Property Values and the Los Angeles MTA Green Line

Ian Hicks
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Purpose Statement

This study is being conducted to determine if there is a relationship between residential property values (home value) and proximity to the Los Angeles County Metropolitan Transit Authority's Green Line Light Rail Transit (LRT). If it is determined that proximity to the Green Line stations has a positive effect on home values by raising them, then this would have implications into placement of future light rail and strengthen the claims that transit-oriented development (TOD) is successful in communities where it is implemented. If the opposite is found to be true, Green Line stations are found to have no effect or a negative effect on home values, then this too has policy implications, as well as begging further research into what other variable or variables may be causing the slide in home values.

Historical Context

The history of the MTA Green Line is intertwined with the history of seven cities, two un-incorporated communities in LA County, the defense and aerospace industries and a much-opposed freeway. The origins of the project date back to the 1960s when Caltrans developed a new Master Plan and proposed what would become the Interstate 105 freeway. The main purpose of this freeway construction would be to alleviate congestion on the Imperial Highway, Century, Firestone and Manchester Boulevards.[1] The construction was delayed for years for a number of reasons but the most prominent opponents were environmental groups and members of the African-American

[1] http://metroprimaryresources.info/20-years-ago-today-groundbreaking-for-the-fully-automated-metro-green-line-but-why-doesnt-it-go-to-lax/678/ accessed May 30, 2012

communities that resided in the path of construction. Eventually, strong advocacy for the freeway from policy makers won out and ground was broken on the project in the 1980s.

The 1972 Caltrans decree for the I-105 project included a transit corridor in the median, though the type of transit was not specified until almost a decade later. As the master plan was developed and construction had started in the 1980s, Metro Rail had designated it to be used as light rail. The Green Line, as it was to be called, would serve as a link between the bedroom communities of Norwalk and Redondo Beach to the cities where the aerospace and defense industries thrived as in Downy and El Segundo. Unfortunately (for the line at least), by the time the route had opened in 1995, the Cold War had ended and with it the funding and demand for both the aerospace and defense industries in the area.[2] As the jobs left so did the middle-class white and Black workers. They were replaced by working-class and poor Latino and Asian immigrants who did not have as much practical use for the line as it was originally intended. Another two factors that had a negative effect on ridership were the lack of direct connection to LAX and the fact that the eastern-most terminus stops just short of the Norwalk/Santa Fe Springs Metrolink Station which would have connected the line to the regional commuter rail system beyond just the MTA Blue Line connection at the Imperial/Wilmington Station (in Willowbrook). A connection to

[2] Adler, S. (1991) The Transformation of the Pacific Electric Railway: Bradford Snell, Roger Rabbit, and the Politics of Transportation in Los Angeles. *Urban Affairs Review, vol. 27 no. 1* 1991: 51-86

LAX was included in the original plan for the Green Line but this faced opposition from communities surrounding the airport and from parking lot operators at LAX, fearing that the free parking provided at Green Line stations would compete with their lots.

Current Cities and Areas Served by the Green Line

This section will serve as a brief overview of the seven cities and two un-incorporated communities that the MTA Green Line serves, detailed demographic information about the study area will be provided in the next section. The cities on the route are (Station names in parenthesis):

- Redondo Beach (Redondo Beach),
- El Segundo (Douglas, El Segundo, Mariposa, Aviation/LAX),
- Hawthorne (Hawthorne/Lennox, Crenshaw),
- Athens ((un-incorporated) Vermont/Athens),
- South Los Angeles (Harbor Freeway, Avalon),
- Willowbrook ((un-incorporated) Imperial/Wilmington)(MTA Blue Line transfer)
- Lynwood (Long Beach)
- Downey (Lakewood)
- Norwalk (Norwalk)

Redondo Beach is a small beach city with a population of 66,748 (2010). Tourists and LA County residents are drawn to the city for the beach recreation possibilities and to the shopping and dining in the revitalized downtown area.

Redondo Beach's laid back and safe, neighborhood feel have caused it to retain some of the highest real estate prices in LA County.[3]

El Segundo is an even smaller city with a population of 16,654 (2010). El Segundo is directly adjacent to LAX and as a result is home to many large aerospace companies and the Los Angeles Air Force Base and Space and Missile Systems Center.[4]

Hawthorne's population is 84,293. SpaceX, one of the leading private space exploration firms in the US is headquartered in Hawthorne.[5]

Athens is a small un-incorporated community east of Hawthorne.[6]

South Los Angeles is a historically rough part of the city. It was the site of a lot of racial tensions between Whites and Blacks through the 50s and 60s and suffered middle-class suburban flight exacerbated by the Watts riots. It was plagued with gang violence and urban blight through the 80s and 90s, but in recent years has seen a drop in crime.[7]

Willowbrook is another un-incorporated part of the county, which was originally semi-rural with large lots and low population density. Development after the 1980s filled in these spaces and it now resembles its surrounding cities.[8]

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[3] www.**redondo**.org accessed May 30,2012
[4] www.**elsegundo**.org/ accessed May 30, 2012
[5] www.**cityofhawthorne**.com/ accessed May 30, 2012
[6] www.wikipedia.org/wiki/Athens,_California accessed May 30, 2012
[7] Sides, J. (2006). *LA City Limits*. University of California Press
[8] http://en.wikipedia.org/wiki/Willowbrook,_California accessed May 30, 2012

Lynwood is a majority Latino city with a population of 69,772 (2010)[9]

Downey is a city of 111,772 (2010) making it the largest city on the Green Line route (excluding LA). It historically was a center of aerospace and space design technology, touting itself as the birthplace of the Apollo Space Program. The main aerospace and defense industry in the city has drastically downsized since the early 90s but the healthcare industry and proximity to job centers in the region have helped it to retain its middle-class population.[10]

Norwalk is a suburban residential city of 105,549 (2010). It is a largely Latino community and serves as a regional transportation hub with its connections to the Green Line and to MetroLink.[11]

Study Area Maps and Demographics

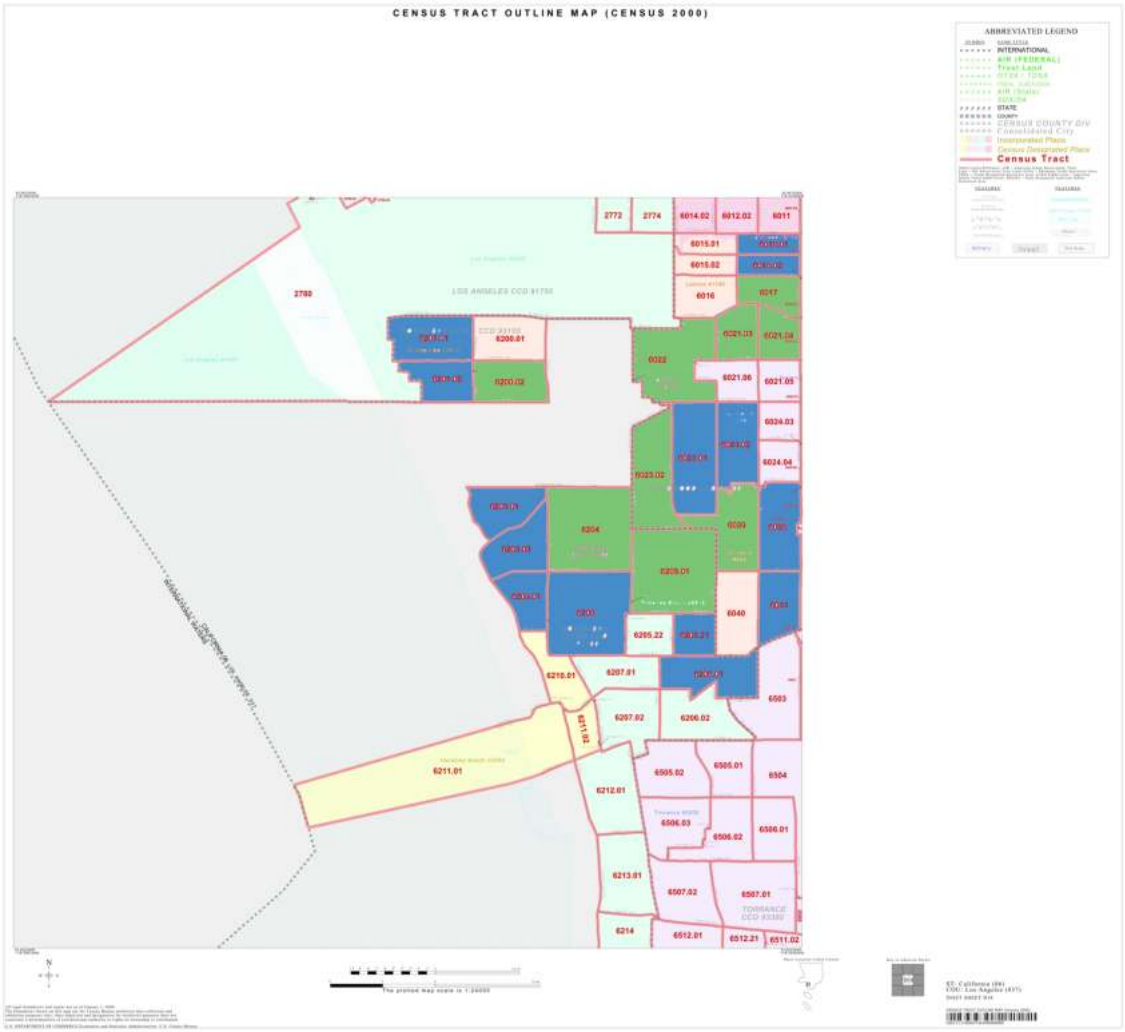
In order to determine what effect the Green Line had on home values, two separate groups of 30 tracts each from the 2010 US Census were selected: A Treatment "Station" group, where a Green Line station was located directly in a particular census tract, and a Control "Adjacent" Group, which consists of tracts near the Green Line but not directly touching it or any stations. Below are maps from the US Census indicating the tracts included in the study, the tracts colored in green indicate they are in the "Station" group, tracts colored in blue indicate

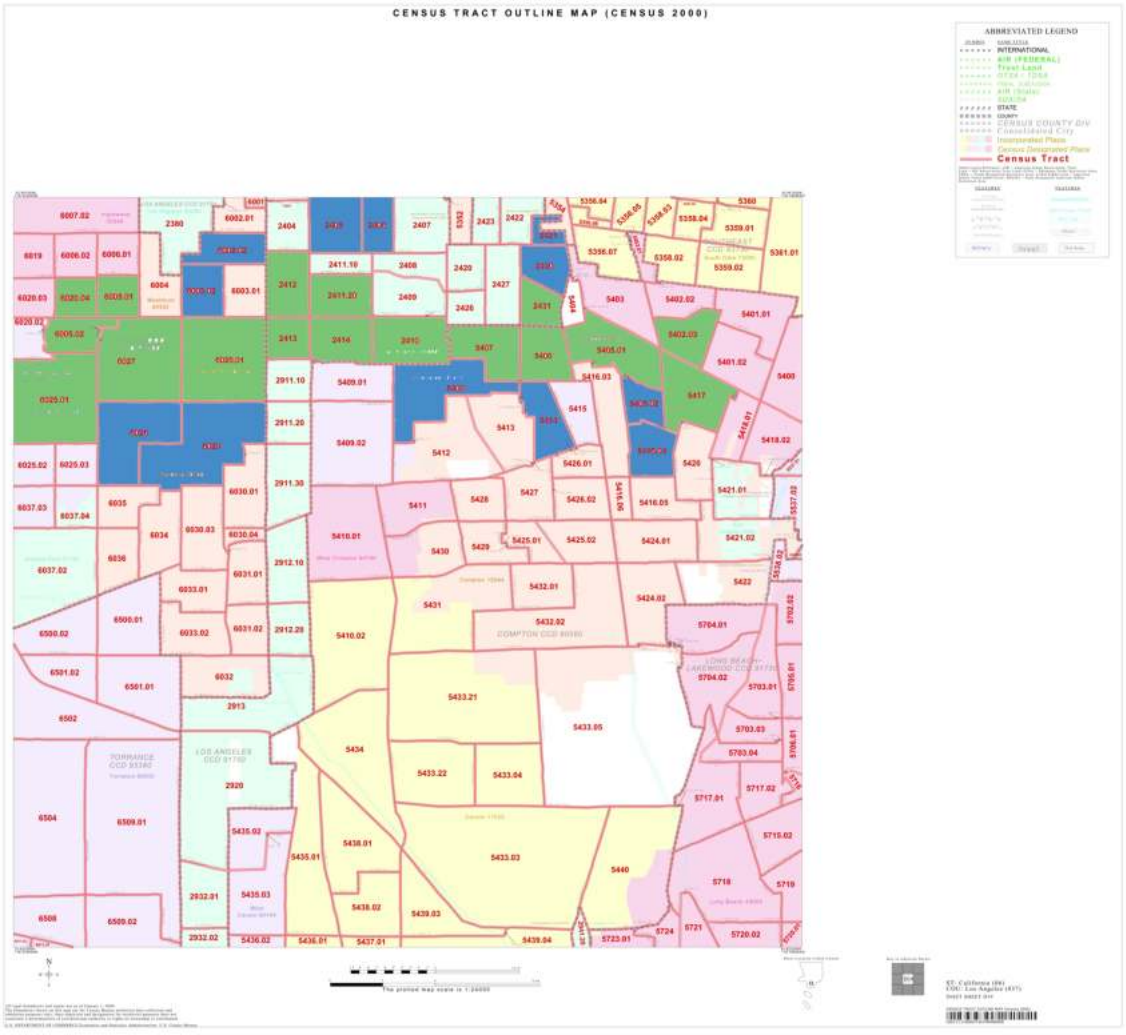
[9] www.**lynwood**.ca.us/ accessed May 30, 2012

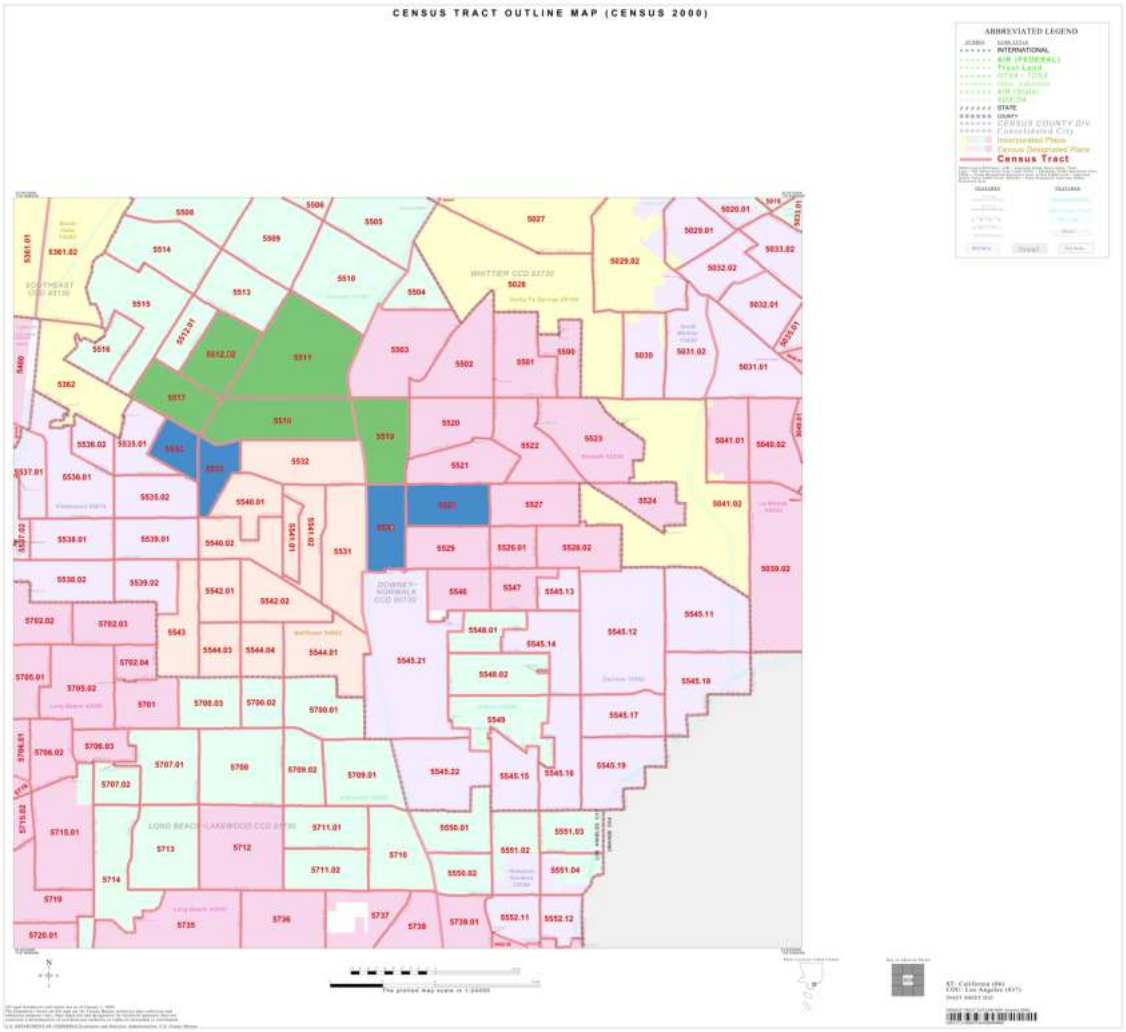
[10] www.**downeyca**.org/ accessed May 30, 2012

[11] www.ci.**norwalk**.**ca**.us accessed May 30, 2012

they are in the “Adjacent” group. There is also an image pulled from Google Earth indicating the MTA Green Line route.




CENSUS TRACT OUTLINE MAP (CENSUS 2000)
ABBREVIATED LEGEND
INTERNATIONAL
STATE
COUNTY
Census Tract
6007.02
6001
6002.01
2404
2407
5332
2423
2422
5356.04
5360
5359.01
6019
6006.02
6000.01
2380
2411.10
2408
2420
2427
5356.07
5358.02
5359.02
5361.01
6004
6003.01
2412
2411.20
2400
2426
2431
5403
5402.02
5401.01
6020.03
6020.04
6008.01
6020.02
6005.02
2413
2414
2410
2407
2400
5405.01
5402.03
5401.02
6027
6026.01
2911.10
5409.01
5416.03
5400
6025.01
5417
5415
5414
5418.01
5418.02
2911.20
5409.02
5413
5412
5426.01
5420
6025.02
6025.03
2911.30
6030.01
5411
5428
5427
5426.02
5416.05
5421.01
5337.02
6037.03
6037.04
6035
6034
6030.03
6030.04
5410.01
5430
5429
5425.01
5425.02
5424.01
5421.02
6037.02
6036
2912.10
6031.01
5432.01
5422
5338.02
6033.01
5431
5424.02
6500.02
6500.01
6033.02
6031.02
2912.28
5410.02
5432.02
5704.01
5702.02
6501.02
6501.01
6032
2913
5433.21
5704.02
5703.01
5705.01
6502
5433.05
5703.03
5703.04
5434
5433.22
5433.04
6504
6509.01
2920
5435.02
5435.01
5438.01
5433.03
5717.01
5717.02
5715.02
5440
5718
5719
6508
6509.02
2932.01
5435.03
5438.02
5439.03
2932.02
5436.02
5436.01
5437.01
5439.04
5723.01
5724
5721
5720.02
The printed map scale is 1:24000.
ST: California (06)
CDU: Los Angeles (037)



Demographic information

All demographic information was retrieved from the US Census website, using the ACS 2010 5-year data set. For the 30 tracts that make up the "Station" Group the total population is 146604, 69450 male and 77154 female. The racial and ethnic breakdown is as follows: 61945 White (42%), 30303 Black (21%), 407

Native American (>1%), 6886 Asian (5%), 427 Pacific Islander (>1%), 42286 Some Other Race (29%), 4350 Two or More Races (3%), 84175 (57%) reported Hispanic ethnicity. Density was calculated by adding up the square mileage of all of the census tracts in the "Station" Group and dividing the total population by the total square miles. The total square miles for this group is 18.67 mi^2, so if we divide the totally population 144604/18.67 we find that there are 7852 persons per mi^2 for the "Station" Group. The Median age for this group is 30.25 years old, 44600 are age 1 to 17, 90427 ages 18 to 64 and 11577 65 and older. Median income is $45,563 per year. There are a total of 45,140 households, 50.2% with four or more occupants, 24.3% with three, 12.5% with two and 12.9% with one. The median number of rooms in a household in the "Station" Group is 4.8. Graphs with demographic information can be found in appendix B.

For the 30 tracts that make up the "Adjacent" Group the total population is 154252, 76617 male and 77635. The racial and ethnic breakdown is as follows: 79868 White (51%), 28689 Black (18.5%), 513 Native American (>1%), 7727 Asian (5%), 209 Pacific Islander (>1%), 32724 Some Other Race (21%), 4522 Two or More Races (3%), 75284 (49%) reported Hispanic ethnicity. Density was calculated by adding up the square mileage of all of the census tracts in the "Adjacent" Group and dividing the total population by the total square miles. The total square miles for this group is 14.87 mi^2, so if we divide the totally population 154252/14.87 we find that there are 10373 persons per mi^2 for the "Adjacent" Group, significantly more dense than the "Station" group, this is most likely due to

the “Station” groups proximity to the I-105 freeway. The Median age for this group is 31.2 years old, 47581 are age 1 to 17, 93741 are age 18 to 64 and 12930 are 65 and older. Median income is $50,464 per year. There are a total of 46,711 households, 62.9% with four or more occupants, 9.8% with three, 16.7% with two and 10.6% with one. The median number of rooms in a household in the “Adjacent” Group is 4.75. Graphs with demographic information can be found in appendix B.

Problem Statement/ Introduction

While many planning, architecture and general publications claim that public transportation infrastructure enhances city life and improves property values[12]; scholarly research has generally been pretty mixed. It can be agreed that the creation of the MTA Green Line has helped alleviated traffic congestion along the I-105 corridor, but this study aims to determine what, if any, effects the light rail line’s placement has had on the residential property values in the areas surrounding the line and the station. It is hoped that insights gained through this study would be able to guide future rail placement and find what variables determine success or failure of LRT implementation. It is also hoped that insight gained through this study could be utilized to settle arguments between those opposed to rail expansion and those who favor and advocate it.

[12] Spivak, Jefferey. (2012) What’s Next For Rail? *Planning, Vol. 78 (No. 5)*: 18-24

Literature Review

There is a wide body of research into the subject of public transport and property values and it seems that each case examined leads to a different result. Since this study is using Los Angeles as a case, it seems appropriate enough to being the review with a previous study done in the Los Angeles area. In the 2002 report prepared by Cervero and Duncan, they found mixed results in their examination of Los Angeles property values with respect to their proximity to transit stations[13]. When they examined the MTA Red Line subway, they found that multi-family housing units near the stations did, in fact see an uptick in value over the properties that were further out. However when examining Bus Rapid Transit (BRT) stops, they saw that although commercial properties seemed to benefit from the proximity to BRT, residential values were actually less[14]. The fact that so many of LA County's transit stops lie in redevelopment areas was one explanation of their findings that they offered.

The same team (Cervero et al) did a companion study in San Diego County the same year. In the San Diego study, they found that generally station location had a positive effect on property values, with greater values added in certain parts of the city. Generally properties in commuter line station areas saw the biggest increase[15]. Interestingly, they did not find the same degree of boost

[13] Cervero, R. Duncan M. (2002). Land Value Impacts of Rail Transit Services in Los Angeles County. *National Association of Realtors Urban Land Institute* June 2002
[14] IBID
[15] Cervero, R. Duncan M. (2002). Land Value Impacts of Rail Transit Services in San Diego County. *National Association of Realtors Urban Land Institute* June 2002

in value for commercial properties in San Diego and they did in Los Angeles.[16] Perhaps Los Angeles' reliance on freeways can be of partial blame in this situation. In a 2006 study Debrezion et al found that station impacts on property values were muted by the presences of a freeway or highway.[17]

Another study that showed mixed results of LRT implementation was suggested by the 1999 study conducted in Portland, OR by Dueker et al. They examined light rail's effect on property values, transit use and growth of two-plus car households. Generally, they found LRT's effect to be positive on all accounts especially when compared to bus routes, but they note that there could be a degree of self-selection of people relocating to LRT rather than habits being changed.[18] Contrast this with a 1995 study in which McDonald et al found that even a planned transit route in Chicago caused a significant increase in both retail and residential properties.[19]

Since the Green Line passes through some areas in Los Angeles county that are notorious examples of urban blight and decay, insight could be gained from examining areas that have transit but unlike Southern California as a whole,

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[16] IBID

[17] Debrezion, G. Pels, E. Rietveld, P. (2007) The Impact of Railway Stations on Residential and Commercial Property Value: A Meta-analysis. *Journal of Real Estate Finance and Economics* (2007) 35:161–180

[18] Dueker, K. J. Bianco, M. J. (1999) Light-Rail-Transit Impacts in Portland: The First Ten Years. *Journal of the Transportation Research Board, Vol 1685* 1999

[19] McDonald, J.F. Osuji, C.I. The effect of anticipated transportation improvement on residential land values, *Regional Science and Urban Economics* vol 25 1995: 261-278

are not experiencing a population gain. In a study of the effects of LRT in Buffalo, NY, Hess et al found that external factors such as number of bathrooms, size of parcel and location within the city had a greater prediction factor over property values than proximity to light rail stations.[20] What's more is they found that in areas where income was high, the stations had a positive effect on property values where as in low-income areas, there was a negative effect on property values[21]. This led to the variables of median income, proximity within the county and poverty to be included in this study. Results from Haider et al's 2000 study echo these findings, stating that number of washrooms and income were a better predictor of median home value.[22]

In Joshi et al's 2006 study, they found that heavy rail and LTR transit systems with high ridership numbers would indicate that properties close to the stations would see an increase in value. They did note that this was most true in multi-family units and that they that if properties were too close to the stations they actually saw a decrease in value. This was thought to be due to noise and traffic from the rail line.[23]

Another case for the positive effects of LRT on property values was put forth in Knaap's 2001 study. He found that in cases of new development in

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[20] Hess, D. B. Almedia, T. M. (2007) Impact of Proximity to Light Rail Rapid Transit on Station-area Property Values in Buffalo, New York. *Urban Studies, Vol 44, No. 5/6 1041-1068*. May 2007

[21] IBID

[22] Haider, M. Miller, E. (2000) Effects of Transportation Infrastructure and Location on Residential Real Estate values: Application of Spatial Autoregressive Techniques. *Transportation Research Board.* Issue 1722, 2000: 1-8

[23] Joshi, H. Guhathakurta, S. Konjevod, G. Crittenden, J. Li, K. (2006) Simulating the Effect of Light Rail on Urban Growth in Phoenix: An Application of the UrbanSim Modeling Environment. *Journal of Urban Technology, Vol 13, No. 2* 2006: 1-21

Washington County, OR, LRT encouraged the areas to be built at high densities and increased both residential and commercial property values.[24] In a

LRT implementation's mixed effect comes from its doubled edged nature to increase retail opportunities but also increase crime.[25] Bowes et al found that residential properties within a quarter mile of a station were found to sell for 19% less than properties three miles from a station.[26] Cost of travel is another variable explored that can effect choice of public transportation over private automobile.[27]

Some of the areas around the Green Line, particularly South Los Angeles, have had past reputations for gang violence and other crime, the decision to include poverty as an independent variable in this study came from the link between crime and poverty established in Becker's 1968 work[28], further expanded upon by Zhao et al[29].

Ryan presented an interesting case in a 1999 article, after reviewing literature and conducting her own research she finds that a property's value with regard to proximity to station will yield mixed results, a better, more predictable measure of property value comes when travel distance to work on public transit

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[24] Knaap, G. (2001) Do Plans Matter? The Effects of Light Rail Plans on Land Values in Station Areas. *Journal of Planning Education and Research, Vol 21, no 1* 2001: 32-39
[25] Bowes, D. Inlanfeldt, K.(2001) Identifying the Impacts of Rail Transit Stations on Residential Property Values. *Journal of Urban Economics, Vol 50* 2001: 1-25
[26] IBID
[27] Koutsopouls, K. C. (1977) Impact of Mass Transit on Residential Property-Values. Annals of the Association of American Geographers, Vol 67 no 4: 564-576
[28] Becker, G. S. (1968) Crime and Punishment: An Economic Approach. *Journal of Political Economy*Vol. 76, No. 2 1968: 169-217
[29] Zhao, H. Feng, Z. Castillo-Chavez, C. The Dynamics of Poverty and Crime. *Mathematical and Theoretical Biology Institute*, article MTBI-02-08M, 2005

is taken into account. Her research suggests that a shorter travel time will result in a higher property value and a longer travel time, a lower value.[30] Ryan's research led to the inclusion of travel time to work and means of transit to be examined as independent variables in this study.

From reviewing the literature it can be seen that LRT implementation definitely yields mixed results. A factor that has dulled results of transit projects in the past is general, national economic recession[31] and hardship, which is something LA is currently experiencing. The MTA Green Line is a unique case in that it was built in an existing urban area and serves a wide range of demographic and economic communities. In all of the cases it seems that externalities beyond LRT itself plays a major role in the effect on property values, variables included in this study are outlined in the next section.

Introduction of Variables

This section will present and define the dependent variable and independent variables that were used to conduct research in this study. All variables were collected from the US Census 2010 ACS 5-year data set. Location variables are determined from the US Census Tract maps. All data was examined on the tract level.

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[30] Ryan, S. (1999) Property Values and Transportation Facilities: Finding the Transportation-Land Use Connection. *Journal of Planning Literature* 1999 13: 412

[31] Cervero, R. (1985) A tale of Two Cities: Light Rail Transit in Canada. Journal of Transportation Engineering Vol. 111, No. 6 1985: 633-650

Dependent Variable

Median Home Value - Value is the respondent's estimate of how much the property (house and lot, mobile home and lot, or condominium unit) would sell for if it were for sale.

Independent Variables

Location – Whether a tract falls into the “Station” Group or “Adjacent” Group

Median Income – The median income divides the income distribution into two equal groups, one having incomes above the median, and other having incomes below the median.

Density – Total population of a tract divided by the total land area of a tract in square miles. Results in persons per mi^2.

Household Type - Households are classified by type according to the sex of the householder and the presence of relatives. Examples include: married-couple family; male householder, no wife present; female householder, no husband present; spouse (husband/wife); child; and other relatives.

Median Number of Rooms – The number of bedrooms is the count of rooms designed to be used as bedrooms, that is, the number of rooms that would be listed as bedrooms if the house, apartment, or mobile home were on the market for sale or for rent.

Travel Time to Work - Travel time to work refers to the total number of minutes that it usually took the worker to get from home to work during the reference

week. The elapsed time includes time spent waiting for public transportation, picking up passengers in carpools, and time spent in other activities related to getting to work.

Poverty - The Census Bureau uses a set of dollar value thresholds that vary by family size and composition to determine who is in poverty. Further, poverty thresholds for people living alone or with nonrelatives (unrelated individuals) vary by age (under 65 years or 65 years and older). The poverty thresholds for two-person families also vary by the age of the householder. If a family's total income is less than the dollar value of the appropriate threshold, then that family and every individual in it are considered to be in poverty. Similarly, if an unrelated individual's total income is less than the appropriate threshold, then that individual is considered to be in poverty.

Means of Transit to Work - Means of transportation to work refers to the principal mode of travel or type of conveyance that the worker usually used to get from home to work during the reference week

Methods of Statistical Analysis

The methods of analysis used for this study were: T-test, linear regression and ANOVA.

Analysis

The first test run was a T-Test among the "Station" and "Adjacent" group's median home values. The result was .329, which is far above the .05 cut-off for

the two-tail t-test; the raw comparison seems to indicate that the introduction of the Green Line had no effect so the H_a was rejected. Median income between the two groups was also analyzed with a t-test, the result being .15, which is above the cut off for rejecting the H_0. It does not seem that proximity to the Green Line has any effect on income either. Regression tests were run on both groups with Median Home Value on the y-axis and Median Income on the x-axis:

"Station" Group	r^2 value: .13278
"Adjacent" Group	r^2 value: .43148

Both groups showed that median home value tracks income in a positive relationship. Note that the relationship was stronger in the "Adjacent" group; the reasons for this stronger relationship are unclear.

As was suggested in some of the studies from the lit review, the tracts were divided into 2 groups based on their east-west location using the Vermont/Athens stop on the Green Line as the mid point. When median home values in the "Station" group were split by east west, the t-test results were significant at .0101 indicating that home west of the Vermont/Athens stop had a higher value. The same trend was observed in the "Adjacent" group with an even stronger effect. The value of .00047 was observed for the "Adjacent" group. The test was run again with two outliers from the west group, tracts 6203.1 and 6203.2 taken out, as they both are beachfront tracts in El Segundo and reported median home values of $1,000,000+. This resulted in a value of .0018, still enough to reject the H_0 and infer that location of west vs. east will

result in a higher or lower home value. The means, medians and t-test results of these four groups are presented in the table below:

	Mean	Median	T-Test
"Station" group west	$538,993	$445,000	
"Station" group east	$381,006	$382,900	.01013672
"Adjacent" group west	$611,482	$486,400	
"Adjacent" group east	$353,850	$344,600	.00047929

The next variable that was analyzed was the poverty variable. This was done using linear regression with number of people below poverty per tract on the x-axis and median home value per tract on the y-axis. The r^2 results are in the table below:

"Station" Group	r^2 value: -.2548
"Adjacent" Group	r^2 value: -.32508

It should be noted that both have a negative slope, meaning that as median home value decreased, the number of people below the poverty level increased. Interestingly, It was a stronger correlation in the "Adjacent" group. This could be due to an overall larger population over the "Station" group.

The next variable analyzed was travel time to work. In both the "Station" and "Adjacent" groups, between 30-34 minutes was the most frequently reported commute time (about 17% for both). Linear regression against the dependent variable (Median Home Value) was run on both with the following results:

“Station” Group	r^2 value: .00022
“Adjacent” Group	r^2 value: -.14108

Interestingly, the “Station” group was flat on this, there was very little correlation between the amounts of people reporting a 30-34 minute commute. In the “Adjacent” group, there was a 14% correlation in a negative slope, indicating that as more people reported a 30-34 minute commute time, their home values were lower.

After running regression, both groups showed a positive correlation between median home value and number of rooms, but again, the “Adjacent” group had a stronger correlation at r^2=.2068, while the “Station” Group had r^2=.18922. The values are so close though that it may not be considered a significant difference.

For the density variable, first a t-test was run between the reported densities of the two groups with a result of .0158, indicating there is a significant difference between the two groups. This could be explained by the presence of the I-105, which takes up more area in the “Station” Tracts. When regression was run on the two groups, it was found that both have an inverse relationship, meaning as density increases home values decrease. The r^2 value for the “Station” group was .14922 and for the “Adjacent” group, r^2=.08819.

The household type variable was split into family and non-family households. since the overwhelming majority of households in both groups were family households, number of family households per tract was chosen to analyze

as the independent against the median home value dependent variable. A regression analysis gave the following results:

"Station" Group	r^2 value: .00924
"Adjacent" Group	r^2 value: -.05323

The "Station" Group had a weak positive correlation and the "Adjacent" a stronger negative correlation.

Since Ryan's (1999) article suggested that a better judge of property value next to stations was travel time, ANOVA was run on the 30-34 minute travel time variable to see if a relationship existed within each set. For both groups, the median home values were sorted by the high to low 30-34 minute travel. The 30-34 minute variables were broken into "tri-tiles" (thirds) ranging from low persons reporting 30-34 minute travel time, medium amount of persons reporting 30-34 minute travel time and high amounts reporting 30-34 minutes travel time. The median home values were split among the groups and an ANOVA test was run on the Station and "Adjacent" groups. Results are below:

"Station" Group:

Low	Mean: 451180
Mid	Mean: 460380
High	Mean: 452640
P-Value	.99

"Adjacent" Group:

Low	Mean: 619,680
Mid	Mean: 666,400
High	Mean: 418,890
P-Value	.14267

In both groups, the P-value was too high to reject the H_0 indicating that this travel time of 30-34 minutes had no correlation to median home value.

Conclusions/ Policy Recommendations

This study has found negligible correlation between median home value and proximity to the MTA Green Line. Based on the results of t-test and linear regression analysis, a stronger predictor of median home value is median income per tract and location of the tract on either the west or east side of the Vermont/Athens stop (west reporting statistically significant higher values). Poverty was also a strong negative indicator of a lower home value. Most surprise was that travel time to work seemed to have little correlation to work even though previous studies have suggested it would be a better predictor than proximity to a station. More research will need to be done to understand what factors effect the median home values on the green line, perhaps future studies could include racial and ethnic make up or educational attainment.

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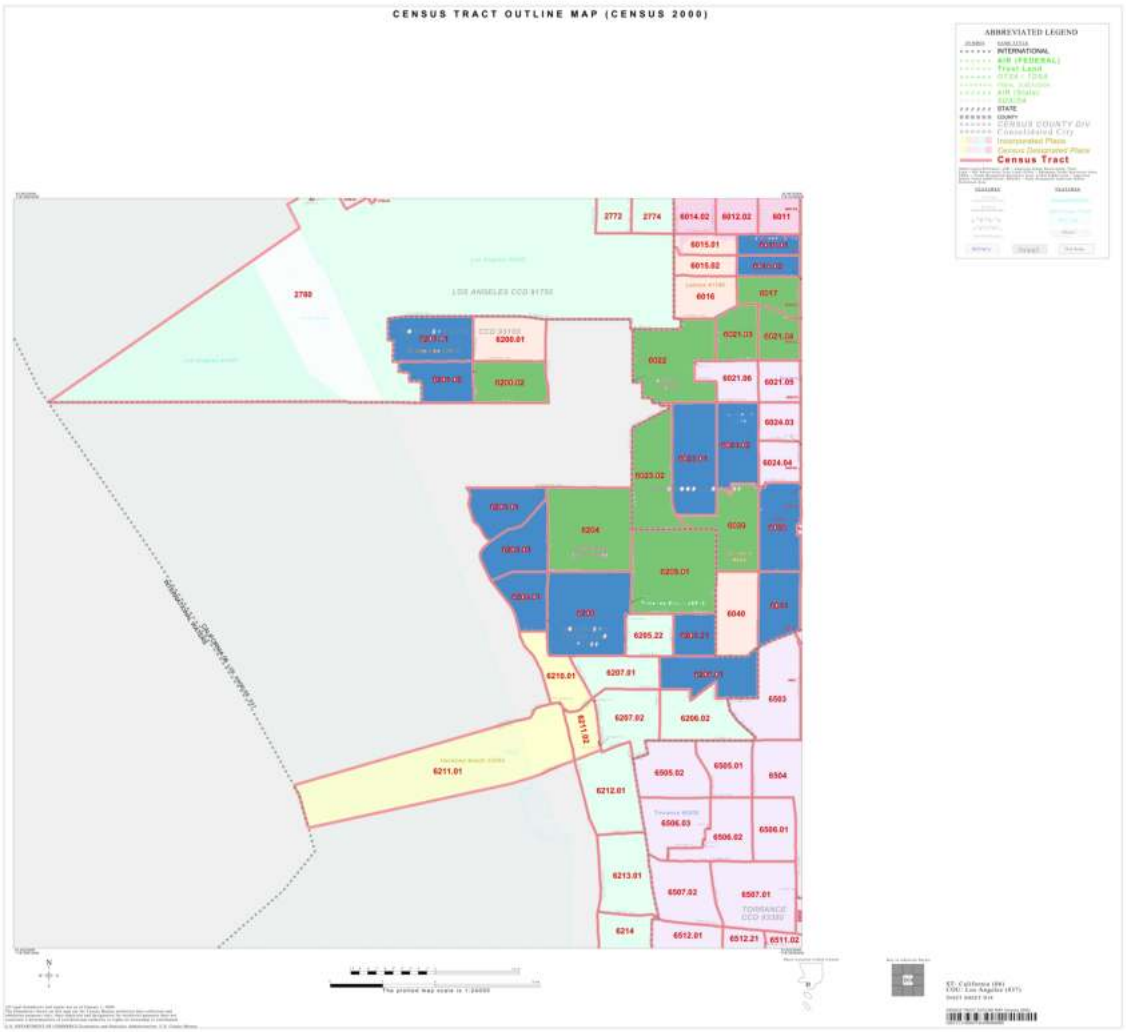
Appendix A- Maps


CENSUS TRACT OUTLINE MAP (CENSUS 2000)
ABBREVIATED LEGEND
INTERNATIONAL
STATE
COUNTY
Census Tract
2780
2772
2774
6014.02
6012.02
6011
6015.01
6015.02
6016
6017
6200.01
6200.02
6022
6021.03
6021.04
6021.06
6021.05
6024.03
6024.04
6023.02
6204
6039
6205.01
6040
6205.22
6210.01
6207.01
6207.02
6206.02
6503
6211.01
6212.01
6505.02
6505.01
6504
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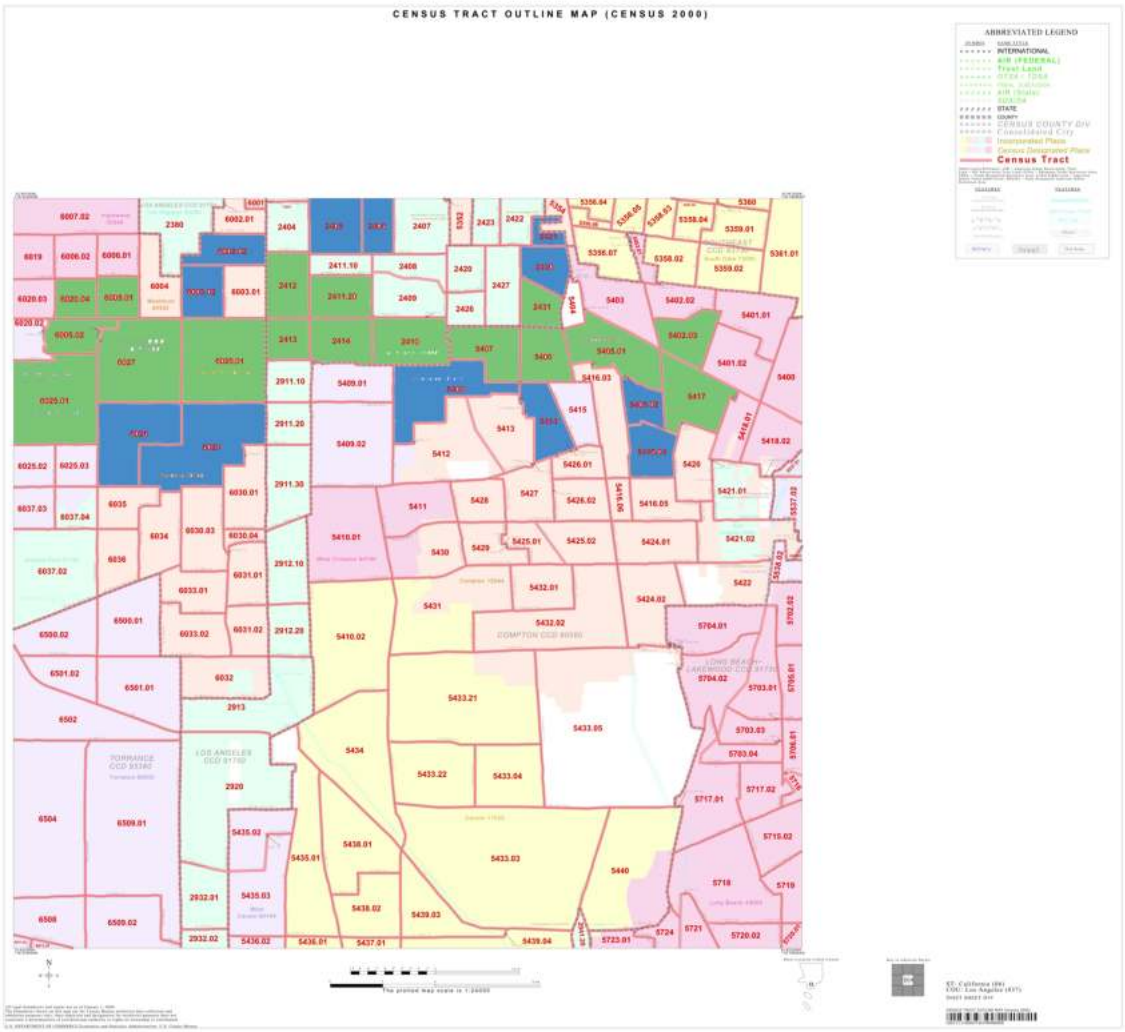
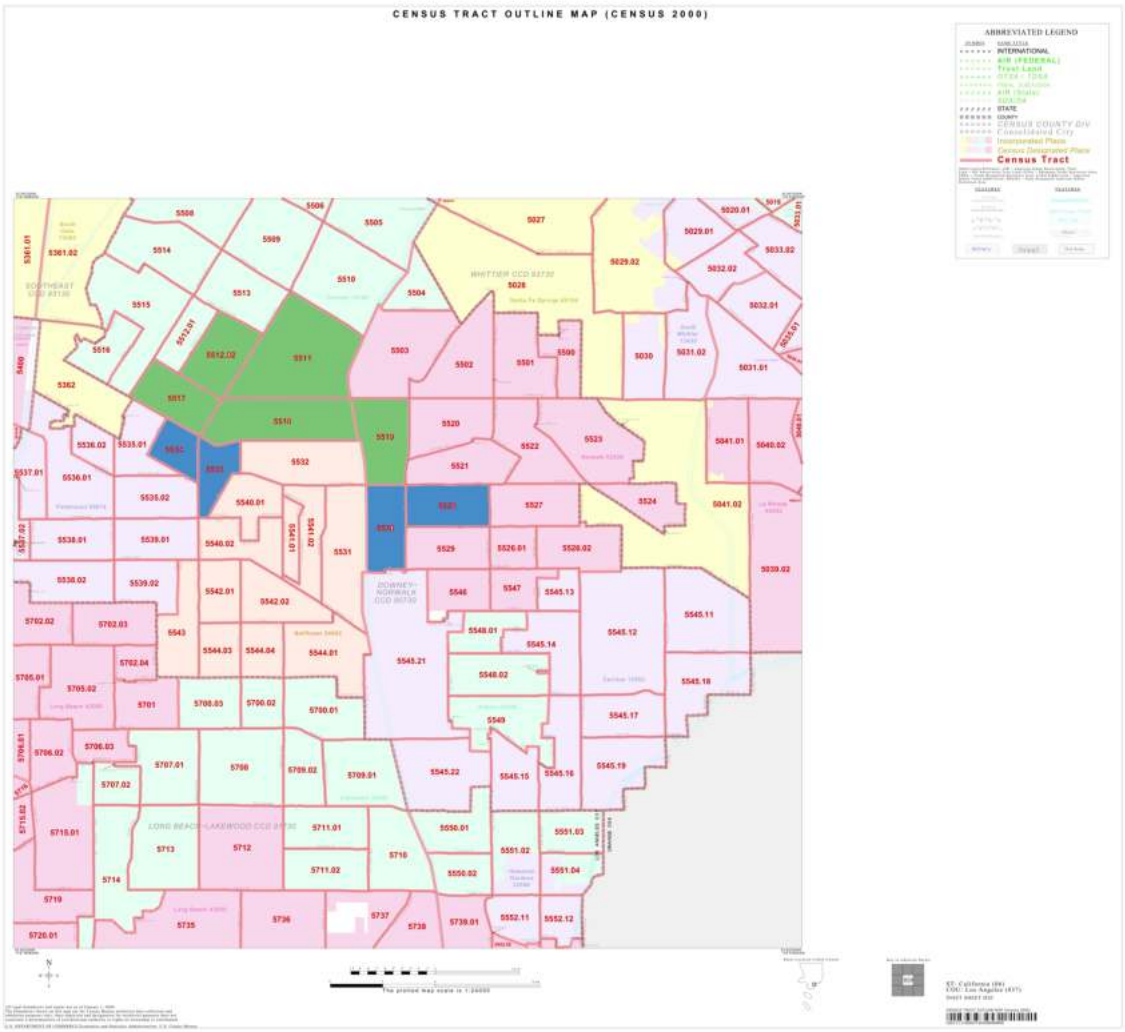
6507.01
6214
6512.01
6512.21
6511.02


CENSUS TRACT OUTLINE MAP (CENSUS 2000)
ABBREVIATED LEGEND
INTERNATIONAL
STATE
COUNTY
Census Tract


CENSUS TRACT OUTLINE MAP (CENSUS 2000)
ABBREVIATED LEGEND
INTERNATIONAL
STATE
COUNTY
Census Tract
5556
5506
5505
5027
5020.01
5029.01
5033.02
5361.01
5361.02
5514
5509
5510
5028
5029.02
5032.02
5513
5504
5032.01
5515
5512.01
5512.02
5511
5503
5502
5501
5590
5030
5031.02
5031.01
5516
5362
5517
5510
5519
5520
5522
5523
5041.01
5040.02
5536.02
5535.01
5532
5521
5537.01
5536.01
5536.02
5540.01
5527
5524
5041.02
5538.01
5539.01
5540.02
5529
5526.01
5526.02
5039.02
5538.02
5539.02
5542.01
5542.02
5546
5547
5545.13
5545.11
5702.02
5702.03
5543
5544.03
5544.04
5544.01
5548.01
5545.14
5545.12
5702.04
5545.21
5548.02
5545.18
5705.01
5705.02
5701
5708.03
5700.02
5700.01
5549
5545.17
5706.01
5706.02
5706.03
5707.01
5707.02
5709.02
5709.01
5545.22
5545.15
5545.16
5545.19
5715.02
5715.01
5711.01
5713
5712
5550.01
5551.03
5711.02
5716
5551.02
5550.02
5551.04
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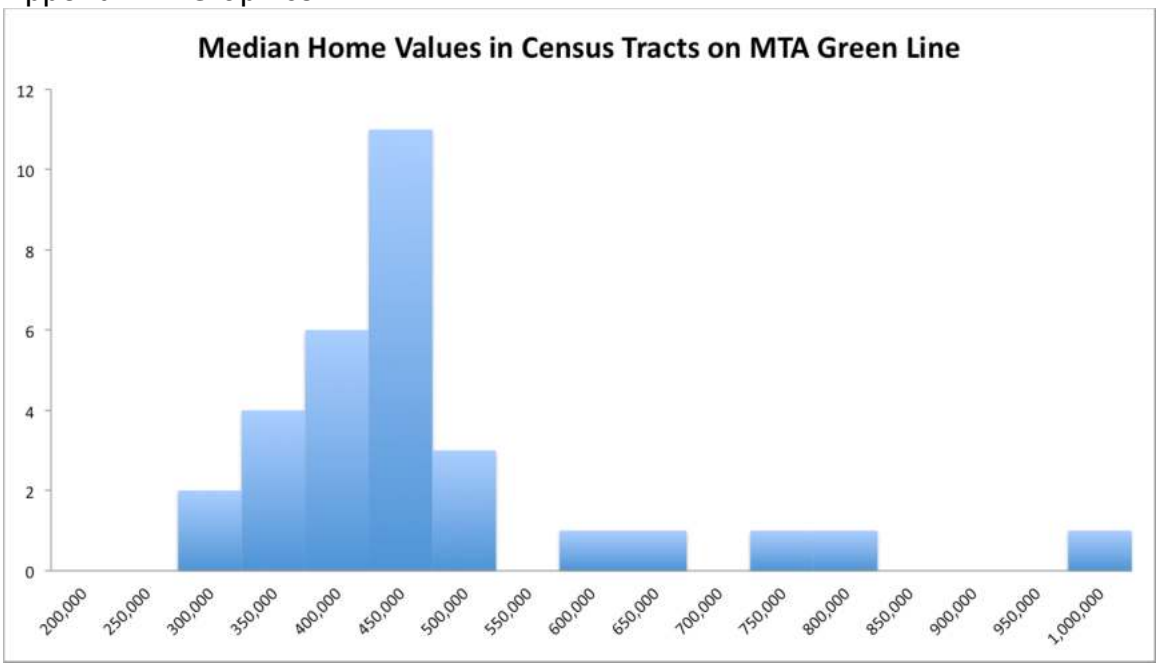
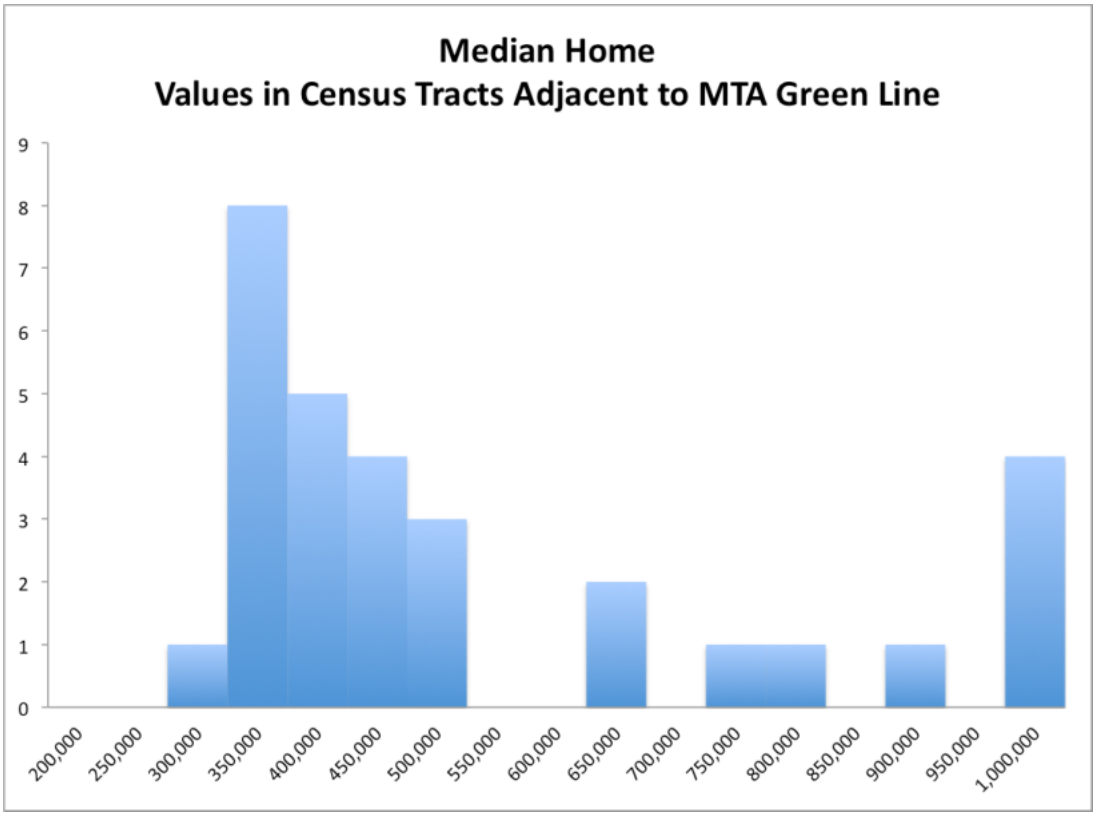
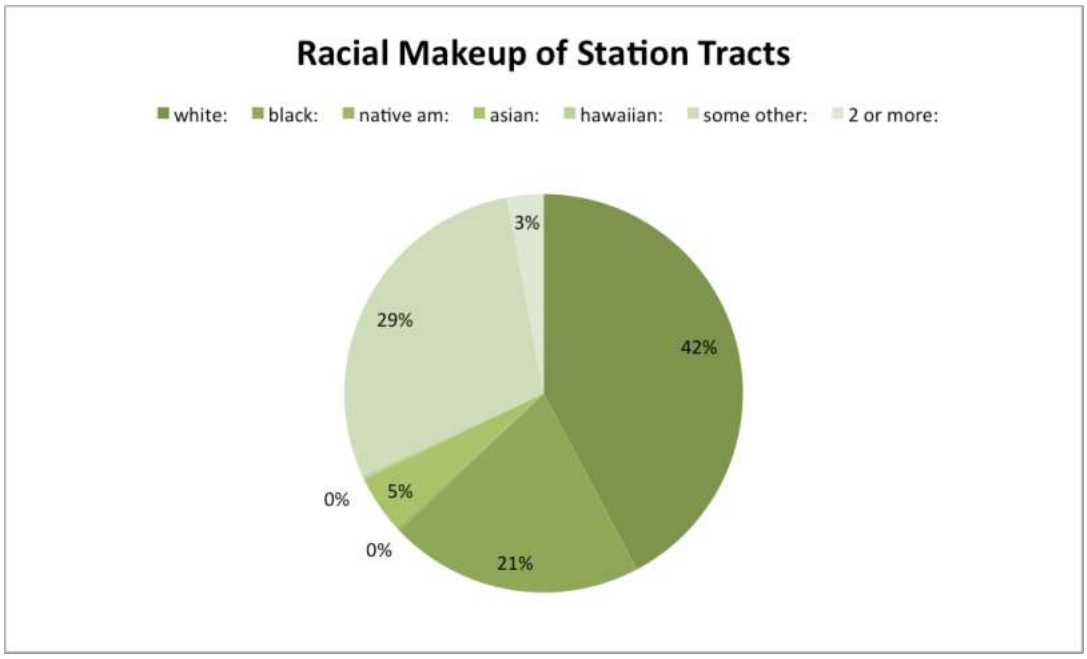
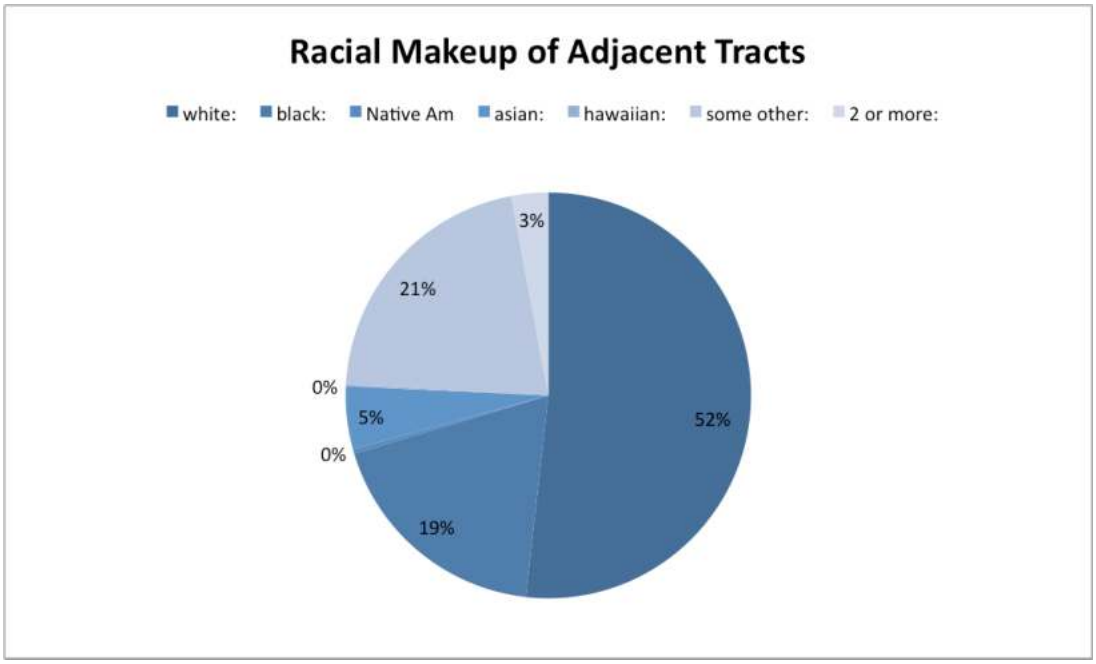
5737
5738
5739.01
5552.11
5552.12
5726.01

Appendix B- Graphics

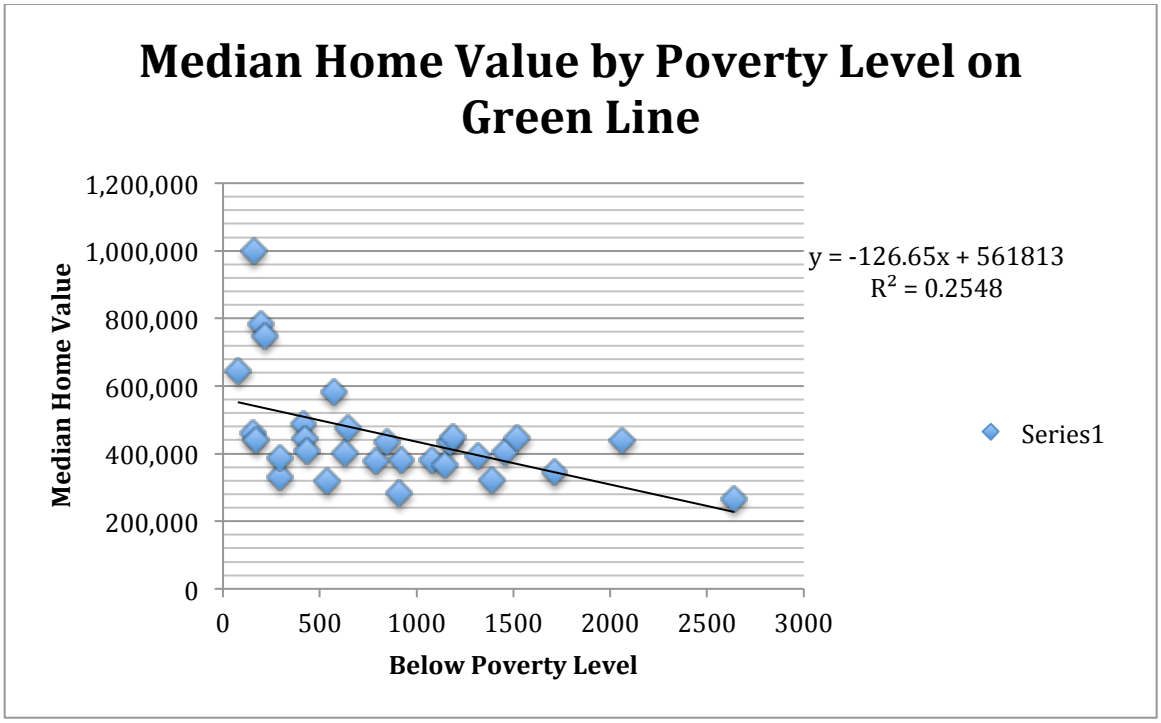


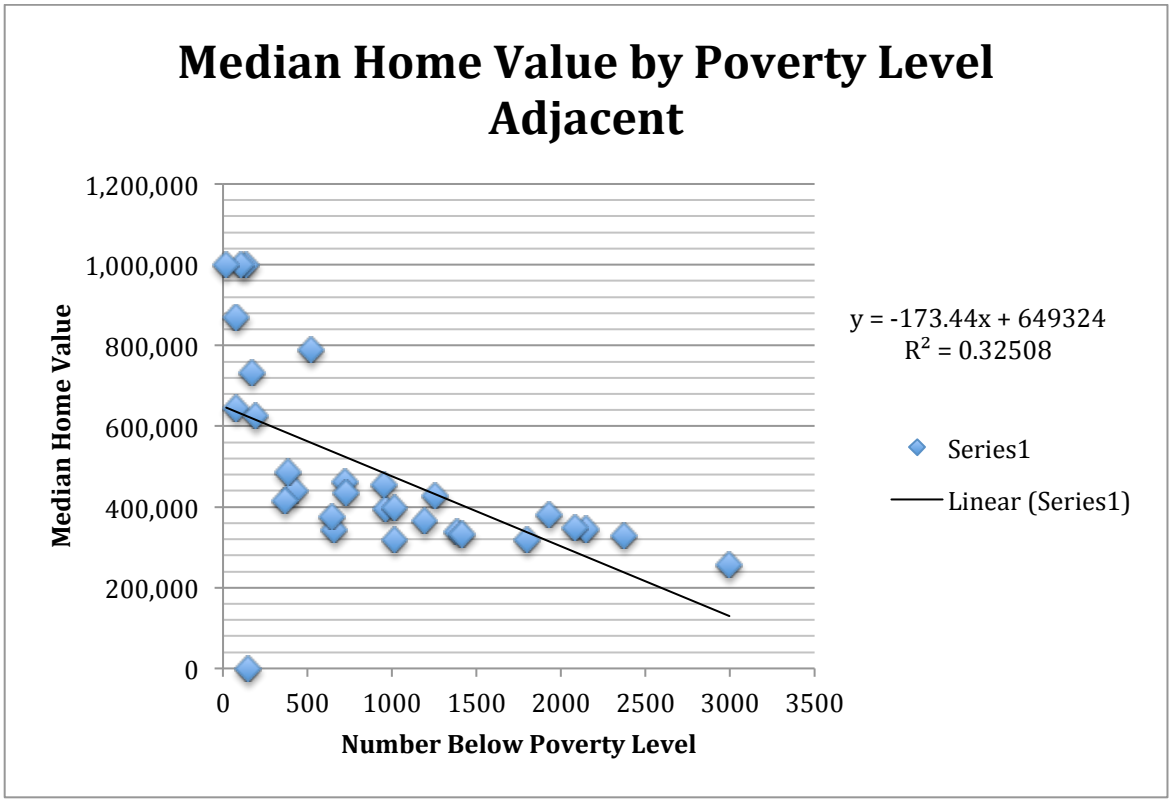


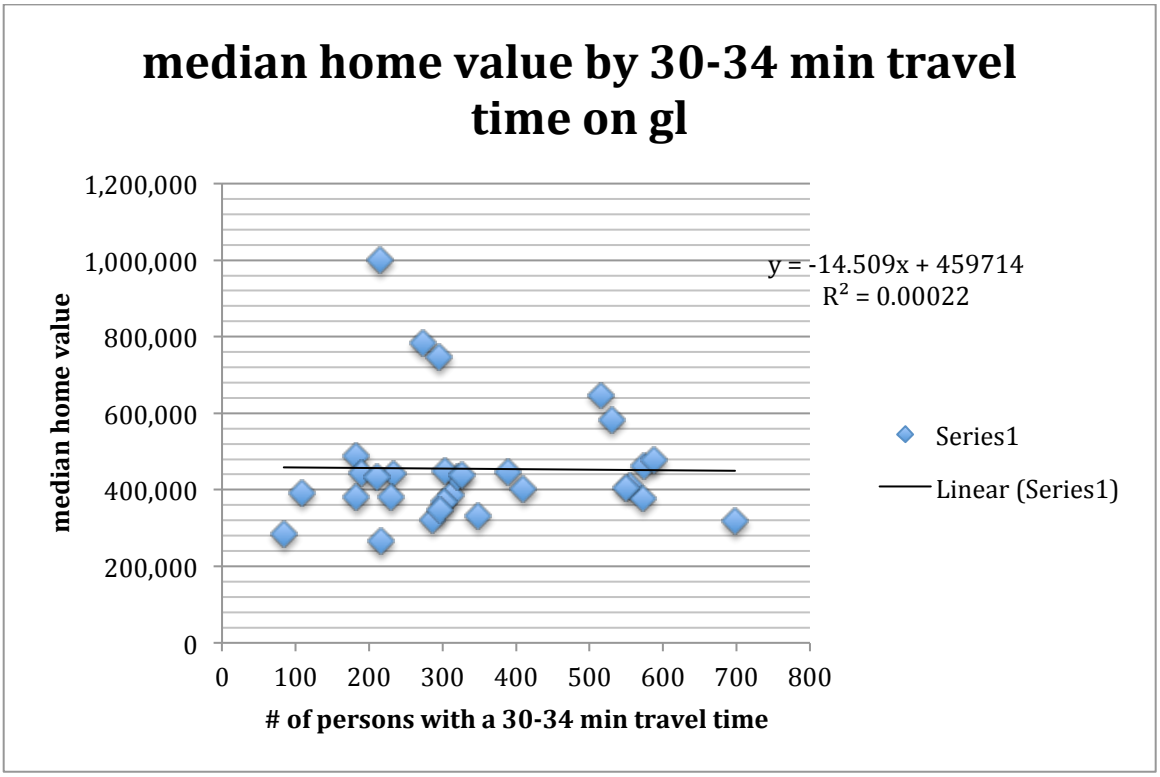

Racial Makeup of Station Tracts
white:
black:
native am:
asian:
hawaiian:
some other:
2 or more:
3%
29%
42%
0%
5%
0%
21%

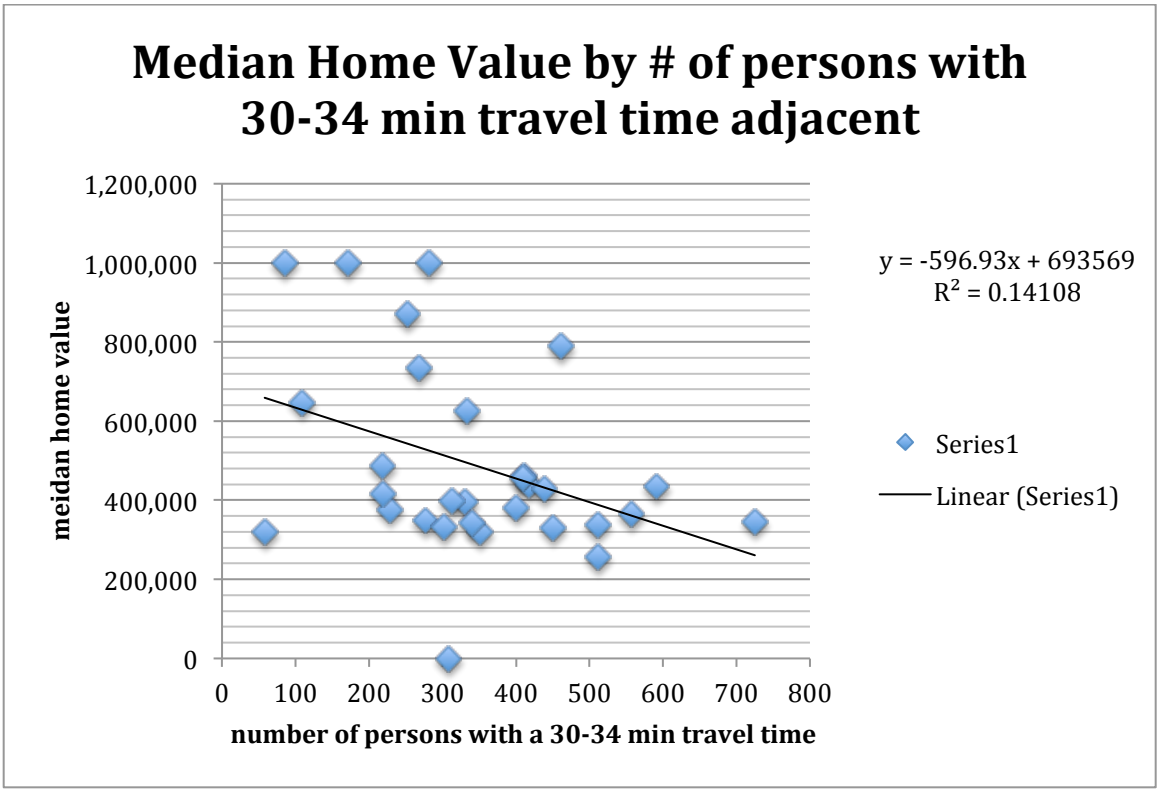

Racial Makeup of Adjacent Tracts
white:
black:
Native Am
asian:
hawaiian:
some other:
2 or more:
3%
21%
0%
5%
52%
0%
19%

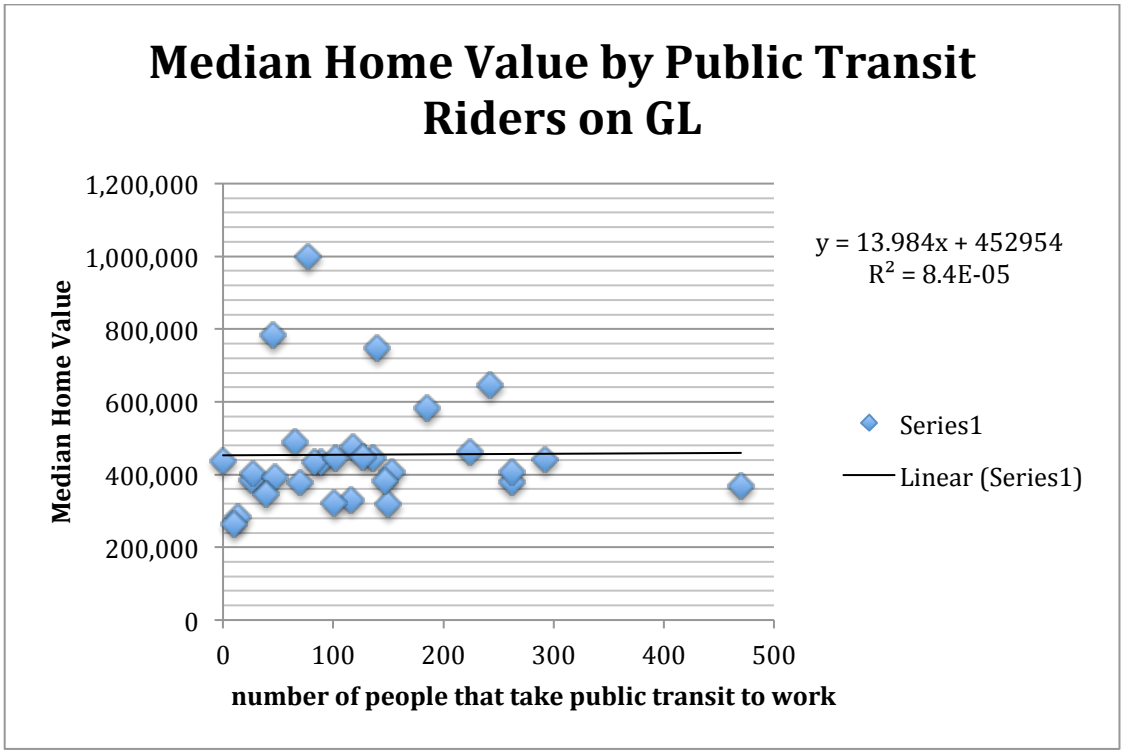
Regression

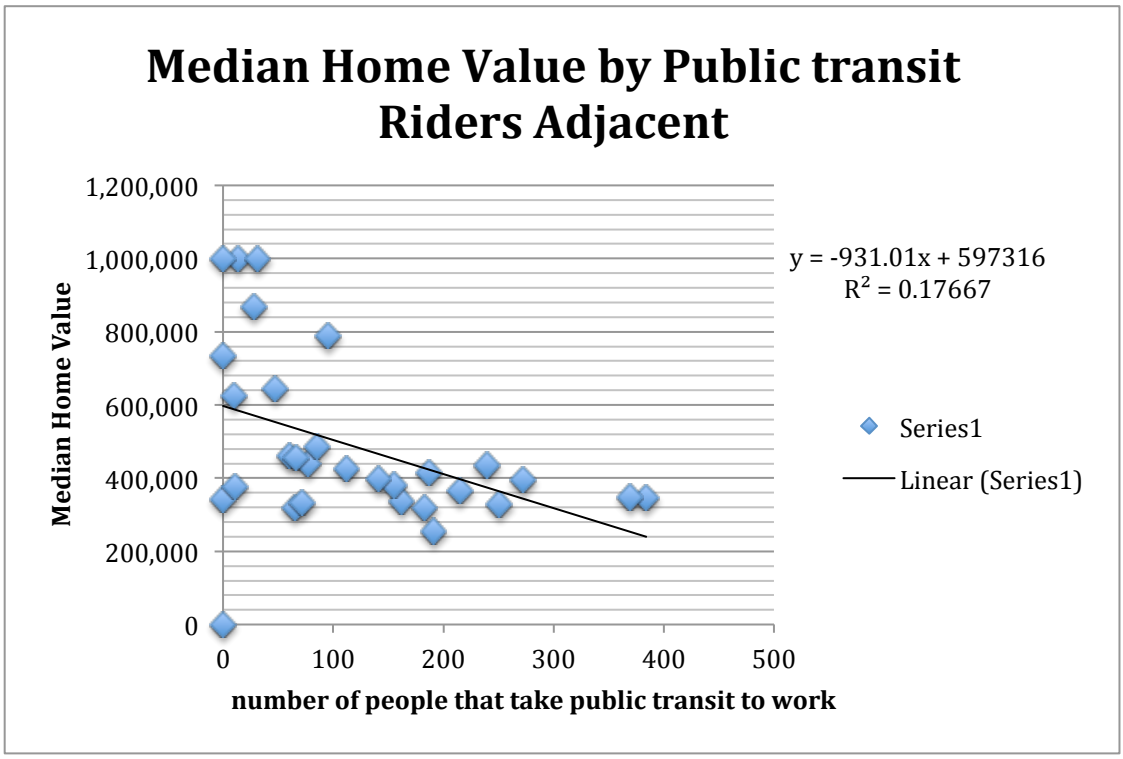

Median Home Value by Poverty Level on Green Line
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Median Home Value
0
500
1000
1500
2000
2500
3000
Below Poverty Level
y = -126.65x + 561813
R² = 0.2548
Series1

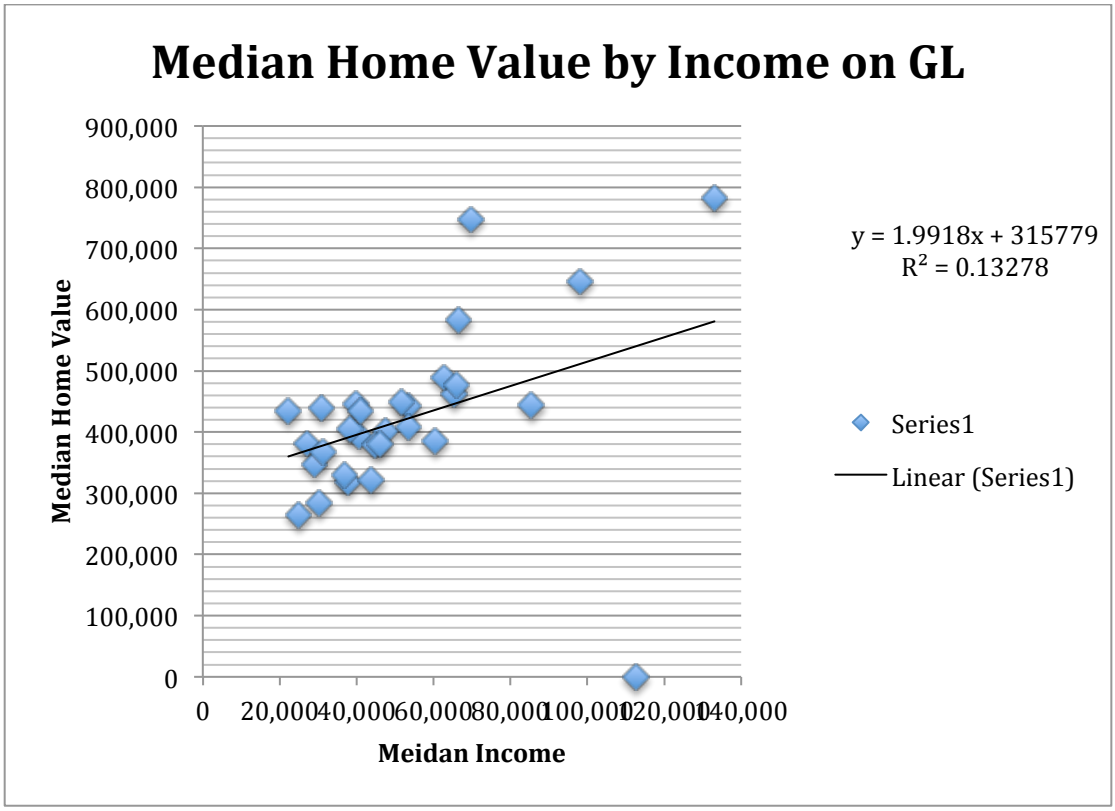

Median Home Value by Poverty Level Adjacent
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Median Home Value
0
500
1000
1500
2000
2500
3000
3500
Number Below Poverty Level
y = -173.44x + 649324
R² = 0.32508
Series1
Linear (Series1)

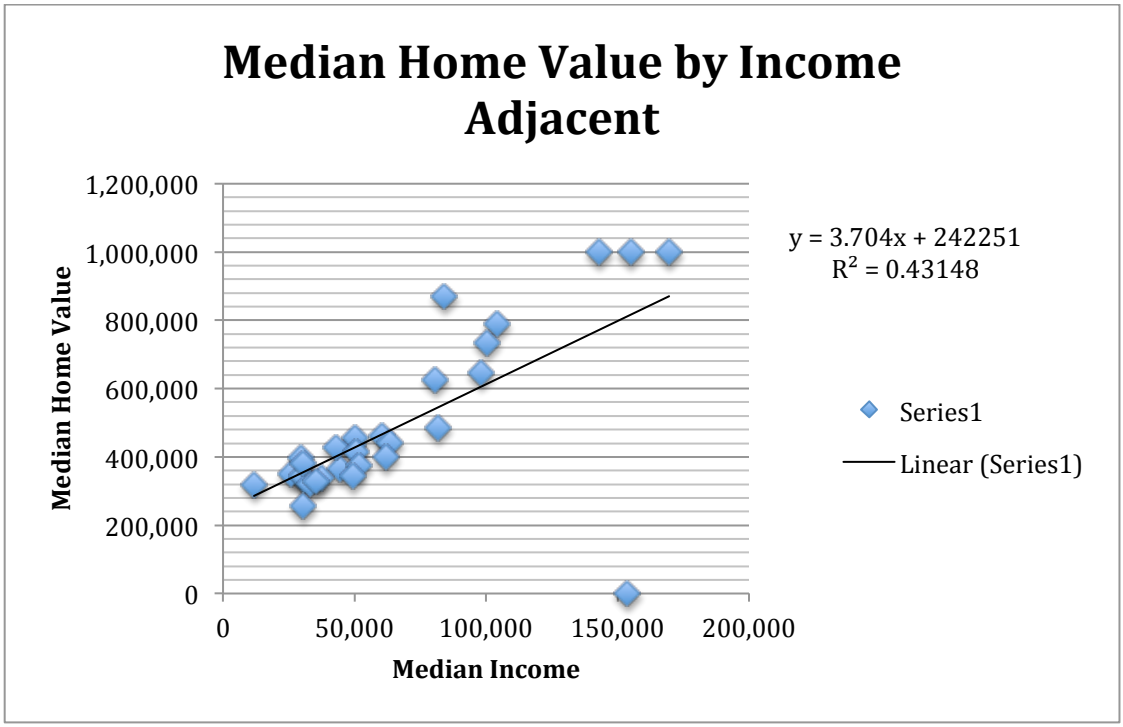

median home value by 30-34 min travel time on gl
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
median home value
0
100
200
300
400
500
600
700
800
# of persons with a 30-34 min travel time
y = -14.509x + 459714
R² = 0.00022
Series1
Linear (Series1)

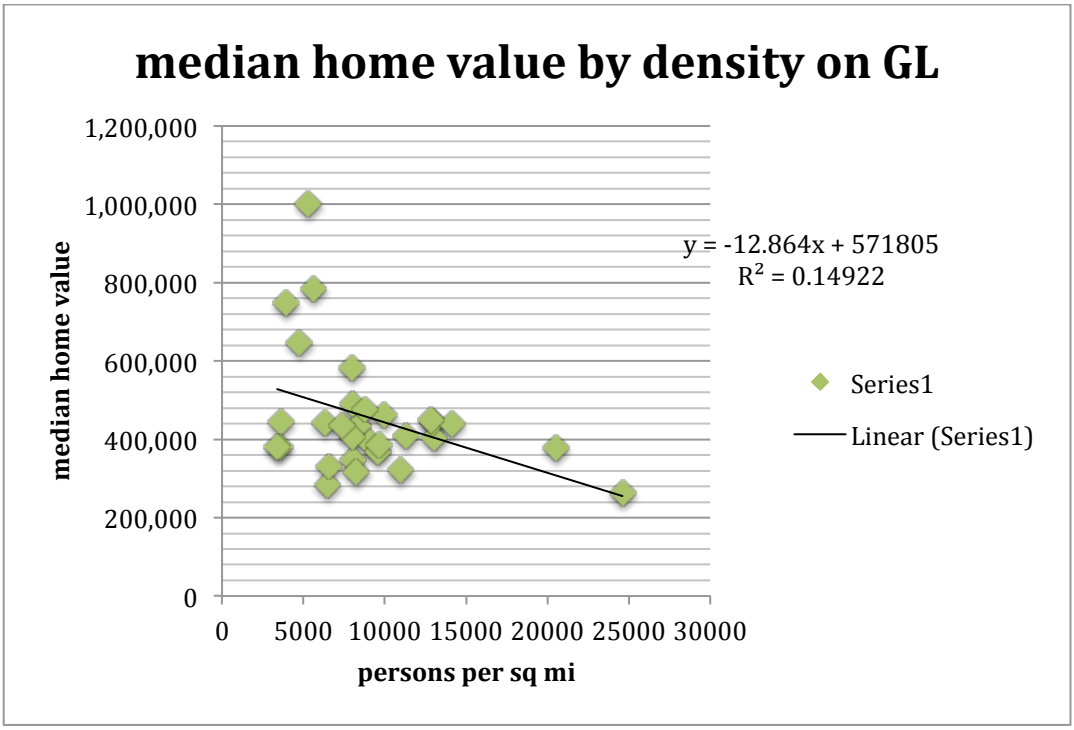

Median Home Value by # of persons with 30-34 min travel time adjacent
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
meidan home value
0
100
200
300
400
500
600
700
800
number of persons with a 30-34 min travel time
y = -596.93x + 693569
R² = 0.14108
Series1
Linear (Series1)

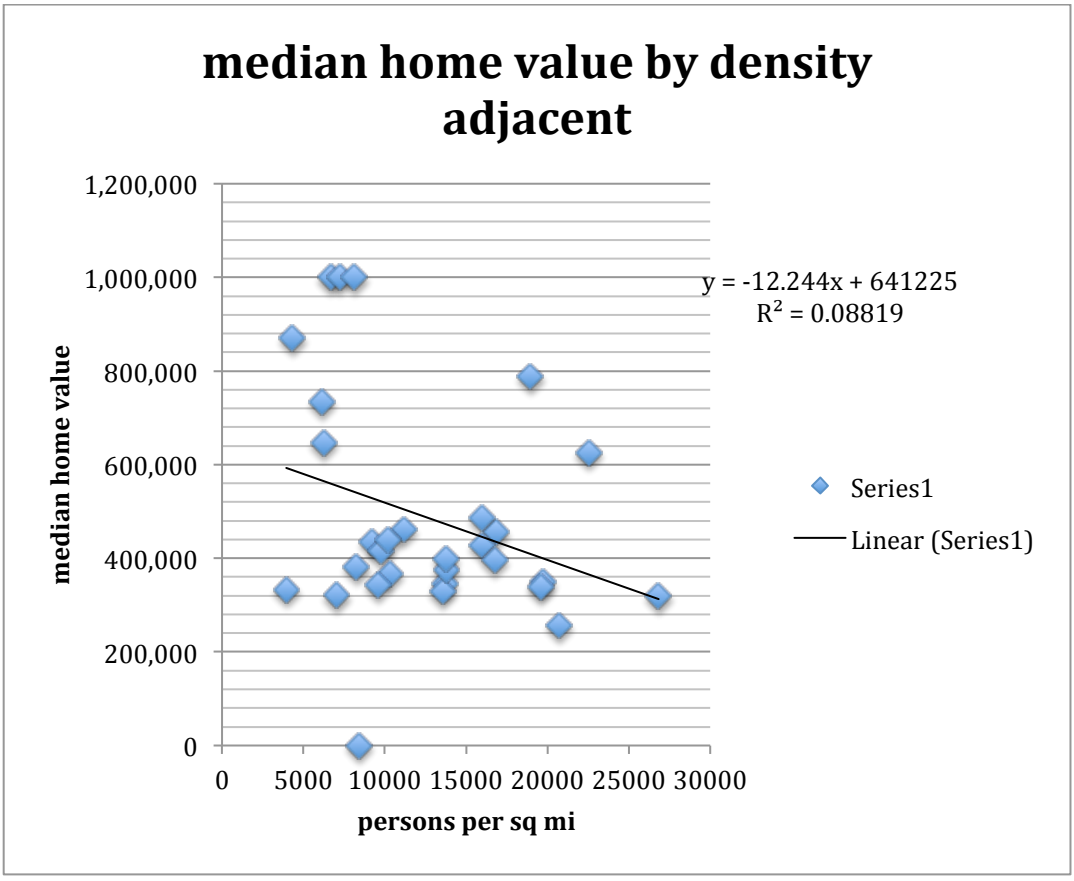

Median Home Value by Public Transit Riders on GL
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Median Home Value
0
100
200
300
400
500
number of people that take public transit to work
y = 13.984x + 452954
R² = 8.4E-05
Series1
Linear (Series1)


Median Home Value by Public transit Riders Adjacent
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Median Home Value
0
100
200
300
400
500
number of people that take public transit to work
y = -931.01x + 597316
R² = 0.17667
Series1
Linear (Series1)


Median Home Value by Income on GL
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Median Home Value
0
20,000
40,000
60,000
80,000
100,000
120,000
140,000
Meidan Income
y = 1.9918x + 315779
R² = 0.13278
Series1
Linear (Series1)


Median Home Value by Income Adjacent
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Median Home Value
0
50,000
100,000
150,000
200,000
Median Income
y = 3.704x + 242251
R² = 0.43148
Series1
Linear (Series1)


median home value by density on GL
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
median home value
0
5000
10000
15000
20000
25000
30000
persons per sq mi
y = -12.864x + 571805
R² = 0.14922
Series1
Linear (Series1)


median home value by density adjacent
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
median home value
0
5000
10000
15000
20000
25000
30000
persons per sq mi
y = -12.244x + 641225
R² = 0.08819
Series1
Linear (Series1)

Appendix C – Definitions from US Census site

All Variables were collected from the 2010 ACS 5-Year Data Set

B25077 Median Home Value

Value

Value is the respondent's estimate of how much the property (house and lot, mobile home and lot, or condominium unit) would sell for if it were for sale.

B19013 Median Household Income

Median income

The median income divides the income distribution into two equal groups, one having incomes above the median, and other having incomes below the median.

B01002 Median Age by Sex

Median age

This measure divides the age distribution in a stated area into two equal parts: one-half of the population falling below the median value and one-half above the median value.

B01003 Total Population

Population

All people, male and female, child and adult, living in a given geographic area.

DP05 ACS Demographics and Housing Estimates

B11001 Household Type

Household

A household includes all the people who occupy a housing unit. (People not living in households are classified as living in group quarters.) A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live separately from any other people in the building and which have direct access from the outside of the building or through a common hall. The occupants may be a single family,

one person living alone, two or more families living together, or any other group of related or unrelated people who share living arrangements.

B25018 Median Number of Rooms

Median Rooms

This measure divides the room distribution into two equal parts: one-half of the cases falling below the median number of rooms and one-half above the median. In computing median rooms, the whole number is used as the midpoint of the interval; thus, the category “3 rooms” is treated as an interval ranging from 2.5 to 3.5 rooms. Median rooms is rounded to the nearest tenth.

B08301 Means of Transportation to Work

Means of transportation to work refers to the principal mode of travel or type of conveyance that the worker usually used to get from home to work during the reference week.

B08303 Travel Time to Work

Travel time to work refers to the total number of minutes that it usually took the worker to get from home to work during the reference week. The elapsed time includes time spent waiting for public transportation, picking up passengers in carpools, and time spent in other activities related to getting to work.

S1701 Poverty Status In the Last 12 Months

The Census Bureau uses a set of dollar value thresholds that vary by family size and composition to determine who is in poverty. Further, poverty thresholds for people living alone or with nonrelatives (unrelated individuals) vary by age (under 65 years or 65 years and older). The poverty thresholds for two-person families also vary by the age of the householder. If a family’s total income is less than the dollar value of the appropriate threshold, then that family and every individual in it are considered to be in poverty. Similarly, if an unrelated individual’s total income is less than the appropriate threshold, then that individual is considered to be in poverty.