The Economic Development Impacts of Streetcars: Measuring the Impact of Streetcar Projects and Identifying the Factors Necessary For Stimulating Development in Streetcar Corridors.

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Executive Summary:

In the past decade, streetcars dramatically increased in popularity with high expectations for stimulating economic development in the aftermath of the recent recession. Since 2009, 14 streetcar projects began construction in large and mid-sized cities and received over $500 million in federal funding. But the actual development impacts of these new streetcar projects are not well understood or studied. The academic literature on the impacts of streetcar systems is nearly non-existent and most of the expectations for streetcars are based on the experiences of lines in Portland and Seattle. Given the substantial amount of investment from localities and the federal government, great expectations for new development, and wide array of cities attempting to construct streetcar systems, the economic development impact of streetcars is important to study and understand. This study found:

- Many cities base their economic development projections either on the experiences of transit-oriented development on other types of rail, like heavy rail, which may have different development potential or they are based on the experiences of Portland and Seattle, which may have different planning and development environments from other cities.

- Federal agencies award streetcar projects primarily on a qualitative analysis that contains very little quantitative rigor or analysis. Furthermore, federal officials do not distinguish between different transit modes when it comes to potential development impacts, despite research showing varying levels of development from different modes. The development impacts promised by these projects are left largely unchallenged and, instead, cities create narratives of the transformative effects streetcars may have for their communities.

- Some streetcar corridors do see substantial growth in development, but not all. Using property values to demonstrate economic development progress, I measured development impacts for recent streetcar lines in Tucson and Atlanta. Tucson demonstrated the largest impact in property values with an over 75% increase in value from two years before the streetcar announcement to 2014. This increase is impressive compared to another corridor in downtown Tucson, which actually saw a slight decline in property values, overall. The Atlanta streetcar corridor, though, saw no increases in property values and saw a significant decline in value that corresponds to the same decline most of the city experienced during the recession. And compared to a comparable corridor in the city, the streetcar corridor did not demonstrate substantially fewer losses in property value. Atlanta illustrates that streetcar investments alone do not stimulate development.

- Using Tucson and Atlanta, along with Portland and Seattle, I found a number of other factors that may contribute to streetcar corridor development. Existing and growing real estate demand, large property owners, zoning, tax incentives, and other related investments in infrastructure are all necessary components of stimulating economic development in streetcar corridors. Additional data analysis in Tucson found that the streetcar corridor was already seeing large increases in property values prior to the construction of the streetcar.

- More robust metrics and analysis of streetcar corridors are necessary for communities and the federal government to better understand the potential development impacts of these projects and weigh their costs and benefits. Furthermore, communities should understand that streetcars likely will not stimulate development without the presence of other investments and factors.

Introduction:

Sometimes, what's old becomes new again. Streetcars were the dominant form of public transportation for several decades in the late 19th-early 20th centuries with dramatic growth all across the United States. After just as dramatic a decline in the mid-century, the past decade has seen a major revival of this form of transit. The first electric streetcar system opened in Richmond, VA in 1888 and within a year, 24 more cities constructed systems, while many others joined over the following decade. Between 1890 and 1907, the number of miles of streetcars in the U.S. grew from 5,783 to 34,404, a nearly 600% increase in less than 20 years.[i] Unlike subways, the streetcar was not limited to a handful of major cities with many cities around the country quickly building these systems. Instead, the streetcar is cited as helping create development through "streetcar suburbs," which were located further from the central business district and let residents commute to their jobs, shopping and other trips via this new form of transit.[ii] In particular, residential neighborhoods grew along streetcar lines and cities stretched further outside the central business district.[iii]

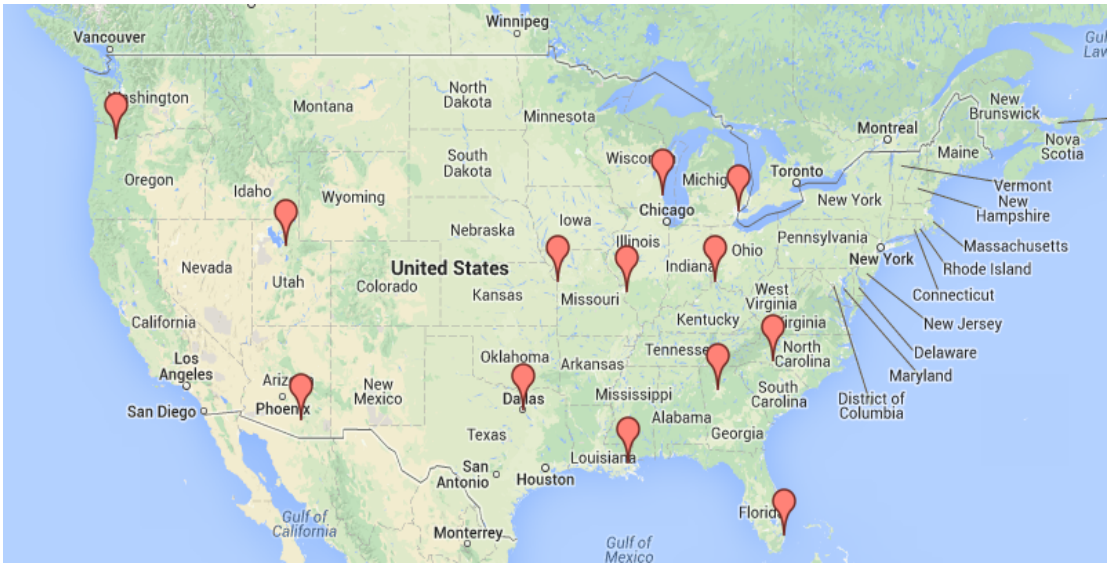
After the 1920's with the advent of automobile, the Great Depression, and a collapse in the business model for many systems, streetcars became a thing of the past.[iv] Interstate and highway systems brought growth and development to new areas. Economic development patterns were altered, as cities expanded and larger regions and metropolitan areas formed. By the late 20th century, streetcars were mere relics and tourist attractions, surpassed by greater transportation innovations.

Transportation and land use patterns in the United States, though, have slowly altered in recent years with a re-emphasis placed on transit-oriented development, particularly in major cities.[v] The advent of the automobile and interstate system not only precipitated the end of all but a few streetcar systems nationally, but also hastened the decline of many central cities. As urban cores slowly repopulate with new businesses and residents looking for less car-dependent lifestyles, interest in expanding public transit systems increases across the country. Environmental concerns in recent years raised awareness of reducing vehicle miles traveled (VMTs) through denser developments and more transit. The heavy rail subway systems of cities like New York and Chicago, though,

are not feasible to build for most localities nor do many cities in the U.S. have the density to support such systems.[vi] Federal support for transportation projects also cannot fund many large-scale, public transportation expansions. Still, the demand for more new forms of public transit exists in numerous communities throughout the country.

Even greater than an appetite for new transit is the desire to create new jobs and economic development for communities, especially in the wake of the recession from which the U.S. is still recovering. In addition to substantial increases in unemployment and major losses in many sectors of the economy, the downturn of 2008 was tied closely to the real estate industry and stalled or prevented many developments throughout the country. Many development and construction firms struggled or closed, while banks tightened credit and private firms endured declining business and reduced employment. The recession threatened the revitalization of central business districts and specific corridors in many communities. Policy makers also felt and still feel tremendous pressure to create jobs for their communities to help replace the 8.8 million jobs lost between 2008 and early 2010, when the economy stopped receding and returned to growth.[vii]

***Figure 1*: 14 federally funded streetcar projects between 2009-2013.**



Source: Original map using information from Federal Transit Administration.

The combination of demand for new transit projects and the need to quickly inject local economies with new jobs and development led to the atmosphere that ushered in a new boom of streetcar projects in the U.S. At the dawn of the 21st century, only a handful of streetcar lines existed in cities like New Orleans, San Francisco, Memphis, Dallas, and Philadelphia. And even in those cities, the streetcar systems were reduced greatly from their peaks in the early 20th century. The past decade, though, saw a renaissance in new streetcar projects with Portland and Seattle leading the way in 2001 and 2006, respectively. Between 2009-2013, after the onset of the recession and in its aftermath, 14

new streetcar projects began construction in the U.S. Furthermore, many mid-sized cities which do not have major public transit or rail projects such as Salt Lake City, Tucson, AZ, and Cincinnati, planned and began constructing streetcar lines. These 14 lines alone represent $1.2 billion in total investment in streetcar construction.

The federal government and relative speed of constructing streetcar projects compared to other transit projects helped fuel the boom of streetcar projects in recent years. With the advent of the Transportation Investment Generating Economic Recovery (TIGER) program as part of the American Recovery and Reinvestment Act of 2009 (known as the Recovery Act), streetcar projects started receiving substantial funding from the federal government. In some projects, such as in Portland and Atlanta, the federal government provided over 50% of the project costs with grants as large as $75 million. Between 2009 and 2013 alone, the federal government awarded $502.4 million to local streetcar projects through the Federal Transit Administration (FTA). As such, the federal government covered 41% of construction costs for these recent projects.

***Table 1*: Federally funded streetcar systems (2009-2013).**

Project	Federal grant from FTA ($million)	Total project cost ($million)	Length of route
Atlanta Streetcar	$47.7	$92.7	2.6 miles
Charlotte Starter Streetcar	$25.0	$37.0	1.4 miles
Cincinnati Streetcar	$40.9	$133.0	3.6 miles
Downtown Dallas-Oak Cliff streetcar	$26.0	$55.5	1.6 miles
Dallas Olive/St. Paul Street Loop	$4.9	$9.9	0.65 miles
Detroit M-1 Rail	$25.0	$136.9	3.3 miles
Ft. Lauderdale WAVE Streetcar	$18.0	$83.2	2.7 miles
Kansas City Streetcar	$20.0	$102.5	2 miles
Milwaukee Streetcar	$54.9	$64.6	2 miles
New Orleans Union Passenger Terminal	$45.0	$52.7	0.8 miles
Portland Eastside Streetcar	$75.0	$128.3	3.3 miles
St. Louis Loop Trolley	$25.0	$41.4	2.2 miles
Salt Lake City Sugar House Streetcar	$26.0	$55.5	2 miles
Tucson Modern Streetcar	$69.0	$196.5	3.9 miles

Source: Federal Transit Administration.

One of the reasons cited for funding these projects was the relative speed with which these lines can be constructed, which was particularly important for quickly stimulating the economy during a recession. U.S. D.O.T. cites this as an area of priority in awarding TIGER funds.[viii] Compared to several years for heavy rail lines or even longer light rail lines, streetcar projects can be built in approximately two years and at a lower cost than other fixed-route transit projects. These characteristics make streetcars appealing to lawmakers and local governments for funding and implementing.

Streetcars are different from other modes of transit, though, they are essentially a limited form of light rail. The American Public Transportation Association defines streetcars as a type of passenger rail cars operating on fixed rails in right-of way that is not separated from other traffic and uses power from overhead electric lines.[ix] Another definition distinguishes streetcars from other light rail by noting that streetcars operate in small areas, while light rail lines may extend 10-20 miles beyond a central business district. One set of criteria says modern streetcars stop every two-three blocks and move at 8-12 mph. Streetcars also usually do not have stations any more elaborate than bus stops.

This boom in streetcar construction, though, has little to do with congestion relief or mobility. The transportation benefits of streetcars are challenged in the literature, due to the limited range and capacity of streetcars, especially when compared with most other modes of transit. For example, the distance for streetcars funded in recent years ranges from 0.6-3.9 miles long for an average line of 2.3 miles per project. Furthermore, streetcars are not separated from traffic, which contributes to their lower costs of construction, but also their lower value in addressing congestion issues.

Many streetcar projects do not even market themselves as mobility or congestion relieving instruments and instead focus on their role as economic development-generating tools. From the Secretary of Transportation to every application for federal funds for these projects to numerous consulting reports on the potential impacts of streetcars, a constant refrain is that streetcars stimulate economic development. Furthermore, the projected development impact is often substantial, if not, transformative for these cities. For example, the Cincinnati streetcar feasibility study, commissioned by the city from consultants HDR, projects $1.5 billion in new economic development in the first 15 years of the proposed streetcar's operation.[x] All other streetcar projects in the U.S. promise large development benefits and opportunities to transform corridors into vibrant areas of these cities. Importantly, the federal government uses economic development impacts, such as the impact on employment, and increasing the economic productivity of land, capital or labor to justify funding these projects.[xi] Between federal funding criteria and local expectations, economic development potential plays a large role in the success of streetcar projects in attracting funding and being implemented.

Despite their popularity, the economic development impacts of streetcars are not well understood. The academic literature on the impacts of streetcar systems, specifically, is nearly non-existent, as the Transit Cooperative Research Program notes and this study's literature review found.[xii] An analysis of several feasibility and impact studies commissioned by cities on potential streetcar systems also found that many of the benefits promised were based either on the impacts of other types of fixed-guideway transportation systems, such as light rail or subway systems, or based on the experiences of first of the modern streetcar systems, Portland, OR. A frequently cited study of Portland found that $3.6 billion in new development occurred in within three blocks of the streetcar's route after its announcement and implementation.[xiii]

The methodologies of these studies are problematic, though, for measuring the impact of streetcars. For one, many light rail lines run much longer (10-20 miles on average and up to 85 miles) than streetcar lines (0.65-3.9 miles) and can allow for commuters to get to various employment centers, which may stimulate more development along the line. Furthermore, the experiences from Portland may not be transferrable to other cities with different planning environments and downtown development markets. As such, the economic development benefits of streetcars are not always presented or calculated accurately. Because of this, cities and the federal government may have unrealistic expectations for streetcar projects or could be investing in more beneficial projects than streetcars, in terms of economic development.

Additionally, the mere measurement and categorization of economic development can be challenging when examining streetcar projects. What counts as economic development and does that definition change from community to community?

Given the substantial amount of investment from localities and the federal government, high expectations for new development, and wide array of cities attempting to construct streetcar systems, the economic development impact of streetcars is important to study and better understand. Results from streetcar systems like Portland and several others have shown increases in new development for streetcar corridors. What is not clear is how much of that development is a result of the streetcar line or perhaps part of a larger revitalization momentum fueled by other policies and investments or even market forces. Without a better understanding of the other forces that may be involved in streetcar corridor success, many cities may find themselves making a poor investment in streetcar lines, relative to their expectations for those lines. Due to their relatively low cost per mile and short distances, many mid-sized and smaller cities such as New Haven, CT, Providence RI, Hampton Roads, VA and Winston-Salem, NC are studying or implementing new streetcar lines, which makes them a rapidly growing (and expensive relative to buses or other possible development interventions) economic development tool. Furthermore, the federal government made and continues to make large grants from its limited public transit capital funds to enable these streetcar projects. In an era of diminishing public resources

and with many communities still seeking ways to create jobs and recover from the recession, understanding the impacts and necessary complements to streetcar projects is critical.

This study attempts to address three areas of interest around streetcars and their economic development impact through the analysis of three streetcar systems.

- What economic development criteria are being used to evaluate streetcars and what are the expectations for these streetcars?
- Do corridors with new streetcar lines show any economic development benefits after the implementation of streetcar lines, compared to the criteria and expectations for these lines?
- If streetcars do stimulate economic development, are other conditions necessary for stimulating that development and what are those conditions?

For the first question, my examination of grant applications and interviews with project and federal officials found that streetcar projects have a wide array of economic development expectations that are not easily or consistently measured. For many streetcar projects, the expected economic benefits are presented as the most significant and important impact of the streetcar and the benefits promised are substantial. In grant applications, projects often cite several types of economic development benefits such as new construction, development of underutilized parcels, residential development and increased commercial activity. One of the most common expectations and metrics for development from streetcars is increased property value for land adjacent to the lines.

These expectations, though, often are based either on the experiences of other cities with very different planning climates or on the impacts of different modes of transit. The primary source of development projections are the results from the successful streetcar corridors in Portland, along with Seattle. Many of the feasibility and consulting reports use these two cities for projecting the potential development from new lines. But these two cities have many other factors involved in the success of their streetcar lines, which makes transferring those successes very difficult and potentially misleading.

Meanwhile, federal agencies award streetcar projects primarily on a qualitative analysis that contains very little quantitative rigor or analysis. The development impacts promised by these projects are left largely unchallenged and instead, cities create narratives of the transformative effects streetcars may have for their communities. And one of the few quantitative metrics included, jobs created, is not consistently measured. For example, an examination of some TIGER grant applications found that job creation often

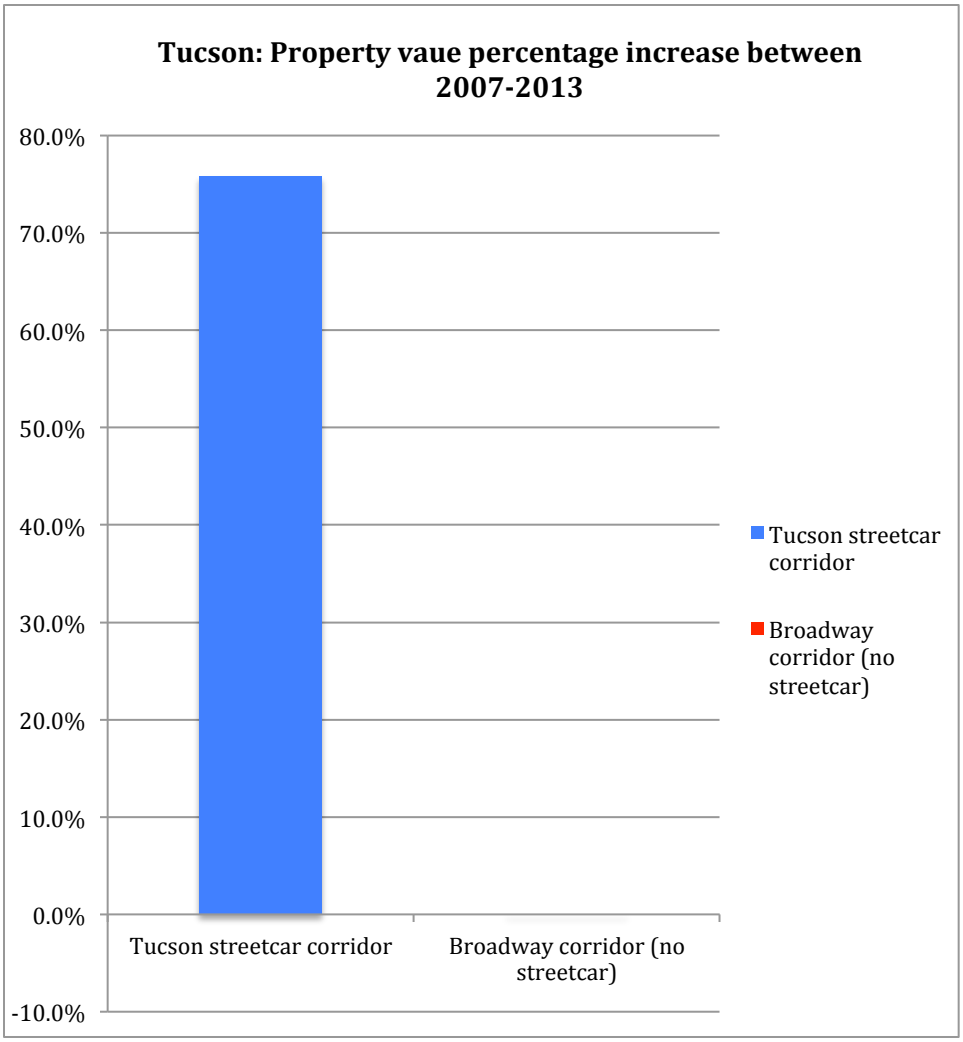
came in the construction industry from the building of the initial streetcar lines and not in permanent jobs from nearby development. Furthermore, many cities have not yet measured the actual job impacts from their streetcar projects. While property value and new construction on underutilized parcels can be measured relatively easily, several cities examined have yet to develop very robust metrics to track development in streetcar corridors. The federal government also has not thoroughly assessed the resulting development from streetcar projects it funded. As such, streetcar projects are not often fully measured for economic development potential or with regard to the expectations for these lines, which makes them difficult to assess as useful economic development investments.

Finally, I found that the federal government does not evaluate the development effects of streetcar projects differently than other modes of transit. For example, conversations with federal officials and review of applications found that federal officials weigh the potential development impacts of streetcars the same as other modes such as light rail or heavy rail. Literature and studies of light rail projects, though, challenge this notion. Heavy and light rail projects may provide broader benefits, especially in terms of mobility, and their larger networks could provide more development potential.[xiv] As such, Federal officials may not be fully or properly evaluating the specific development effects of streetcar projects and, thus, funding these projects with unrealistic expectations.

For the second question, I examined property values around two new streetcar lines and compared them to other corridors in those cities to see if these streetcar corridors showed substantial difference in property value, which may indicate some economic development gain. Development is a difficult concept to measure, especially with new lines and limitations in public data and resources. Property value can offer some sense, though, if the real estate market is placing a higher value on land, which indicates demand for that land. I measured property values from both before the announcement of any streetcar lines and after their construction to examine any changes and followed this same method for non-streetcar corridors. Recent streetcar lines in Tucson and Atlanta served as the primary case studies, while I compared my results in those cities to previous studies with similar methodologies in Seattle and Portland in the subsequent chapter.

Based on the results of this research, streetcar corridors do appear to have some increases in economic development, though, the amount of development differs from city to city. Each of the cities studied saw increases in economic development activity, according to some of the criteria and expectations for these streetcar lines and as measured by property values. Tucson demonstrated the largest impact in property values with a nearly 76% increase in value from two years before the streetcar announcement to 2014, when the streetcar opens. This increase is impressive compared to another corridor in downtown Tucson, which does not have a streetcar, but has received $71 million in other transportation and infrastructure improvements. This corridor, though, actually saw a

slight decline in property values, overall. The Atlanta streetcar corridor, though, saw no increases in property values and in fact saw a significant decline in value that corresponds to the same decline most of the city experienced during the recession. And compared to other corridors in the city that are also the focus of development efforts, the streetcar corridor did not demonstrate fewer losses in property value. In general, streetcar corridors do see some increases in property value and construction, relative to other corridors, but vary in their impact. Without more areas of data, though, the economic development impact of many streetcar projects is incomplete.



Using these case studies, as well as several other streetcar projects such as Portland and Seattle, I examined other factors that may contribute to or be necessary for successful, streetcar corridor economic development. In all of the cities which demonstrated some economic development benefit from streetcar lines, I found a number of other factors existed that may have contributed to this development. Some of these factors, such as existing and growing real estate demand or good economies, were outside the control of streetcar projects and planners. In some cases, a pattern of development was already occurring in these streetcar corridors. Other important factors were deliberate and tied to the streetcars, such as zoning and tax incentives to encourage development. Likewise, the lack of development results in Atlanta correlate to a lack of some of the factors present in the other case studies. In none of the cases I examined did streetcars come into formerly

moribund corridors or spur new development without the presence of many other development tools.

Overall, this research finds that streetcar corridors do see increases in some metrics of economic development, but the presence of other economic and real estate conditions, and many other economic development tools like zoning and incentives are likely necessary for spurring this economic development. Furthermore, this study finds that far more robust metrics and tracking are necessary to really determine how well these investments fare and this is often lacking in many cities. With a better understanding of the impacts of streetcars, perhaps more realistic expectations can be made for streetcar systems, as well other investments needed to make streetcars successful in stimulating development.

This study does not seek to discredit or encourage streetcar efforts. Instead, this research is meant to examine whether or not a rapidly growing and significant tool for economic development is actually meeting development expectations and is a good investment for the many cities already or looking to build streetcar systems. Many communities have areas of underutilized land that are ripe for redevelopment. More importantly, many communities have residents still reeling from the recession who want jobs and better economies. In an era of increasing austerity, federal and local governments have devoted considerable resources to streetcars as a way of delivering new development and employment to communities. This research attempts to better understand if those investments are worthwhile and ensure that any development potential from streetcars is maximized for the betterment of communities.

Chapter 1:
Literature Review and Methodology

Literature Review:

This study is a response to a lack of literature and studies of the development impacts of streetcars. Very little academic literature or rigorous research exists that examines the impacts of streetcars on economic development. In the midst of its increase in funding to streetcars, the federal government commissioned the Transit Cooperative Research Program to conduct a study on this topic, titled "Relationships Between Streetcars and the Built Environment" (2010). The paper noted, "Little in-depth work has evaluated this streetcar resurgence." Furthermore, TCRP found that while a substantial amount of literature exists on the impacts of heavy and light rail systems on the built environment and development, this literature "does not describe these impacts with respect to a contemporary streetcar system and almost no analysis of the value premiums associated specifically with streetcars could be found in the literature." Additionally, almost no studies exist that measure the impact of streetcar lines on economic activity, such as jobs created or increases in sales. One study by Crampton (2003) compares streetcar-like trams in Germany and France with those in Britain and the U.S., including San Diego, Miami, St. Louis and Sacramento. The report uses survey-data of communities to conclude that these U.S. cities saw some downtown development because of their trolleys, but did not see any revitalization in declining areas. The survey-methodology, though, does offer very substantial evidence of specific causation from the presence of a streetcar-like mode to economic development.

The only such study for quantitatively measuring the economic impact of a streetcar line in the U.S. is the Portland Streetcar Development Impacts study (2004) by Hovee and Jordan and commissioned by the Portland Streetcar Inc., operator of the Portland system. Due to its unique nature as the only study of its kind on impact of a streetcar line in the U.S., (and perhaps because of the large benefits reported) this study is widely cited in nearly every feasibility study used by other cities on their own potential streetcar lines and is perhaps the most influential document in fueling the proliferation of streetcar projects. This study examined, on a block-by-block basis, the amount of new development and density of development near the streetcar line before and after the construction of the line. The study found $3.5 billion in new investment within two blocks of the line, including 10,212 new housing units, and 5.4 million square feet of office, retail and hotel development. The report credits 55% of all new development in Portland's CBD as occurring within one block of the streetcar and with less parking ratios than anywhere else in Portland. Additionally, the report provides lessons learned from streetcar development such as engaging developers, using an improvement district for funding, and reducing

parking. Implicit in the study are other amenities necessary to streetcar development, such as pedestrian amenities and a strong regulatory push for denser development. Despite its wide influence, the report must be caveated with the fact that Portland's development environment is not the same as many other places.

A substantial literature exists, though, on measuring the impacts of transit projects on development and real estate values. Transit systems with fixed guideways have a positive impact on nearby real estate values from 6.4%-40% (Cervero, 2004). Lewis (1999) uses a hedonic price model to measure the impact of proximity to rail stations and finds strong property value impacts near subway stations in San Francisco and New York City. Other studies focused on specific cities and systems like St. Louis, Chicago, Dallas and Sacramento found similar results with real estate values seeing a range of 6.2%-32% premium for land near heavy or light rail stations (Landis, 1995; Garrett, 2004; Gruen, 1997; Clower, 2007).

Much of the literature that shows real estate or development impacts from proximity to transit stations also cautions that other factors contribute to spurring development in those areas. Cervero argues that other factors like traffic congestion, local economic conditions, and business cycles also contribute to development in corridors near transit. Crampton also caveats that any of his findings on the economic impact of trams relied on the presence of other factors like a strong local economy and a strategic development plan. Zoning and land use regulations are also important parts of helping stimulate development near streetcar lines (Hovee and Jordan, 2007; TCRP, 2010). For example, Portland instituted parking regulations and pedestrian amenities, as did Seattle. Based on literature, successful streetcar corridors likely require additional planning measures, as well as strong economies and interest in development in the area already.

Methodology:

For the first research question on the criteria used to evaluate streetcar projects and the expectations for these projects, I examined project funding applications and interviewed officials with the Federal Transit Administration and several streetcar projects around the country. Since all of these recent streetcar projects received federal funding, either through the TIGER grant or New Starts programs, the criteria for these federal programs was a starting place for understanding how these projects won funds. The applications for these programs also provided expectations for economic development benefits. Additionally, I spoke with the primary official in charge of overseeing streetcar funding, New Starts and TIGER grants at the Federal Transit Administration, as well as officials at each streetcar project studied to determine what benefits were expected and the basis for those expectations. For all the streetcar projects studied, I also examined the foundational reports and feasibility studies that led to their local approval to see what

evidence was used to support projected economic development benefits. These reports were often compiled by consultants or local agencies. All of this information helped form a clearer sense of how streetcars received federal and local approval and the source of projections for their economic development benefits.

The second research question measuring the impacts of streetcar lines focused on two original case studies and compared them to two other case studies on older streetcar lines performed in literature. I selected the two case studies, Tucson and Atlanta, based on several metrics. For one, both of these lines are among the most advanced of the new group of federally-funded projects, as they were awarded funds five years ago and both have or will open in 2014. Secondly, conversations with federal and local officials cited these as two projects that may be bellwethers for how successful streetcar projects are viewed by the federal government and others, which may affect the likelihood of new projects being funded in the future. The conversations with federal and local officials, along with research through news articles on many of the 14 streetcar projects underway, revealed that the Atlanta streetcar project, in particular, was of great national interest because anecdotal indications are that the line is not performing up to expectations, in terms of generating development. Additionally, neither project has undergone any kind of evaluation of development impact, unlike Portland and Seattle, so an opportunity existed to measure the impact of previously unmeasured streetcar lines. Finally, both of these case studies offered the ability to obtain data from previous years, which made measurement of development prior to the streetcar line announcement or construction possible. In many cities, obtaining historic property data can be very expensive. These two case studies were compared to previous work done by the Brookings Institute in Seattle and other work in Portland, which are streetcar lines that date from 2006 and 2001, respectively. This study used a methodology similar to the one outlined below for this research question and provide some interesting points of comparison for Tucson and Atlanta, which help create the findings for the third research question of this study.

This second research question required original data analysis to determine any economic development benefits from streetcar lines, but faced a number of challenges in design. This research question had several major challenges to overcome. First, the issue of timing was very important in several ways. For one, the current crop of streetcar lines are very new with most having been funded since 2009, meaning they are just opening now in 2014 with many still under construction. Furthermore, many of the older lines are so old that their development impacts occurred decades ago under different circumstances. As such, weighing the impact of these new streetcar lines is challenging given both their very recent completion and other factors such as a difficult economic period that negatively affected most real estate and development markets. Another major issue was the mere concept of measuring economic development. A number of metrics, including jobs, building permits, new businesses, residential construction and property value could all be used as

part of measuring the economic development and progress of a corridor. Many of these metrics, though, are not easily tracked via publicly available data or are not tracked on a granular enough level to be measured in a single corridor. Some local governments also require substantial costs for obtaining historic (any year prior to the current) data that makes any multi-variable or multi year measurement challenging and expensive.

The design for measuring the economic development impact in streetcar corridors attempts to negotiate these challenges, while also providing at least some sense of development progress in these case studies. Given local government data constraints, this study used property values as a proxy for economic development progress. Measuring property values provide a sense of demand for land, which can indicate if the real estate market is increasing or decreasing its interest in an area. Also, property values rise whenever improvements, such as new developments, are made to land. Additionally, as property tax collection is based on property values, increases or decreases in those values have revenue consequences for local governments. So, property values can help show if streetcars are a good investment, at least from the local perspective of recovering expenses through tax revenue. Many of the feasibility studies and applications for funding for these projects also used property value as the primary metric for development. For example, the Cincinnati feasibility study used property value and stated "real increases in prices for real estate can be seen as an increase in the market's willingness to pay for a specific location due to the availability of more desirable amenities."[xv] Other metrics, such as building permits and new business permits, had data availability or consistency issues that made them difficult to use and compare across cities.

For Tucson and Atlanta, data for every parcel in each city was collected in both the present year and two years before the announcement of the streetcar lines. Two years was selected because it controlled for any rumors or pre-announcement planning of the streetcar lines that could have led to early speculation and, thus, changes in property value. Additionally, this controlled for the likely drop in property values during the recession from 2008-2010 and potential recovery from those declines post-recession. The property values from before the streetcar lines, in 2007 for Tucson and 2008 in Atlanta, were adjusted for inflation so they could be accurately compared to 2013 values. Using GIS and parcel data, I drew boundaries around streetcar corridors and examined the property values for all parcels within one block of the entire lines. While transit-oriented development can occur beyond one block of a line, this study maintained a one block radius for two reasons. First, this study is attempting to demonstrate if there is any impact in the most immediate area around the streetcar, not quantify all of the impacts of these streetcar lines. As such, maintaining a one block area of analysis accomplishes this objective and also makes the data collection and analysis more manageable within the constraints of this study.

For comparison to the streetcar corridors, I also researched other corridors in each city that were the focus of development efforts, but lacked any rail or streetcar lines. For example, I used the Broadway corridor in Tucson, which is another downtown corridor that is the subject of street improvements and public investment to stimulate more development. In Atlanta, I selected a downtown corridor originally thought to be a possible future streetcar corridor, but it never moved past very preliminary planning stages. I used the same method of mapping all parcels within one block of the corridor. I merged all of this data with property values from 2007 or 2008 to illustrate the change in property values from before and after the announcement and construction of streetcar lines. For every parcel, I calculated the change in value and determined an overall change in property value for each corridor.

This information allowed for a comparison between streetcar corridors and other corridors in cities to determine if streetcar corridors saw any increases in property value. With these comparisons, I could perform an initial analysis of development progress in streetcar corridors relative to similar corridors in their cities and start to examine if these streetcar investments correlated to any substantial increases in property value.

While the methodology for the second research question provides some sense of how streetcar corridors may perform relative to other corridors in their cities, the third research question attempts to uncover more about what else may be affecting development in these corridors. The third research question, concerning other conditions necessary for stimulating streetcar development, more closely examines the development environments in each case study and compares these corridors to determine if other conditions or interventions may be contributing to development, or in the case of Atlanta, a lack of certain conditions may be hindering development. One of the great challenges of this question, and this study as a whole, is trying to untangle development spurred by streetcars versus development that may occur regardless of streetcars. While causation, either from streetcars or other initiatives, cannot be proven, this research question uses interviews with local officials, research into other local actions such as zoning, and data on real estate conditions to try and determine if other factors may be involved in streetcar development. Ultimately, this third research question builds off the findings of the earlier questions to determine how to improve streetcar and economic development investments by better understanding the environments in which streetcar corridors may thrive or struggle.

Chapter 2:

What economic development criteria are being used to evaluate streetcars and what are the expectations for these streetcars?

This chapter examines the expectations for streetcars from both localities and federal agencies, along with the criteria used to fund and approve these projects. Through this analysis, I determine a better sense of why these streetcar investments are made and how they should be measured to understand if they are successful or not.

What are local expectations for streetcar projects and why do localities support these projects?

An analysis of local streetcar planning documents in numerous cities including Tucson, Atlanta, Cincinnati, Los Angeles, Savannah, Milwaukee, Lincoln, Providence, Minneapolis, Detroit, and Kansas City found that the primary reason cited for streetcars was to stimulate economic development. Local governments initiate streetcar projects and perform the initial planning, analysis and funding for these projects. In most cities, either city agencies or consulting firms (or both) perform the initial studies to determine if streetcar systems would be viable and their projected cost, ridership and development impact. After examining these studies, the most commonly cited benefits and impacts of streetcars are:

- Stimulate economic development through investment, new office, retail and residential development.[xvi]
- Increase property values.
- Create new jobs
- Increase density in a corridor through transit-oriented development, including encouraging pedestrian activity.
- Improve mobility for residents and reducing automobile congestion.[xvii]
- Improved connectivity amongst major activity centers through public transit.
- Environmentally sound by reducing driving and increasing density.

The transportation benefits of streetcars, though, are considered limited compared to other modes of transit. For example, prior to 2009, federal rules on cost-benefit analysis of projects in the FTA's Small Starts program required projects to be compared on mode cost per hour of time saved for users.[xviii] On this metric, buses are always more cost effective and as fast (if not faster) than more expensive streetcar projects. As such, FTA only funded one streetcar project through Small Starts prior to the Recovery Act and rewriting of rules in 2012. Streetcars are limited by not being separated from traffic and subject to traffic and congestion.[xix] Streetcars cannot be rerouted like buses and do not have the network of heavy rail or light rail systems. Nor can they run at fast speeds like

heavy or light rail trains.[xx] Several of these cities, such as Atlanta and Minneapolis, argue that streetcars could serve as feeders to the city's larger transportation network through connections with heavy or light rail lines.[xxi] Additionally, some advocates point to streetcars' ability to attract "choice" riders who would not otherwise ride the bus and, thus, increasing the share of residents or visitors using public transit.[xxii] Given the debatable transportation benefits of streetcars relative to other modes, most of the feasibility studies and applications for funding actually do not heavily emphasize transportation mobility.

Instead, the largest emphasis is placed on the economic development benefits of streetcars with studies touting considerable impacts for each city. Every feasibility study and application for funding places economic development at the top of the reasons for funding and pursuing streetcars. The benefits touted are also significant and varied with jobs, new construction, residences, retail and investment all cited as impacts. Among the development impacts projected for streetcar projects:

***Table 2*: Projected streetcar development impacts for federally funded projects (2009-2013)**

Project	**Impacts**
Atlanta	Over 20 years: $159.33 million in land market benefits.[xxiii] $2.65 million in labor market productivity. Land market benefit comes from greater access to the broader metropolitan economy.[xxiv]
Cincinnati	$379 million over 30 years in increased property value for existing properties along corridor. $1.5 billion in private investment over 15 years. $32 million per year in additional residential units and over $112 million per year in additional commercial and residential development.[xxv]
Detroit	$500 million-$1 billion of economic development such as housing, jobs, new development and access to employment.[xxvi]
Milwaukee	$205 million in new development within quarter mile of streetcar by second year of operation. Over $3.35 billion by 2030. 9,000 new housing units. 1 million square feet of

	new occupied retail space. 4 million square feet of new office space. 20,500 new jobs.[xxvii]
Tucson	$35 million in property value increase by 2015.[xxviii] 341 new housing units. Estimate of $230 million in new construction and over 1,480 long term jobs.[xxix] Estimate of $800 million in new private investment already in the corridor with 58 new retail businesses.[xxx]

These projections are significant and could be transformative for cities. As such, projections of these kinds of jobs, development, and property value increases raise expectations for these projects and justify their costs over less expensive transportation or economic development investments.

An analysis of the source of these projections, though, finds that most of them are based on the experiences of other cities and even other modes of transit. Portland and Seattle are the two most often cited streetcar projects in feasibility reports and websites promoting streetcars. Atlanta, Cincinnati, Milwaukee, Minneapolis, San Antonio, Tucson, Los Angeles, and Kansas City (and many other cities) all point to Portland and frequently Seattle as evidence of streetcar development success. In particular, the source of nearly all streetcar development impacts is a 2005 study by E.D. Hovee on the development impact of Portland's streetcar. A former FTA official named this study as the most influential document driving the streetcar boom of the past five years.[xxxi] Nearly every streetcar project examined cited this study in feasibility studies or their website with the oft-cited figure of $3.5 billion in new development in Portland. This study provides a flurry of impressive development impacts from the line, including that the area within one block of the streetcar corridor went from capturing 19% of new development prior to the streetcar to 55% of all new development in downtown Portland.[xxxii] Additionally, the study found that the development in the streetcar corridor was denser than development beyond three blocks from the corridor. For planners and officials looking to create jobs, improve density and create a corridor that resembles the kinds of urban environments attractive to younger residents, the Portland streetcar experience seems to offer a clear path for doing so.

The Portland streetcar study, along with studies of transit-oriented development form other modes, stands in for a dearth of academic literature on streetcar impacts. The methodology for streetcar economic development impact studies usually involves an inventory of vacant or underutilized parcels along the corridor and then a projection of growth, often based on the experiences of Portland, Seattle and some other cities. In Cincinnati, the HDR report used Portland, Tampa, Little Rock, Tacoma and Kenosha, WI as

the case studies underpinning their cost benefit analysis with the Portland experience providing the primary foundation for projecting development.[xxxiii] Minneapolis used four case studies to illustrate the economic development benefits of streetcars with two of them being Portland and Seattle. The other two were the (at the time) still under construction lines in Tucson and Atlanta and the report only mentions the projections for development on these lines, as it was too early to measure development. Those projections, though, are based on the experiences of Portland.[xxxiv] In another example, a recent study by consultants AECOM for the Los Angeles streetcar had a literature review, but the academic literature included pieces like Robert Cervero's "Transit's Value-Added: Effects of Light and Commuter Rail Services on Commercial Land Values" and "An Assessment of DART's LRT on Property Valuations and Transit Oriented Development." These articles use light or even heavy rail impacts, which due to their different service potential, may not be fully replicable with streetcar lines. The additional studies used by the L.A. study were analyses of heavy and light rail projects in cities, but the only streetcar study cited was the 2005 study from Portland.

> *"This will become an economic engine. This corridor."*
>
> –Former Secretary of Transportation Ray LaHood speaking of Detroit's M-1 line.

While the development experiences of Portland, Seattle and other cities are instructive, care must be taken to consider the different economic, real estate, and planning environments of each city. For example, metropolitan Portland enforces an urban growth boundary that affects the value of land and the density of development within Portland.[xxxv] Other cities like Seattle also may have mitigating circumstances that affect development and growth in certain corridors or may institute additional measures to stimulate growth. I explore these additional factors and measures that affect streetcar economic development impacts more in chapter 3 of this study.

What criteria are used by federal regulators to evaluate streetcar projects with regard to economic development?

While economic, environmental and placemaking motivations all contribute to the recent streetcar boom, one of the reasons often cited for the increase in interest in streetcars among localities is the availability of funding from the federal government. As cited in the introduction of this study, the federal government awarded $502.4 million to local streetcar projects and covered 41% of construction costs. While cheaper than light and heavy rail systems, streetcar systems are more expensive than expanded bus service to construct. For example, in Winston-Salem, expanded bus service is expected to cost $34 million versus $108 million for a streetcar line.[xxxvi] With the federal government covering substantial construction costs, over 50% in Atlanta, the gap between those two alternatives

becomes much smaller. As 14 projects received funding over four years, the FTA and Department of Transportation were receptive to supporting these projects, particularly through the TIGER program. Given their limited mobility benefits and primary motivation as economic development tools, the FTA and their criteria for approving these projects play an important role in understanding the popularity of streetcars and the evaluation of streetcar success.

Most streetcar project qualified for federal funding using the TIGER program's criteria for economic competitiveness, as well as livability and sustainability. The TIGER program has five strategic goals guiding its criteria: state of good repair, livability, environmental sustainability, safety, and economic competitiveness. The economic competitiveness criteria states that projects will be evaluated by DOT on their ability to: 1. Improve movement of workers or goods. 2. Increasing the economic productivity of land, capital, or labor. 3. Result in job creation and practicable opportunities for people and small businesses or economically distressed areas.[xxxvii] The livability criteria prioritize projects that increase transit options and are developed in coordination with economic development decisions. The environmental sustainability criteria focus on reducing pollution and energy use. Additionally, DOT "gave priority to projects that are expected to create and preserve jobs quickly and stimulate rapid increases in economic activity."[xxxviii] Applicants submitted materials that demonstrated how their project would meet each of the criteria for these projects, as well as a basic cost-benefit analysis.

An interview with a former FTA official overseeing the TIGER grants process and DOT documents confirm that FTA did not use substantial quantitative measures for evaluating streetcar projects. While the TIGER Notice of Funding for each round of TIGER grants outline areas of criteria, such as economic competitiveness, no quantitative measures are provided. For example, the criterion of increasing the productivity of land does not come with any specific measures or metrics that applicants must demonstrate potential for in their projects. The criteria areas were also not weighted for scoring, so the evaluation process and prioritization of goals was not clear. Furthermore, a former FTA official confirmed that no quantitative analysis was performed by FTA to evaluate the economic development benefits of the projects.[xxxix] Instead, he said the evaluation was a qualitative exercise in which applicants built a compelling narrative for why their project could make an impact in their communities. The former administrator said the agency did not look for any specific numbers for economic development or perform critical scrutiny of projected development benefits. Successful applicants did need to demonstrate some

interest from real estate developers in the streetcar corridor. For example, applications mention planned developments for their corridor, such as in Atlanta which cites a specific redevelopment project called Renaissance Walk and then points to $1.73 billion of investment planned or underway in "19 development projects are either under construction, planned or proposed within one quarter mile of the streetcar route."[xl] But the official described the application and evaluation process as "qualitative and flexible" without much quantitative analysis.

As a result, some of the projections of development based on experiences of other cities or other modes may have passed through the federal grant award process without greater scrutiny or analysis. Furthermore, FTA and the federal government have not developed any oversight criteria or mechanisms to monitor the progress of streetcar projects in meeting the considerable expectations for development from these projects like those outlined above. One FTA official did say, though, that FTA plans to contract with a research team at the University of South Florida to conduct a before and after study of the agency's streetcar awardees. Additionally, the former FTA administrator noted that only one streetcar project received funding from the most recent round of TIGER grants, which he said may be a nod to the agency's increasing discomfort with some of the delays, budget overruns and management concerns from several recent streetcar projects.

Finally, with regard to federal oversight, the FTA official confirmed, and documents did not contradict, the fact that the FTA does not believe different modes of transit produce different economic development benefits. According to this official, and without any contradicting evidence in criteria and other officials documents, the FTA weighs the potential development impacts of streetcars as the same as the potential development impacts of light rail or even heavy rail. The official said the agency "does not distinguish between the modes and believes fixed rail of any kind creates development." This lack of distinction, though, may be a serious mistake in federal analysis of streetcar projects, as the differences between heavy and light rail versus streetcars could be significant enough to alter the development impacts of streetcars compared to those modes. Heavy and light rail can run much longer distances, lending itself to commuting and more diverse trips among users. Heavy and light rail are also separated from traffic, run at higher speeds and with larger capacities, all of which may affect their development potential. These modes also bring far more mobility benefits, which means the emphasis on their economic development potential is less important in weighing their costs and benefits. But given how critical the economic development benefits are to streetcars, as demonstrated above and with their limited mobility, streetcars may not be providing the same benefits as other forms of fixed rail and should be weighed differently.

Chapter 3

Do corridors with new streetcar lines show any economic development benefits after the implementation of streetcar lines, compared to the criteria and expectations for these lines?

This chapter examines the property values of parcels within one block of the streetcar lines in Tucson and Atlanta to develop a sense of any possible economic development progress in those corridors. These two lines open in 2014 and received substantial federal support from the TIGER program. Both projects cite economic development among their top benefits and are close enough to completion to provide some early indicators of success or failure in stimulating development.

Tucson case study:

Map 2: **Tucson Streetcar Route.**

Source: City of Tucson.

The Tucson Streetcar is a 3.9 mile line in Tucson, AZ that links the University of Arizona campus with other parts of downtown such as the 4th Avenue business district and Congress Avenue entertainment district. The line is projected to cost nearly $197 million dollars with $63 million coming from a February 2010 TIGER grant.[xli] As noted in chapter 2, the line is expected to generate substantial economic impact in new residential and retail development and roughly 1500 jobs. A former FTA administrator also cited the project as

one of the bell weathers for streetcar projects in cities without the same planning and development climate as Portland and Seattle and a project of national interest.

I collected data from 2007 and 2013 on all parcels in Tucson, which included information on their assessed value, according to the Pima County Tax Assessor. Using GIS, I mapped the streetcar corridor and selected all parcels within one block of the line to get a sense of any increases or decreases in property value. The assessed tax values for those parcels were joined together to show the change in values between 2007 and 2013. An estimate of the assessed tax value of those parcels before and after the announcement and construction of the streetcar line is below.

***Map 3*: A sample of the parcels selected within one block of the Tucson streetcar corridor**

***Table 3*: Estimate of changes in property value for parcels within one block of Tucson streetcar line (in 2013 dollars)**

2007 total assessed tax value of parcels	2013 total assessed tax value of parcels	Total change in tax value	Percent of change from 2007 to 2013
$250,517,253	$411,817,851	$190,120,598	75.8%

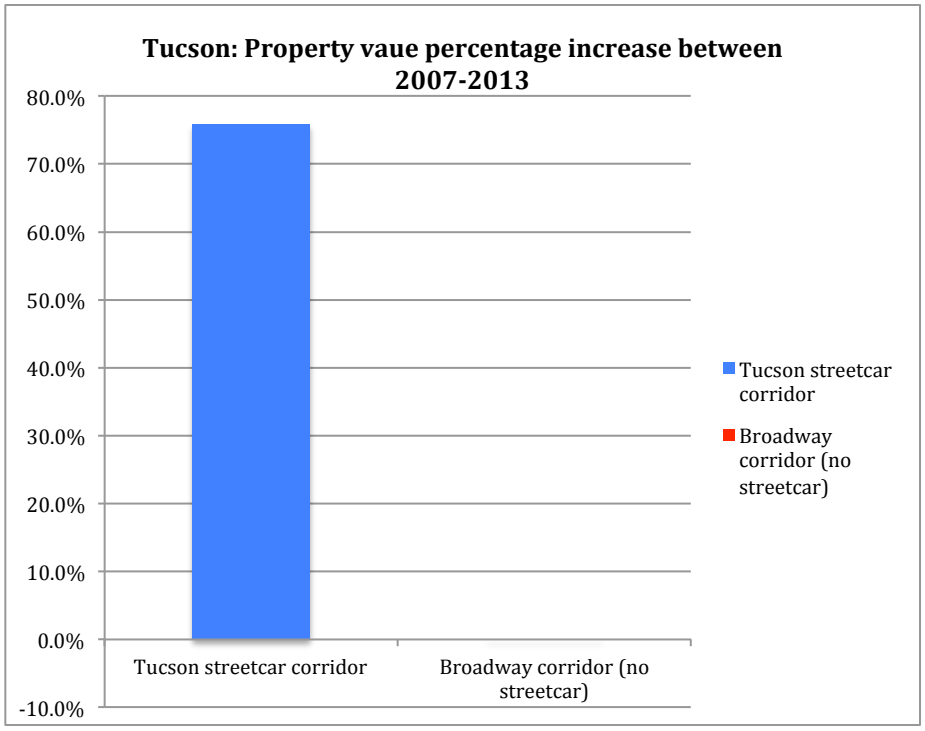
These results show significant growth in the property value of parcels within one block of the streetcar line. I made an effort to avoid the likely drop in property values during the recession by collecting the 2007 value data and adjusting for inflation. For example, 2013 represented the highest number of residential units sold since 2007.[xlii] At the same time, other metrics indicate that Tucson's real estate boom ended in 2005 and the market was already in decline for several years prior to the 2008 recession. The number of residential building permits peaked in 2004, while the market value of property sold also peaked in 2005.[xliii] So, the 2007 assessments may be depressed by the already-deflating Tucson real estate market. Still, the increase in property value over a relatively short time represents a very substantial increase in demand for the property immediately adjacent to the streetcar line.

To provide some context for these results relative to the Tucson real estate market, I also performed a similar analysis for another corridor in the city. The Broadway corridor is also located in downtown Tucson and also runs east-west across the central business district. This corridor contains a mix of commercial, office and some residential development. The corridor was identified in the same 2006 study as the streetcar corridor as a target for transportation investment to stimulate redevelopment.[xliv] Instead of fixed rail, though, the street is subject to a $71.3 million renovation that includes new bus lanes, bicycle lanes, landscaping, pedestrian-friendly sidewalks and new lighting. All of this is aimed at improving the livability of the corridor and stimulate development. Given the geographic proximity, transportation investment, and similar mix of development, the Broadway corridor provides a comparable area of study. The results for the Broadway corridor over the same time period are below:

***Table 4*: Estimate of changes in property value for parcels within one block of Broadway corridor (in 2013 dollars)**

2007 total assessed tax value of parcels	2013 total assessed tax value of parcels	Total change in tax value	Percent of change from 2007 to 2013
$55,565,046	$55,243,088	-$321,958	-0.006%

The Broadway corridor results provide stark contrast with the results in the streetcar corridor in the same central business district. Despite transportation-related investments, the corridor did not see even remotely similar results. Instead of a large increase, the corridor actually saw a small decline in property value over the same time period the streetcar corridor saw a 75% increase. These results are more expected for a real estate market that appears to largely just now returning back to its pre-recession levels.[xlv] The property tax value is essentially at its 2007 level now. The transportation-related improvements, such as pedestrian-friendly sidewalks and bus lanes, may see more of an impact after completion and create less excitement than streetcars, as the street is still under transformation.

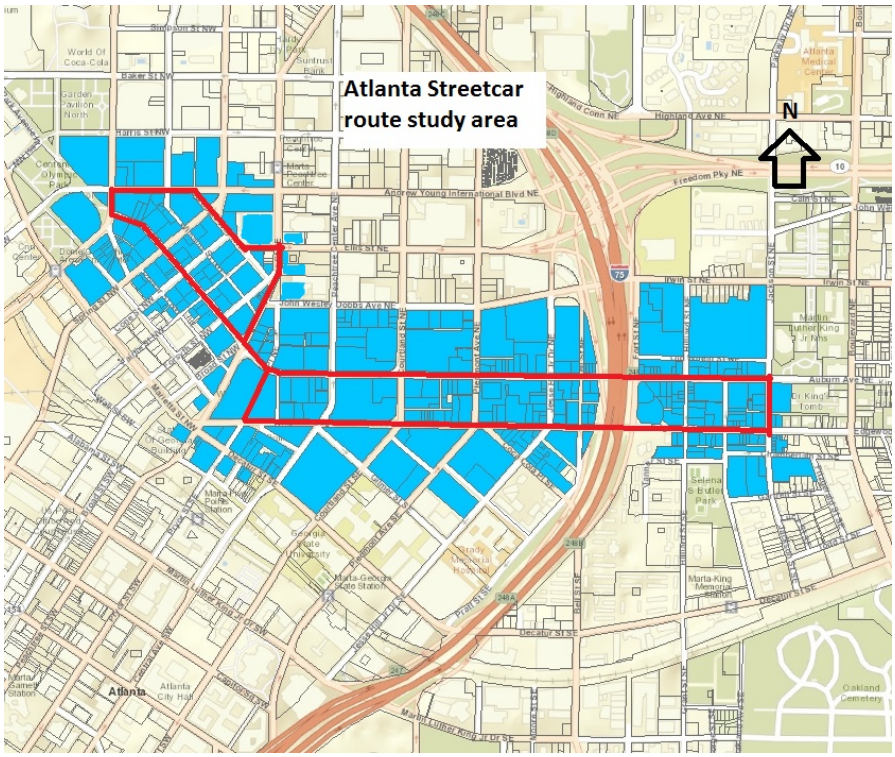


The comparison between the two corridors presents a sharp contrast, which provides at least some possibility that the streetcar is stimulating development. The two corridors are not perfect analogs for each other, but given that both received

transportation funding from the same 2006 regional referendum and are located in the CBD, the comparison is natural. The contrast in results, though, is striking and lends some credibility to the notion that the streetcar corridor is seeing increases in development beyond what may otherwise be expected. But the results do not provide nearly enough evidence that the streetcar alone is providing the stimulus to property values. Instead, these results indicate the need to study all of the factors that may be in play in this corridor such as zoning, incentives, and other interventions that may help contribute to these contrasting results. Nonetheless, in a basic comparison of property values, the streetcar corridor in Tucson shows some substantial signs of growth and stimulus.

Atlanta case study:

The Atlanta streetcar is a 2.7 mile line that links part of downtown Atlanta to a neighborhood east of downtown that includes the Martin Luther King Jr. National Historic Site. The line connects tourist destinations such as the King district and Centennial Olympic Park, as well as the historic Sweet Auburn neighborhood, which declined after the construction of Interstate 75/85 and white flight in the 1960s.[xlvi] Unlike some streetcar lines that run exclusively in CBD corridors, this line runs through a formally-designated Economically Distressed Area and attempts to re-join districts separated by that massive interstate.[xlvii] The line's final cost is likely to be $98 million, after an initial estimate of $69 million when the line was approved by the city and awarded $47 million from an October 2010 TIGER grant.[xlviii] The streetcar is a joint effort between the City of Atlanta, the Atlanta Beltline and MARTA (the region's primary public transit agency), though, the actual operator of the line was still unclear even mere weeks before its completion.



Like Tucson, Atlanta is a Sun Belt metropolis that saw steep real estate declines in the recent recession and wants to use its streetcar project to stimulate jobs and increase density. For example, between 2007 and 2011, the value of new homes in Atlanta was down more than 75% from pre-recession levels. Likewise, the construction of new homes in the city plummeted from 17,254 in 2007 to 136 in 2011.[xlix] So, for a city looking to increase density and development, the streetcar is seen as a way to help recover from a difficult economic period.[l] Additionally, the expectations for this line not only include nearly $160 million in "land market benefits", but officials hope the line is the start of a much larger network of streetcar lines throughout the city.

I collected data from 2008 and 2013 on all parcels in the city of Atlanta, which included information on their assessed value, according to the Fulton County Tax Assessor. 2008 was the earliest data available. While effects from the recession and housing bubble already may be evident in these values, they do not represent the nadir of the recession in subsequent years. Using GIS, I mapped the streetcar corridor and selected all parcels within one block of the line to get a sense of any increases or decreases in property value. The assessed tax values for those parcels were joined together to show the change in values between 2008 and 2013. An estimate of the assessed tax value of those parcels before and after the announcement and construction of the streetcar line is below.

***Table 5*: Estimate of changes in property value for parcels within one block of Atlanta streetcar line (in 2013 dollars)**

2008 total assessed tax value of parcels	2013 total assessed tax value of parcels	Total change in tax value	Percent of change from 2007 to 2013
$51,201,310	$25,073,050	-$26,128,260	-51.0%

The results for Atlanta are as surprising as those for Tucson, but clearly in a different direction. The property values within the streetcar corridor are worth less than half what they were pre-recession, which runs counter to the hopes and expectations for the line. As mentioned above, though, the recession battered Atlanta's real estate market with new residential construction at 0.7% of the 2007 levels and value down 75%. Recovery from the recession has been slow, as well. For example, the city still had a 21.5% vacancy rate for office space at the end of 2013.[li] So, the city's real estate market took a significant dive and struggles to reach pre-recession levels.

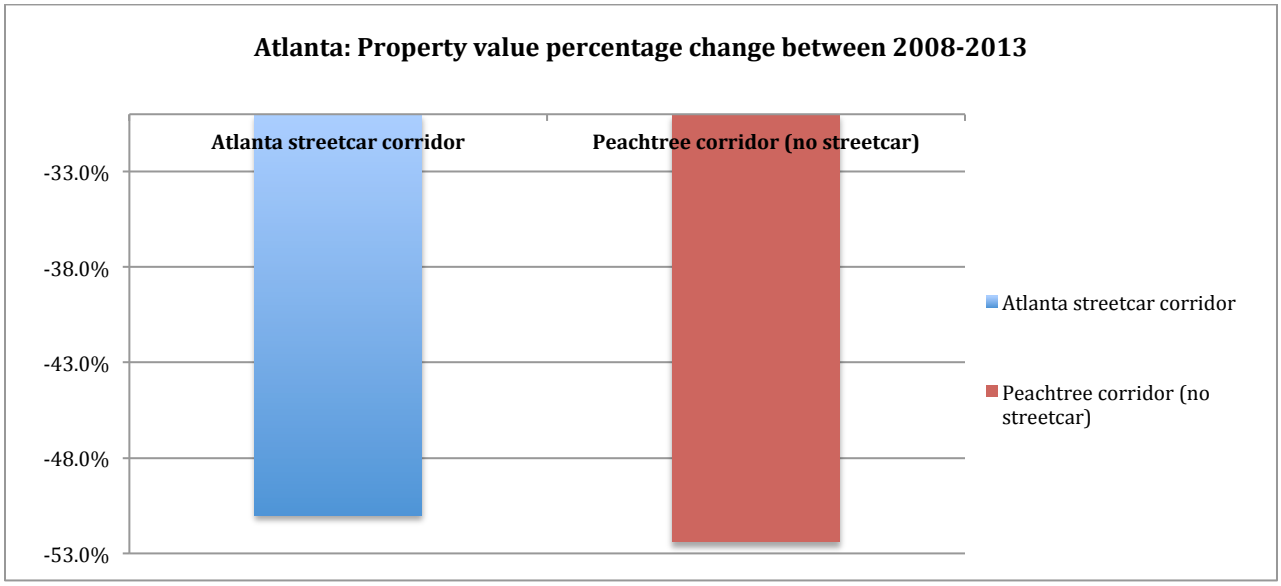
To provide context for the streetcar corridor results, I also measured development in another Atlanta corridor and compared the results. In the mid 2000's, Atlanta officials decided between the current streetcar alignment and another proposed alignment on one of the city's signature streets, Peachtree Street. This line would have been constructed in stages and eventually stretched 14 miles up Peachtree Street, making it the longest streetcar line in the country.[lii] One of the segments, though, ran for nearly two miles out of downtown north towards the city's Midtown area and began near the current streetcar's downtown turnaround point. This particular segment features a similar mix of commercial, office and hotel uses and with only a small amount of existing residential development. The corridor also has opportunities for redevelopment and a similar real estate market, as it is

partially located within downtown, as well. I did not measure the full 14-mile proposed route, as it includes more developed and robust submarkets. This segment appears to most closely resemble the streetcar corridor, though, it does not pass through an Economically Distressed Area. I measured the property values for the corridor using the same methodology and datasets as the streetcar corridor with parcel data from 2008 and 2013. The results for the Peachtree corridor are below.

***Table 6*: Estimate of changes in property value for parcels within one block of unbuilt Peachtree streetcar line (in 2013 dollars)**

2008 total assessed tax value of parcels	2013 total assessed tax value of parcels	Total change in tax value	Percent of change from 2007 to 2013
$33,212,450	$15,814,660	-$17,397,790	-52.4%

The Peachtree corridor experienced a similar decline in property values to the streetcar corridor and consistent with the city-wide real estate declines due to the recession. Like much of the city, the corridor saw over half of its property value lost in just a few years, which represents a dramatic decline and sign of serious market deterioration. The Peachtree corridor results only help confirm that the real estate and development market in Atlanta is very challenging for the streetcar or likely any other corridor.



The results from both corridors also indicate, though, that the streetcar has yet to deliver any appreciable development gains, at least in terms of property value growth. The streetcar corridor experienced a similar level of dramatic property value loss, as the Peachtree corridor. This is in stark contrast to the Tucson corridors, which saw the streetcar corridor gain 76% in property value over a similar period of time while also in a battered real estate market. Qualitatively, though, the Atlanta streetcar results are not so surprising, as news articles and statements from public officials and agencies hint at a lack of progress in the corridor. One article in November 2013 stated that "no new non-student residential construction has been started or even announced on the route of the Atlanta Streetcar."[liii] And both Atlanta City-Council Member Kwanza Hall and the Vice President for Planning and Economic Development at Central Atlanta Progress acknowledged that the corridor struggled to attract much new development, thus far.[liv] So, while the Atlanta streetcar corridor appears to deal with the same challenging local market as other parts of the city, the streetcar has yet to stimulate the desired development expected of it.

Chapter 4:

Factors and actions that may affect economic development in streetcar corridors.

This chapter takes the results from chapter 3 and experiences in other cities to develop some sense of other components and factors that may affect streetcar corridor development. While some of the success or failure of these corridors may be attributable to macroeconomic trends, other actions or initiatives may contribute to the trajectory of these streetcar corridors. The challenge in measuring development is attributing that development to certain interventions or specific factors. The contrasts between Atlanta and Tucson or even older lines like in Portland and Seattle indicate that some factors may be necessary, though, to streetcar corridor development. Using documents, policies and interviews with local officials, I identify some of the other components that may contribute to stimulating economic development in streetcar corridors, such as zoning, incentives, loan programs, existing private interest, anchor destinations, strong real estate demand and other streetscape investments. To begin, I examine some of the other factors present in the successful streetcar corridors and then consider what may be missing in Atlanta.

Why are Portland and Seattle the preeminent examples of streetcar corridor success?

As illustrated earlier, Portland and Seattle are held up as exemplars of the catalytic effect streetcars can have on economic development. The well-known 2005 E.B. Hovee study details the dramatic increases in development and share of the city's overall development in the streetcar corridor in Portland. Meanwhile, the Brookings Institute studied the Seattle South Lake Union line in a 2009 study and found substantial development impacts there, as well. For example, the study found that vacant land within three blocks of the line rose in value at a rate of 123% compared to 53% in other parts of Seattle over a four year period and all property values near the line increased by 53-85%.[lv] In nearly every possible metric from employment to new residential development to development of vacant land and density, the Seattle line saw vast increases that rival and could surpass Portland's streetcar impact. For cities seeking jobs, development and density, these cities offer empirical evidence of the potential for streetcar-stimulated impacts. But the transferability of these results must be tempered by the different planning and real estate climates of these two cities (and corridors) relative to other cities.

When compared with each other and with Tucson, some commonalities and possible necessary conditions become apparent for stimulating streetcar development. Below are a few of the other factors possibly involved in the development of these corridors.

"Anchor tenants" propelled the corridors: In all three corridors, major employers or property owners, similar to "anchor tenants," encouraged the initial development in the streetcar corridors. The clearest example of this is in Seattle, where several large companies expressed strong interest in the land around the corridor and pushed for the streetcar line to be constructed. Prominent Seattle billionaire Paul Allen and his real estate company Vulcan owned 28% of the properties within three blocks of the streetcar line in the South Lake Union district.[lvi] Vulcan contributed $8.6 million to the streetcar line's construction to provide transportation among their properties and help stimulate more development.[lvii] The City of Seattle's Office of Economic Development credited Vulcan's large ownership stake in the district as a major and unique driver of streetcar development. A city report on the lessons learned from the South Lake Union streetcar states that for Vulcan, "Having this amount of land control, investment capital, and a vision for the area that aligned with market demand is extremely uncommon . . . with such a substantial holding, the risk/value proposition for Vulcan was well in their favor, allowing them to contribute significantly to several public projects because the return would accumulate to their properties."[lviii]

The South Lake Union line also benefitted from several other major institutions and firms investing in the area after Vulcan's significant commitment. The University of Washington and the Fred Hutchinson Cancer Research Center both expanded research buildings near the corridor during the economic recession when private development was scarce.[lix] The major private investor, though, was Amazon.com, which based its headquarters in 11 buildings over six blocks of land in the streetcar corridor.[lx] News reports indicate that the streetcar attracted Amazon.com to the district, though, they moved to the district after the investments of Vulcan, UW and the cancer center. Clearly, successful development occurred in the South Lake Union district, but with an initial commitment of a major investor and a few other large employers comprising the majority of the district's development and employment gains.

In Tucson, the University of Arizona serves as the anchor tenant that propels early streetcar development. In planning documents and interviews, one of the major sources of ridership is expected to be students and employees of the university, which sits at the

eastern terminus of the line.[lxi] The university plans to use the streetcar to connect its landlocked campus with expansions into buildings in downtown Tucson. According to a planning document, the university also "encouraged two private housing developers to plan and construct downtown student projects that will provide off campus housing for 1,200 students."[lxii] A recent news article also mentioned how the city adjusted zoning in the corridor to allow for taller building heights to accommodate these private student housing towers.[lxiii] In addition to student housing, major existing employers in the University of Arizona Medical Center and the Arizona Health Sciences Center also anchor the corridor and provide a substantial amount of demand for potential use of the streetcar and development in the corridor.

Meanwhile, in Atlanta, the streetcar corridor lacks major employers with large private investments in the area or large employment magnets and more importantly, the corridor lacks a primary property owner interested in streetcars. The streetcar does run into downtown Atlanta, which houses the state government, a large university, and the headquarters of businesses like SunTrust and Georgia Power. But part of the streetcar line runs through an economically-distressed neighborhood and ends at a tourist destination. And unlike Vulcan or the University of Arizona, these institutions located in downtown Atlanta have yet to commit any new investment for expanding their operations along the corridor or encouraging complementary developments, such as student housing or related firms. Only one private student residence building has been constructed on the line, which serves as the corridor's only new housing since the streetcar's announcement.[lxiv]

Perhaps even more importantly, the corridor lacks a property owner with large shares of land in the corridor willing to make the investments because they will reap many of the rewards, such as Vulcan in Seattle.[lxv] Georgia State University has not committed to additional development along the line. The downtown development authority acknowledged that a major challenge with the line is getting the property along it into the hands of developers or owners who can aggregate the land and create major developments with it. Unlike Seattle, Tucson or Portland, the largest land owners for much of the developable part of the Atlanta corridor are churches, which do not have the same development interests as a real estate firm, retailer headquarters or even university.[lxvi] So, the city is challenged in getting the land ownership to reflect the same dynamic as in those other cities, where a few major, investment-oriented and expanding owners hold significant stakes in the corridor. Without the investment and interest of major anchors, the line does not have the same momentum as other streetcar corridors.

While capitalizing on existing employers, investors, and major destinations in corridors is very logical, the main takeaway is that these corridors have strong anchors that also stimulate and drive development, besides the streetcar. In fact, given the financial and public support of groups like Vulcan in Seattle and the University of Arizona in Tucson, the

streetcar seemed to be a next step in an evolution of corridors, rather than the first or primary step.

Zoning and incentives are critical to stimulating desired development: All three corridors altered their zoning and provided some incentives to encourage development in the streetcar corridors. In every city examine, streetcars are not meant to just stimulate any kind of development, but denser, mixed use development. Zoning for this kind of development is often not in place for many cities and needs to be altered. Additionally, local governments often provide various forms of incentives to developers or employers to locate in the streetcar corridor. These efforts may be acknowledgements that streetcars alone do not stimulate development and/or part of maximizing the considerable investments of streetcar lines by making the corridors even more attractive.

In each of the three more successful cases, local governments made significant zoning alterations and concessions to encourage development. Portland's major zoning changes were to allow for high-density development in the streetcar corridor and minimize the amount of parking developers had to build for new developments.[lxvii] Portland also made use of developer agreements, whereby the city would alter zoning for developers, in exchange for other benefits. For example, the city allowed developer Homer Williams to receiving a dramatic increase in density allowed, in exchange for parks and the demolition of a freeway ramp.[lxviii] Meanwhile, in Seattle and Tucson, both cities changed much of the zoning for the corridors from commercial to mixed use zoning to allow for more residential and mixed-use projects.[lxix] In Seattle and Tucson, the city governments allowed projects in the streetcar corridors to bypass or face expedited zoning processes. Tucson waived municipal fees, provided parcel assembly assistance, and environmental remediation of sites, as well as increasing height limits.[lxx] The city also created the Downtown Financial Incentive District, which specifically waives building permit fees, construction sales taxes, and regulatory relief on parking, landscaping, and setbacks.[lxxi] In Seattle, the city went even further with zoning and created changes targeted at specific industries and firms. For example, the city rezoned in the corridor to make allowances for the biotechnology industry, which allowed for deviations in building height, rooftop equipment and parking to accommodate the needs of that industry.[lxxii] Amazon also received a building height allowance, while Vulcan received accommodations such as control over alley ways and bypassing the usual zoning process.[lxxiii]

In Atlanta, the importance of zoning is obvious in the actions now being taken to correct the streetcar corridor's current zoning. Both Councilman Hall's office and the downtown development authority, Central Atlanta Progress, acknowledge that the zoning for the city's streetcar district is outdated. The western portion of the streetcar line recently became re-zoned from commercial to a mixed use district with no parking

minimums. Much of the eastern portion of the streetcar route is in a "landmark district" which greatly restricts the type of new development and density possible and so will be rezoned as well.[lxxiv] In addition to altering that zoning to a mixed use district, the city announced that part of the route would become a "Commercial Opportunity Zone" which offers incentives to business owners to make additional hires.[lxxv] Councilman Hall also secured a storefront rehabilitation loan program and a Main Street-style incentive program. Finally, part of the streetcar route is now in a tax allocation district, which allows the increases in property values to go towards investment or encouraging investment in the corridor. Of course, property values have yet to rise in the corridor, according to this study's results. While this is an impressive display of incentives and alterations, they are all very recent (within the past few months) and may help explain why the corridor has seen so little development.

***Other public investments necessary for complementing private investment and streetcars*:** While local governments may wish their investments in these corridors ended with the streetcar costs, successful streetcar corridors all featured additional public investment to stimulate development. Seattle made significant investments through public parks and amenities to the area such as the 61-acre park known as the Seattle Commons, as well as Lake Union Park, Cascade Playground and significant streetscape improvements and expansion to Mercer Avenue.[lxxvi] In Tucson, the city spent $23 million on a renovation of six-story mixed use building in the corridor with low income, senior affordable housing, as well as commercial and retail space.[lxxvii] A survey of Portland's economic development staff in 2009 found that while the streetcar was credited with helping development, extensive streetscape improvements, subsidies for affordable housing, loans and grants all contributed to the success of the area.[lxxviii] Portland also used tax increment financing (TIF) to subsidize the upgrading of infrastructure and development in the streetcar corridor.[lxxix] Atlanta is also trying to increase its public investment in the corridor by funding a public art program and using bond revenue from its tax allocation district funds to eventually provide gap financing for development deals.[lxxx] All of these

investments contribute to the kind of placemaking that is part of the streetcar corridor's impact.

Organic development conditions: The most difficult question to answer in this research concerns whether or not these corridors still develop without the streetcar line? The reality is that none of these corridors exist without substantial investments, rezoning, and anchor tenants all geared towards streetcar development. But would these other factors have stimulated development without a streetcar? The question is impossible to definitively answer, but some evidence exists that development may still occur on some level in these corridors (at least the successful ones) without streetcars. A former FTA official hypothesized that Portland's Pearl District would have still seen development without the streetcar, but it may have taken longer and be slightly redirected onto other corridors. A TCRP report on streetcar impacts cast skepticism on the attributing all of the Portland corridor's success to the streetcar by noting the city also had "increased developer demand for more densely developable sites, the real estate boom for condominiums offering urban lifestyles with high amenities in downtown, and rising land costs, likely influenced development patterns irrespective of the streetcar."[lxxxi] The study cites Portland's increase in floor area ratio (FAR) three blocks from the streetcar was *higher* (therefore, denser) than the FAR for new development within one block of the streetcar line. This indicates that other parts of downtown, further from the streetcar line, experienced increased demand for dense development, as well.

Tucson also demonstrates some evidence of development momentum prior to the announcement of the streetcar. My case study in Atlanta did not show an increase in property values in the streetcar corridor, nor do interviews or news articles indicate much development occurring in the area, yet. But the Tucson corridor showed substantial gains in property value after the streetcar announcement. As such, I went further and examined data from 2005 for the corridor and performed the same data analysis by comparing it to the streetcar corridor's parcel values in 2007, the year previously used as the "before streetcar" data set. 2005 represents the earliest tax value data available from the Pima County Tax Assessor. The results are below:

***Table 7*: Estimate of changes in property value for parcels within one block of Tucson streetcar line prior to announcement and construction (in 2013 dollars)**

2005 total assessed tax value of parcels	2007 total assessed tax value of parcels	Total change in tax value	Percent of change from 2005 to 2007
$139,147,832	$212,841,558	$73,693,726	53%

The results of this comparison are as dramatic as those for the previous property value comparisons and indicate some development momentum in the corridor prior to the streetcar. In just two years, the property values rose as dramatically in the corridor as they did from 2007-2013, while the streetcar was being constructed. The 2005-07 period represents a boom in real estate and market prices prior to the crash, but even still this is a tremendous gain in a short time. One mitigating factor may be a 2006 referendum to fund transportation in the region, which eventually funded the streetcar. While the project did not begin construction or was fully planned until 2008-2010, the prospect of a streetcar coming to downtown Tucson became much more realistic with the passage of funding for a streetcar in this regional transportation referendum. Developers may have assumed much of the current streetcar corridor as the only or most viable streetcar corridor option for downtown and so property values rose dramatically. But even that line of thinking indicates the corridor's viability for development prior to the existence of any streetcar. Without federal funding secured and an alignment announced, developers and buyers would still be speculating somewhat, so the corridor likely was on the rise even without a streetcar confirmed.

Chapter 5:

Lessons Learned and Conclusion.

The sudden popularity of streetcars and their relative newness makes studying their impacts challenging. The effects of the recent recession on development both complicates measuring their impact, while also heightening the importance of understanding that impact, given the expectations and investments made for these streetcar systems. Few studies attempt to measure the impact of these lines, preferring the larger heavy or light rail systems as research subjects or relying simply on the experiences of a handful of earlier cities such as Portland and Seattle. As such, the impacts of streetcars are not universally well understood by the public, local officials or federal agencies. But the size of the investments in a time of finite resources and need for solid economic development investments demands more study and research on streetcar systems and their planning to improve these investments. While this study is not a definitive judgment on the efficacy of streetcars, several important lessons learned did come out of this research that could be used to improve streetcar planning and economic development investments and, ultimately, help cities and the federal government gain a better sense of if and how streetcar investments may best serve them.

- Cities should be careful about large economic development expectations for streetcars based on the experiences of other cities with very different planning climates and/or with many other exogenous factors involved in development in their streetcar corridors. As shown, many cities rely on the experiences of cities like Portland and Seattle without fully considering all of the other factors contributing to those cities' streetcar corridor success.
- Federal agencies, such as FTA, need to improve their criteria for analyzing potential streetcar impacts for economic development. This study shows that officials used a qualitative process that did not rigorously examine the development potential in these streetcar corridors. No quantitative measures were mentioned and the estimates for development created by cities were not scrutinized. Furthermore, this study showed the federal government also does not distinguish between modes when it comes to weighing potential development impacts, which may be a mistake, as the larger networks, capacity, tracks separated from automobile traffic, and speeds of other modes could affect their development potential versus streetcar. Future criteria and analysis could more closely examine the amount of development potential in parcels along the line, as well as the presence of many of the other factors mentioned in this report like anchor investors, and consider more closely the differences in development impact among modes.

- The Tucson streetcar corridor appears to have substantial growth in property values, even compared to another similar corridor. This growth may be a continuation of a trend from before the streetcar, but still represents significant growth in the targeted streetcar corridor.
- The Atlanta case study, though, affirms the idea that streetcars do not stimulate development by themselves. The Atlanta streetcar corridor showed virtually no signs of growth in property values and development. This case study is instructive in the need for better timed zoning, public investments, as well as some large property owners with strong interest in the corridor.
- Successful streetcar corridors share certain traits such as anchor tenants, who own large portions of developable land, make substantial investments in that land, and advocate for development in the corridor. Additionally, these corridors all have new zoning to encourage mixed use, denser development, incentive programs, loans and grants, along with other significant public investment, such as parks, publicly developed buildings, or other transportation improvements.
- Existing development and real estate momentum may factor into the success of streetcar lines. As the presence of anchor tenants demonstrate, some interest must already exist in the corridor, in order for a streetcar to be built. With this interest, there exists real estate demand that may not be reliant on a streetcar. As such, streetcars may be more of a complement rather than a catalytic or primary tool for economic development.

The impacts of streetcars are not easy to discern and the source of success and failure in these corridors is debatable. But what is not debatable is the relevance and importance of understanding streetcar's impact on economic development. The need for those impacts, in terms of jobs, livability, density, and new tax revenue are real for many communities in the United States. The path towards obtaining those significant promised impacts, though, is not nearly as clear as a mere streetcar line. But the list of cities looking towards these as tools for stimulating economic development and transforming communities continues to grow. As such, understanding the real benefits and costs of these systems is critical to making sound investments and ensuring communities do not go too far down the line before realizing they missed their stop.

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