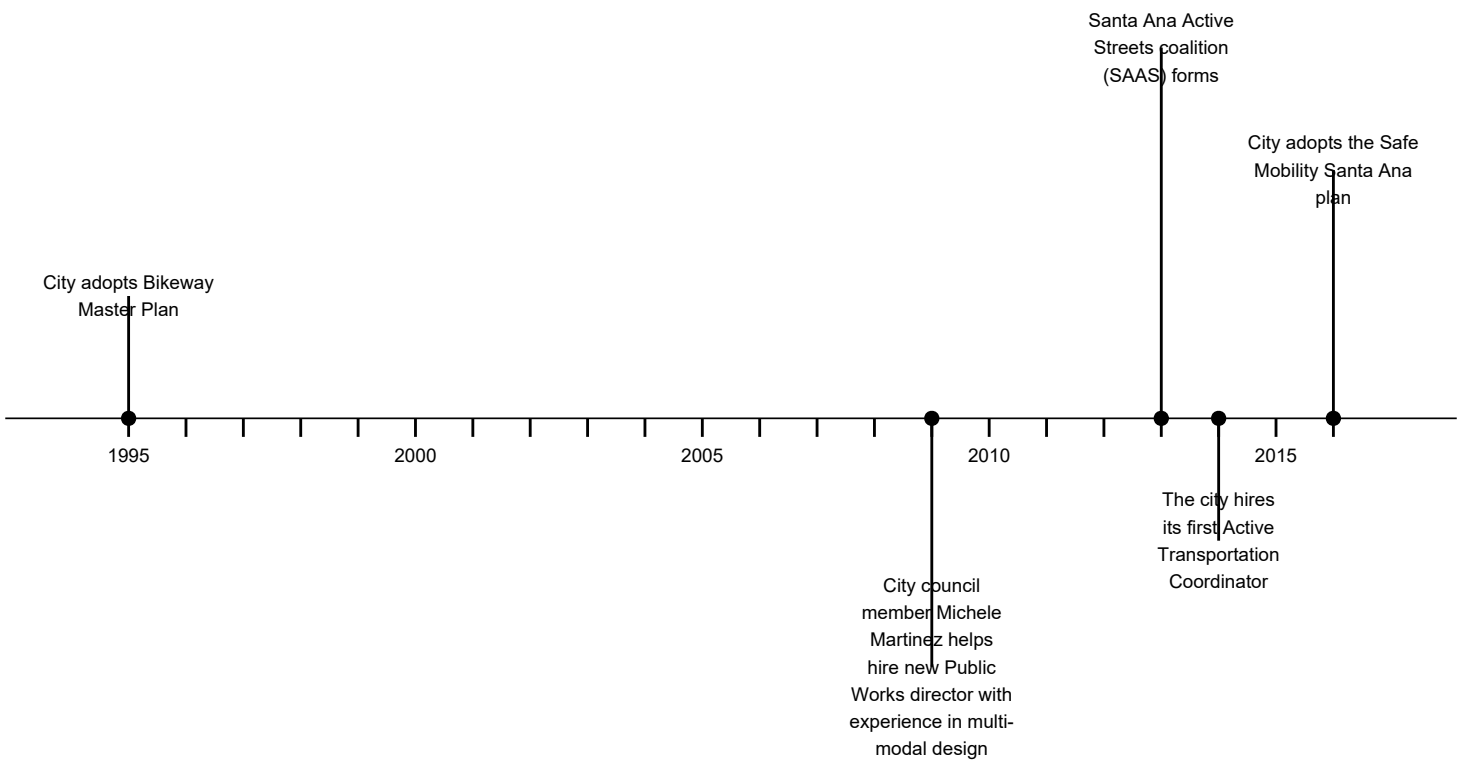


Figure 5.4: Timeline of key events in Santa Ana bicycle politics

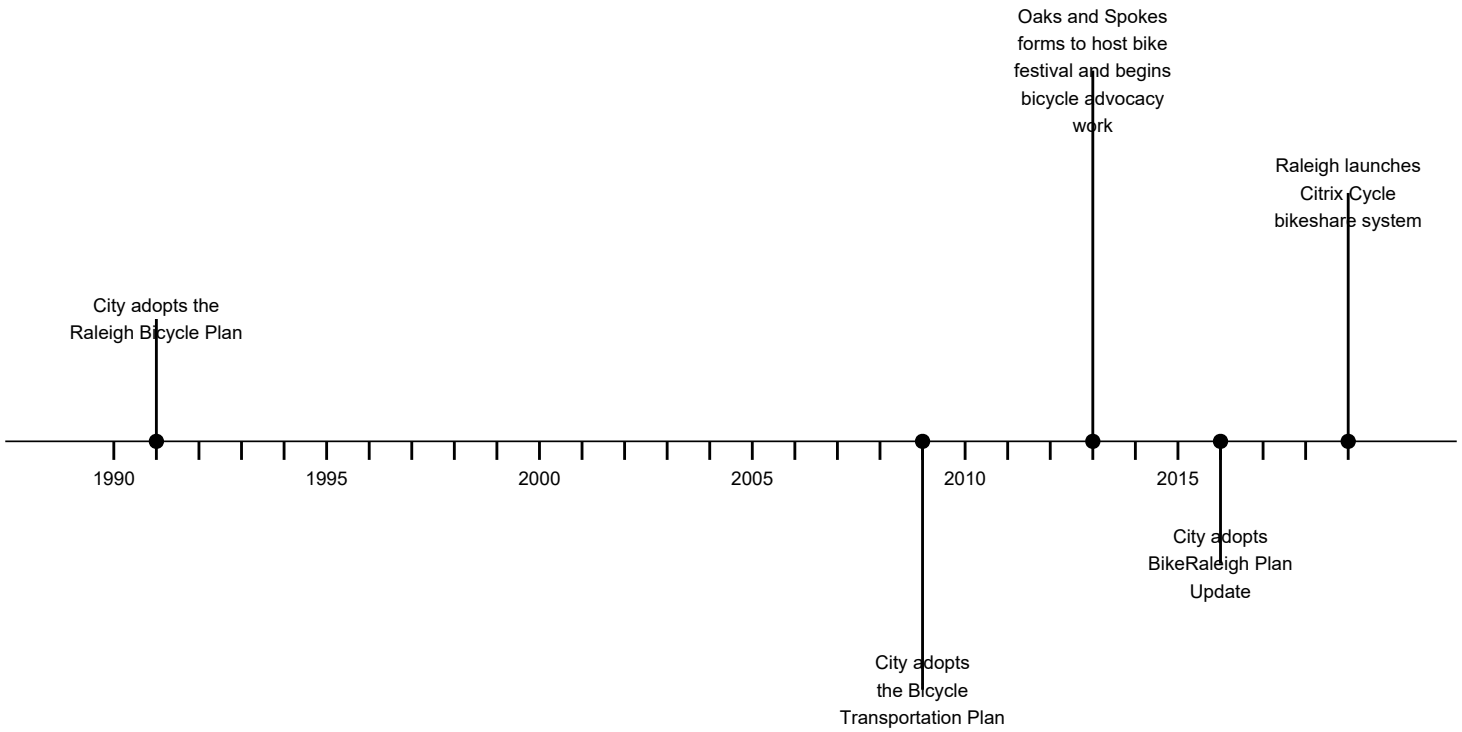


Figure 5.5: Timeline of key events in Raleigh bicycle politics

In contrast, since 2014, Houston has expanded its bikeway network aggressively, adding over 100 miles of bikeways between 2014 and 2017.

Support for bikeway building in Houston was given a boost by the Bayou Greenways 2020 project, a major mixed-use trail and linear park project. In 2012, Houston voters overwhelmingly approved a bond referendum to partially fund this project, which will eventually encompass 150 miles of trails and linear parks along Houston's bayou waterways. The first trail segment opened in 2014, and like the BeltLine in Atlanta, the Bayou trails have enjoyed tremendous popularity. Leaders of the Bayou Greenways campaign went on to push for the professionalization of BikeHouston, and connecting residents to the Bayou Greenway trails was one of the guiding principles of the 2017 Houston Bike Plan.

The Houston Parks Board heads up Bayou Greenways project in collaboration with the Houston Parks and Recreation Department and the Harris County Flood Control District. The project is funded in part by a bond offering of $166 million in parks funding, $100 million of which is for the Greenways project, which was approved by the aforementioned referendum. The rest of the project's funding comes from private sources or federal and state grants. $90 million of the required $120 million had already been raised as of 2017. This included a $50 million gift from the Kinder Foundation, which is headed by the co-founder and former CEO of Kinder Morgan, one of the largest pipeline corporations in North America. The Buffalo Bayou Park and trail system was completed in 2015, and is maintained by the private non-profit Buffalo Bayou Partnership.

The Kinder Foundation was also instrumental in the creation of the Discovery Green park in downtown Houston. Discovery Green is reminiscent of Chicago's Millenium Park, serving as a space for public events and a tourist attraction. In 2015, Houston opened its first two-way protected bikeway, the Lamar Cycle Track, which connects the Buffalo Bayou trail to the Discovery Green park in downtown.

Though at the time of my case selection analysis Houston's bike-sharing program had only 255 bikes at 35 stations, it has continued to expand, and boasted 560 bikes at 86 stations by the end of 2018. The city employs a full-time bicycle and pedestrian coordinator in the Department of Public Works, and coordinates bicycle policy through the Houston Bikeways Program, which is a collaboration between

Public Works & Engineering, Planning & Development, Parks & Recreation and Health & Human Services Departments, and often coordinates with METRO, Houston Parks Board, Houston-Galveston Area Council and other partners, according to the bikeways program website.

Houston has a long-standing bicycle advocacy community. According to one long-time advocate, the city's leading bicycle advocacy organization BikeHouston grew out of what was originally called the Two-Wheel Transit Authority, which was active at least back to the early-1980s. That organization eventually became the Houston Area Bicyclist Alliance (which was still the name as late as 1997), and then later BikeHouston. However, BikeHouston was an all-volunteer organization until 2014, when it was able to hire an executive director thanks to funding from the Houston Endowment, a private philanthropic foundation. At that point, BikeHouston began an effort in earnest to update Houston's bicycle master plan, which hadn't been updated since 1993, culminating in the city's approval of the Houston Bike Plan in March 2017. Since 2014, BikeHouston has been led by Michael Payne, whose professional background was mostly in the energy sector, John Long, a former leader of a Houston-area private montessori school, and Clark Martinson, a planner who had previously served as executive director of Houston's Energy Corridor Management District.

Despite apprehension from some of my interviewees about the city's ability to follow through on the Bike Plan, early signs are encouraging, with Mayor Sylvester Turner pledging in 2018 to build 50 miles of planned bikeways by May 2019, with the help of $10 million in funding from Harris County Precinct One Commissioner Rodney Ellis. Moreover, former Mayor Annise Parker issued an executive order in 2013 that the city follow a complete streets policy to accommodate all modes of travel in its road projects. Thus, Houston seems to have turned a corner toward steady implementation of its bikeway network.

5.1.2 Raleigh

In 1990, Raleigh ranked 32nd out of the 60 cities in my sample with a bicycle-commuting rate of 0.45%. In 2015, the city ranked 38th with a rate of 0.53%. In 2000, Raleigh ranked 33rd out of 43 cities with

available data (23rd percentile) on bicycle infrastructure per square mile, with 25 total miles of bicycle lanes and paths. By 2006, Raleigh ranked 28th out of 45 cities (38th percentile) on bicycle infrastructure, with 61 miles of lanes and paths. By 2014, Raleigh ranked 36th out of 58 cities (38th percentile) on bicycle infrastructure, with 90 miles.

Thus, Raleigh has expanded its bicycle infrastructure, but the rate of expansion has not kept pace with that of other cities. Nonetheless, Raleigh has made some effort to support bicycling, both for transportation and recreation, and published a bicycle master plan in 2009 and an in-depth update in 2016. Additionally, since the time of my case selection analysis, Raleigh has launched a new bike-sharing system dubbed Citrix Cycle, featuring 300 bikes across 30 stations. The City of Raleigh also has organized an annual Capital City Bike Ride since 2013. However, this ride does not constitute an Open Streets event, because it does not close down a section of street to be used as car-free public space, and there have been no true Open Streets events in the city.

Raleigh does have a Bicycle and Pedestrian Outreach Coordinator and a Bicycle and Pedestrian Program Manager, as well as a Bicycle and Pedestrian Advisory Committee. However, the city lacks a strong bicycle advocacy organization. Raleigh did not have a formal bike advocacy organization until at least 2013, when the group "Oaks and Spokes" held its first bike festival. Before the advent of Oaks and Spokes, the Oak City Cycling Project bike shop served as a de facto center of the bicycling community. Oaks and Spokes began as more of a means to celebrate bicycle subculture than to advocate for bicycle friendly policies, with the Oaks and Spokes festival featuring events like "Bike-In Movie", "Bike Polo", "Bike Fashion Show", "Bike Art Show", and "Cyclofemme Ride". However, the Oak and Spokes website came to serve as a clearinghouse of bicycle events and posts related to advocacy for bicycle-friendly policies and infrastructure. After the time of my interviews, Oaks and Spokes became a registered 501(c)(3) non-profit organization, and has increasingly focused on policy advocacy.

Nonetheless, before the first Oaks and Spokes festival the City of Raleigh had already adopted a bike master plan, in 2009, and had started to steadily build out its planned bikeway network. In 2009, Raleigh had 73 miles of bikeway, and by 2012, the city had built an additional 26 miles (BikeRaleigh 2015).

Thus, by 2012, the city had already begun to steadily add bicycle infrastructure, without lobbying from a formal advocacy organization. As one interviewee who works on the city staff put it,

> I would have to say that in the early stages of this, this was very much a thing that came from the [city] organization. Obviously, it couldn't have happened if there hadn't been some community support for it. I think part of it is the perception that this was the direction in which progressive cities were going, and Raleigh wants to be a progressive city, so we need to go in this direction as well. That sort of tribal identification that the cool cities [are doing it].

The 2009 Bicycle Transportation Plan offers some insight into what the city views as the benefits of bicycle friendliness:

- Increased health and physical activity
- Economic benefits
  - Bicycling is affordable
  - Trails increase property values
  - Bike-friendliness attracts tourism
- Environmental benefits
- Transportation benefits (reduced congestion)
- Quality of life
  - People (and the businesses that hire them) want alternative transportation options
  - Trails can accommodate motorized wheelchairs, an asset for an aging population
  - Bike infrastructure makes biking safer for children under age 16 who can't drive

The City of Raleigh, it seems, was motivated to improve conditions for bicycling even without substantial outside pressure. However, after Oaks and Spokes was founded in 2013, they developed a good working relationship with the city, and the pace of bikeway construction was more rapid between 2013 and 2015 than the preceding four years.

5.1.3 Atlanta

In 1990, Atlanta ranked 39th out of the 60 cities in my sample for bicycle-commuting rate, with a rate of 0.3%. By 2015, the city ranked 28th out of 60, with a rate of 0.9%. In 2006, the first year for which I have data on bicycle infrastructure for the city, Atlanta ranked 33rd out of 41 large cities with available data (20th percentile). In that year, Atlanta had about 25 miles of bicycle lanes and paths. By 2014, Atlanta ranked 33rd out of 58 cities with available data (43rd percentile), and had expanded its network of bicycle lanes and paths to 121 miles. Moreover, Atlanta has one of the most active programs of Open Streets events of any city, now holding three events per year, with a total of 19 events held since its inception, and it launched a bike-sharing program in 2016. Thus, Atlanta has steadily moved up the ranks of bicycle-friendly cities.

Unlike many other major cities, Atlanta has not completed a bicycle master plan that proposes a long-term plan for a complete bikeway network. However, its 2008 "Connect Atlanta" transportation plan incorporates bicycling, employing the terminology of complete streets (streets that accommodate all modes of travel) and emphasizing car-alternative modes of transportation as a solution to worsening congestion. Projections of rapid population growth lent a sense of urgency to concerns about traffic. Promoting "Sustainable Travel Modes" was one of the six broad goals of the 2008 plan, and the plan included a map of proposed bicycle routes.

According to figures in the 2008 plan, Atlanta had only 17.5 miles of bikeways. By 2010, that would grow to 53 miles, and the total reached 117 miles by 2017. Thus, the 2008 Connect Atlanta Plan is a good approximation of when Atlanta began steadily expanding its bikeway network. The 2013 Cycle Atlanta: Phase 1.0 Study (City of Atlanta 2013) featured detailed proposals for bikeways on five major corridors connecting the BeltLine mixed-use trail to the city center, highlighting the BeltLine's importance as a foundation for the bikeway network.

The Atlanta BeltLine is the city's most visible bicycle infrastructure project, and it seems to have catalyzed interest in bicycle-friendly policies. The BeltLine is a 22-mile loop of mixed-used paths

and linear parks built on former rail lines around central Atlanta, projected to be completed in 2030. The project was inspired by the 1999 Master's thesis of Georgia Tech planning student Ryan Gravel, which also included a proposal for a streetcar line. In 2000, after graduating, Gravel and some of his colleagues began circulating a summary of his proposal, and they won the support of city council member Cathy Woolard. By 2004, Mayor Shirley Franklin was convinced to take the project seriously, and the BeltLine Partnership was formed in 2005, under the oversight of the Atlanta Development Authority (later renamed Invest Atlanta). The so-called Eastside Trail, the first section of the BeltLine completed, opened in 2014 and was an immediate success (Pendergrast 2017). Most of my interviewees mentioned the importance of this success in generating subsequent enthusiasm for bicycle projects in the city.

Key actors in the Atlanta bicycle community include the Atlanta Bicycle Coalition (ABC) and the PATH Foundation. The ABC was founded in 1991, but has experienced rapid growth in recent years. As late as 2008, the ABC's only paid staff was its executive director and one part-time employee, and in 2013 it had three paid employees (Saporta 2016a), but according to its website ABC now has eight paid staff members. The ABC lobbies for bicycle infrastructure improvements, offers bicycling skills training classes, and founded the city's Open Streets event, Atlanta Streets Alive!, in 2010. The PATH Foundation was also founded in 1991, with the mission to create off-road trails for bicycling in Atlanta. PATH has benefited, since at least 1995, from the patronage of billionaire James C. Kennedy, current chair of media conglomerate Cox Enterprises (`https://pathfoundation.org/about/history/`), which publishes the Atlanta Journal Constitution. PATH has raised a combination of private and public funds to build over 260 miles of trails in the Atlanta area, and is still very active today. However, many of these trails are outside of the urban core, and have been designed with recreation in mind moreso than transportation. However, Cox Enterprises is also a contributor to Atlanta Streets Alive!, and to the BeltLine project. Atlanta lacks a bicycle advisory committee, but in 2015 the city appointed a "Chief Bicycle Officer", who works in the Department of Planning and Community Development. Also of note, former Mayor Kasim Reed, whose term ended in 2017, was a vocal supporter of bicycle-friendly

projects.

The ABC grew out of Atlanta's recreational bicycling community, though many of its early leaders were active environmentalists. The ABC spun off from the Southern Bicycle League (SBL), which was a bicycle touring club active in the Atlanta area since the late 1970s. According to one interviewee who was involved in the SBL at the time, the SBL had an advocacy budget, but they didn't spend it, and in fact wanted to avoid becoming too political. This interviewee was a friend of long-time ABC leader Dennis Hoffarth, who also helped found the Atlanta-based sustainable energy organization Southface Energy Institute in the late 1970s, was instrumental in establishing curbside recycling in Atlanta, and helped start an anti-nuclear-energy organization that is still active today (Saporta 2016b). According to this informant, Hoffarth left Atlanta around 2007, in part because of frustration that ABC "wasn't being listened to", and he moved to what the informant would have previously called a "hippy commune", but is now called an "intentional community". Before leaving Atlanta, Hoffarth was the executive director and visible face of the ABC throughout the 1990s and early 2000s (Saporta 2016b). This interviewee described Hoffarth as "very much environmental", and also agreed that many of those involved in founding the ABC have also been active in advocating for environmental causes.

It is puzzling that Hoffarth left the organization in 2007 because of the perception that the ABC wasn't being listened to, when it seems that city leaders were just beginning to get on board at that point. However, this leadership change was likely fortuitous for the organization, as many interviewees cited current executive director Rebecca Serna's non-adversarial, relationship-building style as a key component of the organization's success since she took over, whereas Hoffarth was described as a "bomb thrower" and a "gadfly". Thus, Serna's style was probably better suited to a period of relative consensus around the benefits of bike-friendly policy.

Several interviewees credited the ABC's open streets event, Atlanta Streets Alive, started in 2010, with building enthusiasm for bike-friendly policies among elected officials and residents. The ABC also co-organized mayoral candidate forums on bike and pedestrian issues, first in 2009, and more recently in 2017, that raised the profile of those issues in the city. The ABC advised the city on its Cycle Atlanta:

Phase 1.0 and 2.0 studies in 2013 and 2018, and also helped fund the 2013 study.

While the BeltLine is popular among many Atlantans and has boosted enthusiasm for bicycling, it has also become a flash point in the city's intensifying struggles over gentrification (Pendergrast 2017; McWhirter 2018). This is particularly the case for the western portions of the trail, many of which run through predominantly African-American neighborhoods.

5.1.4 Santa Ana

In 1990, Santa Ana ranked 13th out my set of 60 largest cities in bicycle-commuting, with a rate of 1.13%. In 2015, the city ranked 27th out of 60, with a bicycle-commuting rate of 0.92%. In 2000, Santa Ana ranked 27th out of 43 cities with data on bicycle infrastructure (37th percentile), with a total of 10 miles of bicycle lanes and paths. In 2014, the city ranked 45th out of 58 cities (22nd percentile), with a total of 15 miles of bicycle lanes and paths. Thus, Santa Ana follows the trend of some warm weather cities (such as Riverside and Anaheim) that were leaders in bicycle commuting in 1990, but where bicycle-commuting has not increased, perhaps in part because of lack of encouragement.

Santa Ana did not have a formal bike advocacy organization until 2012-2013, when local affordable housing organization NeighborWorks Orange County sent a group of residents to the NeighborWorks America community leadership institute, which gives participants seed money to start a project when they return home. The residents chose to work on active transportation safety, and organized a "mini open streets" event on Santa Ana's Maple Bike Trail, and through that event NeighborWorks got connected with other people interested in active transportation in Santa Ana, and that group of people soon formed the Santa Ana Active Streets coalition (SAAS). In addition to NeighborWorks, other organizations involved in the founding of SAAS were Latino Health Access, KidWorks, the Bicycle Tree, and El Centro Cultural de Mexico. None of these organizations were bike advocacy organizations, but rather focused on issues of health, safety, education, and in the case of the Bicycle Tree, co-operative bicycle maintenance. From the outset, SAAS saw its mission not as the promotion of walking and bicycling–they believed that many Santa Ana residents already walked and biked out of economic necessity–but

rather as seeking to improve the safety of vulnerable road users. SAAS also helped organize the city's Open Streets events, which ran for three years from 2014-2016. The event has not been held since 2016, which some interviewees attributed to mismanagement by city officials that led to poor turnout for the 2016 event.

Despite having a housing stock largely composed of single-family homes, Santa Ana is the fourth most densely populated city in the U.S., in part because many households consist of multiple families living in one home. Thus, housing security, gentrification, and displacement are top-of-mind issues for many residents. Because of its embeddedness in comunity organizations from its very inception, SAAS is acutely aware of these issues and is careful not to lend its support to any projects that it believes could contribute to displacement.

Council member Michele Martinez recognized that the safety of walkers and bicyclists was a pressing issue as far back as 2008, but she found it difficult to make progress in safety improvements because of a lack of experience among city planners and engineers in accommodating non-motorized road users. By 2009, Martinez was able to push for the hiring of a new Public Works director who had experience with multi-modal design in Oakland, and this began a gradual process of getting city staff on board that culminated with the hiring of Cory Wilkerson in 2014 as the city's first Active Transportation Coordinator. All the bike advocates that I interviewed spoke glowingly of Martinez and her engagement with and responsiveness to community organizations, and Wilkerson apparently brought that same level of engagement to the public works department, such that there seems to be a unique close working relationship between advocates, the public works department through Wilkerson, and city council through Martinez.

This working relationship helped produce the 2016 Safe Mobility Santa Ana plan, which analyzed all traffic accidents in the city over a 10 year period and identified design and enforcement policies to address problem areas. This plan highlights Santa Ana's emphasis on safety as opposed to promotion of bicycling per se.

SAAS advocated for the inclusion of active transportation facilities in the city's 2014 Five-Year

Strategic Plan. The plan mentions bikeways and a bike master plan briefly, but makes no clear prescriptions. According to the city's "Circulation Element" (a transportation plan), the city published a bicycle master plan in 1995, but it seems unlikely that much of this plan was implemented given that total bikeway extent was only 15 miles in 2014. The City also published a map of potential bikeways in 2012, but without any sort of implementation timeline.

Although Santa Ana has been a laggard in bicycle-friendly policies by the measures I used in my case selection analysis, the city is currently updating the Circulation (transportation) Element of its comprehensive plan, and this Element will include a new bike master plan. In the meantime, Active Transportation Coordinator Wilkerson has led an aggressive campaign to apply for local, state, and federal funding, and has brought in substantial monies to implement bike and pedestrian improvements. Most of the city's projects in recent years have relied on these outside funding sources, which has made the projects politically uncontroversial, but it remains to be seen if the city will commit its own revenue to bike projects in the coming years.

5.2 Interview methodology

I sought out interviewees in each city by initially contacting leading bicycle advocacy organizations, city government departments of planning and public works, and city council members. From these initial contacts, I used snowball sampling to identify other individuals active in bicycle advocacy in the city. Later, due to the emergent relevance of gentrification and displacement, I sought out and interviewed affordable housing advocates in each city except Santa Ana, where I felt the affordable housing perspective was already well-represented among my interviewees. This process yielded 8 to 12 interviewees in each case city, as shown in Table 5.6. In each interview, I asked interviewees to describe their involvement in local bicycle policymaking and advocacy; their motivations for that involvement; the key actors involved in local bicycle policymaking on both sides of the issue, and the arguments made by each side; the most important factors contributing to progress in bicycle policymaking, and

Table 5.6: Interviewees by city

Role	Atlanta	Houston	Santa Ana	Raleigh
Bike Advocate	4	7	5	3
Bureaucrat	1	4	3	2
Elected Official or Aide	3	0	1	1
Housing Advocate	1	1	0	2
Total	9	12	9	8

the most important barriers to progress; and the actors and arguments involved in particular bicycle policy campaigns in which the interviewee had participated. Finally, if this topic had not already come up in the course of the interview, I asked the interviewee whether they had heard of the concept of the "creative class", what their understanding of that concept was, the extent to which local actors argued that bicycle friendly policies would attract economic development, and the importance of that argument to the local success of such policies.

5.3 Findings

Table 5.7 summarizes my coarse-grained findings from my interviews on the question of whether bicycle policies have been motivated by a pro-growth desire to attract businesses and talented workers, as in the "creative class" strategy advocated by Florida (2002). The three columns in the table indicate, respectively, the proportion of interviewees who (1) had heard of the concept of the "creative class", (2) brought up attracting talented workers to the city as a benefit of bicycle friendliness without my directly asking them about this motivation, and (3) agreed that attracting talented workers was an important motivation for bicycle policy in their city.

The first column measures awareness of the term "creative class", and serves as an indicator of the degree of awareness of the discourse of attracting talented workers as economic development strategy. The second column measures deployment of the discourse of attracting talented workers. We could say that this discourse is part of the discursive toolkit of interviewees who used it without prompting. The

Table 5.7: Awareness and deployment of Creative Class discourse (proportion of interviewees)

City	Had heard of "Creative Class"	Brought up attracting talent	Felt that attracting talent motivates bike policy
Atlanta	0.89	0.44	0.67
Houston	0.75	0.42	0.67
Raleigh	0.50	0.38	0.88
Santa Ana	0.89	0.00	0.22

Table 5.8: Fraction of interviewees deploying Creative Class discourse

Role	Atlanta	Houston	Santa Ana	Raleigh
Bike Advocate	2/4	4/7	0/5	1/3
Bureaucrat	1/1	1/4	0/3	2/2
Elected Official or Aide	1/3	0/0	0/1	0/1
Housing Advocate	0/1	0/1	0/0	0/2
Total	4/9	5/12	0/9	3/8

third column measures whether interviewees stated that this discourse has been used to advance and has been effective at advancing bicycle friendly policy in their city.

The majority of interviewees were aware of the term "creative class", with lowest proportion being 0.5 for Raleigh. Slightly less than half the respondents in each city except Santa Ana deployed the discourse of attracting talent in explaining the benefits of bicycle friendliness, whereas none of the Santa Ana interviewees used this discourse without being prompted. Roughly 7 out of 10 interviewees in both Atlanta and Houston agreed that attracting talent was an important motivation for bicycle policy. All but one interviewee in Raleigh agreed with this sentiment, though mostly in reference to a recent bike-sharing campaign, as described below. Table 5.8 shows the fraction of respondents from each role in each city that deployed the discourse of attracting talent. This discourse was used by a majority of advocates in Houston, and half of those in Atlanta, but only one of three Raleigh advocates. Deployment or observation of the creative class narrative are rough indicators of a pro-growth approach to bicycle-

friendliness, and these results indicate that such an approach has been prevalent in Atlanta, Houston, and Raleigh, but not in Santa Ana. The first subsection below summarizes my findings regarding the prevalence of this creative class discourse in each city. Deployment and observation of this discourse is distinct, however, from active involvement of GC actors in bicycle policymaking. I describe evidence from my interviews on active involvement of such actors in the second subsection. Based on my interviews, I argue that the degree of connection between bicycle advocates and community organizations is negatively associated with both creative class discourse and growth coalition involvement in bicycle politics. Thus, in the third subsection below, I summarize my findings on the involvement of community organizations in the bicycle politics of each city. The involvement of community organizations in bicycle politics increases sensitivity to concerns over gentrification an displacement, and the place-making BFP agenda favored by GC actors triggers those concerns. These concerns are the subject of the fourth and final subsection summarizing my interview findings.

5.3.1 Creative Class discourse

A few interviewees in Atlanta provided some of the strongest endorsements of the "attracting talent" narrative. Those who disagreed with that explanation tended to be less closely involved in collaborative bike advocacy efforts with GC actors.

Perhaps the strongest endorsement came from a former city council member who had championed bicycle friendly policies during his time in office ending in 2013. When asked how he got involved in bicycle advocacy on the council, he responded:

> It happened that it was also consistent with Atlanta's growth projections and what we think of ourselves in terms of appealing to young millennials and getting young professionals to the city. From my modest beginnings, it really did get some legs in the city with the Mayor, who was younger. Not a cyclist, but really cared about economic development and which way the city was going in terms of competitiveness with other modern cities. Austin or Charlotte or other cities that we thought we competed with. Then of course, the other bigger cities, even Chicago and New York. But he was very, very interested in that, so we were able to position this in a way that he saw a future as well.

He also stated that in his experience, economic development was the most effective argument in favor of bicycle policy:

> I think in Atlanta, it's a couple things. Maybe at the top of the list is an economic development argument. I think people were convinced that the more you saw visible cyclists, walkers, runners, the more you imagined that the kind of businesses we wanted to be drawn to the city would feel comfortable coming to the city, and feel drawn to the city because they would think that these were the communities that appeal to the workers that they're trying to employ long term. And build the kind of neighborhoods where these folks wanted to live and work and play. The economic development argument was one of the lead arguments, I think, that got Atlanta on board because that's what we are. We're all about that futurism and economic development and being at the forefront as a welcoming business city.

A former ABC board member brought up economic development almost immediately when asked about the benefits of promoting bicycling:

> Yeah I mean, the, you know economic development is certainly kind of a no brainer, but you know there's a lot of people moving back into the cities…I'm looking for like a cool place to live. Right? For me personally, and I'm always working towards making my city even cooler, right? And when I say cool, what does that mean? That means, you know, I want to be able to ride a bike, and I think it's, and you know, I think it's cool to ride a bike. Okay? I want carsharing in my city, like I want all, I want food trucks in my city. I want all of these things that I think make city living livable. And I think, I think biking is just one part of that. If everybody is driving in their city and there's no other way to get around, then, you know it's kind of a lame place to be. So, that's how I defined economic development, is making the city livable basically. And I think biking's an important part of that.

When I asked whether promoting bicycling yields any economic benefits, a city staff member who works on bicycle and pedestrian projects responded that

> …the trends generally are that the younger population is looking to live in a different way, and I think to retain talent and to support innovation and to have more startups and all of this kind of stuff, those people are expecting that they don't have to own a car.

However, not all my interviewees in Atlanta felt that Creative Class arguments were of central importance to bicycle politics. When I spoke separately with two aides to a current city council member, one

indicated that bicycle policy is one part of a package of things needed to attract the "creative class", but emphasized that it was not the central piece of that package:

> Well, I would just say that the creative class translated to Atlanta is just a much wider swath of things than just how you get around or … so, there's certainly the hipsters on their fixies, which kind of makes no sense here since there are really a lot of hills, but there's a small element of that. There's also the arts piece and the hiphop piece and the food piece and the technology and technological, MailChimp, and cutting edge companies. It's part of the whole thing, but it's not the driver of it… cycling policy is an element of, I think, both what the creative class represents as well as demands, but I don't think it's the primary thing. I think it's a mix of a lot of things.

The other city council aide stated that he doesn't believe economic development is a widely used argument in support bicycle policies in Atlanta ("I don't think [the economic development argument is] used a lot"), and instead emphasized the efforts of advocates to reach out to other groups besides the stereotypical "creative class" cyclist, though he also implicitly acknowledged that the types of workers often labeled as part of the creative class were prevalent among the early adopters of bicycling in Atlanta:

> …certainly people in [Richard] Florida's original characterization of the Creative Class, people who embraced Streets Alive certainly initially, and people who really got out there in strength initially, definitely are members of Atlanta's Creative Class. I think, to some extent what Streets Alive tried to do and the Bicycle Coalition tried to do, and is still trying to do, is figure out how you kind of go beyond that, that kind of stereotypical member of the creative class. How you reach beyond that person to attract other people to biking?

One long-time Atlanta bicycle advocate who helped found the organization that eventually became the ABC in the early 1990s offered only lukewarm support for the notion that creative class discourse was prevalent in Atlanta's bicycle politics, opining that he had only heard "a little bit of" arguments about bike amenities attracting businesses and professionals.

In Houston, a leader of BikeHouston readily acknowledged the prevalence of arguments about economic competitiveness. When I asked him what arguments were used in favor of the Bayou Greenways project, he responded that:

> Basically, the argument was, 'Hey, this is a resource that needs to be developed for lots of reasons': A. It will make the city a better place. B. It will make the city more economically competitive in terms of quality of life issues when going out to find talent on the national marketplace for job openings.

Similarly, a leader of the Bayou Greenways campaign who is himself a business executive stressed the importance of a Creative Class style argument in winning the support of city power brokers:

> That pitch was, I think of it as two levels, the one pitch was to the sort of civic establishment and that pitch was, like you said [I had asked whether there were any arguments about benefits to the local economy], 'A competitive city that people want to move to, and that has good amenities, and all that.' It can attract millennials and all that stuff, right? That was the lead pitch, if you will.

Another leading advocate at Bike Houston who spearheaded the recent campaign for a bike master plan affirmed the importance of economic arguments in Houston:

> It depends who you're speaking with. There are other pieces that you often put out there, right? So you talk about traffic, you talk about health. You talk about economic benefits. The sort of quality of life people want to live, where they have amenities and where they have transportation choice. If they are sort of a skilled worker… And, so anyway, depending on who you're speaking with, one may resonate more or less. I think probably in my experience, the most important two are the economics. So, sort of the quality of life and the equity.

A city staff member who oversees bike and pedestrian projects did not bring up the argument unprompted, but when I asked about whether attracting highly-educated workers was a big part of the bike policy conversation, she responded thusly:

> My short answer is, of course. Again, in the Houston Bike Plan, that's why we did our peer reviews, because we want to be competitive with our peer cities, to attract young minds.

Another bureaucrat who ran a management district containing the offices of many big oil companies described the economic benefits of bicycling for his district:

> Well, for the District, which would be the local economy I work for, it's the branding image that we want to be recognized as a healthy place to live and as far as recruiting and retaining

> the new young workforce, being able to be a part of the bicycle culture makes us, gives us a competitive advantage over places that do not embrace bicycling or are not bicycle friendly… With the community that I'm involved with they want to make money renting their office buildings and so they will be very interested in providing amenities that would encourage bicycling so they can market their building and compete with others.

As with the long-time advocate I interviewed in Atlanta, two long-time Houston bicycling advocates did not feel attracting talented workers was a very effective argument, though they believed the truth of the argument themselves:

> We, the advocates always say that. You have to attract young talent. And young talent expects these amenities before they're going to move to a city. So, we as advocates have been saying it for years. The Greater Houston Partnership has just, or no, now it's called Houston First. They've just kind of recently figured out that people want these amenities. And, you know it's been in the press. And I may have heard one… or, I know … one of our city council members has repeated that a couple of times. And I know Mayor Turner has repeated it a couple of times. So it's not anything that anybody's passionate about, and truly believes in, but I think it makes sense to them.

Perhaps the most negative response regarding economic development arguments came from a city planner who had recently worked on the bike plan, and who explicitly wanted to "push back" against the argument that Houston was building bicycle facilities for the creative class. Instead, he argued that the focus for the bike plan had been on safety and equity, particularly for Houstonians who can't afford a car and bike out of necessity.

It is hard to imagine how the contrast between Atlanta and Houston on the one hand, and Santa Ana on the other, could be stronger with respect to the currency of economic development arguments for bicycling. None of my Santa Ana interviewees deployed the discourse of attracting talent as a motivation for bicycle policy without my prompting, and only 2 of 9 indicated it was an important motivation when I asked about it directly. The two interviewees who agreed that bike amenities could provide economic development benefits were a city council member who has been a leading champion of bicycle and pedestrian friendly policies, and a city transportation engineer. Even these interviewees, however, were well aware of concern about gentrification, and acknowledged having to reassure residents that the

primary purpose of new bicycle infrastructure is to improve safety for existing residents who bike out of necessity.

Raleigh is distinguished among my case cities by having the youngest bike advocacy organization. Oaks and Spokes began as a bike culture festival in 2013, and has only more recently taken on more bicycle advocacy. Like Santa Ana Active Streets, it is volunteer-run, but SAAS has been squarely focused on advocacy from its inception. This could help explain why none of the advocates I interviewed had heard the term "creative class" before. Though all of my interviewees agreed that a version of the "attracting talent" argument was important in advocating for bicycle friendly policies, this was likely due to the recent campaign to bring bike share to the city, in which the notion of staying economically competitive was front and center – four of six interviewees specified that this type of argument was only made explicitly for bike sharing.

One city planner was very familiar with "attracting talent" arguments, and personally believed in their validity, but felt such arguments were "hard to measure":

> Yeah, I think so but [the economic benefits of bicycle-friendliness are] diffuse and hard to measure. It's kind of an attractiveness of your community. It's like the greenway network or other amenities through the park system. It's like I think folks come to the community, they want to see this because they know that there are people they want to hire who care about it, and they want those people to be willing to live in Raleigh. So there's certain industries that if your city doesn't have these things, you're not attractive to this demographic. If you're not attractive to that demographic, companies are going to have a hard time hiring people out of that demographic. So if there's overlap between knowledge workers and people who like bike lanes, then your community that has bike lanes is going to do a better job of attracting knowledge workers than if you didn't have them. But it's very difficult to design a research methodology that reliably teases out what is the actual economic impact of this.

5.3.2 Growth coalition involvement

In Atlanta, I observed strong evidence of growth coalition involvement in bicycle policymaking. This included Cox Enterprises chairman James Kennedy's support of the PATH Foundation; Home Depot founder Arthur Blank's contributions, through a foundation, that helped the city create a Chief Bicycle

Officer position; and the integral involvement of the public-private economic development authority in the Atlanta BeltLine and adjoining development projects. I also found evidence that this involvement was motivated by a Creative Class discourse. One former board member of the Atlanta Bicycle Coalition (ABC) highlighted the effectiveness of an economic development argument in convincing business people of the value of bicycle amenities such as the Atlanta BeltLine:

> Yeah so I think the other thing that I referenced that was critical was this Atlanta BeltLine development…and in that case, what I think was significant [was the] city council president, Cathy Woolard, a woman, at the time was receptive to the idea. The mayor was a woman, at the time, Mayor Franklin, was also very receptive to this idea. And they were able to convince the business powers that be, mostly men, you know, that this is an idea that could help reinvent the city in a way that would attract more people, more businesses, and improve the overall quality of life by increasing green space. And I think that that was pivotal for us, because the truth is, we not only have people moving here because, you know, it's warmer, or the housing is cheaper. But we have people moving here because of the BeltLine… And so, the ability to grow the city, and reinvent it in a way that makes it more attractive to people in their 20s and 30s. I think that that has also been another factor in the willingness of city leaders to change policies that have a direct and indirect effect on cycling.

Similar to interviewees in Atlanta, several interviewees in Houston felt that economic development was one of the most important arguments for bicycling, and these interviewees provided even more evidence of active business involvement, at least in the Bayou Greenways project, than interviewees in Atlanta. One advocate who now helps run the city's bike sharing system, and who was very involved in the campaign leading up to a bond referendum to help fund the Bayou Greenways, described the campaign thusly:

> …the people pushing [the Bayou Greenways campaign] were like the old oil money, the property developers. I mean very much establishment, Republican, Texas, or Houston… it looked like the moderate Republicans club. You know, it could be like a developers conference.

This advocate felt that these business people were motivated by civic pride, but also a desire to attract talent to the city:

> the guy who was chairman of the [Parks] Board [which runs the Bayou Greenways project] is a guy named and he owns a real estate investment firm… He was a senior something something at Hines which is a global real estate company. And those folks who depend on talent, who are really looking for top talent, I think get that you have to have these amenities, these quality of life amenities… And I think for property developers, they see, I mean, the best property development deal in the world was Central Park. I mean what you did to the property values around that park was insane. And we're starting to see a little bit of development, concentrated development along the Bayou Greenway corridors. And that is just going to accelerate in my mind, in the next 30 years.

In fact, there was a fair amount of business support, particularly from the Houston Endowment, in the effort to professionalize the local bike advocacy organization, Bike Houston:

> they had this guy named come in [as executive director], and [he] was at Shell, he was [a] Stanford MBA guy. He worked, he and his wife were big wigs at Shell. And he got some funding from the Houston Endowment, he got a good staff including . He was able to really professionalize the, I mean it's a tiny little shop. But he was able to professionalize the operation.

Regarding business involvement in bicycle politics, a leader of BikeHouston had this to say:

> There's a certain subset of business leaders that really take the long-term big picture point of view in terms of quality of life in Houston and the importance of that in making Houston an environment that's attractive to business in terms of holding businesses here in Houston, in attracting businesses to Houston and attracting individual talent to Houston. I think that's really what drives them. They've put a lot of money behind that. is an example of that… he's an individual who owns that company, who resides in Houston, and is able to act as an individual, through his Foundation, and put his money to back his vision of what's good for Houston. If you're looking at Exxon Mobile, it's a multinational corporation, there's not an individual that's the equivalent of . They simply act as a corporation looking for what's in their best interest, and they're not known for philanthropic giving.

5.3.3 Community organization involvement

I only found evidence of community-organization involvement in bicycle politics in Santa Ana. As mentioned previously, the city's leading bicycle advocacy organization emerged from the collaboration of several community organizations concerned with housing and community health, ensuring a close

link between bike and community advocacy. However, just as important is the link between both those groups of advocates and city staff, as described by Santa Ana's Active Transportation Coordinator:

> And the community organizations, they help us … Like when I do a community meeting, I don't do a lot of outreach. I let this core group of people know, "Hey, I'm doing this meeting." And then people just magically arrive. Our community is so engaged here. When I first started here, we're doing this downtown complete street planning. I literally, like I walked into the city and they were like, "Here. This project is just starting." Three weeks after I started with the city we did like a four day workshop. Four days in a row. And every day there was like 50 to 60 people there every single day. Like in Burbank, no way. For just a separate workshop. And it included walking audits and biking audits and like all kinds of map work and stuff.

5.3.4 Concerns over gentrification

In Atlanta, one current staff member at the ABC provided the most explicit articulation of the shift away from creative class arguments as that perspective has come under fire over concerns about affordable housing, gentrification, and displacement:

> …so I would say when I got here, the conversation was definitely like about creative class. It was definitely like Atlanta, like they're filming all these movies here, we've got, you know we need, we need like urban planners, we need all these people like you know, like we need computer programmers… we need tech savvy people, we need urban planners, we need architects, like all these like, you know really cool professions, right? … Now it has changed. And it's really about like preserving affordable, like keeping Atlanta affordable. Building more affordable housing, anti displacement, and that is the big, like for this mayoral election, that's one of the top issues, is affordable housing… And it's something that's actually changed how we talk about bike infrastructure, and you know, biking as this symbol of gentrification.

While this ABC staffer indicated that the organization has adapted quickly to concerns over gentrification, the Atlanta affordable housing advocate with whom I spoke felt not only that a pro-growth, pro-developer agenda had helped advance bicycle-friendliness in Atlanta, but also bike advocates haven't worked hard enough to engage with the communities they are working in. That housing advocate argued that bike advocates have alienated community members and contributed to gentrification and displace-

ment:

> Like bike activists fighting to get a bike lane on Martin Luther King, in the kind of southwestern part of the city, or neighborhood. Neighborhood activists are like, that's not a priority for us right now. We're facing immediate displacement. So that's the space where bike activists might see themselves as really radical progressives, actually can play into the displacement of long term residents. So amongst housing advocates, sometimes the bike folks can be a little tone deaf. And of course, they frame everything around personal safety, and biking being an accessible form of transportation for low income people, that sort of thing. But they don't do a very good job of working with, you know? It's more of… less coming into the community and saying, "This is what you need" … Like we're in this moment of mass displacement and affordable housing crisis. Adding bike lanes to low income communities is something that those that seek to displace and really extract wealth from a community are really excited about. So I think it would be good if bike activists took a step back … And we had this conversation with street artists, too … are your activities, are they helping struggling people? Or are they hurting them? If they're helping transform communities into a more attractive place to extract wealth from, then they're not helping, they're hurting.

This housing advocate acknowledged that bike advocates are becoming more sensitive to these issues, but still observes conflict between the bicycle-friendly and affordable-housing agendas.

One long-time Atlanta bicycle advocate similarly acknowledged that the influx of young college graduates "does cause gentrification and racial turnover and resentment in some cases".

Despite strong evidence of a pro-growth agenda among those advocating for bicycle-friendly policies in Houston, none of my interviewees, including the affordable housing advocate, expressed serious concerns about gentrification or displacement associated with bike programs. This could be due to the relatively low population density in Houston, which puts less pressure on housing prices (McCaig 2015), though Atlanta also has only moderate population density.

In Santa Ana, concerns over gentrification were front and center in nearly all of my interviews. This was not because of a perception that bicycle policies in the city have contributed to gentrification, but rather reflects a general hyper-awareness of the issue and a distrust of developers. Bicycle advocacy in Santa Ana is tightly focused on improving safety for people who bike out of necessity, and the dominant response to questions about attracting talented workers was that that perspective was a recipe for

gentrification. Consider one pointed exchange with a local advocate:

> Me: One argument that sometimes is brought up is people and businesses can choose, or people who are deciding where to get a job and where to live might be looking at a few different places, and they might want to choose a place where it's walkable and bikeable, or … they might want a place with parks, but it kind of all goes together in terms of what makes a community attractive to people. Then also, businesses might look at that, and say they want to locate in those type of places… Does that come into the conversation about why the city should invest in active transportation, to attract residents and attract new businesses and stuff?
>
> Advocate: Are you talking about gentrification?

When I asked a city staff member who focuses on active transportation whether making the city more attractive to new residents and businesses was a big part of the bike and pedestrian conversation in Santa Ana, he had a quick response:

> No, not here. Does it come up in places, absolutely. You know, there's this actual fear within the community regarding displacement and gentrification. And there's a lot of conversations happening now about is active transportation as a system of change, is that causing or is there a correlation between that and these kind of negative, potentially negative side effects.

When I asked him about the creative class term, he indicated that he was aware of it, but that the term itself was closely associated with gentrification in his mind:

> I mean, you go to Silicon Valley and Palo Alto and places like that, like you know, Google is doing its own bike plan, or something like that. I've just kind of seen articles about it. The people that work at these tech companies want to live in places where they can ride their bike around and like, you know … Here we call it gentrification. Like that's the term that my community uses to describe that.

Santa Ana's bicycle advocates are skeptical of developers, as exemplified by this description from an advocate who is also an academic transportation researcher:

> So what ends up happening is that when a big developer comes in who has absolutely no care and consideration for a local community maintaining stability and being able to stay

> in place. They come in and they present to the City Council, these amazing tax revenue of possibilities and opportunities for increasing a particular base of economic wealth. The City Council is awed by it, do you know what I mean? … and the developers understand bike washing like there's no tomorrow. They did it with green washing, and they created all these sustainable energy efficient blah, blah, blah. Now they're doing it with biking infrastructure. 'Oh, we'll come in and build bike paths'.

The link between biking and gentrification has been raised recently in Raleigh, especially in a recent mayoral election, where the African-American candidate criticized the city for spending money on bicycle infrastructure rather than allocating that money to more necessary city functions. However, it doesn't seem like the city has felt strong pressure to take action to allay fears of gentrification, partly due to skepticism about the connection between biking and gentrification, and partly due to the limited scope for city housing policy, as described by a city transportation engineer:

> Yeah, so from the infrastructure standpoint, I mentioned it before, that some people feel like bike infrastructure promotes gentrification. But again I think it's lost on the fact that there's a significant number of low income folks that rely upon bicycles for primary transportation. And they become the customers for using those type of infrastructures, so there's that… And then oh yeah, by the way, here comes some tech people into downtown. They don't wanna commute from Wayfield or Wake Forest, right? They wanna live close to their office. And oh look, I can fix up this bungalow. And that's what gentrification really looks like. That's, it's less nefarious and more evolutionary than anything… The housing discussion is really complicated… because of the fact that we're, I believe it's called a Dillon rule state, where the individual municipalities don't have a lot of independent authority.

Similarly, the two Raleigh-area affordable housing advocates with whom I spoke did not express concern that bicycle-friendly policies are contributing to gentrification and displacement. As in Houston, this could be attributable to relatively lower population density compared to Atlanta and Santa Ana.

5.4 Policy formation patterns

In the narratives of bicycle policymaking in each city, we can identify three stages: the formation of a political coalition, the formation and implementation of policies, and the perceptions of those policies once implemented, which sets the stage for future coalition formation. By assessing the commonalities

and divergences in these three stages, I can identify common patterns in the flow of events of bicycle policymaking. After identifying these patterns, I can attempt to attribute these patterns to characteristics of each case, generating hypotheses about other U.S. cities which were not selected for case study but which share these attributes. Among my four cases, the policymaking process in Atlanta and Houston shares similarities that can be abstracted into a common pattern, and Santa Ana and Raleigh share similarities that can be summarized in a second pattern. Schematic diagrams of these patterns are shown in Figures 5.6 and 5.7.

5.4.1 Pattern 1: Atlanta and Houston

Coalition formation. Both Atlanta and Houston had longstanding bicycle advocacy organizations since the early 1990s, but Atlanta didn't achieve institutionalization of bicycle friendly policy until around 2008, and Houston arguably didn't achieve that milestone until 2017 with the adoption of a new bicycle master plan. Thus, pressure from bicycle advocacy organizations alone was not sufficient to compel these cities to prioritize promotion of bicycling. The turning point in each city was the formation of an alliance between bicycle advocates and growth coalition (GC) members. The formation of such alliances required not only that the GC actors take an interest in bicycle policy, but also that bicycle advocates were willing to work with these leaders. This latter fact is relevant in the Atlanta case, where the city's bicycle advocacy organization, the Atlanta Bicycle Coalition (ABC), was led until 2007 by an activist described in my interviews as a "bomb thrower" and "gadfly". A bicycle advocacy organization which viewed itself as anti-establishment or even anti-capitalist would not readily ally itself with business leaders, nor would business leaders want to work with such an organization. Thus, the departure of this ABC leader in 2007, and the installation of a more pragmatic executive director, was a necessary condition for the establishment of a working relationship between the bicycle advocacy and business communities in Atlanta.

Similarly, in Houston, professionalization of the city's long-standing bicycle advocacy organization was a necessary condition for the formation of an alliance between the advocacy and business

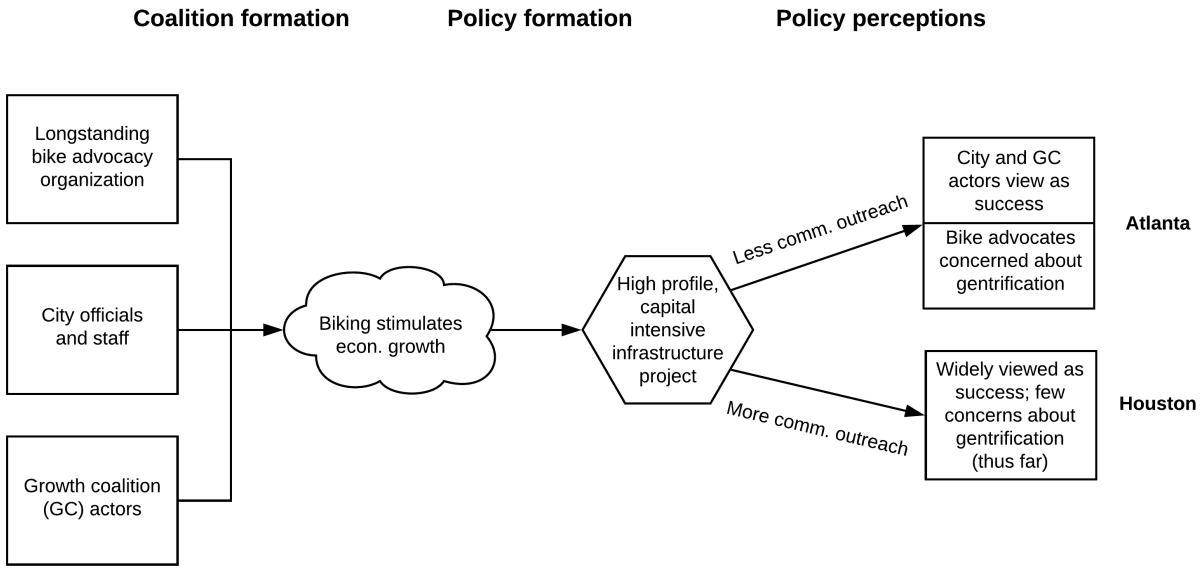


Figure 5.6: Policymaking process pattern 1: Atlanta and Houston

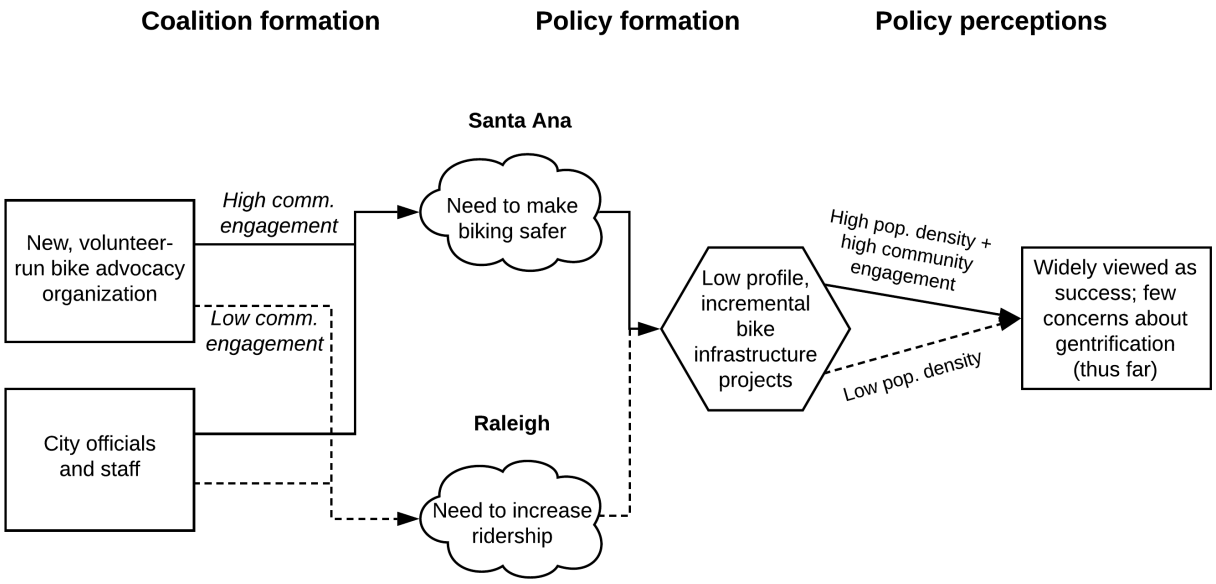


Figure 5.7: Policymaking process pattern 2: Santa Ana and Raleigh

communities. In 2014, BikeHouston hired its first paid executive director, who himself was a businessperson with a background in the gas and petroleum industry, with funding from the Houston Endowment, one of the largest private philanthropic foundations in the country. Professionalization of bike advocacy organizations likely facilitates financial contributions from GC actors, which in turn creates a lever for GC actors to influence the activity of the advocacy organizations.

Along with bike advocacy organizations and GC actors, the third set of partners in the bicycle policy alliances of Atlanta and Houston consists of city officials, including both mayors and city council members, as well as city staff in the planning, engineering, and parks departments. Some, though certainly not all, elected officials and city staff were eager participants in the emerging bicycle policy alliance, though for slightly different reasons. Elected officials in both cities have historically been very business friendly and pro-growth (Stone 1989; Feagin 1988), and thus were sensitive to the growing GC interest in promoting bicycling and livability more generally. City staff, for their part, have little agenda-setting power relative to elected officials, but the growing interest in active transportation, relative to the traditional myopic focus on car traffic, in the transportation planning and engineering professions created a new generation of transportation staff who were excited to apply their expertise to these innovative policies. In fact, several transportation officials in each city were themselves bicyclists and even bicycle advocates, with one planning manager in Houston taking over as executive director of BikeHouston shortly after our interview.

Policy formation and implementation. In both Atlanta and Houston, bicycle friendly policy formation was centered on a large-scale, high-profile infrastructure project, funded and lobbied for by a coalition of public, non-profit, and private actors. In Atlanta, this project was the Atlanta BeltLine, a loop of mixed-used trails encircling the central city, which was put on the public agenda by a city council member and the mayor, but whose development was subsequently led by the city's public-private development agency, with financial contributions from developers who wanted to build along the trail (Pendergrast 2017). In Houston, the project was Bayou Greenways 2020, a system of trails and linear parks to be built along the cities many bayou waterways. The Bayou Greenways project was in part

funded by a bond referendum, but GC actors were heavily involved in the campaign for that referendum, and direct private contributions were also significant. In both cities, the infrastructure built by these projects has attracted substantial usership and has boosted the profile of bicycle friendly policies. Moreover, these projects established a foundation for subsequent bicycle infrastructure planning, with planning documents focusing on connections to the BeltLine and Bayou Greenways trails.

Perceptions of implemented policies. In both Atlanta and Houston, the major bicycle infrastructure projects undertaken by the policymaking coalitions described above have been viewed as successes, both by the coalition members themselves and by large segments of the public. In Atlanta, however, there has also been notable backlash against the BeltLine project in lower-income and working-class communities (Pendergrast 2017). In fact, this backlash extends beyond the BeltLine itself and has arisen in response to a number of bicycle infrastructure projects in the city, with criticism centering on concerns that such projects will pave the way for gentrification and displacement. These criticisms have been persistent and loud enough that bicycle advocates are taking increasing notice, with one advocate noting how the conversation in the advocacy community had shifted from a discourse of attracting tech startups to a greater concern over affordable housing and gentrification.

There has not been the same type of backlash in Houston as in Atlanta. This may be due in some part to greater outreach efforts and emphasis on safety and equity in Houston's planning process. Two of my interviewees who worked extensively on the Houston Bike Plan (a city planning official and the advocacy directory for BikeHouston) emphasized their efforts to solicit and incorporate input from groups beyond the stereotypical "creative class" bicyclist. However, the heavy involvement of real estate developers in the Bayou Greenways project, which is still ongoing, holds the potential for conflicts between existing residents along the planned trails and developers seeking to capitalize on rising property values.

5.4.2 Pattern 2: Santa Ana and Raleigh

Coalition formation. Unlike Atlanta and Houston, Santa Ana and Raleigh did not have longstanding bicycle advocacy organizations. The leading bicycle advocacy organizations in Santa Ana and Raleigh

both formed in 2013. Prior to the founding of these organizations, city officials in Santa Ana and Raleigh were already taking steps to promote bicycling and active transportation. Raleigh adopted its Bicycle Transportation Plan in 2009, and in 2008 Santa Ana city council member Michele Martinez pushed for the hiring of a new Public Works director with experience in multi-modal design from his work in Oakland. Compared to Houston and Atlanta, there was less evidence in Santa Ana and Raleigh of direct involvement of GC actors in the bicycle policymaking coalition. Thus, the coalition formation process in Santa Ana and Raleigh followed a pattern of city-led bicycle friendly policymaking, with organized advocates only joining the coalition in recent years.

Despite these similarities, the coalitions that formed around bicycle policy making in Santa Ana and Raleigh differed in significant ways. Whereas in Raleigh the push for bicycle friendly infrastructure seems to have come in equal parts from the Mayor's office and from city transportation staff with an interest in innovative planning and engineering practices, the impetus for such policies in Santa Ana seems to have come primarily from council member Martinez, who helped install more bicycle friendly staff members in the city's engineering department. Moreover, the motivations of the city officials in question were different, with Raleigh's Mayor Nancy McFarlane emphasizing building the city's reputation as "the most bike-friendly community in the state" (McFarlane, Nancy Undated), whereas council member Martinez focused on the health benefits of active transportation for residents, and the need for safety improvements to protect vulnerable road users. Most importantly, the composition of the advocacy community that joined the bicycle policymaking coalitions in each city differed. Whereas in Raleigh, the bicycle advocacy community is composed primarily of white, middle-class professionals, and is not closely linked to organizations advocating for marginalized groups, the bicycle advocacy community in Santa Ana grew directly out of organizations advocating for poor and working class residents. Much of this difference is likely driven by stark differences in the racial and ethnic makeup of these two cities, with Raleigh a majority white city with a substantial African-American population, and Santa Ana close to 80% Hispanic or Latino. Regardless of the cause, however, this difference in the composition of the bicycle advocacy community was consequential for both policy formation and the

perception of implemented policies.

Policy formation and implementation. Perhaps due to the lower degree of direct involvement of and financial contributions from GC actors in Santa Ana and Raleigh, neither of these cities have undertaken a large-scale bicycle infrastructure project on the level of the Atlanta BeltLine or Houston's Bayou Greenways. Rather, bicycle policy formation in Santa Ana and Raleigh occurred mostly through planning processes led by city bureaucrats with some opportunities for public input. In Santa Ana, bicycle infrastructure policy has been guided by a data-driven focus on safety, as evidenced by the city's 2016 Safe Mobility Santa Ana plan (City of Santa Ana 2016). In Raleigh, planning has been guided by a broader array of goals, including boosting the city's bike commute mode share and improving its Bicycle Friendly Communities ranking.

Beyond these similarities, however, the differing degree of interlinkage between the bicycle advocacy community and community organizations, discussed in the previous section, has had important implications for the policy formation process in the two cities. Specifically, the close connections between city planning and engineering staff, bicycle advocates, and community organizations in Santa Ana has helped ensure high levels of community turn out at planning meetings with opportunities for public input, which in turn makes city staff more accountable to the desires and concerns of residents. In Raleigh, the lack of such close connections to community organizations outside of the bicycle advocacy community has meant that public input has been mostly limited to the bicycle advocacy community itself, which likely skews whiter, more highly educated, and more affluent than the population of Raleigh as a whole.

Perceptions of implemented policies. The close ties between city staff, bicycle advocates, and community organizations has helped avoid significant backlash against active transportation infrastructure in Santa Ana, where high residential density has made gentrification and displacement a very salient concern. Despite the lack of close ties to community organizations in Raleigh, to this point, bicycle policy has not faced significant backlash over concerns of gentrification and displacement, in part due to the city's relatively low population density. Nonetheless, the recent mayoral campaign, in which

an African-American candidate criticized the white incumbent candidate for her support of bicycle infrastructure, hints at the potential for discord over the importance of bicycle friendly policies between different segments of Raleigh's population.

5.5 Growth- versus community-oriented bicycle policy

My case cities suggest that pro-growth discourse has become the norm in U.S. urban bicycle politics, but that GC actors will only actively support a policy agenda centered on large-scale, capital intensive place-making projects. The active involvement of GC actors is the key difference that explains the distinct policy agendas we see in Atlanta and Houston on the one hand, and Santa Ana and Raleigh on the other. However, evidence suggests that Raleigh may simply be at an earlier point on the same trajectory observed in Atlanta and Houston, headed toward greater involvement of GC actors. Thus, whereas the involvement (or lack thereof) of GC actors may explain differences in policy agenda, it is likely the active involvement of community organizations in bicycle policymaking that explains whether a city will follow the normative trajectory toward a professionalized advocacy organization, elected officials who trumpet the myriad benefits of BFPs, active involvement of GC actors, and capital-intensive place-making projects.

Table 5.9 summarizes the presence or absence of nine key factors and outcomes in the bicycle politics of each city. The order of the factors conveys information about proposed causal sequence, such that factors listed higher in the table are thought to influence factors lower in the table. I'll describe more details on these hypothesized causal relationships here. "Community engagement" is listed first, because it is hypothesized to positively influence "Gentrification awareness", which in turn negatively influences "Creative Class discourse". In other words, my case studies suggest that a city in which the bicycle advocacy community is highly engaged with community organizations will have a higher level of awareness about gentrification concerns, which will make arguments for BFPs on the basis of economic competitiveness less resonant among bicycle advocates. On the other hand, the presence of "Creative

Table 5.9: Presence of key factors by city, in order of proposed causal sequence

	Atlanta	Houston	Santa Ana	Raleigh
Community engagement			X	
Gentrification awareness			X	
Creative Class discourse	X	X		X
Professional advocacy org	X	X		
GC actor involvement	X	X		
Activist elected officials	X	X	X	
Place-making project	X	X		
Activist city staff			X	X
Gentrification backlash	X			

Class discourse", creates favorable conditions for the next four factors, which I propose to be mutually reinforcing: "Professional advocacy org", "GC actor involvement", "Activist elected officials", and "Place-making project". When bicycle advocates embrace economic competitiveness arguments, they are more likely to ally with GC actors and entrepreneurial elected officials on a capital-intensive place-making project. Moreover, advocacy organizations that are professionalized make more attractive partners for GC actors, and an alliance with GC actors can aid professionalization by expanding access to financial resources. Regarding the penultimate factor, I propose that the presence of "Activist city staff" is more likely in the absence of a "Place-making project", in cities where the BFP agenda is characterized by incremental additions of bicycle infrastructure influenced by the evolving urban planning and engineering standards that increasingly include road space for bicyclists. Finally, I propose that "Gentrification backlash" is more likely in the presence of a "Place-making project", and unlikely in the presence of "Gentrification awareness". In Atlanta and particularly in Houston, my interviews provide evidence of a strong alliance between business interests and bicycle advocates, similar to that described by Stehlin in San Francisco (2015a). This includes both business-friendly discourse used by advocates, and direct business involvement in supporting bicycle advocacy. Both the Atlanta BeltLine and Houston's Bayou Greenways project are development projects consistent with goals of increasing the exchange value of city land and attracting businesses and workers (Molotch 1976; Florida 2002).

However, in Atlanta and to a lesser extent in Houston, there is evidence of growing concern with gentrification, displacement, and equity in bicycle policy.

In Santa Ana, we see bicycle advocacy that begins from a concern for disadvantaged groups and that is self-consciously anti-displacement. Most interviewees resisted the notion that this anti-displacement lens and hesitancy to ally with developers has slowed the transformation of the city into a more bicycle friendly form, though some admitted that they have to be careful about which bicycle projects they support.

In Raleigh, bicycle advocacy has not developed to an extent that has allowed for an alliance between advocates and developers. The recent campaign for bike share indicates that the city may increasingly emphasize economic competitiveness in promoting bicycle projects, but the recent mayoral campaign suggests that this may lead to conflicts over gentrification similar to what has occurred in Atlanta.

The story of bicycle politics in Atlanta and Houston share a number of striking similarities. Both cities have long-time bicycle advocacy organizations that grew out of, and for most of their history remained closely aligned with, the recreational bicycling community. Despite being founded in the early 1990s, both organizations were run almost entirely by volunteers until recently (the late 2000s in the case of Atlanta, and around 2014 in the case of Houston), when they were able to raise the funds to hire full-time staff. In both cities, the timing of the professionalization of these organizations coincided with growing enthusiasm for bicycling in city government, sparked in large part by two large transportation and recreation projects – the Atlanta BeltLine and Houston's Bayou Greenways project. Though the potential benefits of these projects to current residents was certainly part of their motivation, interviewees in both cities emphasized the importance of these projects for remaining "competitive" with other large U.S. cities in their ability to attract dynamic businesses and a skilled workforce. Moreover, this economic development motivation was crucial in mobilizing the support of wealthy business leaders and developers, members of the "growth coalition" (Loughran 2014; Molotch 1976). Professionalization of these advocacy organizations made it easier to incorporate them into the public-private partnerships that characterize contemporary urban development (Pacewicz 2015). These high-profile projects helped

jumpstart enthusiasm for bicycling in both cities, and the multi-use paths they created provide a foundation for building well-connected, comfortable bikeway networks in each city that could help push bicycling past a tipping point. However, the very high-profile nature of these projects, and the involvement of for-profit developers, has raised concerns of gentrification and displacement in surrounding neighborhoods, particularly in Atlanta, as predicted by "green gentrification" scholars (Anguelovski et al. 2019).

Bicycle politics in Raleigh have followed a different, and more low-profile, trajectory, but with important parallels. While all my case cities developed and adopted bicycle infrastructure master plans in the early- to mid-1990s, Raleigh was the first to formally update its plan post-2000, in 2009, despite the fact that the city did not have a formal bicycle advocacy organization until 2013. The fact that Raleigh created an updated plan without pressure from an advocacy organization, and in a city with relatively low rates of bicycling for transportation (as indicated by bike commute mode share) suggests that city leaders were motivated by something other than popular support. One interviewee claimed that the city's interest in becoming bicycle friendly was motivated by a desire to keep up with other "progressive" cities (a la DiMaggio and Powell 1983), and the city's more recent debate over bike-sharing indicates that city leaders view biking as an aspect of remaining "competitive", similar to the discourse deployed in Atlanta and Houston. Just as the long-time presence of advocacy organizations in Atlanta and Houston failed to, on its own, put bicycle-friendly policy on the city's agenda, we see in Raleigh that a bicycle advocacy organization is not a necessary condition for a city to prioritize bicycle-friendly policy.

Like Raleigh, Santa Ana had no bicycle advocacy organization until after 2010, but unlike Raleigh, Santa Ana has not updated its bicycle infrastructure master plan since the 1990s, though it is currently in the process of doing so. Thus, Santa Ana city leaders appear not to have embraced bicycle promotion as a means of remaining economically competitive. Notably, Santa Ana is my only case city without a formal goal to increase bicycle mode share, and the only city which has not applied to be certified as a "Bicycle Friendly Community" by the League of American Bicyclists. Nonetheless, bicycle-friendliness

has, in recent years, become a prominent issue in the city, not *because* of a connection between bicycling and economic development, but rather *in spite of* that connection. The enthusiasm for active transportation in Santa Ana is sustained by a uniquely close working relationship between a city council member who has championed active transportation improvements for their health and safety benefits; a dedicated Active Transportation Coordinator who has applied aggressively for outside funding sources; and an active transportation advocacy organization that can mobilize widespread community support and feedback through its connections to community organizations. Santa Ana's high population density and large working class and immigrant population has made residents highly attuned to concerns of gentrification and displacement, such that any association between bicycle-friendliness and attracting new businesses and residents is viewed as a liability rather than an asset. Santa Ana's bicycle politics has remained squarely fixed on the issue of safety, as evidenced by the creation of a "Safe Mobility" plan before any update to the bicycle master plan. While Santa Ana may be on the brink of incorporating routine bicycle improvements into city policy, the resistance to aligning bicycle improvements with developments that would be favored by GC actors may prove to be a political barrier. So far, the city has funded improvements almost entirely with outside grants, which has helped sidestep the controversy that would come from using general fund revenue, and has allowed the city to make progress without strong support from many city council members or vocal support from the mayor.

The way that Santa Ana was able to advance a bicycle-friendly agenda without relying on pro-growth arguments was by emphasizing the safety of vulnerable road users. This is a potent argument for bicycle improvements when combined with a conception of bicyclists as lower-income persons who can't afford car ownership and aren't well-served by public transportation. The same argument could perhaps be mobilized in other cities if bike advocates focused more on finding common ground with lower-income residents in their community.

Regarding the relative effectiveness of growth- versus community-oriented bicycle policy, there are competing indications. On the one hand, one could argue that capital-intensive, place-making policies will have limited effectiveness. As Hackworth (2007) argues, capitalism depends on differentiation to

create value and profit. Thus, local developers will only be interested in a given amenity-creating project to the extent that the project creates an inequality in access to the given amenity, such that people with means to do so will pay for proximity to the amenity. Bicycle policies motivated by growth and guided by concern for profits will tend to concentrate access to bikeability, both within particular areas of a city and within particular cities (since the competition for growth, attracting jobs and the "creative class" are zero-sum games). These developments are geared toward attracting affluent residents who can afford to pay for access to scarce amenities. The success of these projects (such as the Atlanta BeltLine) is not measured in terms of increased active transportation or reduction of environmental harms, but in terms of their ability to attract positive attention and development to the city.

On the other hand, the place-making projects supported by growth coalition actors in Atlanta and Houston show how an infusion of private resources can boost the ambitiousness of bicycle friendly policy and generate excitement and momentum for further improvements. Advocates in Santa Ana have successfully avoided bicycle policies that contribute to gentrification, but this cautiousness, along with their reliance on federal grants, has limited the pace of progress in redesigning the city for active transportation.

On balance, it seems that the best approach would be one that mobilizes and engages the community, not in outright opposition to growth-oriented bicycle policy, but to ensure that the benefits of such redevelopment are shared by poor and working-class residents, as with the community benefits agreements discussed in chapter 3. Such an approach is pragmatic in recognizing the reality of growth coalition power in US cities, and seeks to harness that power to achieve environmental goals, while also mobilizing, not to oppose, but to redirect that power toward a more equitable distribution of economic and environmental benefits.

Chapter 6

Is business good for biking?

In the introductory chapter of this dissertation, I proposed four central questions. First, to what degree have business leaders been instrumental in the rise of bicycle friendly policies in U.S. cities since 1990? Second, to the extent that business leaders have been instrumental, do the politics of bicycle friendly policymaking offer lessons for how business influence could be harnessed in support of environmentalist policies? Third, to what degree have marginalized groups been involved in promoting bicycle friendly policies? And fourth, to the extent that marginalized groups have been involved, what does their involvement reveal about the influence of these groups in contemporary urban politics? In this chapter, I will first summarize my findings with respect to these questions, and then I will consider the implications of these findings for the future prospects of bicycle friendly policy and for sociological research on urban politics, gentrification, and the environment.

6.1 Review of arguments by chapter

In chapter 2, I reviewed past research relevant to the political arrangements underlying bicycle friendly policies. This inquiry directed my attention to the sociological study of urban politics. I found that most sociologists agree that urban policymaking is typically dominated by a coalition of business leaders,

large property owners, and their allies who shape urban policy to encourage economic and population growth that benefits them materially. Furthermore, declines in federal aid to cities and the corporate merger movement have only tightened the grip of the urban growth agenda. The dominant strategies of urban growth, however, have shifted in ways that necessitate a reevaluation of the traditional opponents of growth and of the relationship between growth and environmental protection. The Creative Class discourse, which argues that the key to regional economic growth is providing quality of life amenities that will attract talented entrepreneurs and professionals, has become increasingly influential as urban economies come to rely increasingly on professional services, consumption, and tourism as opposed to manufacturing. This agenda of growth through quality of life has increasingly aligned the interests of the environmentally-concerned among the middle- and upper-classes — traditional opponents of growth – with those of the growth coalition. Scholars of green gentrification have shone a light on the negative consequences of this new brand of sustainable urban development for poor and working-class residents, but no consensus has emerged on whether such development should be unequivocally opposed, or whether lower-income residents should rather mobilize to ensure they share in the benefits of these projects.

In chapter 3, I analyzed the complex relationship between transportation policy and travel behavior using data on bicycle infrastructure and bicycle commuting. The complexity of this relationship called for an approach that attends to both the reciprocal relationship between infrastructure and practice and the moderating influence of cultural factors. With longitudinal data on bicycle-commuting in 62 large US cities from 2000-2014, I used fixed-effects regression and structural equation modeling to perform two strong tests of whether the expansion of bikeway facilities induces more bicycling, and whether this effect depends on the strength of environmentalism in a city. I also used structural equation modeling to perform a preliminary test of the reverse causal effect — whether bicycle commuting can spur bikeway creation, again allowing for a moderating effect of environmentalism. My results added to existing evidence that bikeways induce bicycling, and provided preliminary support for the reverse effect, but also indicated that both effects are moderated by local environmentalism.

In chapter 4, I performed an exploratory regression analysis of bicycle friendly policy adoption. Through this analysis, I identified several key factors that explain much of the variation among large U.S. cities in an index of bicycle friendly policy adoption. One of these factors was the prevalence of Creative Class occupations. To facilitate a balanced appraisal of the mechanism of this relationship, I identified four cities that filled all four cells of a two-by-two table defined by higher- vs. lower-than-expected bicycle friendliness and low vs. high prevalence of creative class occupations.

Finally, in chapter 5, I examined the rise of bicycle friendly policies in the four cities identified in chapter 4, assessing the involvement of growth coalition actors and Creative Class arguments in bicycle politics, and the types of bicycle policies those actors and arguments support. I found that the involvement of growth coalition actors and Creative Class arguments in bicycle politics is associated with capital-intensive, place-making projects such as greenway trails and bike-sharing systems which are viewed as contributing to a city's economic competitiveness. These types of bicycle-friendly policies can create excitement and momentum for further bicycle improvements, but are also more likely to exacerbate social inequities in access to green amenities and affordable housing. In contrast, cities in which bicycle politics is characterized by close cooperation between community organizations, elected officials, and city staff pursue more low-profile bicycle-friendly policies, with careful consideration of equity. I concluded by considering the likely effectiveness of these different styles of bicycle policy for increasing bicycle transportation in cities, and I argued that the best arrangement given existing political realities is one that harnesses the resources of the growth coalition while engaging and mobilizing poor and working-class residents to demand that the benefits of green infrastructure and new development be shared equitably across the socio-economic spectrum.

6.2 Summary of findings on research questions

6.2.1 Business involvement in bicycle policymaking

In two of my case cities, I found evidence of substantial involvement of business and growth coalition (GC) actors in bicycle policymaking. In Atlanta and Houston, GC actors provided significant financial support for bicycle friendly policies, either directly or through contributions to bicycle advocacy organizations. In some cases, such as the campaign in support of the bond referendum for Houston's Bayou Greenways 2020 project, GC actors actively participated in lobbying efforts for bicycle friendly policies. Moreover, in both Atlanta and Houston, I found strong evidence that GC support for bicycle friendly policies was motivated by what I have termed the Creative Class discourse: the belief that cities must enhance the quality of life available to residents in order to attract a talented workforce and the businesses that rely on such talent. In other words, GC support was based on the belief that bicycle friendliness improves prospects for growth. Involvement of GC actors in these cities was facilitated by the professionalization of their respective bicycle advocacy organizations, which provided a means for GC actors to funnel financial support to bicycle friendly policies while also gaining influence over advocates.

In my other two case cities, Santa Ana and Raleigh, I found less evidence of active GC support for bicycle friendly policies. In Santa Ana, this can be attributed to the ideological stance of the bicycle advocacy community, which views any alliance with developers as antithetical to their mission of improving living conditions for existing residents without threatening their housing security, and to the low prevalence of Creative Class occupations in the city. To Santa Ana advocates, the Creative Class narrative is simply a discursive tool used to justify gentrification and displacement. This perspective was partly shared by bike advocates' allies on the city council and in the city engineering department, though these city officials sometimes argued for the possibility of encouraging growth without threatening the housing security of lower income residents.

The case of Raleigh, when contrasted with Atlanta and Houston, suggests some factors that may

modulate GC involvement in bicycle policymaking, even in the absence of outright opposition to allying with GC actors in the advocacy community. In Raleigh, neither bicycle advocates nor city officials expressed any antipathy toward working with GC actors, and in fact, both advocates and city officials agreed that attracting talent was an important benefit of bicycle friendly policies. Furthermore, the launch of Raleigh's bike share system, which is named Citrix Cycle after it's largest corporate sponsor, shortly after I concluded my interviews in the city demonstrates the potential for GC involvement in bicycle policymaking given the right conditions. In Raleigh, the lower degree of GC involvement in bicycle policymaking may be attributable to the lack of a professionalized bicycle advocacy organization and the absence of a high-profile, capital-intensive bicycle infrastructure project comparable to those undertaken in Atlanta and Houston. A professionalized bicycle advocacy organization, as discussed above, may provide a convenient path for GC actors to channel their support and influence. A high-profile project like the Atlanta BeltLine or Houston's Bayou Greenways is a natural means for GC support for a few reasons. First, the high capital costs make it a prime candidate for a public-private partnership. Second, the high visibility of the project increases its potential for demonstrating corporate social responsibility. Finally, the large scale and high visibility of the project can be expected to raise land values in the surrounding area, such that contributions to the project may have a direct return on investment for area land owners.

The absence of a high-profile project of this kind may, in turn, be partly attributable to the smaller size of the Raleigh metropolitan area relative to Atlanta or Houston, and the correspondingly smaller pool of public and private capital available. Similarly, despite the high prevalence of Creative Class occupations in Raleigh, city leaders may feel less urgency about attracting the Creative Class than Atlanta or Houston, who seek to compete with perceived peers such as New York City and Los Angeles.

6.2.2 Harnessing business support for environmental policy

My findings with respect to GC involvement in bicycle policymaking suggest both strategies for attracting business support for environmental policy, and the pitfalls of such support. Perhaps most encourag-

ingly, my findings suggest that GC actors will throw their support behind policies perceived to enhance quality of life based on the belief that such policies will attract population and economic growth. This finding in the context of bicycle policy has implications for many types of environmental policy, since many policies aimed at protecting environmental resources are also viewed as quality of life enhancements, such as policies to protect clean air, clean water, and preserve urban greenspace. Not all types quality of life policies, however, are equally likely to attract GC support. My findings in Atlanta and Houston, especially in contrast to the case of Raleigh, indicate that GC actors are more likely to support high-profile quality of life policies that create place-based amenities with the potential to exploit rent gaps (Smith 1979). This finding echoes Harvey's observation that entrepreneurial urban regimes tend toward policies that spur "place-making" rather than policies to improve living conditions across a whole territory (1989).

This latter finding points both to a strategy for attracting GC support and a danger of such efforts. For activists seeking GC support for environmental policy, this suggests a strategy of focusing on high-visibility, place-bound environmental projects, such as the cleanup of the Gowanus Canal in Brooklyn (Gould and Lewis 2018), or the preservation of green space through the creation of a luxury park (Halle and Tiso 2014). However, these are the very types of projects that have been criticized by scholars as catalysts of "green gentrification" (Anguelovski et al. 2019). On close examination, the same attributes that make a project attractive to GC actors often make it more likely to contribute to gentrification and displacement or exacerbate inequalities in access to environmental and quality of life amenities. Specifically, GC actors' interest in quality of life enhancements is closely tied to the capacity of those enhancements to raise land values, allowing them to charge higher rents, which is exactly the outcome that lower-income residents and anti-displacement activists fear. Place-based projects may improve environmental conditions in their immediate vicinities, but they are more likely to redistribute environmental harms than reduce them (Park and Pellow 2013).

Is my conclusion, then, that GC support should be shunned by activists seeking better urban environmental policies, because such an alliance will lead to relatively ineffective policies that exacerbate

inequality? No, not exactly. Rather, to those who would argue that a quality of life agenda unites environmentalist and GC interests, I would respond that my analysis shows only a partial overlap of interests, such that winning GC support will likely require the adoption of policies that do not maximize the public good, even if they do offer environmental benefits for some.

There is clearly a danger in supporting place-making environmental projects, but there is also a danger in shunning the support of powerful GC actors. In the case of bicycle infrastructure, place-making projects such as the Atlanta Beltline may stimulate further demand for infrastructure that connects to the project corridor. Both the Atlanta BeltLine and Houston's Bayou Greenways have come to serve as the foundation for bicycle infrastructure planning in their respective cities. The best approach, it seems, would be one that mobilizes and engages the community, as bicycle advocates in Santa Ana have done, not in outright opposition to growth-oriented bicycle policy, but to ensure that the benefits of such redevelopment are shared by poor and working-class residents.

6.2.3 Marginalized groups in bicycle policymaking

Whereas I found active involvement of GC actors and business leaders in bicycle policymaking in two of my case cities, I only found comparably active involvement of marginalized groups in one city, Santa Ana. Thus, there is more evidence from my case cities that the current bicycling renaissance is animated by GC interests than evidence that it is driven by the interests of marginalized groups. This is in part due to the roots of bicycle advocacy in each city. In Atlanta, Houston, and Raleigh, bicycle advocates were mostly white and middle-class. In Atlanta and Houston, bike advocacy organizations grew out of recreational cycling clubs, and in Raleigh, bike advocacy grew out of the urban bicycle culture scene, which is dominated by college students and young professionals. In contrast, in Santa Ana, bicycle advocacy arose from community organizations united not by a love of recreational bicycling or bicycle culture, but by concerns with the safety of bicyclists and pedestrians and with physical activity and public health.

The greater involvement of working-class community organizations in Santa Ana compared to my

other case cities cannot be explained simply by a lack of such community organizations in those other cities, though there may be a greater density of such organizations in Santa Ana. One factor that likely plays a role in the greater influence of community organizations in Santa Ana is the city's racial and ethnic makeup. Around 80% of residents identify as Latino, and in recent years all city council members and the mayor have identified as Latino. Despite the fact that Latinos make up a majority of the population in Santa Ana itself, the minority status, and lower average socioeconomic status, of Latinos in the state of California and in the U.S. means that Latino ethnicity is still a salient identity and a rallying point around which community organizations can mobilize residents, even across lines of socioeconomic status. For the same reason, Latino office holders in Santa Ana may feel a greater obligation to address the concerns of marginalized groups than do, for instance, non-Hispanic white office holders in a majority non-Hispanic white city.

While the greater general influence of community organizations in Santa Ana is one part of the explanation for the greater involvement of such organizations in bicycle politics specifically, the other question is why Santa Ana's community organizations have come to be concerned with bicycle policy to a greater degree than community organizations in my other case cities. In fact, to the extent that interviewees in my other cities mentioned community organizations' involvement in bicycle policymaking, it was almost always as opponents or skeptics of bicycle friendly policies, such as an African-American community in Atlanta that opposed a planned bike lane, or the "super-neighborhood" organizations that often sparred with BikeHouston in the planning process for the Houston Bike Plan. While there are likely many factors that explain this difference, two important factors are the high degree of concern with obesity, physical activity, and public health in Santa Ana, and the city's combination of high population density and car-centric transportation system. Community concern with public health is evident in the influence of the non-profit Latino Health Access; the focus on health of council member Michele Martinez, who previously served as the executive director of the Alliance for a Healthy Orange County; and in the city's creation of a "Wellness Corridor" in downtown Santa Ana to encourage physical activity.

Related to this concern with public health is the substantial focus among city leaders and community

organizations with the safety of vulnerable road users. If Santa Ana residents are to increase their physical activity through walking and bicycling, they will need safer streets. Despite being one of the most densely populated large cities in the country, Santa Ana's road system is characterized by wide, often six-lane, arterial roads that facilitate fast-moving traffic, making the roads hazardous for people walking, bicycling, or using other "rolling" modes of transportation such as skateboarding. Growing outcry over these road users being injured and killed by car-drivers led to the development of the Safe Mobility Santa Ana plan, adopted by the city in 2016.

Thus, whereas in other cities, community organizations may often not view promoting bicycle infrastructure as a priority, or may even view such projects as counterproductive, community organizations in Santa Ana have supported bicycle infrastructure as a means to improve community health and safety. At the same time, these community organizations and the Santa Ana Active Streets coalition that they spawned have maintained an acute awareness of the perceived dangers of bicycle friendly policies as an attractive cover for urban renewal and gentrification. This awareness has made bicycle advocates in Santa Ana wary of allying with private developers. This approach protects advocates from being accused of facilitating gentrification, but it also means that bicycle friendly policies in Santa Ana will likely not be able to take advantage of the greater pool of funding made available through public-private partnerships. Indeed, the bicycle friendly policies implemented at the time of my interviews were supported exclusively through state and federal grants, which the city's Active Transportation Coordinator has pursued aggressively.

6.2.4 Marginalized groups in urban politics

With Santa Ana as the only city among my cases where lower income or racial and ethnic minority groups were substantially involved in bicycle policymaking, my analysis does not provide much support for the notion that the power of marginalized groups in urban politics has increased. Bicycle policymaking, of course, is only one small part of urban politics, and a part that some marginalized groups may not care much about, one way or the other. However, bicycle policymaking often overlaps with

land use and development policy making, which is a major arena of urban politics, and one that is often of great concern to marginalized communities. To the extent that my study of bicycle policymaking yields insights into the contemporary politics of urban development, the results point to an alarming — from the point of view of marginalized groups — convergence of interests between GC actors and middle-class progressives that has the potential to exacerbate inequality in U.S. cities.

Specifically, this convergence centers on the concept of quality of life. While the classic formulation of growth machine theory (Molotch 1976) views the use value of land, which is the primary concern of urban residents, as negatively correlated with land's exchange value, which is the primary concern of GC actors, the contemporary discourse of economic growth through quality of life enhancements brings these two types of value into closer alignment. If a city stimulates growth by making itself a more pleasant place to live, then both residents and GC actors can benefit from the same quality of life policies. The problem with this realignment is that it is partial and coincidental. In other words, GC actors do not profit when residents' quality of life improves, but rather they profit when people are willing to pay a higher price to live, work, or shop in a place with a higher perceived quality of life. Moreover, whereas land values for a whole region might rise in the long term as the result of region-wide quality of life enhancements, in the short term, land values in a particular area rise or fall according to how it compares to other areas within the same region. Thus, GC actors have an interest not in the quality of life of a region, but in the quality of life of a *place* relative to other places. This points to two predictions about the types of quality of life policies that will be supported by GC actors: first, that they will create *place-bound* quality of life enhancements, and second, that access to these places will be dictated by ability to pay.

From one point of view, this dynamic is just another iteration of past urban development patterns in which actors in the real estate industry profited by catering to the desires of the middle- and upper-classes. What is new, however, is how seemingly progressive agendas such as environmental conservation and green transportation have become enmeshed in these patterns, with the potential to further weaken opposition to GC interests. This cleaving of various areas of progressive politics according to

their relationship to GC interests is evident in the comments of one Atlanta interviewee. As an affordable housing activist, he bemoaned the actions of bike advocates who consider themselves progressives, but whom he believes are helping weaken the housing security of lower income residents. Bicycle advocates may be particularly susceptible to erroneously believing that their work will benefit lower-income communities because of the affordability of bicycling relative to other transportation modes. This is not to say that bicycle enhancements cannot truly benefit lower-income communities, but rather that it is especially easy to mistakenly assume that they will even in cases where they are part of development policies that cause gentrification and displacement.

While my study does point to the potential for alliances between middle-class progressives and GC actors that contribute to gentrification and displacement, I also found evidence of growing sensitivity among bicycle advocates to the implications of various bicycle policies for lower-income communities. One Atlanta bicycle advocate described the shift in discourse in recent years, from an emphasis on attracting tech businesses to the city, to a greater emphasis on maintaining housing affordability. Moreover, there is evidence the bicycle advocacy movement at the national level has recognized the need for greater attention to diversity and inequality, both in the rhetoric of the League of American Bicyclists organization, and in the rise of advocacy groups focused explicitly on marginalized groups, such as the Untokening collective (Untokening Collective 2017).

6.3 Implications for the sociology of urban politics

In Chapter 3, I reviewed research in the sociology of urban politics and found widespread empirical support for growth coalition theory, which predicts that a growth coalition (GC) of large landowners and their allies will dominate urban land-use politics. This consistent finding led me to predict that, to the extent that cities have adopted bicycle friendly policies, these policies have been supported by local GC actors. My findings provide mixed support for this hypothesis, with evidence of active support from GC actors only present in two of my four case cities. However, the two cities in which I found active

support from GC actors — Atlanta and Houston — are also the two cities which stood out as positive outliers in my case selection analysis. Santa Ana and Raleigh, in which I found little evidence of active GC support, were negative outliers in my case selection analysis. Thus, my findings are consistent with the contention that involvement of GC actors is an important factor in explaining variation in some measures of bicycle friendly policy.

Whereas past research has consistently shown that GC actors have disproportionate influence on urban policymaking, there is less consensus on how that influence is exerted *vis-à-vis* the groups identified as challengers in the classical formulation of GC theory, namely, middle-class homeowners, working-class and poor residents, and environmental activists. My study shows that, at least in the realm of bicycle policymaking, GC actors have allied with bicycle advocates, a group generally in close political alignment with environmental activists and drawing typically from environmentally-concerned middle- and upper-class residents. Moreover, my findings show that these alliances hold the risk of expending progressive political capital and placing an implicit seal of progressive approval on policies that play into urban development patterns which endanger the housing security of working-class and poor residents. Nonetheless, given the political reality of GC dominance and the need to reduce cities' carbon footprints, the best way forward may be to seek greater involvement of and benefit-sharing with poor and working-class communities, rather than mobilization against the new smart growth agenda.

6.4 Implications for the sociology of gentrification

For scholars interested in the causes of gentrification, my study highlights the important implications of contemporary environmental politics for urban development. More research is needed on how environmental aims can be used to justify policies that worsen housing security and exacerbate inequality, and conversely, on how cities can pursue environmental goals without such negative consequences (e.g., Curran and Hamilton 2012). Relatedly, my case study of Santa Ana demonstrates how groups representing marginalized communities can provide an alternative framing of quality of life issues that supports

alternative policy approaches with more equitable consequences. By emphasizing public safety rather than economic competitiveness, bicycle advocates in Santa Ana kept the focus of infrastructure policy on corridors and intersections with high rates of traffic injuries and fatalities, which are often in areas where more pedestrians and bicyclists are working-class and poor residents. This approach enabled incremental progress in facilitating active transportation while minimizing risks of displacement and ensuring a relatively equitable distribution of policy benefits.

6.5 Implications for environmental sociology

Although bicycle policy is not usually seen as a central part of environmental policy, there is reason to think that my findings offer lessons for the politics of urban environmental policymaking more generally. My findings in Atlanta and Houston show that much of the appeal of bicycle friendly policies to GC actors centers on their power as a signal of quality of life, which in turn is thought to attract population and economic growth. Many environmental policies, such as ensuring clean air and clean water and preserving green space, are similarly viewed as quality of life enhancements, and thus these policies may have a similar appeal to GC actors. Thus, there is the potential for alliances between GC actors and environmental groups around these issues. My findings indicate, however, that such alliances can lead to policies with place-bound benefits that are unequally accessible according to socioeconomic status. The actual extent of environmental benefits of such "place-making" policies is suspect, and more research is needed to measure their impact.

6.6 Future prospects for bicycling in US cities

Both rates of bicycling and the adoption of bicycle friendly policies have increased in large U.S. cities in recent decades, but the political dynamics that underlie these trends have implications for their future trajectories. In two of the four case cities I examined, there was substantial involvement of business

leaders in campaigns for bicycle infrastructure and other bicycle friendly policies, and in three of the four cities, bicycle friendly policies were routinely discussed as part of a strategy for economic growth. If bicycle friendly policies can only gather sufficient political support when they are pitched as an economic development tool, what are the prospects for sustained growth in such policies in the future?

One way to evaluate the future prospects of bicycle policy and bicycle travel in U.S. cities is to compare them to the European cities that have already achieved high rates of bicycling. Have U.S. cities become more like the leading bicycle friendly cities of Europe? One way to make this comparison is in terms of urban planning, and in this realm, the answer is a clear and resounding "no". The most bicycle friendly cities of Europe tend to be found in countries where urban development is to a large degree centrally-planned at the national or large-regional level (Logan and Molotch 2007). If anything, U.S. urban planning has become more decentralized during the recent bicycling renaissance, with the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 devolving some authority from the states to metropolitan planning organizations. This decentralizing shift likely did contribute to the rise of bicycle friendly policies (see Handy and McCann 2010), but it also renders planning decisions more subject to influence by powerful local actors. The sensitivity to local interests that is characteristic of U.S. urban planning often leads to solutions that represent compromises between powerful actors in different parts of a metropolitan region, rather than solutions that serve the general interest of the region (Adler 1991). When taken to the extreme, this patchwork planning policy can lead to disastrous regional level outcomes, such as the Houston region's high susceptibility to flooding during Hurricane Harvey, due in part to the high incidence of paved surfaces stemming from weakly regulated development (Krugman 2017).

Another way to evaluate the future prospects of bicycling in U.S. cities is by attempting to extrapolate forward based on observed political dynamics. In other words, what are the driving forces behind the current bicycle renaissance, how have those driving forces shaped the types of bicycle policies that have been adopted, and how will still-unfolding reactions to those policies shape the possibilities for subsequent policymaking? I'll consider those three questions in turn. First, in terms of driving forces,

my analysis suggests that a discourse of bicycle friendliness as a strategy for growth, and to a lesser extent, direct support from local business leaders, are necessary conditions for the adoption of bicycle friendly policies.

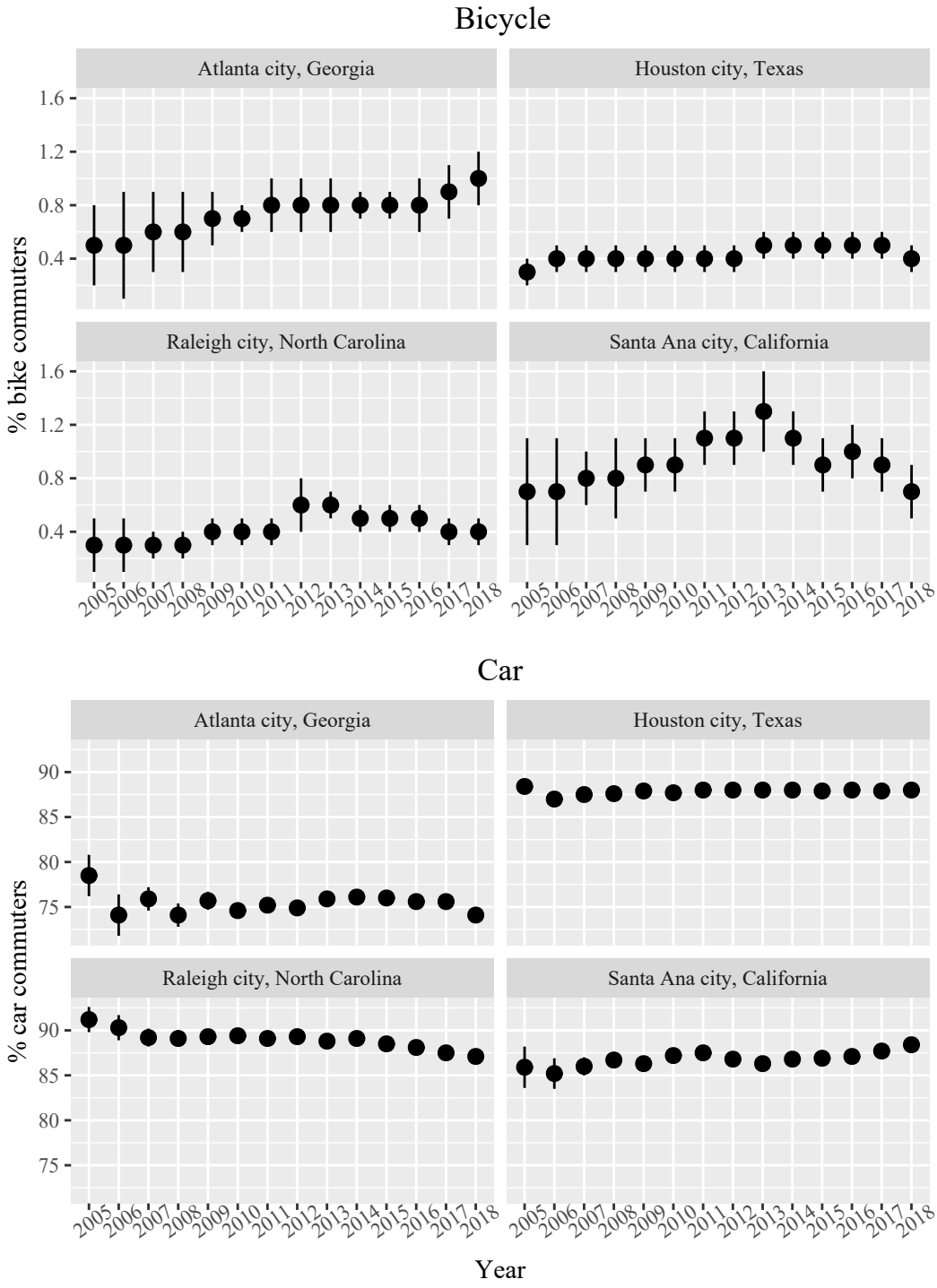
To the extent that bicycle friendly policies must be justified in terms of their perceived contribution to economic growth, the types of policies adopted will be constrained. As an economic development strategy, cultivating a high quality of life in one's city is in large part a matter of cultivating a particular image. Thus, bicycle friendly policies that more effectively portray the image of a high quality of life will be privileged over those with less surface appeal. For example, landscaped greenways or linear parks and lively bicycle festivals offer more opportunities for positive imaging than do a well-connected on-street bikeway system or traffic calming measures. As Stehlin and Tarr argue, "bicycle advocacy practices have become progressively entangled with the placemaking projects of neoliberal urbanism's 'livable' turn… [advocates] articulate the benefits of bicycle infrastructure in the *lingua franca* of the localized urban space-economy: increased property values, a larger customer base, a more attractive consumer environment, and a happier and more productive workforce" (2017, p. 1335).

The fusion of bicycle policies with a pro-growth agenda thus leads to policies that privilege growth over redistribution. It is no wonder, then, that in many places, part of the reaction to the spread of bicycle infrastructure has been concern about impending gentrification. This reaction is problematic for bicycle advocates, because most see themselves as progressives who favor policies to improve the lives of marginalized communities. If bicycle policy making continues down a path of working hand-in-hand with developers and pro-growth interests, the backlash from other progressive groups working more closely with marginalized communities will become increasingly hard to ignore, and bike advocates will be forced to clarify their allegiances.

This line of thinking leads us to the exceptional case of Santa Ana, California, where bike advocacy emerged out of community organizing and has placed opposition to gentrification at the forefront of its agenda. Santa Ana demonstrates both the possibility and challenges of a different mode of bicycle advocacy. One lesson from Santa Ana is the potency of a traffic safety frame as an alternative to the

pro-growth, quality of life frame that predominates in my other case cities. Advocates – including both community activists and activist government officials – have drawn attention to traffic injuries and fatalities to demand action to improve the safety of city streets for vulnerable road users such as pedestrians, bicyclists, and skateboarders. This framing, like the "Stop de Kindermoord" (stop the murder of children) anti-car campaigns in 1970s Amsterdam (Reid 2017), are hard to ignore, but also help to focus attention on working-class and lower-income communities where such incidents of "traffic violence" (as it is termed by one Santa Ana city engineer) are disproportionately common.

Finally, though mode choice on the journey to work is an imperfect indicator of bicycling for transportation, we can look to Census Bureau data on bicycling to work to assess the trajectory of bicycling in my case cities. Figures 6.1-6.3 show the trends in rates of commuting by bike, car, public transit, and foot, as well as trends in working from home, for years 2005-2018. When viewed in isolation, these trends provide some support for the superiority of growth-oriented bicycle policymaking in increasing rates of bicycling for transportation. Figure 6.1 shows that the only city among my case cities to achieve sustained growth in bicycle-commuting is Atlanta, where the bicycle mode share rose from around 0.5% in 2005 to 1% in 2018. In contrast, the community-oriented bicycle policies of Santa Ana have failed to induce sustained growth in bicycle commuting during that period. Figure 6.2 suggests that this difference could also be related to Atlanta's relatively high rate of public transit commuting, since public transit and bicycling have been shown to be complementary modes. In any case, these figures are a reminder that changing transportation behavior is an uphill battle, and that advocates would be wise to seek the support of powerful political allies, while also mobilizing poor and working-class residents to push for an equitable distribution of the costs and benefits of reshaping urban built environments.



Source: American Community Survey 5-year estimates

Figure 6.1: Trends in commuting by bicycle and car with 90% confidence intervals, 2005-2018

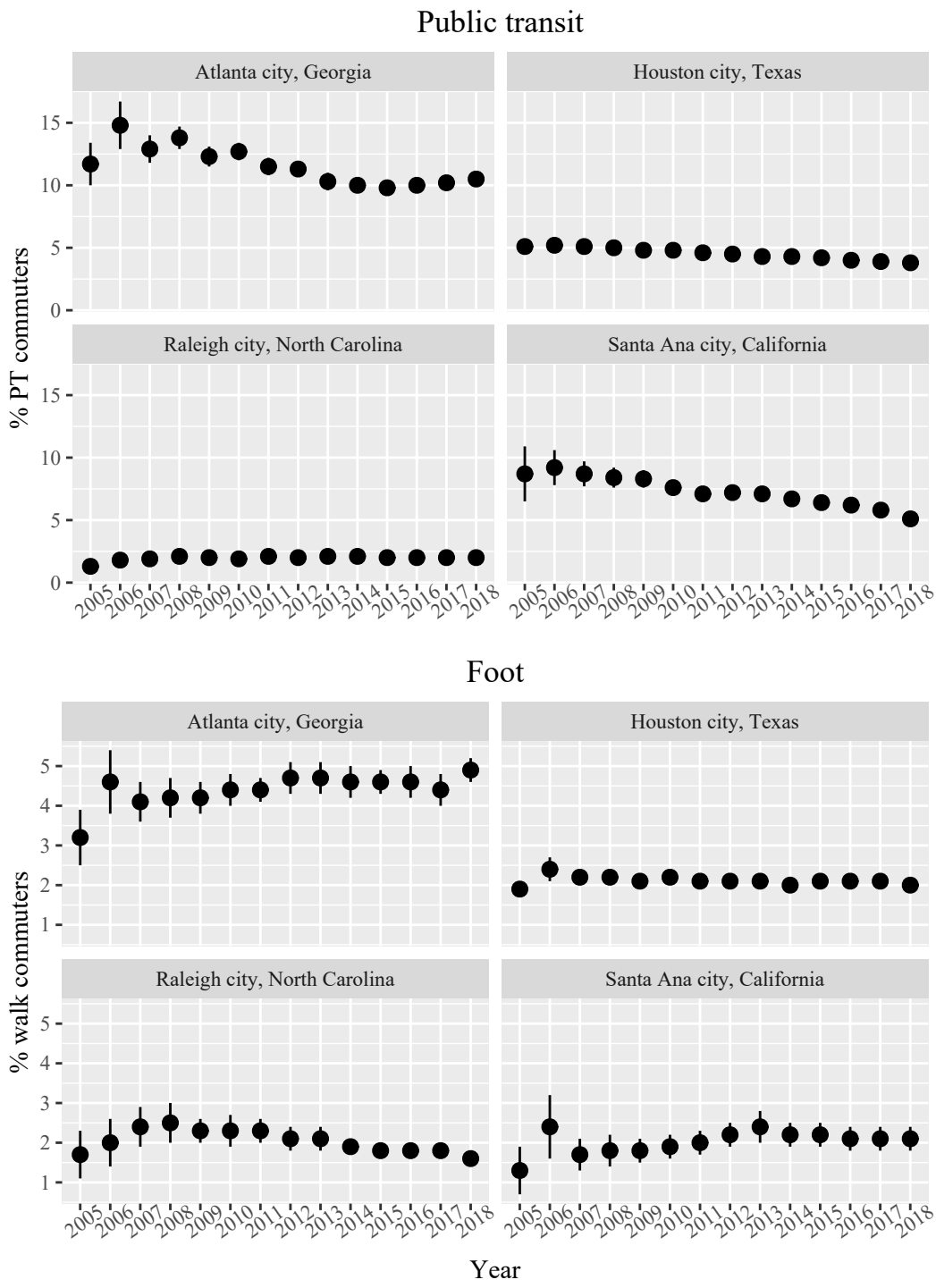
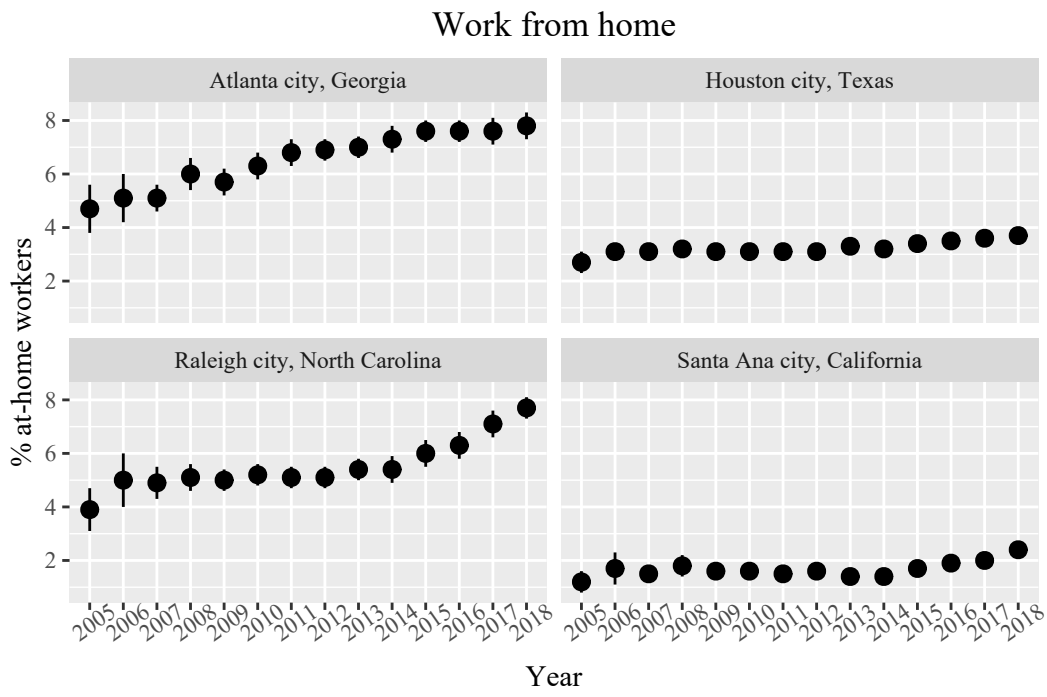


Figure 6.2: Trends in commuting by public transit and by foot with 90% confidence intervals, 2005-2018



Source: American Community Survey 5-year estimates

Figure 6.3: Trends in working from home with 90% confidence intervals, 2005-2018

Appendix A

Open-source software used for analysis and typesetting

I performed much of the analysis and composition of this dissertation using the R language (R Core Team 2020) and the RStudio IDE. Throughout the dissertation, I cited several R packages that I used for specific parts of my analysis, but I also used other R packages and complementary open-source software for general data input, output, plotting, tabulation, and manipulation, as well as for typesetting the dissertation itself.

- For general data manipulation and transformation, I used the packages **dplyr**, **tibble**, **tidyr**, **purrr**, **data.table**, and **car** (Wickham et al. 2020b; Müller and Wickham 2019; Wickham and Henry 2020; Henry and Wickham 2019; Dowle and Srinivasan 2019; Fox and Weisberg 2019).
- For reading and writing files, I used packages **readr** and **readxl** (Wickham et al. 2018; Wickham and Bryan 2019a).
- For regular expressions and string manipulation, I used package **stringr** (Wickham 2019).
- For producing and arranging plots, I used packages **ggplot2**, **scales**, **grid**, **gridExtra**, and **cowplot** (Wickham et al. 2020a; Wickham and Seidel 2019; R Core Team 2020; Auguie 2017; Wilke 2019).

- For manipulating date-time data, I used package **lubridate** (Grolemund and Wickham 2011).
- For downloading and installing R packages stored locally or on GitHub, I used package **remotes** (Hester et al. 2020).
- For bundling my own code into R packages, I used the packages **devtools** and **usethis** (Wickham et al. 2020c; Wickham and Bryan 2019b).
- For formatting publication-quality tables, I used the R packages **gt**, **kableExtra**, and **pander** (Iannone et al. 2020; Zhu 2019; Daróczi and Tsegelskyi 2018).
- I wrote this dissertation in R Markdown syntax, which is based on Markdown, interwoven with R code, and converted this marked up text to PDF using the R packages **bookdown**, **rmarkdown**, and **knitr** (Xie 2020a; Allaire et al. 2020; Xie 2020b). These R packages, in turn, rely on the open-source projects LaTeX (LaTeX3 Team 2020) and pandoc (McFarlane 2019). To ensure that this dissertation conformed to the formatting requirements of The Graduate School, I adapted the thesisdown package, borrowing tricks from the huskydown package. The resulting R package nudown is publicly available on GitHub.

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