Bus Rapid Transit as an Agent of Change:
A Study of Neighborhoods Surrounding the Los Angeles County Silver Line

Jessica Mitchell
May 4, 2018

Occidental College
Department of Urban and Environmental Policy
Professor Mijin Cha and Professor Bhavna Shamasunder

Acknowledgements

Thank you, thank you, thank you to Professor Cha and Professor Shamasunder for your guidance and feedback throughout this project!

Thank you Professor Sadd, I could not have completed my research without GIS - I am so thankful for your suggestions and teachings.

Thank you, Valerie Lizárraga! You have been integral to my life and growth at Oxy. I am grateful to have worked with you and to have learned from you.

Thank you to my family and friends for your support and for your warmth. Specifically, thank you, Mom for reading this entire thing! Thank you Michael and Veronica for your kindness and solidarity in completing this research! Thank you to my housemates for being so sweet!

Introduction

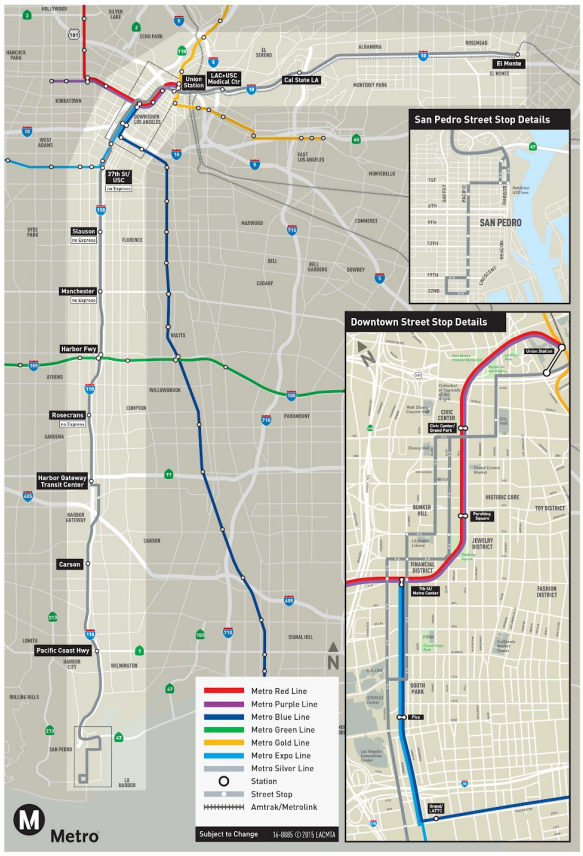
In November 2016, Los Angeles County voters approved Measure M. This ballot measure approved an increased sales tax in order to fund transportation and infrastructure improvements throughout the County (Metro n.d.). While this may seem like good news to some, many have expressed cynicism about the introduction of additional public transit to Los Angeles County, as demand for transit could induce gentrification in neighborhoods (Rosenthal 2018 and the LA Times Editorial Board 2016). However, scholarly literature has not been conclusive in linking public transit to this form of neighborhood change (Kahn 2007).

This discrepancy among lived experience and literature necessitates a better understanding of the relationship between public transportation, as a form of public investment, and the neighborhoods in which it is introduced. On one hand, transit is necessary in linking people to opportunity through the places where they can work, exercise, eat, and enjoy their leisure time (Semuels 2016). But at the same time transit holds damaging potential of displacing groups that need transit in order to access these opportunities (Rosenthal 2018 and LA Times Editorial Board 2016). Not only is this damaging towards the neighborhood's sense of identity, but spatially this is counterintuitive in that often the groups that have the greatest need for public transportation are the same groups that are vulnerable to displacement.

To understand debates on the impacts of public transportation on surrounding communities and the actions that transit agencies should take towards avoiding or mitigating negative impacts, this study focuses on the Metro Silver Line, a Bus Rapid Transit (BRT) lite line in Los Angeles County (Figure 1). Specifically, this study examines the extent to which neighborhoods surrounding the Silver Line have experienced changes in demographics relative

to that of Los Angeles County using an index of change created using Decennial Census and American Community Survey data. Interviews with Silver Line riders were also conducted in order to give more context as to how these changes can be categorized.

Figure 1 - Map of Los Angeles County Silver Line



Los Angeles County Metropolitan Transportation Authority, 2015. "Metro Silver Line: Introducing Express Service."

The aim of this study is to provide research in order for LA County and Los Angeles County Metropolitan Transportation Authority (Metro) officials to make informed decisions when implementing transit in the future. If the Silver Line has induced positive change, how can this be replicated in the future? One the other hand, if it has induced negative change, what form of transit would be favorable for the future of the County?

Background

This section contextualizes for the study of the Silver Line's effect on neighborhoods that surround it by defining and and providing a history of BRT. This section also delves into the specific history of the Silver Line and its current functionality.

What is BRT?

Bus rapid transit (BRT) systems can be described as innovative bus systems that mimic the quality of light rail but utilize buses rather rail cars, generally at a lower cost. In their federally-funded report "Characteristics of Bus Rapid Transit for Decision Making" Diaz et al (2009) use transit expert Herbert Levinson's definition:

> A flexible, high performance rapid transit mode that combines a variety of physical, operating and system elements into a permanently integrated system with a quality image and unique identity.

Although this definition neglects to mention that BRT systems operate using buses, Levinson's definition puts emphasis on the flexibility and uniqueness of the system. BRT differs from traditional bus transit by combining a number of traits such as segregated bus lanes, limited stops, and weather-protected stations. These traits are included with the aims of providing riders with faster and more reliable service. Each BRT system is unique, as Levinson states, in that there is not a set quota in the number defining traits a BRT system must have in order to be considered a BRT system. The following are traits of BRT:

- Running ways
- Bus stations
- Limited stops
- Quick boarding
- Intelligent Transportation System (ITS) Elements
- Fare collection
- Branding/ advertising

Transit systems that combine a mix of traditional bus traits and BRT traits have also emerged. These systems, dubbed "BRT Lite," may have an exclusive bus lane only for parts of the line or may only board from one of their doors, for example.

History of BRT

BRT emerged out of necessity. In the early 1970's, the city of Curitiba, Brazil had to meet the transit needs of its residents but the light rail transit (LRT) system that was planned for the city would be too costly. Instead, the city implemented an innovative bus system that used bus-exclusive lanes that were separated from the road by a median. Curitiba's bus system grew to become the first BRT system in the world in 1982 (Lindau et al 2010). BRT systems have since spread throughout Latin American cities, including Bogotá, São Paulo, Ciudad de México, Guayaquil, and Lima. Additionally BRT has spread in Asia, to cities including Guangzhou and Jakarta. BRT as a system has received praise for being a cost-effective way to alleviate the transit-burden – the difficulty of getting to and from spaces necessary for daily life, such as places to shop or to earn a wage – and to lessen pollution from automobiles (Hidalgo and Carrigan 2010).

BRT has had limited popularity in the United States. This is likely due to negative perceptions of buses in the United States (Ben-Akiva and Morikawa 2002). Two of the most successful BRTs in the US, Cleveland's Healthline and Los Angeles' Orange Line, are single corridors, rather than an entire BRT system. However, these lines have been successful in reaching or exceeding estimated ridership. Even with BRT's successes, this transit system tends to be viewed as an intermediary step between traditional buses and rail, rather than a complete

system in its own (Vincent 2010). Still, others argue that BRT is a viable and cost-effective alternative to rail, in which the US should invest (Ginberg 2006).

Silver Line

Metro introduced the Silver Line in December of 2009. The Silver Line served as a way to combine and simplify existing express buses that connected El Monte, a small city just east of Los Angeles, to San Pedro, another small city in the Los Angeles County South Bay area (Figure 1). The lines that were replaced by the Silver Line include the 444, 446-447, 484 and 490, all of which were express bus lines - meaning they had less frequent stops than a typical bus (Camino 2009). The Silver Line is categorized as BRT lite rather than a full BRT line, because although it operates on exclusive High Occupancy Vehicle (HOV) or bus-only lanes for the majority of its route, it acts as a traditional bus line in the Downtown Los Angeles leg of its route. The line's route in total is approximately 26 miles long (Weikel 2014).

Notably, when it opened, the Silver Line's fare was $2.45, nearly a dollar more than the $1.50 fare of Metro's existing rail and busways. The uncharacteristically high fare was set at this value in order to be comparable to the fares of Foothill Transit, a separate public transportation agency that operates primarily in the San Gabriel and Pomona Valleys whose Silver Streak bus operates on the proposed route. Though the Silver Streak and the Silver Line now charge the same fare and accept the opposite's multi-day passes, Metro justified the $2.45 fare by stating that existing riders would see lower-quality service because of the time it would take for them to transfer to the Silver Line. Additionally, Metro officials write that the transfer and change in fare would necessitate fare inspections on the Line, which could also slow down service speed (Metro Operations Committee 2009).

While the Silver Line has not reached ridership levels that are comparable to Metro's other high quality transit lines, including rail and BRT, the line's ridership has increased substantially since its opening at the end of 2009. During 2010, its first full year open, the Silver Lines ridership was 2,108,032 rides for the year. In 2016, Metro's most recently reported year, ridership was at 4,509,983 - an average increase of 400,325 boardings per year. In comparison over the same period of time the Orange Line, Metro's full BRT line located in the San Fernando Valley, only had an average increase of 111,297. However the Orange Line, which opened in 2005, had a much higher ridership for the year of 2016 with 7,754,858 boardings.

Literature Review

This section will provide definitions and parameters in order to answer the questions: Have Los Angeles County neighborhoods changed with the introduction of the Silver Line, a BRT lite line? If so, how have they changed? And how can these changes be categorized? To begin, I will examine existing notions of neighborhood change, including degradation, revitalization, and gentrification. Next, I will situate this study within conversations about the feasibility of BRT as an alternative to rail. This will be followed by a focus on BRT and its role in effecting change around it. Finally, I will examine the role of transit agencies and local governments in either encouraging or mitigating these effects.

Neighborhood Change

In their literature review on transit as a form of public investment equitable development expert Miriam Zuk and her colleagues (2015) examine dimensions of neighborhood change through three overarching forms of change: decline, ascent, and gentrification. The implication of these forms of neighborhood change, as either a benefit or detriment to the neighborhood in which they take place, can be a point of contention (Pollack et al 2010). Regardless of these

labels, however, Zuk et al argue that a large driver of general neighborhood change is public investment or disinvestment (Zuk et al 2015). Existing literature acknowledges public transportation as a form of public investment, whose effect is often studied through changes in home values (Wachter and Gillen 2006). On top of acting as of public investment itself, the introduction of public transportation can often lead to additional investment in other forms (Bates et al 2017).

Neighborhood decline, defined by Zweirs et al as "any negative development in the physical, social or economic conditions of a neighborhood as experienced by its residents or other stakeholders"(Zweirs et al 2014), has historically been viewed as a natural process (Zuk et al 2015). However, Zuk argues that the process is unnatural in that decisions, such as migratory patterns, investments, and discriminatory actions, spur decline more so than the simple passing of time (Zuk et al 2015). Vincent (2012) gives the example of the Federal Housing Administration providing loans in suburban areas but not inner city areas.

By contrast, a study of Minneapolis's Neighborhood Revitalization Program presents a working definition of neighborhood revitalization as, "a means to improve residential neighborhood quality and increase citizen participation" (Holzer 2017). Again this change is brought primarily through the form of public investment (Zuk et al 2015). Scholars acknowledge that difficulty in executing neighborhood revitalization stems from the allure of public investments may draw in members of the middle- and upper-class and subsequently displace existing low-income residents (Pollack et al 2010). In this way, revitalization can be linked to gentrification.

Similarly, gentrification represents yet another form of neighborhood change. Although the term "gentrification" has existed for decades, it lacks a singular agreed-upon definition (Grube-Cavers and Patterson 2015; Kirkland 2008). Part of the difficulty in defining gentrification, Kirkland (2008) writes, is that the process involves a "you-know-it-when-you-see-it" aspect. Gentrification generally refers to the class transformation of a neighborhood: a process involving the displacement of a neighborhood's low-income residents, their subsequent replacement with medium- to high-income residents, and an influx in economic development. But as Kirkland describes, gentrification causes the personality of a neighborhood to change in addition to the economic status of its residents. For example, the inflow of the middle- and upper-class people may bring about change in terms of the demographic of those visiting the neighborhood and the types of services available within the neighborhood (Kirkland 2008). While there is limited literature regarding the connection between transit and gentrification, Dawkins and Moeckel (2016) argue that there is a theoretical link between this form of neighborhood change and transit investment.

In a study of revitalization efforts in the Skid Row and Gallery Row neighborhoods of Los Angeles, Collins and Loukaitou-Sideris (2016) acknowledge both the supply-side and demand-side as causes of gentrification. As with other forms of neighborhood change, the supply-side of this process takes the form of "public investment public investment and policies, as well as private developers who purchase and redevelop properties" (Collins and Loukaitou-Sideris 2016). The demand-side of gentrification stems from the actions and interests of individuals, who move to or invest in neighborhoods because of the neighborhood's appeal (Collins and Loukaitou-Sideris 2016). These causes of gentrification are important to understand

while examining transit's role, as a public investment, in affecting change in neighborhoods around it.

BRT vs. Rail

Separate from conversations regarding general neighborhood change, is an ongoing debate over the practicality of BRT as an alternative to rail. Though there are only eleven cities in the United States utilizing BRT, many transit planners have began to consider BRT as a viable alternative to rail (Brown 2015). Because of its low construction and operational costs, Brown (2015) writes that BRT has established its role as "an effective, efficient, and lower-cost option to rail transit". Indeed, from an economic standpoint BRT has been found to be favorable to rail. In a study comparing both user and operator costs of BRT, light rail transit (LRT), and heavy rail transit (HRT), Tirachini et al (2010) found that BRT was more cost-effective than both forms of rail, except for in cases of high demand in which rail's speeds can give it an advantage over BRT's user cost.

Still, research on public preferences towards mode of transportation demonstrates that many members of the general public do not hold BRT to the same standard as rail services. Ben-Akiva and Morikawa (2002) found an overall preference of rail services over bus, express bus, and commuter rail. A similar conclusion was reached by Beirão and Cabral (2007), who interviewed members of the general public in order to understand attitudes towards different modes of transportation, including traditional bus, LRT, and private car. This study found that the general public felt that LRT was "more reliable, comfortable, frequent, faster and spacious than bus service" (Beirão and Cabral 2007). On top of its utility, the study's participants were attracted to LRT because they found it "attractive" and "new"(Beirão and Cabral 2007).

Missing from this conversation is an evaluation comparing the effects of BRT and rail on surrounding neighborhoods. Though research exists on the effects of rail alone on surrounding neighborhoods, literature examining the effects of BRT is limited. This is especially true for BRT in the United States (Brown 2015).

BRT and Neighborhood Change

Because BRTs were first established in Latin America, most research regarding BRT examines this form of transportation within Central and South America. In a case study of Bogotá's Transmilenio, Bassett and Marpillero-Colomina (2013) write that although it is difficult to directly link any transit system to gentrification because of the number of variables involved, property values along the Transmilenio showed increases within the first year of the systems operation. Additionally, the authors acknowledge the argument that the Transmilenio has not effectively alleviated the transit burden for the poor because many spaces that had historically served low-income residents were destroyed in order to develop the transit system itself or subsequent commercial spaces (Bassett and Marpillero-Colomina 2013). Similarly, in a study examining housing values within a ten minute walking distance of Bogotá's Transmilenio BRT system using a Hedonic model, Munoz-Raskin (2007) found that the value of medium-income housing market properties gave premium to the proximity of the Transmilenio. Because the opposite was true for the low-income housing market, Munoz-Raskin concludes that Transmilenio does not alleviate the transportation burden for the poorest in Bogotá. This does not indicate that the Transmilenio caused gentrification in Bogotá, as property values only rose for those who are already middle-income and therefore not a gentrifiable population, while it does speak to BRT's potential as a transit system to serve all commuters, not just those with

capital. In a study of the spread of BRT in Latin America, Mejía-Dugand et al (2013) describe that public infrastructures, even when successful in alleviating the transportation burden for the poor and in improving environmental conditions, can favor high income residents and perpetuate gentrification.

The relationship between BRT and neighborhood change in the context of the United States has seen limited research (Brown 2015). In studying how a BRT system may affect communities in the Powell-Division in Portland, Bates et al (2017) conclude that BRT is a viable option for the city even though the introduction of transit can be linked to displacement of low-income residents. This study asserts that planners must think critically about how to meet both transit and housing needs, and that there is no clear answer on how to address transit needs without neglecting housing needs (Bates et al 2017). While the author determined that in this situation the costs felt through gentrification were outweighed by the benefits of increased mobility, this is not necessarily true for other locations globally or domestically (Bates et al 2017).

There is significantly more literature examining the impacts of rail on surrounding neighborhoods than there is of BRT. However, there is not a clear consensus on how to categorize neighborhood change that comes with the introduction of rail. In a study of the transit systems in 14 areas, Kahn (2007) found that only some of these rail systems induced gentrification. Instead, the consensus seems to be that rail contributes to higher property values, that do not always lead to gentrification. Cervero (2006) explains that the greatest increases in land premiums tend to come with commuter rail systems in metropolitan areas. Similarly, Grube-Cavers and Patterson (2015) found a positive and statistically significant relationship

between rail transit stations and gentrification in two of the three Canadian cities that they studied.

Encouraging and Mitigating Change

Some scholars assert that governmental bodies have a responsibility to deter gentrification. After reaching the conclusion that transportation investment can have unintended and undesired consequences for the surrounding community, Pollack et al argues that, "policymakers need to get ahead of potential problems by using coordinated and community-responsive planning tools" (Pollack et al 2010). This seems governmental role seems to be embraced in some cases; DeVerteuil (2011) writes that local government interventions are "vital" in allowing low-income renters to avoid displacement. DeVerteuil also emphasizes the necessity of a cooperative city council for mitigating gentrification by way of policy. Accordingly, other authors describe government's role in welcoming gentrifiers, Collins and Loukaitou-Sideris (2016) write, "developers and cities hope to attract white middle-class urban dwellers and revitalise neglected neighbourhoods".

Methodology

As described above, within existing literature gentrification is studied both quantitatively, through observation of changes in demographics and in land value, and qualitatively, through the exploration of lived experiences and personal narratives. This study recognizes that in order to comprehensively examine the changes that have occurred in neighborhoods near Silver Line stations relative to other neighborhoods around the county, it is necessary to utilize both quantitative and qualitative methods. For this reason, this study uses a mixed methods approach.

Study Area

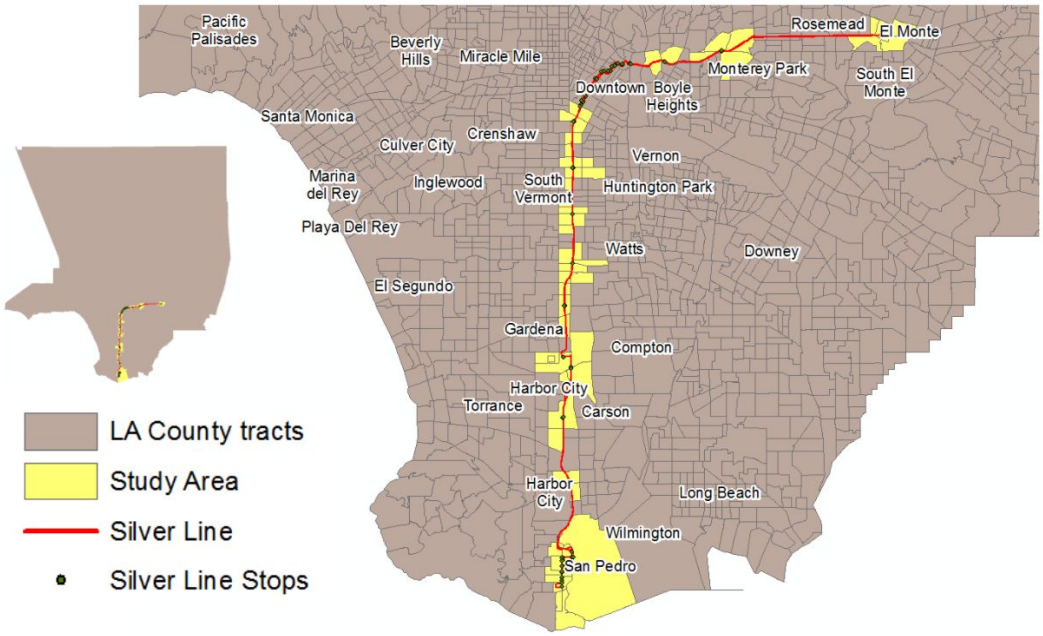
The term "neighborhood" is often understood to encompass a sense of community, rather than just spatial bounds. However, for the purposes of this study, neighborhoods are denoted as geographic units using census tracts. This study used census tracts to define neighborhood boundaries because US Decennial Census and American Community Survey (ACS), the data sources used in this study, publicly report using census tracts as the smallest land unit. The study areas were created following the example set by Brown (2016) by using ArcMap Network Analyst tool in order to determine walking distance to Silver Line stations rather than Euclidean distance, the latter which may overrepresent how accessible Silver Line stations are to surrounding census tracts. Figure 1 shows the study area, which was calculated using ArcMap's Network Analyst. However, this study differs from Brown's study in that it examines neighborhoods within a half mile around all Metro transit lines, in addition to the Silver Line, as a measure to maintain the credibility of this study while using ACS data sets. Because of ACS uses such a small sample size it is necessary to have a large study area in order to account for the large margin of error that accompanies ACS data (Bazuin and Fraser 2013).

This study examined neighborhoods that are near both stations and traditional street stops. Stations differ from stops in that stops have limited seating and shelter for riders, and do not have machines for riders to acquire or refill their TAP cards. Areas that have street stops without stations include Downtown Los Angeles and San Pedro. Because the Silver Line has these traditional street stops and functions as a traditional bus in some legs of its route, it has been dubbed BRT lite. This study examines both types of the Silver Line's stops to examine

whether or not BRT lite induces change in surrounding neighborhoods, regardless of the line's function at specific stops.

However, the Downtown Los Angeles section of the Silver Line was excluded in this study because of the complexity of Downtown. There are too many existing outside factors, such as other high quality transit lines, to distinguish what may have induced any changes that have occurred in the neighborhoods surrounding the Silver Line. With the exclusion of Downtown, this study focused on neighborhoods around eleven Silver Line stations and 12 Silver Line stops.

FIGURE 2 Study Area



Data

Neighborhood changes were quantified using data from the ACS. Data were used from the the US Decennial Census from 1990 and 2000 and the ACS 2009-2014 five year estimate. Two comparison periods were taken from these datasets, the first period measuring change during the period of 1990 to 2014 and the second measuring 2000-2014. Again, these years were

selected because the Silver Line opened in December 2009 and including two periods of change helps to strengthen the. From these data sets, observations can be made about how the neighborhood might have changed from before the introduction of the Silver Line to after its introduction. ACS data are limited in that the smallest land unit reported are census tracts, but ACS data are commonly used in studying neighborhood change and gentrification.

Geospatial Analysis

Using the methodology that Brown (2016) used in studying change in neighborhoods surrounding Metro's Orange Line, a full BRT line in the San Fernando Valley, this study used GIS in order to create an index of neighborhood change.

To begin, Census and ACS data were downloaded from Social Explorer, a website which provides data from a number of surveys including both the Decennial Census and the American Community Survey. This website was used to account for the re-drawing of the census tracts that occurred in 2010. In order to make the data from before and after the re-drawing comparable, Social Explorer provides data that has been altered using the Longitudinal Tract Database (LTD), which was developed by Brown University's Dr. John Logan and his colleagues. Data downloaded from Social Explorer had already been converted to 2010 geographies using the LTD.

The index itself was created by aggregating the changes faced by each census tract. Four variables of change were examined: percentage of population that was White, percentage of population that had obtained a Bachelor's degree or higher, percentage of population that had an income above the 2010 poverty level, and percentage of homeowners (Table 1). These variables were selected because of their importance in existing literature.

TABLE 1 Index Variables and Weights

Index Variables, Change 1990/2000 -- 2010-2014	Weight
% white	1.0
% with Bachelor's Degree or higher	1.0
% homeowner	1.0
% above 2010 poverty level	1.0

Using ArcMap, Census and ACS data downloaded from Social Explorer were linked to a layer projecting the 2010 Los Angeles County census tracts. The change in percentage for each variable was calculated and then combined for the index. The four variables were each given the same weight. Because it combines changes in percentages, with a maximum possible change for each variable being 100% change, the index ranged from -4 to 4. Once the index was created, the indices of the study area was compared to those of the areas surrounding other Metro services and of Los Angeles County. Indices were calculated for changes that occurred between the 1990 Census and the 2010-2014 ACS and between the 2000 Census and the 2010-2014 ACS.

While the index allowed for these change in these areas to be quantified and compared, a threshold to deem an area "gentrified" was not created. Without a threshold the index cannot stand alone, and as such the indices of the study area, neighborhoods around Metro's other services, and the County were compared amongst themselves.

Interviews

In addition to the geospatial analysis that was performed using ArcGIS, interviews were conducted in order to give a more nuanced understanding of the findings of the geospatial analysis. A total of five semi-structured interviews were conducted with Silver Line riders. Interviewees were asked questions regarding their experience on the line and their observations about businesses and residents in their neighborhoods (Appendix A).

Interview participants were selected through convenience sampling. I asked Silver Line riders on the Line or waiting at Silver Line stops if they would be willing to share about their experiences on the line and in their neighborhood. Participants gave informed written consent prior to partaking in the interviews. Interviews then took place on the Line or at Silver Line stops and typically lasted 15 to 20 minutes.

Though I intended to record interviews for note-taking purposes, I found that the Line was too noisy to obtain a clear recording. Instead, I took detailed notes on information provided by participants.

Following the interviews, I coded the interview notes using Dedoose, a web application research tool. Most codes were created after interviews were completed, but before the coding process began. Additional codes were added as needed during the coded post.

Findings

Following the mixed methods approach detailed above to determine if changes have occurred in the neighborhoods proximate to the Silver Line and if so, to understand the nature of these changes, this section details the key findings of this study. The section is divided by method, with findings from the geospatial portion of this study presented first followed by findings from the interview portion of the study.

Preliminary Demographics

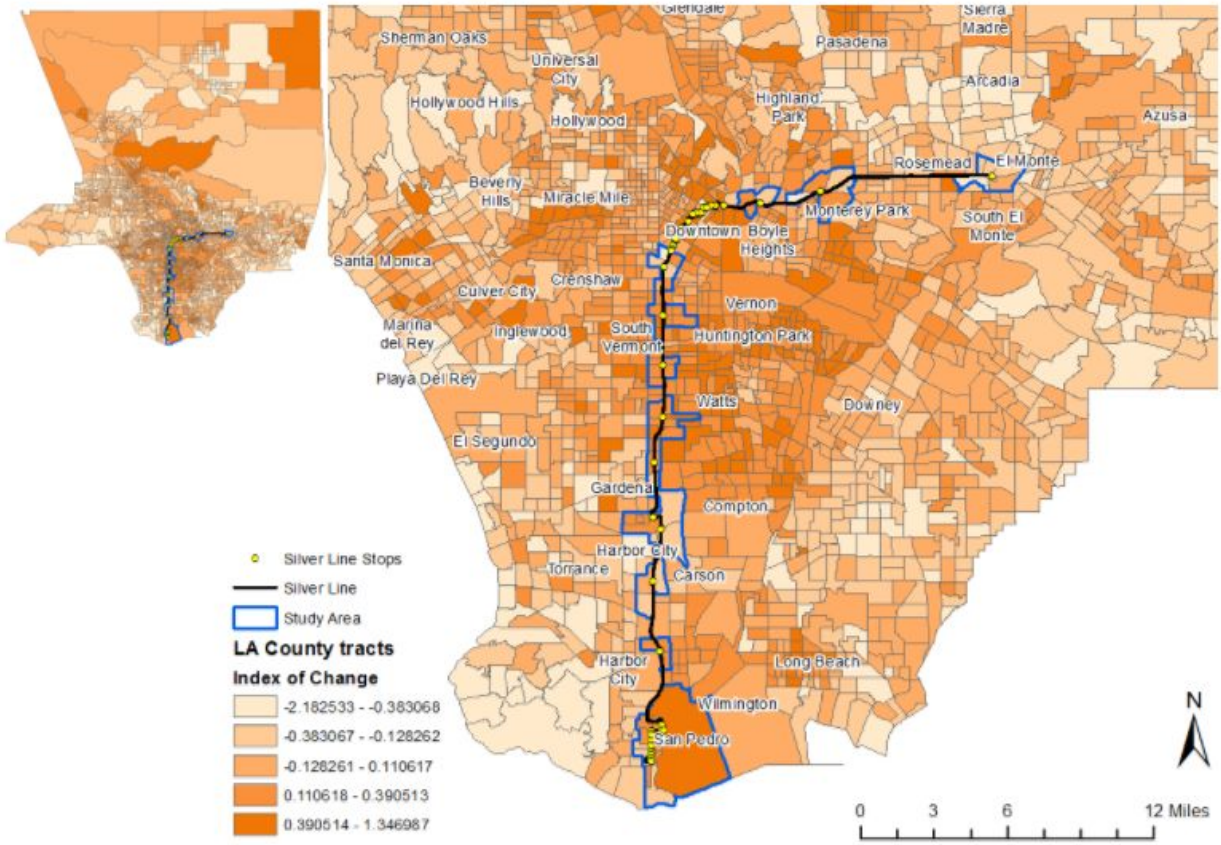
The study area, which includes census tracts within half a mile walking-distance from a Silver Line stop except for in the Downtown Los Angeles area, includes 64 census tracts with a total area of 35.72 square miles. According to data from the 2010-2014 ACS 5-year estimate, this area had a population of 265,767. From the same survey, the population of the study area during

2010-2014 was reported to be 50.92% female and 49.08% male. During this same reporting period the racial makeup of the study area was 39.6% white, 15.0% black, and 12.1% Asian.

Neighborhood Change Index

This study examines change over two periods of time: 1990 through 2014, and 2000 through 2014. During the initial period 1990-2014, the average index of change value was -0.0366 for Los Angeles County as a whole. This was lower than that of the study area, which had an average index of change of 0.0433 (Figure 3). Though the index cannot stand on its own, it serves to compare the amount of change that areas have undergone. The study area's higher average index value corresponds to greater increases in White percentage population, percentage of the population that has attained at least a Bachelor's degree, percentage of residents above the poverty level, and percentage of homeowners. An index of below zero is caused be a decrease rather than an increase in the aforementioned categories.

FIGURE 3 1990-2010/2014 Index of Change on Los Angeles County geographies



In comparison to census tracts that are within half a mile of Metro's other services, which has an average index of change of 0.0623, the study area has a slightly lower average index of change. This finding supports that neighborhoods more proximate to the Silver Line, excluding downtown, have experienced greater change than the county as a whole. Yet these Silver Line neighborhoods have experienced slightly less change when compared to neighborhoods around other Metro transit ways.

The areas within the defined study area that experienced the most change during this time were the South LA and San Pedro areas, with average indices of 0.250 and 0.051 respectively (Table 2). In contrast, El Monte experienced a decrease in these demographic groups and thus has a negative average index of -0.265. While these communities have negative index values, the absolute value of the average indices for these areas are still high. This means that these communities experience a large decrease in populations that are white, college-educated, homeowners, above poverty level.

This can also be visualized through Figure 3, in which South LA and San Pedro have darker shaded tracts, denoting a higher index value. By contrast, on the map El Monte and Monterey Park both have lightly shaded tracts meaning these communities had lower index values.

TABLE 2 Communities' Average Change Indices

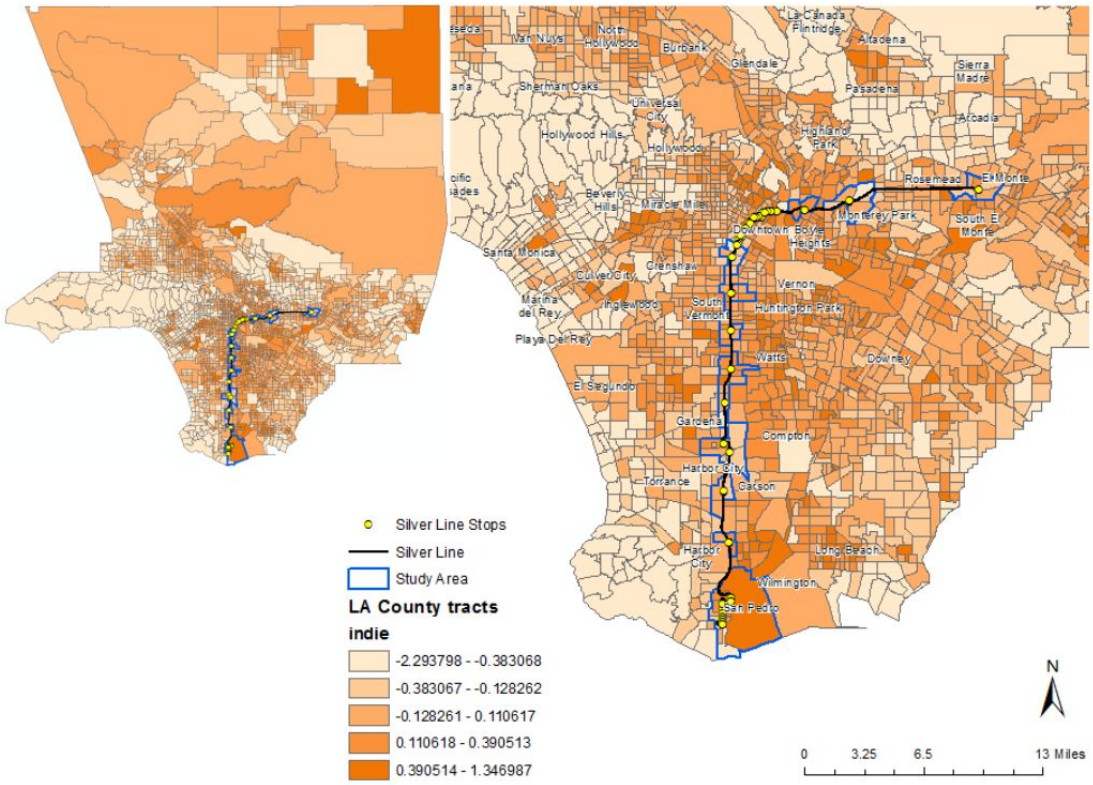
	1990 Average Index	**2000 Average Index**
El Monte	-0.265	0.007
Monterey Park	-0.139	-0.219
South LA	0.250	0.071
San Pedro	0.051	0.127

TABLE 3 2000-2010/2014 Percentage Change by Variable

	Study Area	Metro neighborhoods	LA County
White	24.7%	21.9%	14.7%
Bachelor's Degree	1.2%	4.0%	-12.6%
Above Poverty Level	12.6%	2.9%	-0.02%
Homeowner	14.5%	13.9%	2.5%

Outside of the study area, the darkest areas of the map are clustered in the center of the County, within the bounds of the City of Los Angeles. Areas with lighter shading include Rancho Palos Verdes, to the west of San Pedro, and Bel Air, 2 (Figure 3).

FIGURE 4 2000 - 2010/2014 Index of Change on Los Angeles County geographies



During the second period that was examine, change between the 2000 Census and the 2010-2014 ACS, results were similar. LA County has an average index of change of -0.115, while the index of change for the study area is 0.020 (Figure 4). In comparison, neighborhoods within half a mile of Metro's other services have an average index 0.022. Again this supports the notion that Metro's other service, which mostly consists of rail lines, experienced more change in the aforementioned population. Notably during this period El Monte experienced an influx of this population (Table 2).

This is also seen in Table 3, which lists the percentage change in the four variables in the study area, Metro neighborhoods, and LA County as a whole during the 2000-2014 period. This table shows that the study area had much higher percentage increases than the County in each of the four variables.

That over both observed periods Silver Line neighborhoods experienced a higher index of change than that of LA County as a whole is indicative of neighborhoods proximate to the Silver Line experiencing increases in white, middle-class residents that were greater than that of the County. However, Silver Line neighborhoods did not experience increases in this white, middle-class population as great as neighborhoods near Metro's other services.

Interviews

Data collected through interviews with Silver Line users yield mixed results. Many interviewees began their interviews by stating that they did not feel substantial change had occurred in their neighborhoods, but later went on to describe specific changes in housing, commercial developments, or financial aspects of their neighborhoods. Overall, the experiences

of these five Silver Line users support that changes have occurred these neighborhoods have occurred though these changes do not fit the criteria for gentrification.

Types of Change

The most commonly occuring code was "Positive", referring to interviewees' choices in words in describing how they felt about their neighborhood or the Silver Line. Every participant noted that the Silver Line was useful to them, usually for travelling to work. All five participants were interviewed while either on their way to work or while returning home from work, and many stated that they took the line twice a day, five times a week. However, the code, "positive" was primarily used to describe participants' experience on the Line.

Including its child codes, the code "Change" was the next most commonly occurring code. This is shown in Figure 3, which shows the incidence of each code per interview. The term "Change" was intentionally left general, as to avoid biasing interview participants.

TABLE 4 Interview Code Frequency

Code	**Frequency (# of appearances)**
Stability	11
Commercial Change	7
Housing Change	4
Financial Change	3
Safety/Security Change	1
Cultural Change	0
Environmental Change	0

The most frequently used Change code was "Commercial", for participants' descriptions of change were based in the addition of commercial development in their neighborhoods. Four of the five interviewees mentioned some sort commercial development at least once during their interview. When asked about development in their neighborhood, a Rosemead resident noted that

there were many restaurants and shops opening rather than offices. They felt that this was because the San Gabriel valley was known for its restaurants, while Downtown LA serves more as a job hub for the region. This was echoed by an El Monte resident, who also described restaurants as the main type of new business that they observed. Another El Monte resident explained that the new commercial developments that they had noticed were shopping centers, giving the example of a nearby mall that had the department store, Ross. This participant followed this statement by praising the development for bringing a new life to the neighborhood, which they stated was "dilapidated" before. One LA resident voiced a similar sentiment after explaining that there is a lot of construction occurring in their neighborhood. The LA resident felt happy with this construction and the incoming businesses, because many of the storefronts near them were previously unoccupied.

Though the majority of participants described an increase in commercial development, they did not seem to see any relation between the introduction of Silver Line and this development trend. One El Monte resident stated that they believe the driver of change in these situations is larger businesses that lease to smaller businesses. None of the interviewees vocalized any belief that the Silver Line was connected with commercial development.

Another commonly used Change code was the "Housing" code. Again this code was left general in order to allow for the free flow of responses from participants. In describing a change in the housing situation of their neighborhood, a San Pedro resident explained that when they had first moved to the neighborhood in 2005 their rent was $550/month for a one bedroom apartment, compared to now when the apartment goes for $1100/month. By contrast, an El Monte resident who originally had a difficult time bringing any new housing units in their

neighborhood to mind excitedly shared that there was a new apartment complex that was for seniors and low-income individuals being built near them. While these two instances are both changes related to the housing markets in their respective neighborhoods, these changes are very different from one another.

Notably, the Change child codes “Cultural”, “Environmental”, and “Social” were not applied in any of the interviews. Many interviewees stated that their was not any sort of community, cultural or otherwise, existing in their neighborhood. One participant stated that because of a language barrier, it was sometimes hard for those in their community to communicate with one another. Another interview participant described her neighbors as “very diverse”, and had been for as long as they had lived in the neighborhood. Because of this feeling of disconnectedness, participants may have felt that it would be difficult for to break up a cultural community in their neighborhood because such a community was not already in existence.

Additionally, with nearly as many code applications as the Change codes, the “Stability” code was heavily used. Interview participants often prefaced the changes that they described by stating that they believed their neighborhood had not changed very much. This code was most often applied when participants described their neighbors; participants stated the neighbors that they knew had not moved out of the neighborhood and that they had not noticed incoming neighbors, either.

The combination of the geospatial analysis with the qualitative data collected through interviews suggests that while demographic changes that occurred in Silver Line neighborhoods were greater than that of the County, they do not constitute as gentrification. While there was a

in flow of white, educated, middle-class residents greater than that of the County, interview data suggests that at a personal level this change was not felt. Changes in commercial development with a less than palpable effect on the make-up of these Silver Line neighborhoods.

Analysis

While neighborhoods near the Silver Line experienced greater demographic change all together relative to Los Angeles County, this change variable substantially among Silver Line neighborhoods. Some Silver Line neighborhoods experienced a decrease in white, upper to middle class homeowners during the same period that other neighborhoods in the study area experienced the opposite. This suggests that these changes were not brought on by the introduction, but instead by other external forces. However, at the same time the changes observed in these neighborhoods and their relation in time to the introduction to the Line should not be ignored.

Additionally, it is apparent that the neighborhoods near the Silver Line experienced less dramatic change relative to neighborhoods near Metro's other services. As discussed in previous sections, this reaffirms literature regarding transit and neighborhood change, which has been more conclusive in linking rail to neighborhood change than BRT to neighborhood change.

Recommendations

As mentioned previously, through Measure M funding Los Angeles County will see the introduction of a number of public transit lines in the coming years (Metro n.d.). Given the complex changes that this study has found through geospatial analysis and the exploration of personal experiences, it is necessary that both Metro and Los Angeles County Government plan for the introduction of this transit in ways that avoid subjecting residents to barriers to transit,

such as increased housing costs. The findings discussed above (Table 5) must be met with appropriate action in order to maintain the quality of life for current residents.

TABLE 5 Recommendations

Evidence	Finding	Recommendation
-Greater index of change in Silver Line neighborhoods than LA County -"A lot of people are moving out to the suburbs because the cost of living has gotten so high in LA. Like a lot of people are coming out to the Valley and even further out. So lots of people are moving outwards to avoid the overcrowding"	-In flow of white, educated, middle- and upper-class residents	-Protections for renters
-"When I first moved in one bedroom was $500 a month and now its $1100 a month"	-Increased housing costs	-Protections for renters
-"They're mostly stores and restaurants - like, I don't really see a lot of offices or corporations moving in - it's really just restaurants"	-Increased commercial development	-Community benefits agreements to introduce developments that are relevant to the needs of the community

Increased BRT Lite in Los Angeles County

Overwhelmingly, interviewees had positive sentiments towards the Silver Line. Residents found it to be reliable, time-effective, and much more enjoyable than the traffic that they would face if they drove. These positive sentiments towards the line, combined with its average index of change that was lower than that of Metro's other services make BRT lite a suitable option for Los Angeles County. Compared to Metro's other services including rail and full BRT, the Silver

Line had less impact on neighborhood stability, which is favorable in that it would serve existing members of the community as a primary constituent group rather than favoring tourists and incomers with more economic mobility.

Protections for Renters

Because this study has found through geospatial analysis and through personal accounts that neighborhoods near the Silver Line experienced an increase of white, educated, middle- and upper-class homeowners, paired with some Silver Line communities experiencing dramatic increases in the cost of housing, it is crucial that Los Angeles County protects renters of the neighborhoods in which it introduces BRT in the future. Though the City of Los Angeles has a Rent Stabilization Ordinance, a number of Silver Line communities fall outside of the boundaries of the City and Los Angeles County as a whole does not have such protections for renters (Los Angeles County Consumer and Business Affairs n.d.). Additionally, the Los Angeles Rent Stabilization Ordinance (LARSO) leaves many Angelenos unprotected by only covering buildings built before 1978 (Khouri 2017). Los Angeles County must protect those who already live in neighborhoods where transit is being introduced so that these residents will be able to access the transit that is being built for them.

Protections for renters could come in a number of forms. First, a more comprehensive rent stabilization ordinance for the City of Los Angeles or rent stabilization legislation at the county level could alleviate the burden of the cost of housing for renters by controlling how landlords increase rent. Second, there is not currently policy requiring just cause eviction (Khouri 2017), or an eviction because the tenant is at fault for causing damage or not paying

rent, rather than an eviction without reason. Policy requiring just cause evictions could protect renters near transit from being evicted for landlords to redevelop their units and increase rents.

Community Benefits Agreement

The combination of a lack of cultural or communal identity and a described influx of commercial development in the form of restaurants and shopping centers, calls for the use of Community Benefits Agreements (CBA). Pollack describes a CBA as "a project-specific, negotiated agreement between a developer and a broad community coalition that outlines the project's contributions to the community and ensures community support for the project"(Pollack 2010). Because residents associated the introduction of the Silver Line with increased development, it is important that these developments are aimed at meeting the needs of the community. Through the establishment of a CBA, community members could directly influence the types of resources or businesses established in their communities in order to fit their needs, rather than the development of commercial centers aimed at drawing in tourists. By utilizing a CBA, development projects could be aimed at building stronger relationships within the community.

Further Research

As discussed in previous sections, there is limited research both on the effects of rail and those of BRT. While the findings of this study suggest BRT lite as a viable alternative to rail transit systems because of BRT lite's reduced impact on surrounding neighborhoods, this is just one study. To best understand how BRT lite influences neighborhoods around them, it is necessary that this form of transit and its impact on surrounding neighborhoods is studied more.

Limitations

The greatest factors limiting this study were due to the sample design of the qualitative data. To begin, the study is limited by its small sample size. However, qualitative data was meant mainly to supplement the findings of the geospatial analysis. The sampling design was also limited by the sampling method. While it would be more wholistic for the study to include the perspectives not only of Silver Line riders, but also of general residents of neighborhoods near the Silver Line. This would ideally serve to balance any bias that Silver Line riders have towards the line. To reach residents of the study area I contacted neighborhood block groups in hopes of reaching their constituents. However I was unable to reach anyone willing to be interviewed through these neighborhood groups, so the perspective of non-rider residents is not accounted for.

Another limitation faced by this study was Census and ACS data. Though Census and ACS data can be compared across the 2010 redrawing of the tracts using the longitudinal tract database, reporting of Census and ACS data has changed in a way that makes some variables difficult to compare. In contemporary literature, household median income is used as measure of income however because this data was either not collected or not reported in 1990, this study uses poverty level as a variable to measure changes in income. This can be problematic in the poverty level does not detail how far below residents are beneath the poverty level, instead it lumps all families below the poverty level together.

Conclusion

By way of examining both demographic changes over time in Los Angeles and Silver Line riders' personal experiences, it is evident that neighborhoods surrounding the Silver Line

experienced an influx of White, middle to upper class residents following the introduction of the line. Yet, because these changes were varied along different parts of the Silver Line it is unclear the influence that the Line had in affecting these changes. Additionally at the ground level, residents of these neighborhoods did not notice dramatic changes in their neighbors, suggesting that this form of change cannot be categorized as gentrification, as this process includes a displacement of low-income residents, their replacement with middle to high income residents, and a palpable change in the character of the neighborhood itself. While a number of interviewees shared that they had noticed an increase in commercial development, which can be associated with gentrification, this does not negate their observations that neighbors did not move out or in. Instead, this change represents a demographic shift in some of the neighborhoods near the Silver Line. Because neighborhoods near the Silver Line remained stable relative to neighborhoods near Metro's other services, BRT lite is recommended for Metro and LA County to simultaneously serve its constituents' transit needs and avoid creating barriers to accessing transit for those who need it most.

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Appendix

Appendix A - Interview Questions

1. Where are you from?
2. Where do you currently live? How long have you lived there?
3. How do you get around?
    a. How do you feel about the Silver Line? Quality? Reliability?
    b. How often do you live the Silver Line?
4. What were some of your first impressions of the type of people who lived in the neighborhood when you first moved in?
5. What were some of your first impressions of the type of stores or services offered in the neighborhood when you first moved in?
6. Do you think that these impressions still ring true?
7. Has the neighborhood stayed the same since you began living here? Have neighbors moved out? New residents moved in?
    a. Do other members of your community share similar identities to yours? How has this changed in your time living here?
    b. Could you give an example of these changes?
    c. Describe what you mean
8. What changes have you noticed?
    a. If any changes, why do you think that these changes have occurred? What caused these changes?
    b. If any changes, would you call these changes "gentrification"?
9. Do you feel that there is a shared identity among you and your neighbors?
    a. What type of identity, cultural, class, etc?
    b. How does this play out in your interactions?