Abstract

This study examines neighborhood housing and transportation choices available to working households in 28 U.S. metropolitan areas. The purpose is to determine how constraints within the

Report Contents

This report is organized into six sections with three appendices. The main text of the report explains the approach, data, findings, and recommendations. Three appendices provide: supporting and background tables (Appendix A), separate profiles for each of the 28 metro areas (Appendix B), and a detailed explanation of the methods used in the study (Appendix C).

Expenditure Survey results, the distribution of households by Area Median Income for each region, and other metro rankings of measures used or created in this study.

Appendix B. Metro Area Profiles: A 4-page profile for each of the 28 metros in the study including: a characterization of the region by housing and transportation costs and choices; a map of the region by neighborhood housing/transportation cost type with the location of the

Table of Contents

1. Introduction

Affordable and good quality housing for working families is increasingly becoming scarce throughout the nation. Many working families are spending more than one-half of their budgets for housing alone. While housing is often the largest household expense, it is but one of the many significant expenses facing working families. Transportation is a close second for most households in the U.S. and it is an even higher or equal percentage of income for lower income households. As gasoline prices and interest rates rise and regions expand further out into undeveloped areas away from established communities and job centers, housing and transportation costs are only getting higher. Rising costs and households in financially difficult situations also impact neighborhoods, regions, and communities. Sprawling development causes higher infrastructure costs for cities, congestion causes greater levels of pollution, and long commutes affect businesses through lost productivity, greater levels of absenteeism and tardiness, and ultimately turnover when a worker leaves in search of a better commute.

A recent study by the Center for Housing Policy, *Something's Gotta Give: Working Families and the Cost of Housing*, using the microsample from the Bureau of Labor Statistics Consumer Expenditure Survey (CES), documented the excessive housing and transportation cost burdens on working households[1]. The study found that 44.3% of all working families spend more than half their total expenditures on just these two costs. The Surface Transportation Policy Project and Center for Neighborhood Technology have also reported on these two combined costs in the three *Driven to Spend* reports since 2000. Based on the 2003 CES, the 2005 *Driven to Spend* report showed that the median income households in the 28 areas covered in the study spent $21,213, or 52%, of expenditures on housing and transportation[2].

Yet, there has not been enough analysis of the combined housing and transportation costs for working families at a specific and small unit of geography, e.g. a neighborhood or census tract. The CES expenditures that are reported by *specific income levels* are not available below the four major regions in the U.S. and the expenditures at the metropolitan level are only available for the *median income* household. This level of information (region and metropolitan) and frequency of the survey (the CES is reported annually based on quarterly surveys), makes the CES a useful source for identifying conditions and trends over time, but without detailed geographic information tied to these costs it does not lend itself to assessing the specific problems or causes in neighborhoods and/or regions that might be associated with household costs—particularly for lower income households.

For instance, in 1990 the combined housing and transportation costs in the CES survey were as low as 37% in Kansas City and as high as 47% in San Francisco, San Diego, Los Angeles, and Miami. By 2000, the range had jumped from to 48%hpec34c aTD0.2nd C. "SaTD0.2m

end, San Diego. While some of this variation can be explained by the variation in the cost of living from region to region, it is not completely clear how much the costs vary within a region, particularly by incomes within a region.

Of the two costs—housing and transportation—uncovering the reasons for transportation cost variation is especially challenging. Accordi

The 28 metro areas in this study are the same as those in the CES annual survey. They represent 25 of the largest metros in the U.S. and were home to nearly 47.1 million households, or 45% of all U.S. households, in 2000.[3] Of these 47.1 million households, 27% (12.6 million households) earned between 30% and 80% of their respective region's Area Median Income (AMI) in 2000. Relative to a dollar amount, 14.3 million households earned less than $35,000 a year. (See Table A3 in Appendix A).

We find that costs vary by neighborhood and by region and that lower income households most often have a higher cost burden for *both* housing and transportation in all neighborhoods and regions. For all households earning between $20,000 and less than $50,000 in the 28 metro areas, the study found the combined expenditures range from 54% of income in Seattle to 63% of income in Chicago. However, in instances where neighborhoods had local concentrations of affordable housing, households had lower housing *and* transportation costs. This was true in 23 of the 28 regions.

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[3] In 2000, there were 105,480,101 households in the U.S. according to the 2000 Census, SF1.

Household Income

Using Census 2000 household income breakout for each tract we summed the number of households within the following six annual income ranges:

- Less than $20,000
- $20,000 to less than $35,000
- $35,000 to less than $50,000
- $50,000 to less than $75,000
- $75,000 to less than $100,000
- $100,000 to less than $250,000

We chose these categories because they represent, roughly, quintiles of national household incomes—i.e., each category contains nearly 20 percent of U.S. households. We did not include households above $250,000 since they are less than 3% of the population and the high incomes in this group would have greatly skewed the highest bin. And as the average median household income is approximately $46,000 in these regions, the first three categories roughly match the 30-50, 80, and 100 percent of area median income measures that are often used in qualifying households for affordable housing. This makes these income categories useful for policy makers that use AMI to operate programs based on incomes. While they are not exactly the same as AMI, we used a small range within each bin, $15,000 to $20,000, and several bins, to help make the comparison between these ranges and the percentage of AMI in each region.

However, in order to use the transportation cost model, which is based on a specific income, we could not use a range. Therefore, for each census tract, we used the Census PUMS 5% data from the PUMA[4] that encompasses each tract to determine the weighted average income of households in each income bin. For instance, to determine what actual income to use in the income bin range of "Less than $20,000", we used the PUMS data which provides a count of households at each income level. By querying the PUMS data for households by income restricted to just households earning an income of $0 to $20,000, and to households not living in group quarters, we could identify that the weighted average income in that bin and in that PUMA was actually, $10,385 for all households, $9,837 for renters, and 11,368 for owner households. We did this query for each PUMA and each income bin in each of the 28 metro areas. We then applied the results to each income bin in each tract in the 28 metro areas. While this method is not exact since PUMA's are 100,000 persons or more and census tracts are typically 3,000 persons, the error is contained within each inco

Table 1

Census Income Bin

Table 3

Percent of Households Paying 35% or more of Income by Income in 28 Metros (Census 2000, SF3, H.97, H.73)			
Income	**Rent**	**Own**	**All**
Less than $10,000	65%	70%	66%
$10,000 to $19,999	70%	54%	65%
$20,000 to $34,999	31%	39%	34%
$35,000 to $49,999	8%	25%	17%
$50,000 to $74,999	3%	12%	9%
$75,000 to $99,999	1%	5%	4%
$100,000 or more	0%	2%	2%
TOTAL	**31%**	**18%**	**23%**

Transportation Costs as a Percent of Income

The transportation cost data is predicted with a unique model developed by Center for Neighborhood Technology and Center for Transit Oriented Development that uses Census, transit system, National Household Travel Survey, and other data sources to estimate a household's auto use, auto ownership, and transit use at the census tract level for a particular household size and income. This model is run on the specific income bins described above. The monthly transportation cost derived from the model is then taken as a percent of each weighted average income for each income bin in each census tract. This is to report on transportation costs by income for each neighborhood. To characterize the entire neighborhood in terms of transportation costs, we calculated a weighted average of the percentage of income of the six income bins. See Appendix C for a more complete discussion of this technique and references to the model's development. The following table lists the estimated percentage of income on transportation for each of the six income bins in each of the 28 metros.

Table 4

Metro Area	<$20,000	$20,000 to <35,000	$35,000 to <50,000	$50,000 to <$75,000	$75,000 to <$99,000	$100,000 to <$250,000

cost burden. The map below (figure 1) shows this job density measure in relation to the employment center measure in the Minneapolis-St. Paul area.

Figure 1
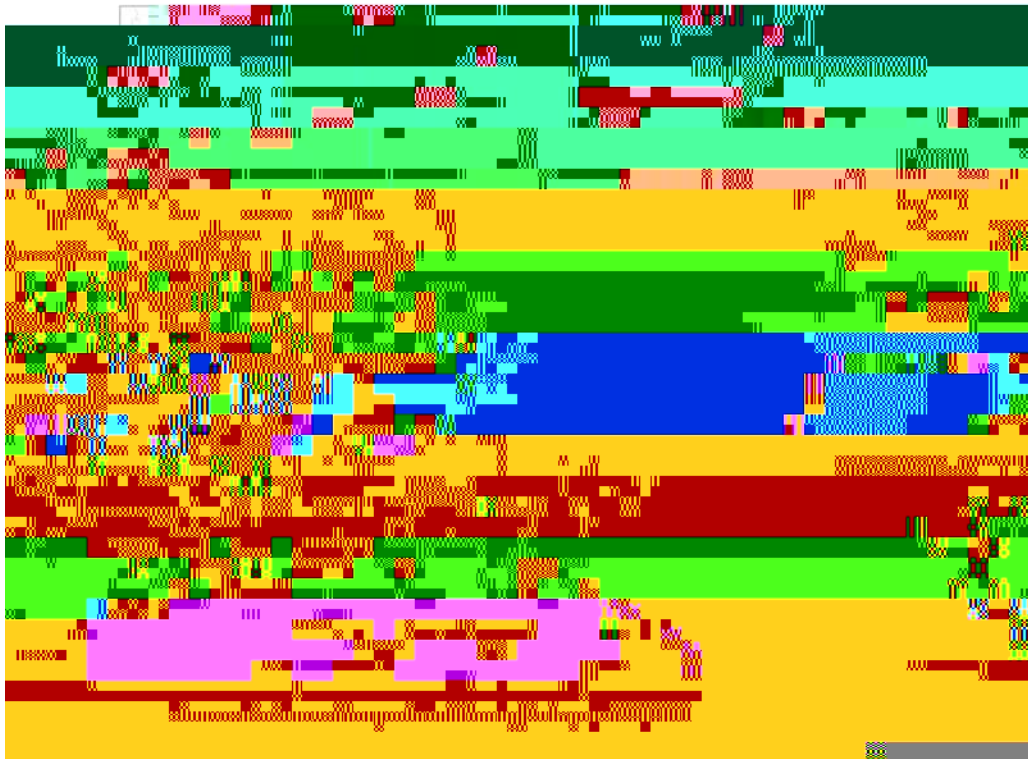
Worker Commuting Characteristics

The Census Transportation Planning Package (CTPP), allows us to examine the commute patterns of workers in each census tract. In part three of CTPP the home and work place census tracts are provided for each worker. Using a GIS, we assigned the distance between the center of the home tract and work tract to estimate a commute distance. We then used this distance with the time to commute reported by each worker in the Census to calculate an average speed (distance / time = speed). These calculations gave us an average speed, time, and distance for the average worker in each tract by mode to work. However, this measure is not perfect since the distance is "as the Crow Flies", e.g. a straight line between two points, and therefore is generally an underestimate of the commute distance since workers are generally not able to travel from home to work in a straight line. Yet, it provides a consistent statistic by which to compare the journey to work for all workers for all tracts. Breaking the measure of distance, speed and time by mode allows us to compare public transit users to auto users.

In addition to using this measure to judge the quality and cost of the commute for the commuter, we also found it to be a reliable indicator of congestion faced by the workers within a census tract. The slower the speed, the more likely the worker is traveling in a congested area. Even with our underestimate of distance, we found the average speed to be approximately 24 miles per

hour across all 28 metros. According to The Nationwide Personal Transportation Survey (NPTS), "the average commuting speed, including trips by all modes, went from 28 mph in 1983 to 34 mph in 1995."[5]

Household Socioeconomic Characteristics

Household characteristics have been obtained from Census 2000. Variables analyzed include educational attainment, unemployment rates, household size, vehicle ownership, commute time, average household size, race, housing unit density, tenure, occupants per room, workers place of work, travel means to work, time leaving for work, year structure built, and housing unit structure type.

Availability of Affordable Housing

The Department of Housing and Urban Development (HUD) along with the Census creates a special tabulation of housing data using the housing and income data in the census to calculate the number of affordable units in each tract that are available to households of each AMI level.

Table 6

Region	H%	T%	H+T%
Anchorage, AK MSA	28%	18%	46%
Atlanta, GA MSA	27%	21%	48%
Baltimore, MD PMSA	27%	19%	46%
Boston, MA CMSA	28%	19%	47%
Chicago, IL CMSA	28%	18%	46%
Cincinnati, OH CMSA	25%	23%	48%
Cleveland, OH CMSA	26%	22%	49%
Dallas, TX CMSA	26%	21.0275 0 0 10.0291 300.42 588.96 Tm0.0003 Tc08	

3. What are households paying to live in their neighborhood: Housing and Transportation Expenditures by Income and Place

For several decades, households of all incomes- but higher incomes in particular- have been moving from central city neighborhoods to newer neighborhoods in surrounding and farther out suburban areas. As households have moved, jobs have followed. In search of better schools, more space, and less crime, households have also tended to move to neighborhoods of similar socioeconomic and demographic characteristics, e.g. places with other households of similar incomes, educational levels, family structures, and race. The concentration of jobs, e.g. "employment centers", has followed these higher income households and increasingly regions are becoming multi-centered, with the central city being only one of several employment centers.

This pattern of movement by both households

- Households in the highest income category, $100,000 to <$250,000, have the lowest combined housing and transportation expenditures from 21% of income in the Above Avg. H and Above Avg. H&T neighborhoods to 24% in the other two neighborhoods.

- At all income levels, at the 28 metro aggregate, the lowest combined housing and transportation expenditures are in the Above Avg. H neighborhoods. These neighborhoods provide the greatest mix of housing units and prices, as well as incomes, and the lowest transportation costs in absolute terms. The greater mix of housing types allows more households of various incomes to find housing that is nearby affordable transportation. However, for lower incomes, these neighborhoods often present a trade-off of higher housing prices for units that are often older, and therefore possibly in poor condition, and smaller in exchange for low transportation costs. Housing ownership by lower income households in these neighborhoods is often out of reach but renting in these neighborhoods can be the most affordable in terms of combined housing and transportation expenditures.

Note the costs are not the lowest in the "Below Avg. H&T" neighborhoods as a percentage of income even for the highest income bins. This is because these are mostly high income suburban areas (average income is $76,444) and housing and transportation costs are also high. However, at 24% of income, higher income households inn inn1 Tw[incom)8.(b)0.4(ined housing and transportation expen

Figure 5

Table 7

Income	% on H+T	% in Neighb.	% of income bin	% on H+T	% in Neighb.	% of income bin	% on H+T	% in Neighb.	% of income bin	% on H+T	% in Neighb.	% of income bin
<$50,000		**33%**	**26%**		**59%**	**19%**		**70%**	**36%**		**48%**	**19%**
$0-<$20,000	116%	8%	19%	106%	23%	21%	111%	30%	44%	119%	14%	16%
$20,000-<$35,000	69%	12%	26%	58%	20%	19%	62%	23%	35%	70%	17%	20%
$35,000-<$50,003.0601 Tm0.0045 Tc[69%)-291p7.528%				0.0045 Tc0.004275043(%)-2627.20.0045 Tc[1(0%)-2915.8469%)-2033.51(0%)-2429.3283%								bin

the two neighborhood types that are primarily in cities and inner-suburbs in most regions, the Above Avg. H and Above Avg. H&T neighborhoods. These two neighborhood types are also where the median incomes of renters, when compared to all renter households, are the lowest at $33,578 and $24,198, respectively.

Table 8

Distribution of Households by Tenure and Neighborhood Type				
	Below Avg H & T	**Above Avg. H**	**Above Avg H & T**	**Above Avg. T**
Median Income				
Owners	$79,671	$61,041	$43,783	$55,897
Renters	$47,767	$33,578	$24,198	$34,699
All Households	$71,930	$43,824	$31,718	$50,119
Households by Neighborhood				
Total Owners	11,972,149	2,225,590	4,453,270	5,973,487
% Owners	75%	33%	42%	73%
Total Renters	4,017,270	4,601,492	6,267,595	2,250,452
% Renters	25%	67%	58%	27%
Households across Metros				
% of all owners in 28 metros	49%	9%	18%	24%
% of all renters in 28 metros	23%	27%	37%	13%

The breakout above shows a trend, but even as a weighted average it hides some variation. While incomes within suburban neighborhoods, census tracts in this case, are typically within a narrow range, or there is at least a clear majority of an income level, more urban areas, such as the Above Avg. H neighborhoods, are the exception. Because of this income clustering (or segregation), the weighted average expenditure on H+T shown above is generally representative of at least 40% of households in each neighborhood type. However, the weighted average does not show the full range, especially at the ends of the distribution.

When the distribution is shown by income (See Table 9), for moderate income households ($20,000 to <$50,000) **housing costs** as a percentage of income:

- are *highest* in the Below Avg. H&T and the Above Avg. H neighborhoods for both owner and renter households;

- are *lowest* in the Above Avg. T neighborhoods for owners and for renters earning less than $20,000, and the Above Avg. H&T neighborhoods

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have the lowest H expenditure in the Above Average T neighborhoods, which demonstrates the reason more households in this income group are moving to outer suburban and exurban areas to purchase a lower-priced home. Yet, the housing burden is only slightly higher in the Above Avg. H&T neighborhoods for owner households earning $20,000 to $50,000, than it is in the Above Avg. T neighborhoods. However, the transportation costs in the Above Avg. H&T neighborhoods are much lower than the Above Avg. T neighborhoods thereby making these neighborhoods the most affordable in terms of combined H+T for owners of all incomes, except those earning <$20,000. The name of this neighborhood does not indicate this affordability because the majority of households in these neighborhoods are lower income renters and their costs are high as a percentage of income.

By Metro Area

For each metro area, the distribution of households by H+T Type is similar to the 28-metro average. In all regions, the Below Average H&T neighborhoods are the greatest share of neighborhoods, but not the majority. Within this neighborhood type households earning greater than $50,000 are the majority, however, ranging from 54% of households in Pittsburgh to 78% of households in Washington D.C. These households are paying from 22% of income to 45% of income on combined housing and transportation costs.

The neighborhood type with the second highest share of all neighborhoods varies somewhat across metros but in 25 of the 28 it is the Above Avg. H&T neighborhoods, ranging from 23% of neighborhoods in Chicago to 41% in Anchorage. Households earning less than $50,000 are the majority in this type and their expenditures on housing and transportation range from 42% of income to 119% of income. The three exceptions are Honolulu, where the second common type of neighborhood is Above Avg. H, and Boston and New York where the second type is Above Avg. T. In Boston and New York, households earning less than $50,000 living in Above Avg. T neighborhoods are 46% and 41% of households in these areas and are paying 55% to 124% of income on the combined expenses.

The following table (Table 10) shows the distribution of households for each metro across H+T Type, as well as the weighted average H+T expenditures of all households in the region compared to the H+T expenditures for the subset of households earning $20,000 to less than $50,000. The percentage of income on H+T for all households is on average across all 28 metros 48% of income, from a low of 42% in Washington D.C., reflecting the high incomes in that region, to a high of 54% in Miami. But for households earning $20,000 to less than $50,000, the average H+T expenditure is 57% of income, from a low of 54% in Pittsburgh to a high of 63% in San Francisco. These two extremes are due to the housing prices in those areas; Pittsburgh households in this income category have the lowest housing expenditure, 22%, and San Francisco households of this income have the highest, 35%. The Atlanta and Seattle regions are close seconds, each at 61% of income but in Atlanta the high H+T is due to high transportation costs, 32%, and moderately high housing costs, 29%, and the Seattle costs are due to high housing, 31%, and high transportation costs, 30%.

Table 10

Region	Below Avg H&T	Above Avg. H	Above Avg H & T	Above Avg T	Below Avg H&T	Above Avg. H	Above Avg H & T	Above Avg TAbove

Characteristics of Neighborhoods

To further define the neighborhood types, beyond what households were paying as a share of income on housing and transportation, we used a cluster analysis to identify whether other neighborhood characteristics were also related to place or to households expenditures. These other characteristics are: incomes, educational attainment (percent with a bachelor degree),

are more related to density, number of daily trips, distance to work, and the housing stock and location, in addition to income and household size.

Simply comparing the income of each cluster with the percentage of income spent on H+T makes it appear that expenditures—as a share of income—are just a matter of income. As incomes go up, expenditures go down. While this is true, it is not the complete story, especially since the average in a cluster represents at least 2,967 neighborhoods and each of those neighborhoods could vary from the average H+T expenditure of the cluster. For instance, a household earning $20,000 to $35,000 could have combined expenditures ranging from 66% in Above Avg. H neighborhoods to 71% in Above Avg. T neighborhoods and both neighborhoods might fall in the same cluster (see Table 10 above).

By matching the demographic neighborhood classification to the H+T neighborhood classification, we get a sense of whether all neighborhoods of a particular cluster do have the same H+T expenditures, and conversely whether all neighborhoods of

incomes. While the moderate income cluster neighborhoods ($54,490) are nearly equally distributed across the four H+T Types (at 25%, 22%, 20%, and 33%), 88% of the low income cluster neighborhoods are in Above Avg. H or Above Avg. H&T, nearly the converse of the high income cluster neighborhoods ($74,818) of which 87% fall into the other two H+T types. The very high income cluster ($100,128) neighborhoods are almost exclusively (93%) in the Below Avg. H&T neighborhoods.

The significance of classifying the same set of 29,608 neighborhoods by a number of characteristics and not just the housing and transportation costs indicates that expenditures are largely a factor of place and where households live is largely a factor of income. Households do not have equal access to the same places and therefore shoulder additional burdens associated with the places they are able to access. The level of access is examined below.

Because of the similar distribution between the H+T Types and the cluster analysis, we summarized the remaining characteristics by the H+T Types.

Neighborhood Type Summary

The following descriptions and table of each H+T Type summarize the above findings.

Below Average H&T Neighborhoods: These neighborhoods contain 38% of households in the 28 metro areas. They spend an average of 39% of their income for housing and transportation. The neighborhoods are on average the second furthest away from the closest central city (16.8 miles), after Above Avg. T neighborhoods. Households in these areas are mostly homeowners (75%) with the highest median incomes of the four types, approximately $70,428. The households are predominantly white (81%), have the second largest household size, are majority family households, have the highest median age, and the highest percentage of the two household types: married with kids and married without kids. They also have the lowest percentage of male or female single-parent households. Members of these households have the highest percentage of graduate and bachelor's degrees and live in households with the highest average workers per household (1.55). As expected, this neighborhood type has the lowest unemployment rate (4%) and the lowest poverty rate (5%).

Above Average H Neighborhoods:

is married households without children, 30%, followed by married households with children, 27%. Members of these neighborhoods have lower educational attainment levels than Below Avg. H&T and Above Avg. H, 20% with a graduate or bachelor degree, after the Above Avg. T neighborhoods. These neighborhoods have the second lowest unemployment rate (5%) and the second lowest poverty rate, 8%.

Table 13

Characteristic	Below Avg H&T	Above Avg. H	Above Avg. H&T	Above Avg T
Average Median Household Income (owners)	$78,007	$61,041	$43,783	$55,897
Average Median Household Income (renters)	$46,769	$33,578	$24,198	$34,699
Average Median Household Income (all)	$70,428	$43,824	$31,718	$50,119
Total Renter Households	4,017,270	4,601,492	6,267,595	2,250,452
Renters as % of all Households in 28 Metros	10%	11%	15%	5%
% of all Renters in 28 Metros	23%	27%	37%	13%
Renters as % of Households in the Neighborhood Type	25%	67%	58%	27%
Total Owner Households	11,972,149	2,225,590	4,453,270	5,973,487

Locations of Neighborhood Types

This section further analyzes the location of the H+T neighborhood types. Location matters for both housing and transportation costs since proximity to and availability of jobs is a factor that contributes to both transportation costs and household incomes, as well as housing prices, as does the density, mix of housing units types and tenure, availability of neighborhood services and amenities, and transportation choice.

To identify the general location of the neighborhood types within the region, we use the proximity to types of Employment Centers (EC) as a way to characterize whether the neighborhood is in the central city (Central City EC), an inner or middle-ring suburb (Other EC), or an outer-ring suburb or exurban area (Away from EC). Recall from Section One that employment centers are contiguous areas of at least 5,000 jobs or more in which the job density is at least 7 jobs per acre in the contiguous area.

This characterization is a first step in identifying the location of the H+T neighborhood types. It is not perfect however due to the varying nature of employment centers in each metro area. In total, there are more than 57 million jobs in these 28 regions and 37% of these jobs are contained within 466 employment centers. The number and percentage of jobs that fall within employment centers in regions varies from just 18% of all jobs in Miami to 51% of all jobs in New York. The total number of employment centers in a region also varies, from one and seven ECs in Anchorage and Atlanta, respectively, to 68 and 76 ECs in Los Angeles and New York, respectively.

The following table (Table 14) presents the number of jobs and employment centers within each region.

Table 14

Metro Area	Total Jobs	Jobs in Employment Centers	% of Jobs in Employment Centers	Employment Centers in Region
Anchorage, AK MSA	135,997	41,074	30%	1
Atlanta, GA MSA	2,080,327	580,690	28%	7
Baltimore, MD PMSA	1,143,425	331,629	29%	9
Boston, MA CMSA	2,928,326	949,458	32%	22
Chicago, IL CMSA	4,189,946	1,429,970	34%	35
Cincinnati, OH CMSA	939,716	232,461	25%	8
Cleveland, OH CMSA	1,384,765	281,958	20%	12
Dallas, TX CMSA	2,544,920	867,795	34%	10
Denver, CO CMSA	1,347,391	442,980	33%	12
Detroit, MI CMSA	2,440,788	686,857	28%	25
Honolulu, HI MSA	403,983	234,546	58%	6
Houston, TX CMSA	2,052,949	705,336	34%	12
Kansas City, MO-KS MSA	896,319	215,170	24%	10
Los Angeles, CA CMSA	6,587,361	3,085,900	47%	68
Miami, FL CMSA	1,610,493	580,329	36%	9
Milwaukee, WI CMSA	826,524 (28%) 267257912ba6(fa5eT0B0883w[)0(8.9645)74.26 495L7831446-0007078.69(93e00			

Table 15

<table>
<tr><td colspan="12" align="center">**Distribution of Neighborhoods by Housing & Transportation Costs**
by Location in Region based on Adjacency to Employment Centers (EC)</td></tr>
<tr><td colspan="3" align="center">**Below Avg H&T**</td><td></td><td colspan="3" align="center">**Above Avg H**</td><td></td><td colspan="3" align="center">**Above Avg H&T**</td><td></td><td colspan="3" align="center">**Above Avg T**</td></tr>
<tr><td>Central City EC</td><td>Other EC</td><td>Away from ECs</td><td>Miles to CC</td><td>Central City EC</td><td>Other EC</td><td>Away from ECs</td><td>Miles to CC</td><td>Central City EC</td><td>Other EC</td><td>Away from ECs</td><td>Miles to CC</td><td>Central City EC</td><td>Other EC</td><td>Away from ECs</td><td>Miles to CC</td></tr>
<tr><td>8%</td><td>18%</td><td>74%</td><td>16.8</td><td>31%</td><td>26%</td><td>43%</td><td>9.5</td><td>17%</td><td>20%</td><td>64%</td><td>16.0</td><td>2%</td><td>8%</td><td>90%</td><td>31.0</td></tr>
</table>

- The Above Avg. T neighborhood type has by far the greatest share of neighborhoods away from major centers of employment, 90%, and they are 31 miles on average from the center of the nearest central city. With only 2% of these neighborhoods located near the Central City EC, it is safe to say these neighborhoods are mainly suburban and largely in outer or exurban communities.

- The Below Avg. H&T neighborhood is the other predominantly suburban type, with 74% away from ECs and 18% near Other ECs. Only 8% of these are proximate to Central City ECs. The lower distance from the central city, 16.8 miles, compared to 31 miles in the Above Avg. T neighborhoods, indicate these are mostly inner and middle ring suburbs, not exurbs.

- The Above Avg. H neighborhoods are the most likely to be near jobsy rraway

Table 16

Metro Areas	Central City EC	Other EC	Away from ECs	Miles to CC	Central City EC	Other EC	Away from ECs	Miles to CC	Central City EC	Other EC	Away from ECs	Miles to CC	Central City EC	Other EC	Away from ECs	Miles to CC
New York, NY CMSA	21%	25%	54%	17.7	86%	7%	8%	8.2	30%	36%	35%	18.1	1%	16%	83%	38.9
Los Angeles, CA CMSA	5%	38%	58%	25.1	26%	46%	28%	17.0	15%	34%	50%	21.3	2%	20%	78%	48.0
Boston, MA CMSA	4%	17%	79%	18.0	61%	14%	25%	4.7	7%	37%	55%	24.5	0%	10%	90%	32.6
Anchorage, AK MSA	14%	0%	86%	14.4	n/a	n/a	n/a	n/a	44%	n/a	56%	11.5	10%	0%	90%	14.9
Miami, FL CMSA	7%	19%	74%	20.0	37%	21%	42%	12.8	30%	13%	57%	12.9	4%	5%	91%	20.9
San Francisco, CA CMSA	11%	38%	51%	9.9	22%	43%	35%	7.5	2%	38%	61%	16.7	0%	15%	85%	25.5
Phoenix, AZ MSA	5%	12%	82%	14.8	22%	27%	51%	11.7	18%	20%	61%	10.7	1%	9%	90%	24.5
Seatte, WA CMSA	9%	24%	68%	14.5	26%	31%	43%	8.3	6%	33%	61%	24.0	0%	5%	95%	30.7
San Diego, CA MSA	11%	24%	65%	14.9	33%	25%	42%	10.6	15%	23%	62%	13.4	2%	15%	82%	20.9
Cincinnati, OH CMSA	0%	7%	92%	13.0	16%	16%	68%	7.1	18%	17%	65%	10.6	2%	1%	97%	20.0
Milwaukee, WI CMSA	6%	9%	85%	11.8	37%	21%	42% -1.5(4)28.(7.224 Tw( )-3k)-184390.019%	23-1065.5L7-1824.W	26(54.421824.1(25%							

The locations of H+T Types can be used to target places for housing and transportation policies for working households and to identify causal effects between expenditures and neighborhood characteristics, such as the lack of services, public transit and affordable housing, and the distance to jobs.

It makes sense, and has been shown through the Location Efficiency study

4. What Determines the Burden?

This section seeks to answer the question raised in the previous section: How do savings on either housing or transportation costs vary from place to place?

To answer this question we first look at trends for all the neighborhoods within the 28 metro areas, without accounting for metro area differences, and then we breakout the differences byc-0.001ore(accoun)

The following plots represent all households in four

The trends above for each income level for all households in the 28 metro areas are also consistent with the expenditures and commute distances by H+T Neighborhood Type. Comparing the housing and transportation expenditures for the three income bins from $35,000 to $75,000 in each of the H+T Neighborhood Types with the average commute distance of each neighborhood type, we found the following pattern of housing and transportation expenditures:

- The percentage of income spent on housing is higher in areas with the shortest distance (Above Avg. H), than it is in areas with longer distances, the Above Avg. H&T and Above Avg. T neighborhoods, but less than the housing percentage in the middle distance, Below Avg. H&T neighborhoods. In relation to the commute distance plots above; housing prices sta <<high in the neighborhoods with the shortest distances which are typically in the central cities, drop with a slight increase in distance to the inner ring suburbs, then increase in price with the next increase in distance to the middle ring suburbs, and then drop again in the neighborhoods with the greatest distances in the exurban areas.

- Unlike the housing costs which rise and fall with distance to employment, transportation costs continue to increase with commute distance. At different distances for each income, transportation costs eventually rise above housing costs as a percentage of income.

The net effect is that total combined housing and transportation costs increase with commute distance even though housing prices ultimately decrease at the greatest distance.

Regional Differences

The trends across all metro areas are useful for identifying general patterns and relationships, many of which can be used to interpret the reason for costs in specific neighborhoods within a region, but differences in metro areas, such as concentration of employment in employment centers, the availability and quality of mass transit, the strength of the housing market, etc., also make it necessary to look at each metro area separately.

To begin our comparison of burdens by region, we first compared our housing and transportation costs to the CES costs in 2000 as one benchmark for our hybrid of housing and transportation expenditures. We found a significant positive correlation between the CES housing and transportation expenditures for the median income in each metro area and the housing and modeled transportation costs for comparable incomes in this study (See Table A4 in Appendix A)[8]. With this validation for our average expenditures at the regional level, we used these averages to determine whether metro types could be classified into a combination of housing and transportation costs. A cluster analysis resulted in four different types of metro areas:

- 10 metros with Low Housing/High Transportation costs,
- 4 metros with High Housing/Low Transportation Costs;
- 3 metros with High Housing/Medium Transportation Costs; and
- 11 metros with Medium Housing/Medium Transportation costs.

These metro categories are listed in the table below. The category with the strongest relationship among regions is Low Housing/High Transportation. Regardless of the different clustering methods we tried, these 10 regions always clustered together.

Table 19

Metro Area Categorizations by Reported Housing and Modeled Transportation Expenditures as a Share of Income (2000)			
Low Housing (25.4%) High Transportation (22.8%)	**High Housing (29.2%) Low Transportation (15.8%)**	**High Housing (32.0%) Med Transportation (19.5%)**	**Med Housing (27.3%) Med Transportation (19.6%)**
Cincinnati, OH CMSA	Honolulu, HI MSA	Los Angeles, CA CMSA	Anchorage, AK MSA
Cleveland, OH CMSA	New York, NY CMSA	Miami, FL CMSA	Atlanta, GA MSA
Dallas, TX CMSA	San Francisco, CA CMSA	San Diego, CA MSA	Baltimore, MD PMSA
Detroit, MI CMSA	Washington, DC PMSA		Boston, MA CMSA
Houston, TX CMSA			Chicago, IL CMSA
Kansas City, MO-KS MSA			Denver, CO CMSA
Milwaukee, WI CMSA			Minneapolis, MN MSA
Pittsburgh, PA MSA			Philadelphia, PA CMSA
St. Louis, MO MSA			Phoenix, AZ MSA
Tampa, FL MSA			Portland, OR CMSA
			Seattle, WA CMSA

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[8] To obtain an income from our six income bins that could be compared to the median income surveyed for a metro area in the CES, we either used a single income bin that encompassed the CES median income, or took a weighted average of two income bins if the CES income was at the low or high end of an income bin.

The next figure, which plots each metro area along the housing and transportation expenditure axis shows the above categories but specifies where each region falls within the cluster.

Figure 7

1-Anchorage, 2-Atlanta, 3-Baltimore, 4-Boston, 5-Chicago,
6-Cincinnati, 7-Cleveland, 8-Dallas, 9-Denver, 10-Detroit,
11-Honolulu, 12-Houston, 13-Kansas City, 14-Los Angeles,
15-Miami, 16-Milwaukee, 17-Minn-St Paul, 18-New York,
19-Philadelphia, 20-Phoenix, 21-Pittsburgh, 22-Portland OR,
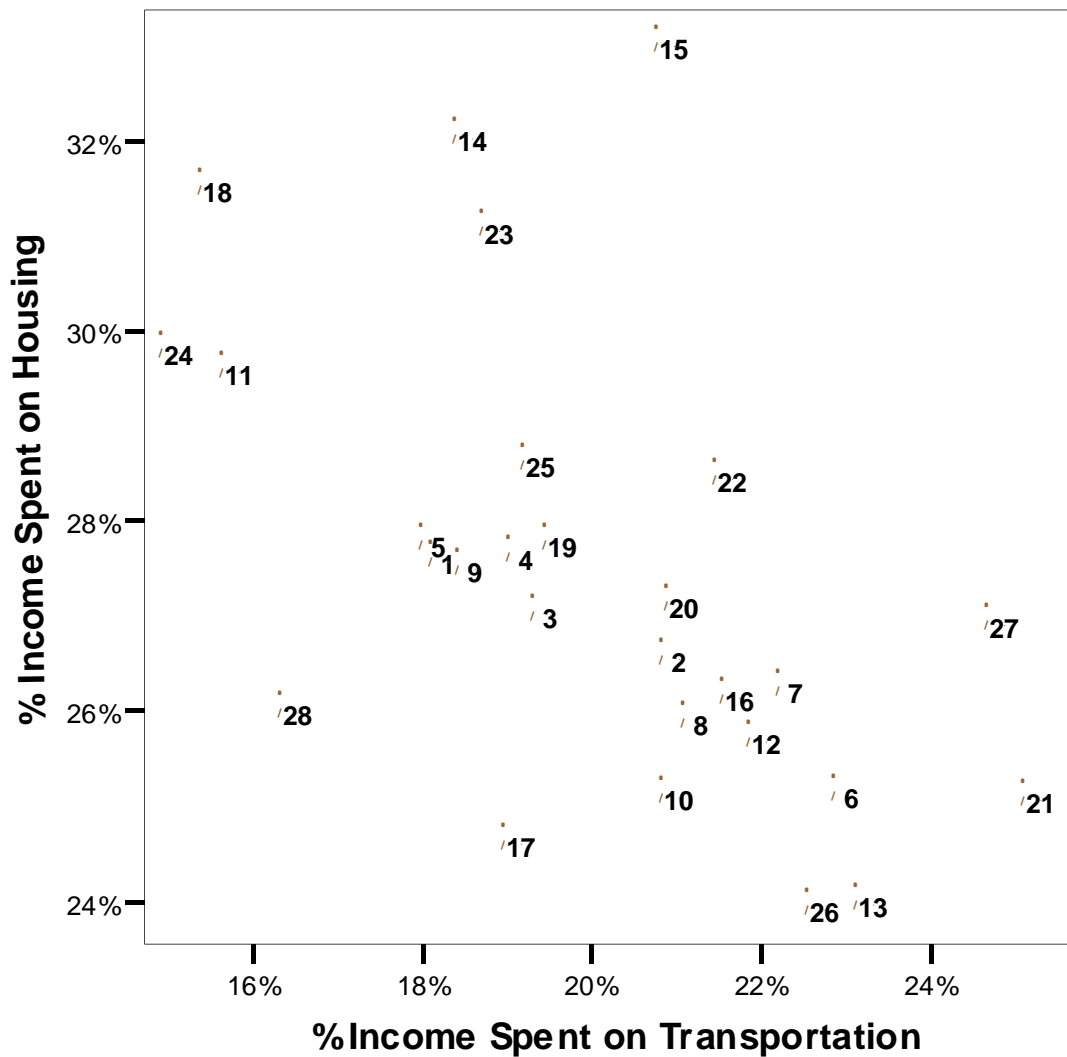
On the whole, without considering the different burdens by income, the top five most expensive metro areas for households based on the combined housing and transportation costs relative to income are: Miami (54%), Tampa (52%), Los Angeles (51%), Pittsburgh (50%), and Portland (50%). These five areas are a mix of types: Miami and Los Angeles are High Housing/Medium Transportation regions, Tampa and Pittsburgh are Low Housing/High Transportation regions, and Portland is the only Medium Housing/Medium Transportation region. The region type, High Housing/Low Transportation, e.g. San Francisco, Honolulu, Washington D.C., and New York does not make the top five list when ranking regions according to the average of all households. Because these regions are known for their very high housing cost burdens on working families, we realized it was important to also rank each region according to income categories.

These additional rankings by income category show that certain "H/T region types" might be more expensive for working families than higher income families. When the 28 regions are ranked separately for the second through fifth income bins, there are 11 regions that were within the top five most expensive for either one of the income categories or for the region as a whole. The following table lists the 11 regions, their region type, and where they rank in terms of the Top 5 list for each income category. The combined housing and transportation expenditure for that income is shown in parenthesis along side the rank. The area mewing/Higw Tw(hesis along side the.1and)T.

Second, a region from each of the four H/T region types ranks among the five most expensive in at least one of the lists, however, the Low Housing/High Transportation only appears in the Average of All Incomes ranking. The two regions that make this list, Tampa and Pittsburgh, also have low median incomes.

Third, regions categorized as Medium Housing/Medium Transportation appear most often. It's possible in these regions, there are not enough instances to make a trade-off between housing and transportation for low to moderate incomes and therefore they are most often saddled with both costs in the medium range making the combined costs high, e.g. (**Med. H + Med. T = High H+T).**

Regardless of region type, the rankings illustrate the importance of addressing both household costs for low and moderate income households. The cities with the highest expenditures are not just those with either very high housing costs, although this is the issue with San Francisco because of *extreme* costs, or just the places with affordable housing shortages or with very high transportation costs. The high cost regions are a combination of regions with medium to high costs in both household necessities and a mixture of places with varying levels of affordable housing shortages and transportation options. In places with low levels of affordable housing shortages, high transportation costs outweigh the greater availability of affordable housing. In places with transportation choice, lower income households do not have equal access to the transportation assets and in places without transportation choice, lower income households bear a higher transportation burden from the lack of choice than do higher income households.

To illustrate this mix of factors that may contribute to the housing and transportation expenditures by working households in each region, Table 21 summarizes these housing and transportation characteristics: the H/T region type; the state of the housing market, e.g. hot, weak, sprawling, expanding; the availability of affordable housing; the level of transportation choice; the concentration of employment centers; the level of congestion, and the housing and transportation expenditures of households earning from $20,000 to <$50,000. The table is ranked by H/T region type and then by the expenditure on housing and transportation by households from $20,000 to <$50,000. (Note the regions that rank high in their respective region type, are not on the above ranking lists by smaller income bins because this table takes a weighted average of two income bins--$20,000 to <$35,000 and $35,000 to <$50,000.) Initial observations from the table include: the most expensive places for this combined income category are not always regions with high affordable housing shortages, e.g. Kansas City; places with high transportation costs have lower concentrations of jobs within employment centers, e.g. Tampa; congestion levels vary between and within region types, but tend to be highest within medium and high housing expenditureTwsjc1r0 Ttroters, e.Los A coleter(g and)J-52.75 0 TD0.0003 Tc-0.0003 Tww(regions wir

Table 21

MSA	H+T Type	Housing Market (Price and Construction Density)	Housing Burden (% of 30-50% HAMFII with Severe Burden)	Affordable Housing Shortage	Transportation Choice (% non-auto commuters, Rail Transit System Size)		Employment Centers (Pop. near ECs, Jobs in ECs)					
New York, NY CMSA	High H, Low T	Hot Densifying Mkt.	22%	high	31%,	Extensive Rail	54%,	51%	49	16	29%	32%	61%
San Francisco, CA CMSA	High H, Low T	Warm Sprawling Mkt.	27%	high	14%,	Extensive Rail	42%,	49%	72	13	31%	30%	60%
Honolulu, HI MSA	High H, Low T	Hot Single Family Mkt.	23%	medium	15%,	No Rail	39%,	58%	20	-10	29%	30%	59%
Washington, DC PMSA	High H, Low T	Hot Single Family Mkt.		medium		Large Rail							

Does the presence of affordable housing and employment access affect H+T and does it vary by region?

The table above suggests relationships among some of the characteristics and housing and transportation costs. This analysis further examines how various spatial features of the housing market, including the spatial distribution of affordable housing, are associated with average household expenditures on housing and transportation costs. To examine this issue, we estimated two linear regression models with housing as a percentage of income (H) and transportation as a percentage of income (T) as dependent variables and the following as independent variables: *measures of urban form and spatial location relative to employment* (natural log of housing unit density, distance from nearest employment center, census tract job accessibility using a gravity model, median commute time), *local supply of affordable housing* (percent of units in tract that are "affordable" to working families from CHAS), and *household income* (natural log of the median household income for the tract). Each model, estimated for the pooled sample of census tracts in all 28 metropolitan areas, also includes dummy variables ("fixed effects") indicating the metropolitan area in which the tract was located. The following summarizes the statistically significant results from these regression analyses for the average of all metro areas. Following the aggregate results, is a list of the variations in these results by metro area:

- *Expenditures on housing are higher in more densely-developed areas that are within close proximity to jobs, while expenditures on transportation are lower.* As suggested above, households make tradeoffs between housing costs and accessibility to jobs. In the models, increases in housing unit and employment density are associated with higher H and lower T and households in tracts closer to employment centers spend more on H and less on T.

- *Expenditures on housing are lower in areas with a larger supply of affordable housing units.* We find that increases in the percent of units affordable to working families locally are associated with large reductions in housing costs. Among all factors influencing housing costs, affordable housing supply has an impact that is second in magnitude only to the median household income of the census tract.

- *The results suggest that expenditures on housing are higher in areas with higher degrees of traffic congestion, while expenditures on transportation are lower.* The median commuting time is positively associated with housing costs and negatively associated with transportation costs. Since the models control for the factors influencing average commute distances for households within the tract, we interpret this finding to imply that increases in commute time signal increases in local roadway congestion, which tends to be higher in locations that are within a close distance to employment centers. The negative influence of commuting time on transportation costs may possibly indicate modal shifts that occur in areas experiencing high levels of auto congestion. Such shifts would lower transportation costs since commuting by transit is generally more affordable than commuting by auto.

When we studied the regression model results for each of the metro areas separately, we found similar trends with some exceptions.

- *In 20 of the 28 metro areas, local concentrations of affordable housing are associated with declining transportation **and** housing cost burdens.* The exceptions are five west coast cities in terms of lowering both costs: Anchorage, San Diego, San Francisco, Portland, Seattle, and San Francisco; Honolulu in terms of increasing housing costs; and Miami and Tampa in terms of increasing transportation costs. The five west coast exceptions may be due to State-supported affordable housing planning in Oregon and California, or because in San Francisco and San Diego affordable housing is in such scarce supply, that no one tract has a large enough share to exert influence on housing or transportation costs. The increases in affordable housing concentration and increased transportation costs in Miami and Tampa may be due to the tourism industry and the extensive Gulf coast and ocean coastlines in these cities, affordable housing is likely further inland and away from employment centers rather than in the downtown areas which would mean locations with affordable housing have high transportation costs.

- *Job Density and housing costs are positively associated in 19 of the 28 regions.* In seven regions, however, there is no association. In some cases, the lack of association may be due to the ubiquity of employment centers and high job density, such as New York, San Francisco, and Los Angeles. In these three regions, the percent of jobs in employment centers is 47% to 51%. In the other four regions where these two measures are not associated, it may be due to the exact opposite--there may be too few instances of sufficient job densities to exert significant pressure on housing costs. In St. Louis and Detroit, job density and housing costs are unexpectedly negatively associated. These two regions have weaker central city housing markets and therefore the employment centers in their central cities have high job density but are not exerting price pressures on the nearby housing.

- *Transportation Costs are positively associated with distance to employment centers in 21 regions, negatively associated in Detroit and St. Louis and are not associated in five other regions; Cleveland, Dallas, Miami, Milwaukee, and Phoenix* This again could be due to the nature of employment centers in these regions. These regions have relatively lower concentrations of jobs in employment centers. St. Louis, Detroit, Milwaukee and Cleveland each have less than 30% of jobs concentrated in centers and Dallas and Miami have less than 37% of jobs in employment centers.

- *Housing Costs are negatively associated with distance to employment centers in 19 regions and positively associated in Honolulu.* In eight other regions; Pittsburgh, Portland, San Diego, Seattle, Boston, Cleveland, Kansas City, Miami, and Milwaukee, housing costs are not associated with distance to employment centers.

- *Housing Unit Density is associated with housing costs in 23 of the metros, negatively associated in San Francisco and Denver, and not associated in Washington D.C., Chicago, and Phoenix.* In San Francisco and Washington D.C. the negative or neutral association may be due to the overall hot housing market, e.g. housing prices are high everywhere regardless of higher densities. In Denver and Phoenix, household preferences may be stronger for lower density communities than the downtown higher density areas. Additionally, or conversely, there may not be enough high density housing areas to show up in our models.

Table 22 lists the model results for each of the metro areas.

Table 22

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Metro Area	Job Density and Housing Costs	Increase in HU Density and Housing Costs	Distance to Employment Centers and Housing Costs	Distance to Employment Centers and Transportation Costs	Local Concentration of Affordable units and Housing & Transportation Costs
Anchorage, AK MSA	Positive	Positive	Negative	Positive	
Atlanta, GA MSA	Positive	Positive	Negative	Positive	Negative
Baltimore, MD PMSA	Positive	Positive	Negative	Positive	Negative
Boston, MA CMSA Honolultiv1(v)ₛ10ᵢ7ᵥ5(,)8.84s⋅847⁴⊖3m.28 455.02nver, TPositiveⱵPositive					Negative
Chicago, IL CMSA	Positive		Negative	Positive	Negative
Cincinnati, OH CMSA	Positive	Positive	Negative	Positive	Negative
Cleveland, OH CMSA		Positive			Negative
Dallas, TX CMSA		Positive	Negative		Negative
Denver, CO CMSA	Positive	*Negative with H&T*	Negative	Positive	Negative
Detroit, MI CMSA	*Negative*	Positive	Negative	*Negative*	Negative
Honolulu, HI MSA	Positive	Positive	*Positive*	Positive	*H costs rise*
Houston, TXve	NegaitiGgiin TD3 Tc[Ne)1S.76 -15.4(i)-1 1 Tf7KaM94 n4s liPꜧve				Negative

in the room count, but common areas, such as living rooms, are included in the count in addition to bedrooms. We considered more than one person per room an overcrowded situation since the average number of occupants per room is 0.12 occupants.

In the six regions, the instance of overcrowding is greatest in the two neighborhood types that are most affordable to working households and have the highest percentages of working households, the Above Avg. H&T and Above Avg. H neighborhoods. Los Angeles was the exception with high overcrowding in the Above Avg. T neighbor

our point that even in developed areas there is still room for new construction. The lower rate of newer construction in the Above Avg. H&T neighborhoods indicates lack of recent investment and probably units that are not only older but possibly in worse condition. Lower home prices in these areas could also indicate the condition.

Table 24

	Age of Housing Stock by H+T Neighborhood Type			
Region	**Below Avg. H&T**	**Above Avg. H**	**Above Avg. H&T**	**Above Avg. T**
Atlanta	1983	1973	1970	1983
Chicago	1964	1950	1952	1965
Denver	1979	1971	1965	1971
Los Angeles	1967	1965	1962	1971
Pittsburgh	1960	1947	1944	1956
Portland	1974	1965	1964	1973
Wtd. Average	**1968**	**1958**	**1958**	**1967**

Table 25

	Percentage of Housing Units Constructed since 1990			
Region	**Below Avg. H&T**	**Above Avg. H**	**Above Avg. H&T**	**Above Avg. T**
Atlanta	33%	22%	14%	34%
Chicago	14%	6%	6%	15%
Denver	27%	17%	12%	19%
Los Angeles	11%	9%	8%	14%
Pittsburgh	10%	3%	3%	8%
Portland	28%	19%	17%	24%
Wtd. Average	**24%**	**16%**	**10%**	**21%**

Housing Choice

Table 27

Neighborhood Type	Weighted Avg. Time	Weighted Avg. Distance	Weighted Avg. Speed	Mode Share	% H	% T	% H+T
Below Avg. H & T (all modes)	**28.8**	**9.9**	**20.3**		**24%**	**15%**	**39%**
by Auto	27.1	9.8	20.8	93%			
by Public Transit	51.6	11.5	12.7	7%			
Above Avg. H (all modes)	**31.1**	**7.6**	**15.7**		**32%**	**15%**	**47%**
by Auto	26.7	8.0	17.9	77%			
by Public Transit	45.9	6.2	8.5	23%			
Above Avg. H & T (all modes)	**29.4**	**8.9**	**18.7**		**34%**	**25%**	**59%**
by Auto	26.8	9.0	19.8	89%			
by Public Transit	50.4	7.7	10.0	11%			
Above Avg. T (all modes)	**29.4**	**12.3**	**24.0**		**26%**	**23%**	**49%**
by Auto	28.4	12.1	24.1	97%			
by Public Transit	64.4	18.9	17.4	3%			
All Neighborhoods (all modes)	**29.4**	**9.8**	**20.0**				

Burdens on Neighborhoods and Regions

Congestion

One hypothesis of this study was whether regions with the greatest shortages of affordable housing or with the highest transportation costs or highest housing costs had higher levels of congestion. To address this question, we mapped the commute speeds by neighborhood for ten regions in comparison to average daily traffic levels on major roads. Placing these maps along side the Housing/Transportation trade-off map created for each of the ten regions shows a strong relationship between congestion and the presence or absence of jobs and affordable housing.

The San Francisco region maps are shown below and the remaining nine regions are at the end of Appendix B.

The Bay Area has the most expensive housing market in the country. It also stands out in that nearly half of its jobs are concentrated in employment centers and 42% of the population lives near these centers. However, as the Housing/Transportation trade-off map on the right shows, the households near these employment centers are generally higher income—the white areas on the map. Looking at these same areas on the congestion map (map on the left), shows these areas also have the slowest commute speeds and that they line the highways leading to the employment centers. In contrast, the areas that have the highest commute speeds are generally the same areas as the Above Avg. H&T and the Above Avg. T neighborhoods —the red and gray areas on the Housing/Transportation trade-off map. The higher speeds in the low and moderate income areas indicate a worker living in one of these neighborhoods is able to begin the commute at a higher rate of travel, because there are lower levels of traffic since few workers are coming into these areas, but probably encounters congestion on the latter part of their commute once the worker reaches the congested highways and roads near the centers.

The percentage of workers that are commuting out of the place where they live in order to access work is highest for the Above Avg. T neighborhoods and typically lowest for the Above Avg. H neighborhoods. However, across the eight regions, this varies. Atlanta has low percentages of households in all four neighborhood types that can live and work in the same place whereas Chicago, Dallas and Portland have more than half their workers in Above Avg. H and Above Avg. H&T neighborhoods that live and work in the same place.

Table 30

	Percent of Workers that Work and Live in Same Place by H+T Neighborhood Type			
Region	Below Avg. H&T	Above Avg. H	Above Avg. H&T	Above Avg. T
Atlanta	23%	33%	35%	21%
Chicago	31%	61%	55%	25%
Denver	30%	48%	41%	27%
Los Angeles	29%	41%	38%	29%
Pittsburgh	22%	44%	34%	14%
Portland	37%	53%	50%	33%
Dallas	41%	58%	57%	38%
San Francisco	35%	45%	35%	30%
Wtd. Average	**30%**	**48%**	**43%**	**27%**

The impact on the higher income neighborhoods near employment centers is heavy traffic, possibly worse air quality, and longer times to work despite the ability to locate closer to work. The impact on the region as more households either commute to concentrated centers surrounded by higher priced housing, or to places around the region but outside the place they live, is clogged and congested major roads that require higher levels of maintenance, traffic safety and enforcement, and capital improvements.

H+T Neighborhood Types compared to highway congestion, commute speeds, and employment centers

Figures 8 and 9 *(Additional comparison maps for 9 other regions are in Appendix B)*
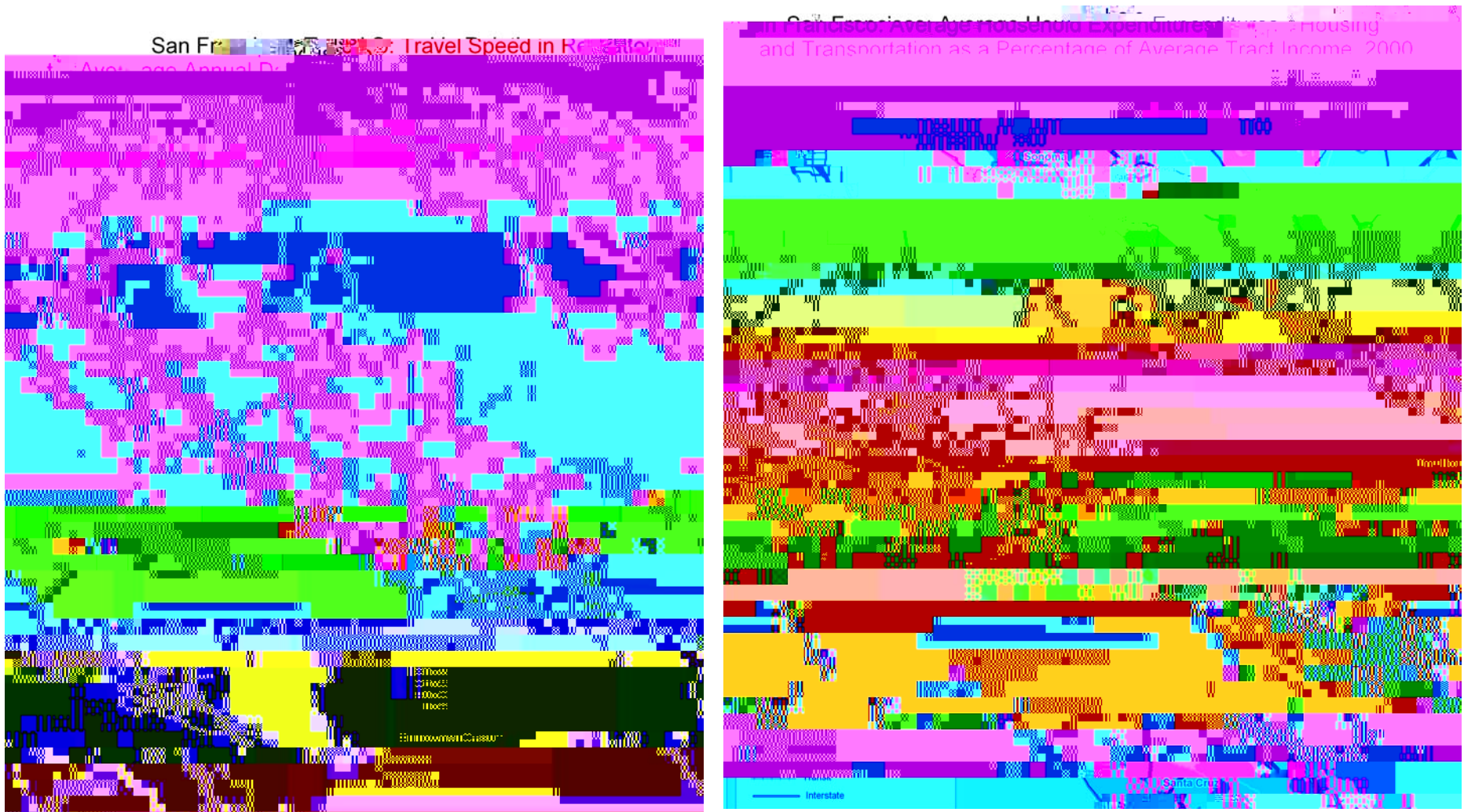
Trends 1990 to 2000

To obtain a sense of whether the patterns we have identified as of 2000 are different than they were in 1990 and therefore might change again, stay the same, or worsen by 2010, we looked at some of the contributing factors to housing and transportation costs in both 1990 and 2000.

The CES surveys indicate from 1990 to 2000 housing and transportation costs rose for most households in the 28 regions at a faster rate than incomes. From 1990 to 2000 the combined costs rose from 41.7% of median income to 52.4%, a 26% increase, while the percentage change in incomes of the surveyed households was 0.3% (adjusted for inflation). The 26% increase in expenditures was during the same period that median incomes, according to the Census, only rose by 4%, on average for all 28 regions. In eight of the regions real incomes dropped. Four regions experienced median income growth greater than 10%; San Francisco, Minneapolis-St. Paul, Portland, OR, and Denver, CO. (See Table A2, Appendix A for 1990 and 2000 Median Income comparisons from the Census by region). While the Census shows more favorable increases in median income than the income growth that was reported in the CES, a 4% increase in income on average is still much less than a 26% increase in household expenditures. Using either measure of income in comparison to the rise in expenditures, suggests expenditures rose faster than incomes during this time period for most households in the majority of the 28 regions.

For eight regions, we compare census tracts that maintained th

6. Summary of Findings

The following points summarize our primary findings. In general, we identified a combination of forces—high income households wanting to live close to suburban job centers; limited affordable units in suburban areas; low transit availability in exurban areas; high income households in urban areas supporting high housing prices in the most accessible locations; moderate income households seeking higher quality and bigger homes being forced to look to places that are 30 miles from the central city; and a lack of employment centers in lower income areas—that combine to leave working households either stretched to afford the housing and/or transportation near jobs; pushed to exurbs in search of higher quality or more spacious housing that they can afford; or left behind in neighborhoods with lower quality housing, concentrated poverty, high unemployment rates, and low accessibility to jobs and daily necessities.

Trade-offs by Income, Place and Tenure

Because households generally live in neighborhoods they are able to afford, neighborhoods are highly segregated by income. In high income neighborhoods, home prices remain high because households have the incomes to afford them and supply matches demand. These neighborhoods are mostly suburban and also have high absolute transportation costs because land uses generally do not support non-auto modes. In low income neighborhoods, low income households have lower costs than if they were to locate in a high income neighborhood, but their costs burdens as a percentage of income are still above regional averages due to lower income levels:

- For households earning $20,000 to less than $50,000, their average combined expenditures on housing and transportation are lowest in Above Avg. H neighborhoods and Above Avg. H&T neighborhoods, the two lower income neighborhood types, but their combined expenditures, from 43% to 62% of income (see Figure 5), are still higher than combined housing and transportation expenditures for households earning $50,000 or more.

Combined costs by neighborhood type vary by tenure:

- As of 2000, combined housing and transportation costs as a percentage of income were *lowest* for **renters** of all income categories, in the Above Avg. H neighborhood type. These neighborhoods provide the greatest mix of housing units and prices, as well as

7. Recommendations

Our findings suggest four major policies:

I. Policies for workforce housing must be paired with policies that both support and improve workforce transportation and with policies to promote better planning of the location and distribution of employment and job centers within regions. Workforce transportation would mean major improvements to the frequency, extent, and capacity of public transit in all regions. Communities would need to be developed and redeveloped in ways that can support transit to and from the employment centers and within communities; this would go a long way toward ensuring that workforce transportation becomes a reality and so households could save money and congestion in regions would be reduced. Targeting employment to areas that already house a substantial number of working families would also highly benefit working households as well as regions by helping these neighborhoods with high rates of unemployment and low educational attainment levels. This was the intent of the Enterprise Zones and Empowerment

likely continue to follow the high income households and abandon or overlook the low income neighborhoods. This policy applies to all metro areas since every region has high concentrations of Above Average H&T neighborhoods. It could be especially helpful for regions with weak central cities, such as Detroit and St. Louis.

IV. Household transportation costs need to be communicated to consumers, policy makers, and planners. Consumers can use the information to make location decisions before they make choices on housing costs alone. Local government planners and policy makers can use the modeled transportation costs to adjust zoning so that commercial and industrial land uses can be proximate to affordable transportation and housing. This will allow some of the many daily household trips to be made on foot or by transit rather than by auto. MPO and State planning staff can use transportation cost maps to plan new transit lines and stations, and compare them to highway options and areas that are targeted for housing growth. Savings to households and communities from reduced congestion could be used as justification for greater expenditures on public transit and community planning. This is another policy that applies to all regions but is especially important to sprawling regions with little or not transit.

Table A2. Growth in Area Median Income 1990 to 2000
(Sorted by Change in Income 1990 to 2000)

MSA	1990 Median Income	1990 Median Adjusted	2000 Median Income	Change 1990-2000
Los Angeles-Anaheim-Riverside, CA CMSA	$36,711	$49,193	$45,903	-7%
Anchorage, AK MSA	$43,946	$58,888	$55,546	-6%
Honolulu, HI MSA	$40,581	$54,379	$51,914	-5%
Boston-Lawrence-Salem, MA-NH CMSA	$40,666	$54,492	$52,792	-3%
New York-Northern New Jersey-Long Island, NY-NJ-CT CMSA	$38,445	$51,516	$50,795	-1%
Washington, DC-MD-VA MSA	$46,884	$62,825	$62,216	-1%
Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD CMSA	$35,797	$47,968	$47,528	-1%
San Diego, CA MSA	$35,022	$46,929	$47,067	0%
Miami-Fort Lauderdale, FL CMSA	$28,503	$38,194	$38,632	1%
Baltimore, MD MSA	$36,550	$48,977	$49,938	2%
Cleveland-Akron-Lorain, OH CMSA	$30,332	$40,645	$42,215	4%
St. Louis, MO-IL MSA	$31,774	$42,577	$44,437	4%
Pittsburgh-Beaver Valley, PA CMSA	$26,501	$35,511	$37,467	6%
Detroit-Ann Arbor, MI CMSA	$34,729	$46,537	$49,160	6%
Chicago-Gary-Lake County, IL-IN-WI CMSA	$35,918	$48,130	$51,046	6%
Houston-Galveston-Brazoria, TX CMSA	$31,488	$42,194	$44,761	6%
Milwaukee-Racine, WI CMSA	$32,359	$43,361	$46,132	6%
Tampa-St. Petersburg-Clearwater, FL MSA	$26,036	$34,888	$37,406	7%
Atlanta, GA MSA	$36,051	$48,308	$51,948	8%
Dallas-Fort Worth, TX CMSA	$32,825	$43,986	$47,418	8%
Seattle-Tacoma, WA CMSA	$35,047	$46,963	$50,733	8%
Cincinnati-Hamilton, OH-KY-IN CMSA	$30,977	$41,509	$44,914	8%
Phoenix, AZ MSA	$30,797	$41,268	$44,752	8%
Kansas City, MO-KS MSA	$31,613	$42,361	$46,193	9%
Minneapolis-St. Paul, MN-WI MSA	$36,565	$48,997	$54,304	11%
Portland, OR PMSA, Portland-Vancouver, OR-WA CMSA	$30,930	$41,446	$46,090	11%
San Francisco-Oakland-San Jose, CA CMSA	$41,459	$55,555	$62,024	12%
Denver-Boulder, CO CMSA	$33,126	$44,389	$51,088	15%
Average	$34,701	$46,500	$48,372	4%

MSA 2000	30% AMI	50% AMI	80% AMI	100% AMI	120% AMI	Total HHS*	% of HHS >30% to 50% AMI	% of HHS >50 to 80% AMI	No. of HHS >30 to 80% AMI
Anchorage, AK MSA	$16,664	$27,773	$44,437	$55,546	$66,655	94,479	11%	17%	26,063
Atlanta, GA MSA	$15,584	$25,974	$41,558	$51,948	$62,338	1,460,540	10%	18%	405,034
Baltimore PMSA	$14,981	$24,969	$39,950	$49,938	$59,926	959,047	10%	16%	254,932
Boston-Worcester-Lawrence, MA-NH-ME-CT CMSA	$15,838	$26,396	$42,234	$52,792	$63,350	2,011,887	10%	15%	516,228
Chicago-Gary-Kenosha, IL-IN-WI CMSA	$15,314	$25,523	$40,837	$51,046	$61,255	3,268,555	10%	16%	871,343
Cincinnati-Hamilton, OH-KY-IN CMSA	$13,474	$22,457	$35,931	$44,914	$53,897	706,164	11%	17%	193,350
Cleveland-Akron, OH CMSA	$12,665	$21,108	$33,772	$42,215	$50,658	1,166,919	11%	16%	314,840

Appendix B – 28 Metro Profiles

This section provides a profile on each of the 28 metro areas in the study. For each of the metropolitan areas, the profile includes the following sections. Following the 28 metro profiles are congestion maps of 9 of the regions referenced in the main paper.

1. **Profile:** This table provides a quick profile on the housing stock, current prices in the market, e.g. hot, cool, and an assessment of the affordable housing supply; the transportation choices in the region defined by the non-auto mode share to work and the size of the transit system; and the jobs/housing relationship, e.g. what percent of jobs are in employment centers and what percent of the population lives near employment centers.

2. **Region Housing + Transportation Neighborhood Map:** Map of the region's neighborhoods (tracts) according to the portion of income the average income households in each neighborhood are spending on housing and tran

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 50% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 72%. These households pay 24% to 43% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost ne

Anchorage

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	59,816	-	42,895	11,920	114,631
% Transit	1%	0%	3%	1%	2%
Time all	18.3	-	16.9	22.5	18.2
Distance all	6.5	-	4.4	13.1	6.4
Speed All	20.8	-	15.6	33.2	20.2
Transit Commuters					
Time Transit	36.7	-	33.5	31.2	34.1
Distance Transit	5.3	-	3.1	10.2	4.2
Speed Transit	10.7	-	7.0	17.7	8.8
Auto Commuters					
Time Car	18.2	-	16.3	22.3	17.9
Distance Car	6.5	-	4.4	13.1	6.4
Speed Car	20.9	-	15.9	33.4	20.4

Expenditures by Income	Central City EC	Outside an EC
$0-<$20,000		
% Income on Housing	64%	68%
% Income on Transport.	6rt. 6rt.-0.0(-0.046 0 0 .5(-)]TJ6.0141[5(-)]T1uTw[$8.)-13( )-5086.3( )-6.3( )-6.3( )-6.3( )-5094.3	

Atlanta, GA MSA

Center for Neighborhood Technology with Virginia Tech

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods, have the greatest share of households in the region, 37% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 71%. These households pay 24% to 43% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 27% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 68%. These households pay 48% to 119% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Atlanta

Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	64%	64%	127%	66%	52%	119%	53%	73%	126%	58%	61%	119%	59%	62%	121%

Atlanta

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	712,093	299,833	440,446	377,445	1,829,817
% Transit	1%	6%	9%	1%	4%
Time all	31.7	27.9	32.2	33.2	31.5
Distance all	11.4	8.5	10.4	14.6	11.4
Speed All	21.3	18.5	20.5	25.9	21.6
Transit Commuters					
Time Transit	48.4	46.4	56.6	53.3	52.6
Distance Transit	12.1	7.3	8.7	13.5	8.9
Speed Transit	16.5	10.8	11.1	20.9	12.1
Auto Commuters					
Time Car	31.4	26.7	29.9	33.1	30.7
Distance Car	11.4	8.6	10.5	14.6	11.5
Speed Car	21.4	19.0	21.4	25.9	22.0

Expenditures by Income   Central City

Baltimore, MD PMSA

Profile: Baltimore, MD PMSA	
Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Lukewarm Densifying Market
Households earning 30-50% HAMFI with Severe Burden:	15%
Affordable Housing Shortage:	Low
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	11%, Medium Rail System, 50
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	20%, 29%

Baltimore: Average Household Expenditures on Housing and Transportation as a Percentage of Average Tract Income, 2000
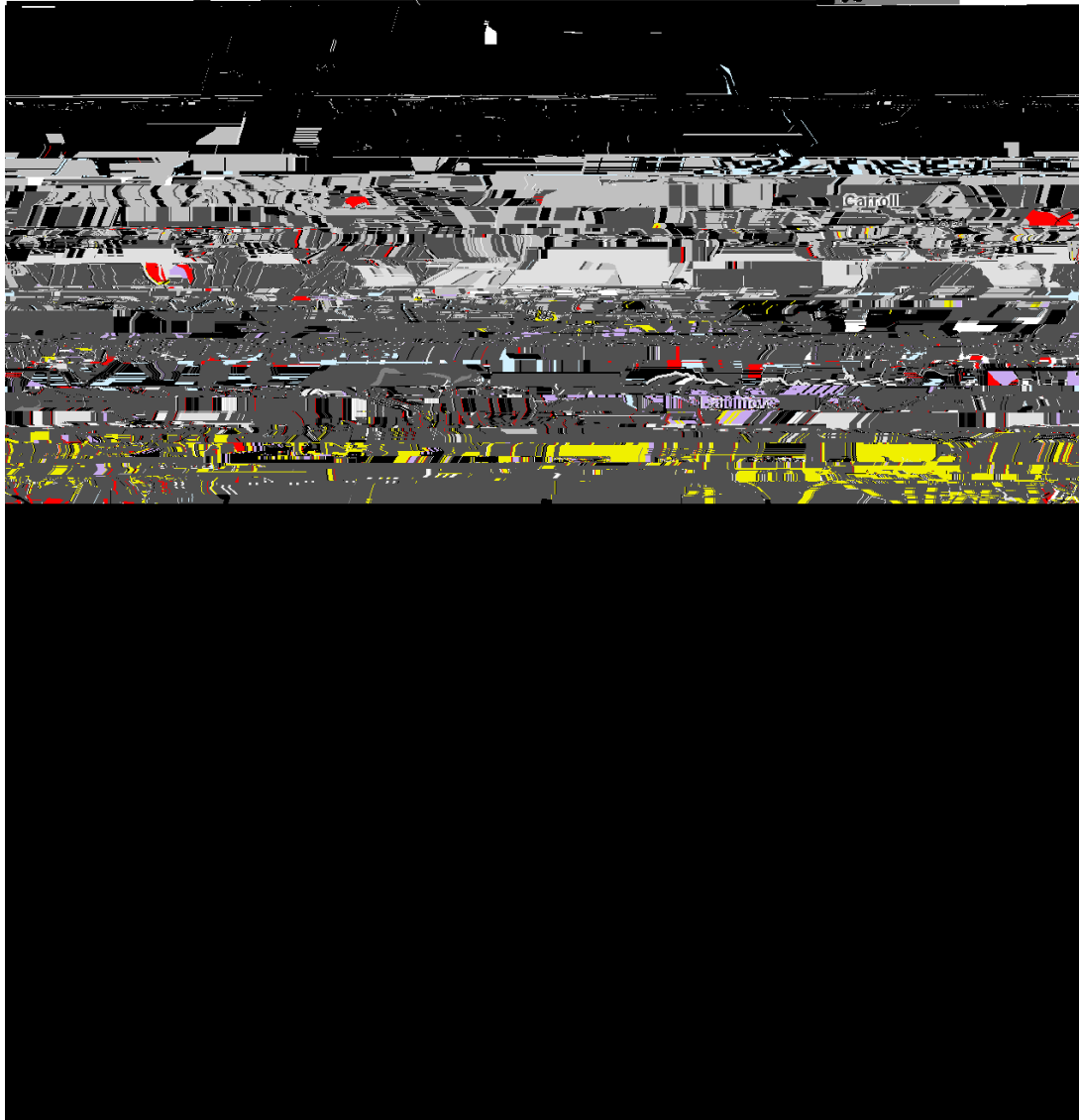
Baltimore

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	522,264	101,609	236,691	257,050	1,117,614
% Transit	3%	14%	15%	2%	6%
Time all	29.9	29.7	31.6	29.7	30.2
Distance all	11.6	7.7	8.5	11.9	10.7
Speed All	22.6	16.0	17.4	23.2	21.0
Transit Commuters					
Time Transit	60.1	49.2	51.5	52.8	52.9
Distance Transit	17.5	6.6	6.0	15.2	9.2
Speed Transit	17.4	8.4	8.1	16.9	10.7
Auto Commuters					
Time Car	29.0	26.6	28.0	29.2	28.7
Distance Car	11.4	7.9	9.0	11.9	10.8
Speed Car	22.7	17.2	19.1	23.4	21.7

Household Expenditures by Income and Proximity to Employment Baltimore, MD PMSA			
Expenditures by Income	**Central City EC**	**Other ECs**	**Outside an EC**
$0-<$20,000			
% Income on Housing	55%	59%	57%
% Income on Transport.	44%	51%	57%
% Income on H+T	99%	110%	114%
$20,000 - <$35,000			
% Income on Housing	26%	32%	31%
% Income on Transport.	24%	32%	35%
% Income on H+T	50%	65%	66%
$35,000 - <$50,000			
% Income on Housing	19%	23%	24%
% Income on Transport.	17%	24%	25%
% Income on H+T	36%	47%	49%
$50,000 - <$75,000			
% Income on Housing	15%	19%	19%
% Income on Transport.	13%	17%	18%
% Income on H+T	27%	36%	37%
$75,000 - <$100,000			
% Income on Housing	12%	15%	16%
% Income on Transport.	9%	13%	14%
% Income on H+T	21%	28%	29%
$100,000 - <$250,000			
% Income on Housing	10%	12%	12%
% Income on Transport.	6%	8%	9%
% Income on H+T	16%	20%	21%
Average of All Incomes			
% Income on Housing	32%	27%	26%
% Income on Transport.	20%	19%	20%
% Income on H+T	52%	46%	46%
Owner Median Income	$41,993	$60,368	$59,904
Renter Median Income	$21,657	$37,572	$34,350
Median Income	$27,376	$51,282	$52,668

Boston, MA CMSA

Profile: Boston, MA CMSA	
Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Lukewarm Sprawling Market
Households earning 30-50% HAMFI with Severe Burden:	17%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	14%, Extensive Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	33%, 32%

Boston: Average Household Expenditures on Housing

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 35% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 71%. These households pay 25% to 43% of their income for housing and transportation (Fig. 1).

Above Average Transportation cost neighborhoods have the second greatest share of households in the region, 26% (Fig. 2). Households earning $50,000 or more annually are the majority of households in these neighborhoods, at 56%. These households pay 24% to 42% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Boston

Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	58%	62%	120%	61%	43%	104%	53%	68%	122%	54%	54%	108%	56%	56%	112%
$20,000 - <$35,000	36%	38%	73%	37%	24%	61%	31%	42%	72%	30%	33%	63%	33%	34%	68%

Chicago, IL CMSA

Profile: Chicago, IL CMSA

Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Lukewarm Sprawling Market
Households earning 30-50% HAMFI with Severe Burden:	16%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	15%, Extensive Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	30%, 34%
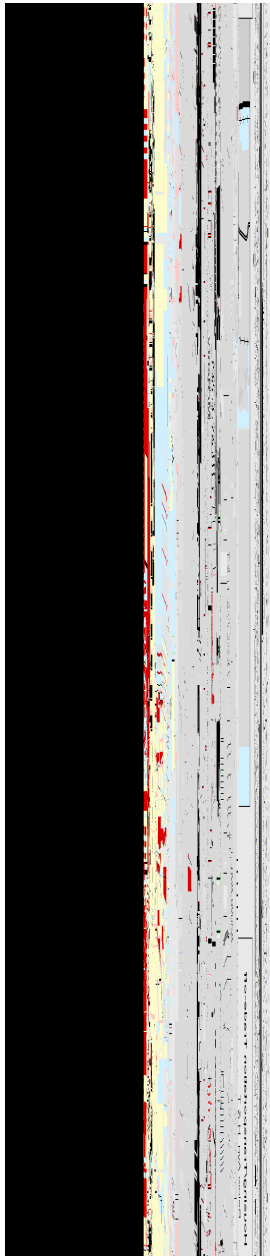
Cincinnati, OH CMSA

Profile: Cincinnati, OH CMSA

Combined Housing and Transportation Category:	Low H, High T
Housing Market:	Cool Sprawling Market
Households earning 30-50% HAMFI with Severe Burden:	11%
Affordable Housing Shortage:	Low
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	5%, No Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	16%, 25%

Cincinnati

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T

Cleveland, OH CMSA

Profile: Cleveland, OH CMSA	
Combined Housing and Transportation Category:	Low H, High T
Housing Market:	Cool Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	16%
Affordable Housing Shortage:	Low
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	6%, Medium Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	14%, 20%

Cleveland: Average Household Expenditures on Housing and Transportation as a Percentage of Income

Center for Neighborhood Technology with Virginia Tech

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 43% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 57%. These households pay 23% to 38% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 35% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 78%. These households pay 43% to 105% of their income for housing and transportation (Fig 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Cleveland	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	52%	56%	107%	57%	47%	104%	47%	65%	113%	53%	53%	105%	52%	55%	107%
$20,000 - <$35,000	29%	35%	64%	29%	29%	58%	25%	40%	66%	25%	33%	58%	27%	35%	62%
$35,000 - <$50,000	23%	26%	48%	22%	21%	43%	20%	29%	50%	19%	24%	43%	21%	26%	47%
$50,000 - <$75,000	19%	19%	38%	18%	16%	34%	17%	22%	39%	15%	18%	33%	18%	19%	37%
$75,000 - <$100,000	16%	15%	31%	14%	12%	27%	14%	16%	30%	12%	13%	26%	15%	15%	30%
$100,000 - <$250,000	13%	10%	23%	12%	8%	20%	11%	11%	22%	10%	9%	19%	12%	10%	22%
TOTAL	23%	19%	42%	29%	19%	48%	24%	26%	49%	32%	28%	60%	26%	22%	49%

Fig. 2 Distribution of Households by Income by Neighborhood Type

Cleveland					
		% of HHS in	% in		% of HHS in
Income Category	# of HHS	Quad	Region	# of HHS	Quady8 r0-39.8(2 72.48 r07 d)T#.56e6 I-75 0196 scn0.008 Tc0 Tw(C)13(I)8.5(ev)19.1(e)9.5(I)8.5(an)6. 72.48 r07 d

Cleveland

Commuter Characteritics	Below Avg H&T

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 41% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 68%. These households pay 24% to 40% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 26% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 73%. These households pay 45% to 115% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Dallas	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	62%	59%	122%	62%	48%	111%	51%	67%	119%	55%	60%	115%	57%	59%	116%
$20,000 - <$35,000	34%	36%	70%	31%	29%	59%	26%	40%	66%	26%	36%	62%	29%	35%	64%
$35,000 - <$50,000	26%	26%	52%	22%	21%	43%	19%	29%	48%	19%	26%	45%	22%	26%	48%
$50,000 - <$75,000	21%	20%	40%	18%	16%	34%	16%	22%	37%	15%	19%	34%	18%	19%	38%
$75,000 - <$100,000	17%	15%	32%	16%	12%	28%	13%	16%	30%	13%	14%	27%	16%	15%	30%
$100,000 - <$250,000	14%	10%	24%	13%	8%	22%	11%	11%	22%	10%	10%	20%	13%	10%	23%
TOTAL	23%	17%	40%	28%	18%	46%	24%	26%	50%	30%	28%	58%	26%	21%	47%

Fig. 2: Distribution of Households by Income by Neighborhood Type

Dallas						
		% of HHS in	% in		% of HHS in	% in
Income Category	# of HHS	Quad	Region	# of HHS	Quad	Region	# of HHS

spend the most time by transit, 52.8 minutes, while households in Below Average Housing and Transportation neighborhoods go the farthest distances by transit, 12.7 miles.

Dallas

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	971,310	320,454	518,054	447,043	2,256,861
% Transit	1%	3%	4%	1%	2%
Time all	27.2	25.3	27.7	30.7	27.7
Distance all	10.3	8.0	9.5	13.8	10.5
Speed All	22.2	19.0	20.9	25.8	22.2
Transit Commuters					
Time Transit	49.1	47.3	52.8	49.0	50.3
Distance Transit	12.7	6.7	7.7	9.7	8.6
Speed Transit	17.0	10.5	11.0	13.7	12.3
Auto Commuters					
Time Car	27.0	24.5	26.7	30.6	27.3
Distance Car	10.3	8.0	9.6	13.8	10.5
Speed Car	22.2	19.3	21.3	25.9	22.3

Household Expenditures by Income and Proximity to Employment
Dallas, TX CMSA

Expenditures by Income	Central City EC	Other ECs	Outside an EC
$0-<$20,000			
% Income on Housing	60%	62%	58%
% Income on Transport.	52%	54%	63%
% Income on H+T	112%	116%	121%
$20,000 - <$35,000			
% Income on Housing	29%	31%	30%
% Income on Transport.	30%	33%	38%
% Income on H+T	59%	64%	68%
$35,000 - <$50,000			
% Income on Housing	22%	23%	22%
% Income on Transport.	22%	24%	28%
% Income on H+T	43%	46%	50%
$50,000 - <$75,000			
% Income on Housing	17%	18%	18%
% Income on Transport.	16%	17%	20%
% Income on H+T	33%	36%	38%
$75,000 - <$100,000			
% Income on Housing	14%	15%	14%
% Income on Transport.	11%	12%	15%
% Income on H+T	25%	28%	29%
$100,000 - <$250,000			
% Income on Housing	11%	12%	11%
% Income on Transport.	7%	8%	10%
% Income on H+T	18%	20%	21%
Average of All Incomes			
% Income on Housing	28%	27%	25%
% Income on Transport.	22%	20%	23%
% Income on H+T	51%	48%	49%
Owner Median Income	$62,451	$65,631	$59,949
Renter Median Income	$34,916	$38,539	$35,901
Median Income	$45,334	$51,576	$50,449

Denver, CO CMSA

Profile: Denver, CO CMSA	
Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Cool Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	20%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	7%, Small Expanding Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	27%, 33%
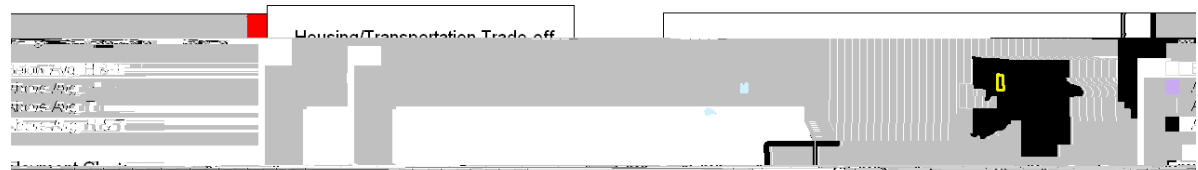
Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 42% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 71%. These households pay 24% to 42% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 29% (Fig. 2). Households

Denver

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	522,801	157,650	312,383	179,576	1,172,410
% Transit	3%	8%	7%	3%	5%
Time all	26.0	24.3	25.7	27.3	25.9
Distance all	8.9	6.8	7.7	10.9	8.6
Speed All	20.4	16.7	18.0	23.5	19.7
Transit Commuters					
Time Transit	46.5	36.9	42.1	47.9	42.8
Distance Transit	11.1	5.7	6.5	10.5	8.1
Speed Transit	14.7	9.2	10.2	14.5	11.7
Auto Commuters					
Time Car	25.4	23.3	24.6	26.7	25.1
Distance Car	8.9	6.9	7.8	10.9	8.6
Speed Car	20.6	17.3	18.6	23.7	20.1

Expenditures by Income   Central City EC   Other ECs   Outside an EC

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 44% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 66%. These households pay 23% to 39% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 28% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 72%. These households pay 43% to 113% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Detroit	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	54%	58%	113%	61%	55%	116%	49%	64%	113%	56%	57%	113%	55%	58%	113%
$20,000 - <$35,000	29%	36%	65%	34%	33%	67%	25%	40%	65%	26%	34%	60%	27%	36%	63%
$35,000 - <$50,000	23%	26%	49%	25%	24%	49%	20%	29%	48%	18%	25%	43%	21%	26%	47%
$50,000 - <$75,000	19%	19%	39%	19%	18%	37%	16%	21%	38%	14%	18%	33%	18%	19%	37%
$75,000 - <$100,000	16%	15%	31%	16%	13%	30%	13%	16%	30%	12%	14%	26%	15%	15%	30%
$100,000 - <$250,000	13%	10%	23%	13%	9%	22%	11%	11%	22%	9%	9%	18%	12%	10%	22%
TOTAL	22%	17%	39%	28%	18%	45%	23%	24%	46%	31%	27%	57%	25%	21%	46%

Fig. 2: Distribution of Households by Income by Neighborhood Type

Detroit

Detroit

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	1,062,297	221,918	498,523	422,757	2,205,495
% Transit	0%	2%	6%	0%	2%
Time all	26.4	25.5	26.6	27.0	26.4
Distance all	10.3	9.3	8.9	12.0	10.2
Speed All	22.6	21.2	20.7	25.1	22.5
Transit Commuters					
Time Trans	41 (.6I(41s)9..)9.	207	212	4(21.)48(9)TJ6.0111 0 TD0.00	

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 39% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 69%. These households pay 25% to 40% of their income for housing and transportation (Fig. 1).

Above Average Housing cost neighborhoods have the second greatest share of households in the region, 24% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 61%. These households pay 40% to 99% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Honolulu	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	62%	51%	113%	64%	35%	99%	54%	59%	113%	61%	51%	113%	61%	47%	108%
$20,000 - <$35,000	37%	31%	67%	36%	19%	55%	31%	36%	67%	34%	31%	66%	35%	28%	63%
$35,000 - <$50,000	28%	23%	50%	26%	15%	40%	26%	26%	52%	27%	23%	50%	27%	21%	48%
$50,000 - <$75,000	23%	17%	40%	22%	12%	34%	20%	19%	39%	23%	18%	40%	22%	16%	39%
$75,000 - <$100,000	20%	13%	33%	19%	10%	29%	18%	14%	32%	22%	14%	36%	20%	13%	32%
$100,000 - <$250,000	16%	8%	25%	16%	7%	23%	15%	10%	24%	16%	9%	25%	16%	8%	24%
TOTAL	25%	13%	39%	34%	13%	47%	27%	19%	46%	34%	21%	54%	30%	16%	45%

Fig. 2: Distribution of Households by Income by Neighborhood Type

Honolulu		% of HHS in	% in		% of HHS in	% in		% of HHS in	% in		% of HHS in	% in		% in
Income Category	# of HHS	Quad	Region	# of HHS	Quad	Region	# of HHS	Quad	Region	# of HHS	Quad	Region	# of HHS	Region
$0-<$20,000	6,015	7%	3%	11,855	22%	5%	4,458	15%	2%	12,031	23%	5%	34,359	16%
$20,000 - <$35,000	9,234	11%	4%	11,056	21%	5%	4,652	16%	2%	9,903	19%	5%	34,845	16%
$35,000 - <$50,000	10,528	12%	5%	9,350	180.7(35)-9.2(0)T5%	4	23%	5%	34,355	16%				

0 - <$50,000   1028   12%-9.2(5)T5% 9,350 16%   23%   5%   34,35 9

FULL

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 37% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 68%. These households pay 23% to 40% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 30% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 74%. These households pay 44% to 115% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Houston Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	61%	62%	123%	62%	49%	112%	49%	69%	119%	54%	61%	115%	56%	60%	116%

Houston

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	729,436	322,398	476,919	290,772	1,819,525
% Transit	2%	5%	6%	1%	3%
Time all	29.5	27.2	29.3	30.5	29.2
Distance all	11.7	8.5	9.6	13.5	10.9
Speed All	22.7	18.5	20.6	26.2	22.0
Transit Commuters					
Time Transit	50.5	46.5	54.2	54.6	51.3
Distance Transit	17.5	8.2	7.9	12.0	10.6
Speed Transit	20.8	11.8	10.7	15.5	13.8
Auto Commuters					
Time Car	29.0	26.2	27.7	30.2	28.4
Distance Car	11.5	8.5	9.7	13.6	10.9
Speed Car	22.8	18.9	21.2	26.3	22.3

Expenditures by Income	Central City EC	Other ECs	Outside an EC
$0-<$20,000			
% Income on Housing	61%	59%	56%
% Income on Transport.	50%	55%	65%
% Income on H+T	111%	115%	121%
$20,000 - <$35,000			
% Income on Housing	29%	29%	28%
% Income on Transport.	29%	34%	39%
% Income on H+T	58%	63%	66%
$m<$350000			

Kansas City, MO-KS MSA

Profile: Kansas City, MO-KS MSA	
Combined Housing and Transportation Category:	Low H, High T
Housing Market:	Cool Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	15%
Affordable Housing Shortage:	Low
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	3%, New Start Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	18%, 24%
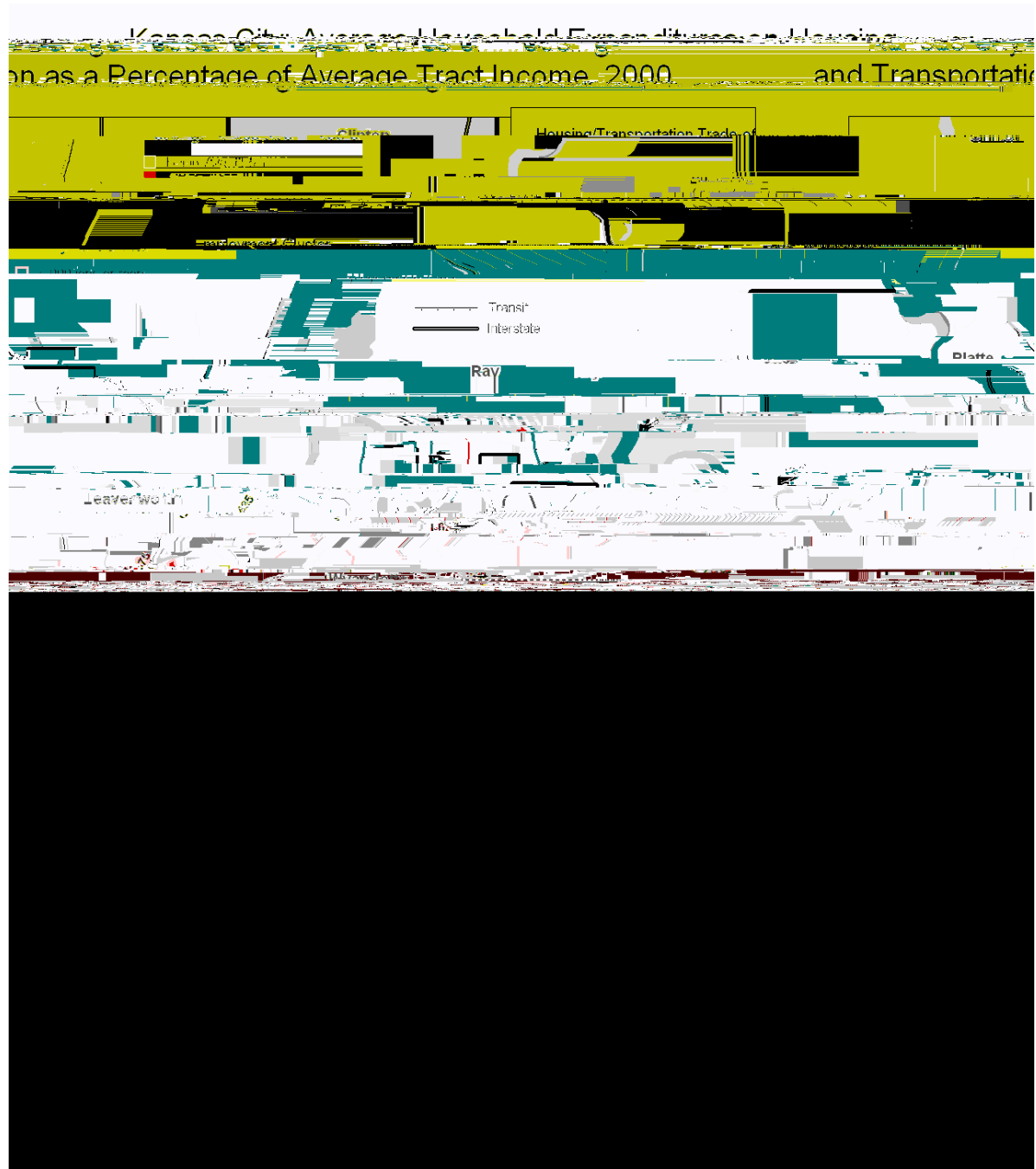
Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 38% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 64%. These households pay 23% to 39% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 27% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 74%. These households pay 43% to 109% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Kansas Cit

Los Angeles, CA CMSA

Profile: Los Angeles, CA CMSA

Combined Housing and Transportation Category:	High H, Med T
Housing Market:	Hot Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	28%
Affordable Housing Shortage:	High
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	8%, Large Rail System

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 40% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 65%. These households pay 25% to 43% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 28% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 72%. These households pay 46% to 111% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Los Angeles

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	2,442,147	915,791	1,452,612	903,265	5,713,815
% Transit	2%	7%	11%	2%	5%
Time all	29.2	28.7.77er.1(%)TJT0.0095 Tc-0.011 Tw[(Ti)11.9(me al)11.9(l)-9213.8(2)6.			

Miami, FL CMSA

Profile: Miami, FL CMSA

Combined Housing and Transportation Category:	High H, Med T
Housing Market:	Hot Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	42%
Affordable Housing Shortage:	High

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 43% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 59%. These households pay 24% to 42% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 34% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 78%. These households pay 45% to 111% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Miami

neighborhoods, 9.5 miles. Households in Above Average Transportation neighborhoods also have the longest transit commute by time, 57.6 minutes.

Miami

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	697,770	166,590	431,835	171,128	1,467,323
% Transit	2%	5%	8%	3%	4%
Time all	29.2	28.7	29.4	29.4	29.2
Distance all	9.5	7.9	7.6	9.6	8.7
Speed All	19.2	16.6	16.3	19.8	18.1
Transit Commuters					
Time Transit	53.7	46.2	52.1	57.6	52.0
Distance Transit	10.6	6.3	6.6	10.3	7.6
Speed Transit	13.5	9.7	9.3	12.5	10.4
Auto Commuters					
Time Car	28.8	27.7	27.4	28.7	28.3
Distance Car	9.5	8.0	7.7	9.5	8.8
Speed Car	19.3	17.0	16.8	19.9	18.4

Household Expenditures by Income and Proximity to Employment
Miami, FL CMSA

Expenditures by Income	Central City EC	Other ECs	Outside an EC
$0-<$20,000			
% Income on Housing	62%	67%	66%
% Income on Transport.	47%	54%	57%
% Income on H+T	109%	121%	123%
$20,000 - <$35,000			
% Income on Housing	32%	37%	37%
% Income on Transport.	28%	32%	34%
% Income on H+T	60%	69%	71%
$35,000 - <$50,000			
% Income on Housing	24%	28%	27%
% Income on Transport.	20%	23%	24%
% Income on H+T	44%	51%	51%
$50,000 - <$75,000			
% Income on Housing	18%	22%	21%
% Income on Transport.	14%	17%	18%
% Income on H+T	33%	39%	39%
$75,000 - <$100,000			
% Income on Housing	15%	18%	16%
% Income on Transport.	10%	13%	13%
% Income on H+T	25%	30%	30%
$100,000 - <$250,000			
% Income on Housing	11%	13%	12%
% Income on Transport.	7%	8%	9%
% Income on H+T	18%	21%	21%
Average of All Incomes			
% Income on Housing	37%	32%	32%
% Income on Transport.	22%	19%	21%
% Income on H+T	59%	51%	53%
Owner Median Income	$42,276	$56,081	$49,784
Renter Median Income	$23,447	$32,743	$31,333
Median Income	$31,414	$47,615	$43,870

Milwaukee, WI CMSA

Profile: Milwaukee, WI CMSA

Combined Housing and Transportation Category:	Low H, High T
Housing Market:	Lukewarm Low-Med Density Market
Households earning 30-50% HAMFI with Severe Burden:	15%
Affordable Housing Shortage:	Low
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have

Minneapolis, MN MSA

Profile: Minneapolis, MN MSA	
Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Lukewarm Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	13%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	7%, New Start Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	24%, 34%
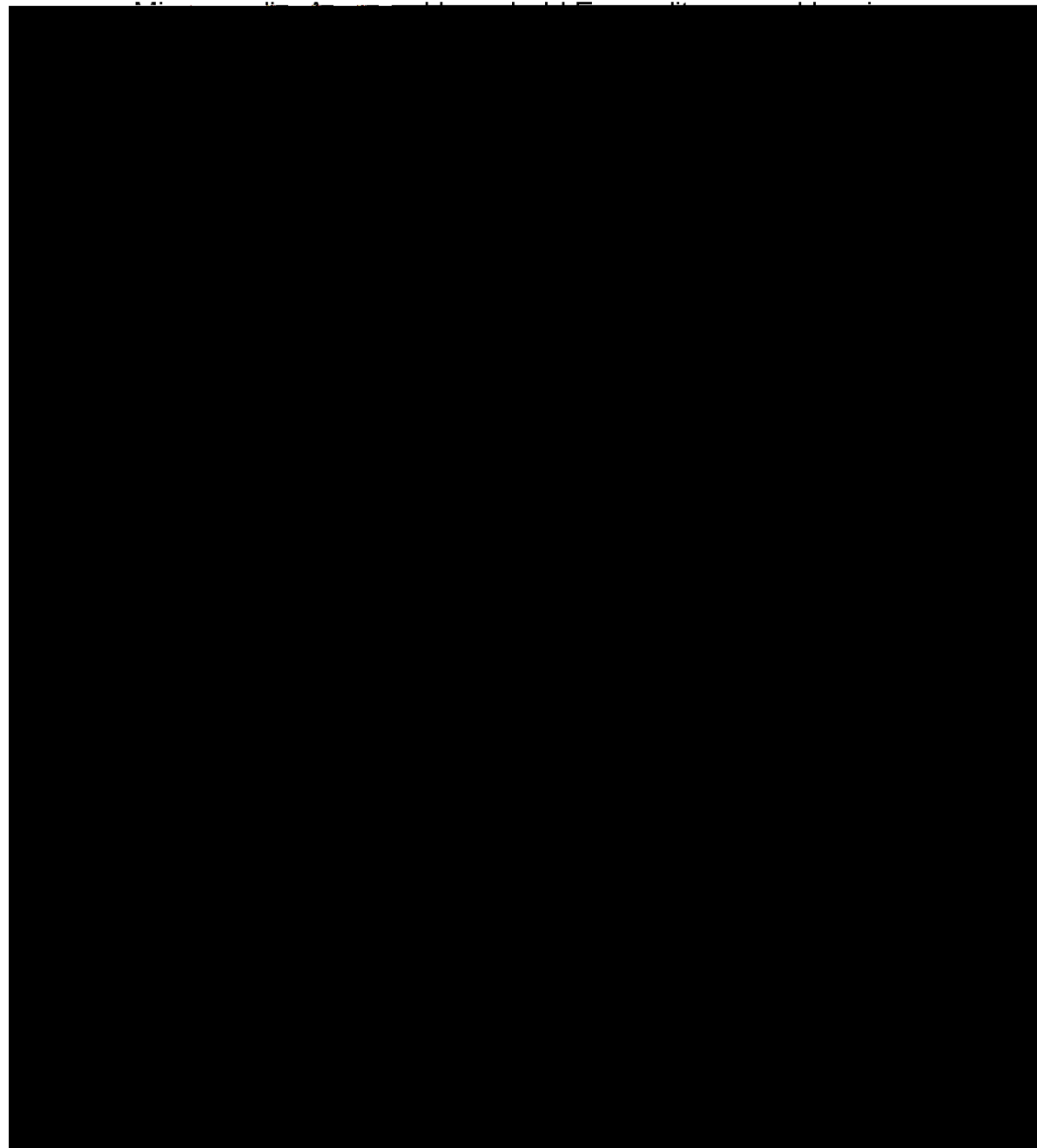
Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 42% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 70%. These households pay 23% to 40% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 26% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 63%. These households pay 46% to 106% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

| Mn-St Paul Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	57%	56%	113%	56%	43%	99%	49%	65%	114%	53%	53%	106%	54%	54%	107%
$20,000 - <$35,000	32%	35%	67%	30%	27%	58%	29%	40%	69%	29%	33%	62%	30%	34%	64%
$35,000 - <$50,000	25%	26%	51%	23%	21%	44%	23%	30%	53%	21%	25%	46%	23%	26%	49%
$50,000 - <$75,000	21%	19%	40%	18%	16%	34%	19%	22%	41%	18%	19%	36%	19%	19%	39%

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 31% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 69%. These households pay 24% to 41% of their income for housing and transportation (Fig. 1).

Above Average Transportation cost neighborhoods have the second greatest share of households in the region, 26% (Fig. 2). Households earning $50,000 or more annually are the majority of households in these neighborhoods, at 60%. These households pay 25% to 43% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

New York

Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	67%	47%	114%	67%	34%	101%	62%	62%	124%	61%	47%	108%	64%	45%	109%
$20,000 - <$35,000	41%	28%	69%	34%	17%	51%	36%	38%	74%	34%	27%	61%	36%	27%	63%
$35,000 - <$50,000	31%	21%	51%	24%	12%	36%	28%	28%	55%	25%	21%	46%	27%	20%	47%
$50,000 - <$75,000	25%	16%	41%	19%	9%	28%	23%	20%	43%	20%	16%	36%	22%	16%	38%
$75,000 - <$100,000	21%	12%	34%	16%	7%	23%	19%	15%	34%	17%	12%	29%	19%	13%	31%
$100,000 - <$250,000	16%	8%	24%	13%	5%	17%	14%	10%	25%	13%	8%	21%	15%	8%	23%
TOTAL	28%	1,ory	(ry).6759.6(1o69.6(,4)-1191.4(10()-175()-1191.4759.5(55%)91750.9(1)91.4(0()-177/TT4(o)0(ry)-23/TT48()-175()-1191.4761.2((											

Philadelphia, PA CMSA

Profile: Philadelphia, PA CMSA

Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Hot Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	18%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	13%, Extensive Rail System

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 40% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 64%. These households pay 24% to 39% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 26% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 69%. These households pay 46% to 109% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Philadelphia	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	59%	53%	111%	60%	43%	104%	55%	64%	119%	56%	53%	109%	57%	52%	110%
$20,000 - <$35,000	33%	33%	65%	30%	25%	55%	31%	40%	71%	29%	33%	62%	31%	33%	63%
$35,000 - <$50,000	25%	24%	50%	23%	19%	41%	24%	29%	53%	22%	24%	46%	24%	24%	48%
$50,000 - <$75,000	21%	18%	39%	18%	14%	32%	20%	21%	41%	18%	18%	36%	19%	19%	38%
$75,000 - <$100,000	18%	14%	32%	15%	11%	26%	16%	16%	32%	15%	14%	29%	17%	14%	31%
$100,000 - <$250,000	14%	10%	24%	13%	8%	20%	13%	11%	24%	12%	10%	21%	13%	10%	23%
TOTAL	25%	16%	41%	31%	17%	48%	26%	22%	48%	32%	25%	57%	28%	20%	47%

Fig. 2: Distribution of Households by Income by Neighborhood Type

Philadelphia

Philadelphia

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	1,079,355	310,519	547,584	514,955	2,452,413
% Transit	7%	21%	15%	2%	9%
Time all	28.4	31.4	28.4	26.7	28.4
Distance all	9.3	7.6	8.3	10.7	9.1
Speed All	19.0	14.9	18.0	23.0	19.1
Transit Commuters					
Time Transit	50.8	45.2	46.5	51.8	47.8
Distance Transit	12.1	6.7	6.5	13.8	8.7
Speed Transit	13.5	8.7	9.0	16.3	10.7

Phoenix, AZ MSA

Profile: Phoenix, AZ MSA	
Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Hot Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	26%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	5%, New Start Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	28%, 32%
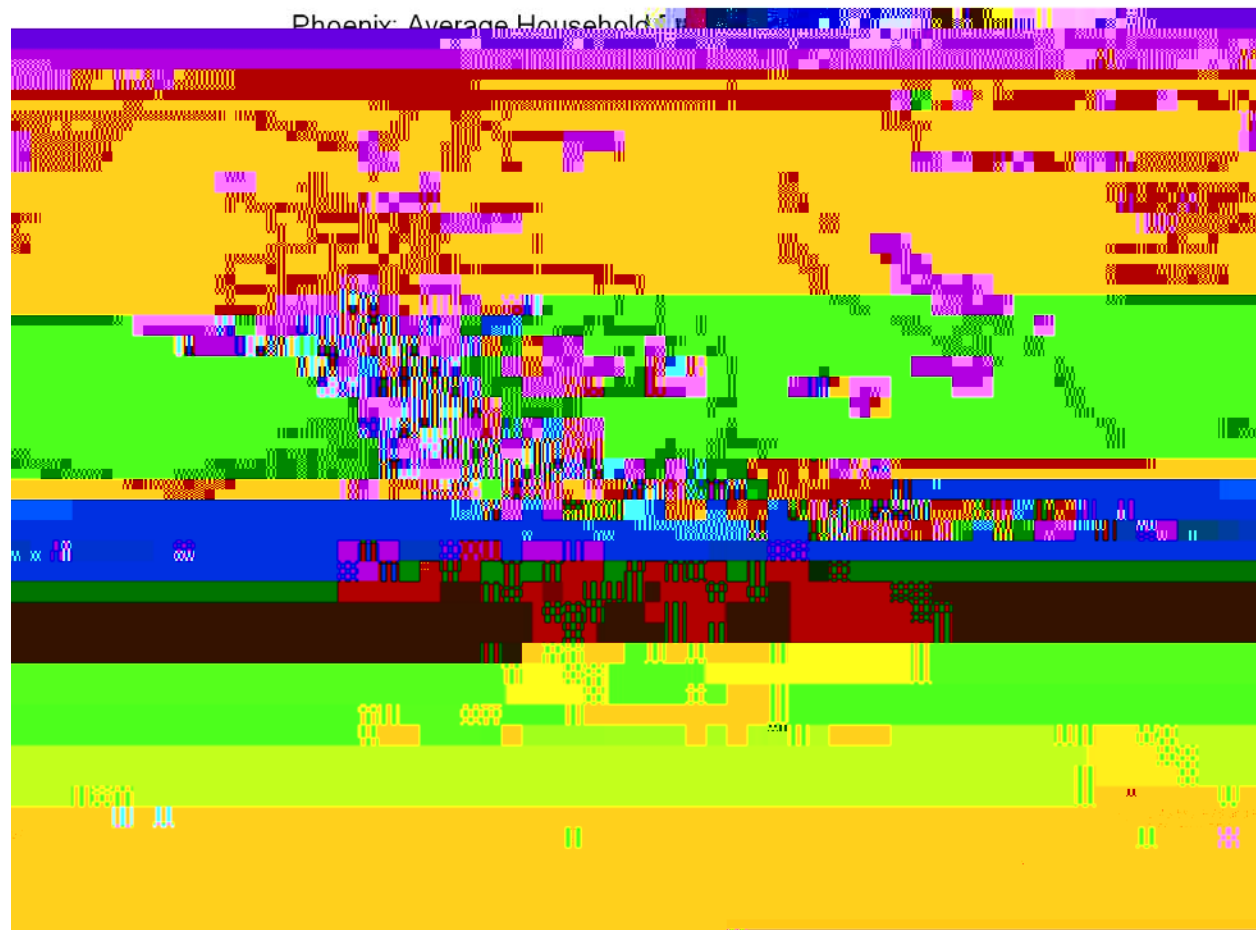
Center for Neighborhood Technology with Virginia Tech

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 39% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 66%. These households pay 23% to 41% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 29% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 73%. These households pay 44% to 111% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Phoenix	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	63%	58%	121%	65%	51%	117%	49%	63%	112%	57%	53%	111%	58%	55%	114%
$20,000 - <$35,000	36%	36%	72%	34%	32%	65%	26%	39%	65%	28%	33%	61%	31%	34%	65%
$35,000 - <$50,000	27%	26%	53%	24%	23%	48%	20%	28%	48%	20%	24%	44%	23%	25%	48%
$50,000 - <$75,000	21%	19%	41%	19%	17%	36%	17%	21%	38%	16%	18%	34%	19%	19%	38%
$75,000 - <$100,000	18%	15%	32%	16%	13%	29%	14%	16%	29%	13%	13%	26%	16%	14%	30%
$100,000 - <$250,000	13%	10%	23%	13%	9%	21%	10%	10%	20%	10%	9%	19%	13%	9%	22%
TOTAL	24%	17%	41%	29%	19%	48%	24%	25%	49%	31%	26%	57%	27%	21%	48%

Fig. 2: Distribution of Households by Income by Neighborhood Type

Phoenix														
Income Category	# of HHS	% of HHS in Quad	% in Region	# of HHS	% of HHS in Quad	% in Region	# of HHS	% of HHS in Quad	% in Region	# of HHS	% of HHS in Quad	% in Region	# of HHS	% in Region
$0-<$20,000	28,551	7%	3%	28,095	16%	3%	26,613	16%	3%	84,391	28%	8%	167,650	16%
$20,000 - <$35,000	f in													

DRAFT

Pittsburgh, PA MSA

Profile: Pittsburgh, PA MSA

Combined Housing and Transportation Category: Low H, High T

Housing Market: Cool Single Family Market

DRAFT

Portland, OR CMSA

Profile: Portland, OR CMSA

Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Lukewarm Densifying Market
Households earning 30-50% HAMFI with Severe Burden:	24%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	9%, Large Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	25%, 32%

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 38% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 61%. These households pay 24% to 42% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 34% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 67%. These households pay 49% to 115% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Portland Income Category	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	61%	60%	121%	61%	48%	109%	54%	67%	122%	58%	57%	115%	59%	58%	116%
$20,000 - <$35,000	34%	36%	70%	32%	30%	62%	30%	41%	71%	31%	35%	66%	32%	36%	67%
$35,000 - <$50,000	26%	27%	53%	24%	23%	47%	25%	30%	54%	24%	26%	49%	25%	26%	51%
$50,000 - <$75,000	22%	20%	42%	20%	17%	37%	20%	22%	42%	19%	19%	38%	20%	20%	40%
$75,000 - <$100,000	19%	15%	33%	16%	13%	29%	17%	17%	33%	15%	14%	30%	17%	15%	32%
$100,000 - <$250,000	14%	10%	24%	12%	8%	21%	13%	11%	24%	12%	10%	21%	14%	10%	23%
TOTAL	**26%**	**18%**	**44%**	**31%**	**19%**	**50%**	**26%**	**24%**	**51%**	**31%**	**25%**	**57%**	**28%**	**22%**	**50%**

Portland, OR

Commuter Characteritics	Below Avg H&T	A

San Diego, CA MSA

Profile: San Diego, CA MSA

Combined Housing and Transportation Category:	High H, Med T
Housing Market:	Hot Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	31%
Affordable Housing Shortage:	High

Center for Neighborhood Technology with Virginia Tech

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 40% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 66%. These households pay 26% to 44% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 30% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 72%. These households pay 46% to 111% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

San Diego Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T

Households in Below Average H & T neighborhoods have the longest transit commute by distance (11.7 miles).

San Diego

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	447,754	133,534	297,625	204,909	1,083,822
% Transit	2%	4%	7%	3%	4%
Time all	25.1	22.6	26.7	27.7	25.7
Distance all	10.0	8.5	9.3	11.4	9.9
Speed All	22.9	22.0	21.3	24.1	22.6
TransinBTan-iewm					

21.3

San Francisco, CA CMSA

Profile: San Francisco, CA CMSA

Combined Housing and Transportation Category: High H, Low T

Housing Market: Lukewarm Sprawling Market

Households earning 30-50% HAMFI with Severe Burden: 27%

Affordable Housing Shortage: High

Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 41% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 75%. These households pay 27% to 45% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 26% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 56%. These households pay 52% to 118% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

San Francisco	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	71%	49%	124%	66%	40%	107%	61%	63%	124%	65%	53%	118%	66%	51%	118%
$20,000 - <$35,000	45%	30%	76%	41%	24%	65%	37%	38%	75%	38%	32%	70%	40%	31%	72%
$35,000 - <$50,000	34%	22%	57%	31%	18%	49%	29%	28%	57%	28%	24%	52%	31%	23%	54%
$50,000 - <$75,000	28%	16%	45%	25%	13%	38%	24%	20%	44%	23%	18%	40%	25%	17%	43%
$75,000 - <$100,000	24%	12%	37%	21%	10%	31%	21%	15%	36%	19%	13%	32%	22%	13%	35%
$100,000 - <$250,000	19%	8%	27%	16%	7%	23%	16%	10%	26%	15%	9%	24%	18%	8%	26%
TOTAL	29%	12%	41%	33%	12%	45%	28%	18%	46%	34%	20%	54%	30%	15%	46%

Fig. 2: Distribution of Households by Income by Neighborhood Type

San Francisco	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			TOTAL REGION	
Income Category	# of HHS	% of HHS in Quad	% in Region	# of HHS	% of HHS in Quad	% in Region	# of HHS	% of HHS in Quad	% in Region	# of HHS	% of HHS in Quad	% in Region	# of HHS	% in Region
$0-<$20,000	65,120	7%	3%	57,869	17%	3%	39,296	10%	2%	125,761	21%	6%	288,046	13%
$20,000 - <$35,000	77,988	8%	3%	48,868	14%	2%	53,525	13%	2%	109,060	18%	5%	289,441	13%
$35,000 - <$50,000	93,965	10%	4%	48,508	14%	2%	60,195	15%	3%	98,580	17%	4%	301,248	13%
$50,000 - <$75,000	167,894	18%	7%	65,511	19%	3%	94,735	23%	4%	119,889	20%	5%	448,029	20%
$75,000 - <$100,000	145,370	16%	6%	44,345	13%	2%	68,705	17%	3%	67,928	11%	3%	282,003	12%
$100,000 - <$250,000	378,172	41%	17%	75,723	22%	3%	91,669	22%	4%	76,132	13%	3%	545,973	24%
ALL INCOMES	928,509	100%	41%	340,824	100%	15%	408,125	100%	18%	597,350	100%	26%	2,274,808	100%

Relationship of Affordability to Accessibility

Anchorage, San Diego, San Francisco, Seattle, a

Seattle, WA CMSA

Profile: Seatte, WA CMSA

Combined Housing and Transportation Category:	Medium H, Medium T
Housing Market:	Lukewarm Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	22%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	11%, Small Expanding Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 37% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 66%. These households pay 26% to 45% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 27% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 64%. These households pay 49% to 113% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Seattle	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	67%	55%	126%	63%	46%	109%	57%	65%	122%	58%	55%	113%	61%	55%	116%
$20,000 - <$35,000	39%	34%	75%	36%	28%	63%	32%	40%	72%	32%	34%	66%	34%	34%	69%
$35,000 - <$50,000	30%	25%	57%	27%	21%	47%	26%	29%	55%	24%	25%	49%	27%	25%	52%
$50,000 - <$75,000	25%	18%	45%	22%	16%	38%	21%	22%	43%	20%	19%	39%	23%	19%	42%
$75,000 - <$100,000	21%	14%	36%	19%	12%	31%	18%	16%	34%	17%	14%	31%	19%	14%	34%
$100,000 - <$250,000	16%	9%	26%	15%	8%	22%	13%	11%	24%	13%	10%	22%	15%	9%	25%
TOTAL	28%	16%	45%	32%	16%	48%	27%	22%	49%	32%	24%	56%	29%	19%	49%

Above Average Transportation cost neighborhoods have the longest commute in time by transit (67.8 minutes) and by auto (28.5 minutes) and in distance (14.7 miles by transit and 11.4 miles by auto).

Seattle

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	596,630	231,273	384,294	328,580	1,540,777
% Transit	7%	15%	7%	3%	7%
Time all	27.7	26.2	28.5	29.7	28.1
Distance all	9.0	7.5	9.8	11.5	9.5
Speed All	19.3	17.0	20.2	23.1	20.0
Transit Commuters					
Time Transit	43.4	37.8	48.7	67.8	45.2
Distance Transit	8.8	6.0	9.1	14.7	8.6
Speed Transit	12.2	9.5	11.7	14.1	11.4
Auto Commuters					
Time Car	26.5	24.1	26.9	28.5	26.7
Distance Car	9.0	7.7	9.9	11.4	9.6
Speed Car	19.8	18.4	20.8	23.4	20.7

Expenditures by Income	Central City EC	Other ECs	Outside an EC
$0-<$20,000			
% Income on Housing	61%	63%	62%
% Income on Transport.	46%	55%	62%
% Income on H+T	106%	118%	124%
$20,000 - <$35,000			
% Income on Housing	33%	35%	36%
% Income on Transport.	26%	33%	38%
% Income on H+T	59%	68%	74%
$35,000 - <$50,000			
% Income on Housing	25%	26%	27%
% Income on Transport.	19%	24%	28%
% Income on H+T	44%	50%	55%
$50,000 - <$75,000			
% Income on Housing	20%	21%	22%
% Income on Transport.	14%	18%	20%
% Income on H+T	34%	39%	42%
$75,000 - <$100,000			
% Income on Housing	17%	17%	18%
% Income on Transport.	10%	13%	15%
% Income on H+T	27%	31%	33%
$100,000 - <$250,000			
% Income on Housing	13%	13%	14%
% Income on Transport.	6%	9%	10%
% Income on H+T	19%	22%	24%
Average of All Incomes			
% Income on Housing	31%	29%	28%
% Income on Transport.	16%	19%	20%
% Income on H+T	47%	49%	48ou%um.004 Tu9%a63(u)5(73932 TD36

St. Louis, MO MSA

Profile: St. Louis, MO MSA

Combined Housing and Transportation Category:	Low H, High T
Housing Market:	Cool Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	12%
Affordable Housing Shortage:	Low
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	4%, Small Expanding Rail System

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 41% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 61%. These households pay 23% to 40% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 27% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 74%. These households pay 42% to 108% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

St. Louis	Below Avg H&T (1)			Above Avg H (2)			Above Avg T (4)			Above Avg H&T (3)			Wt. Avg of Quads		
Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	55%	58%	116%	55%	49%	103%	46%	70%	115%	51%	57%	108%	51%	58%	110%
$20,000 - <$35,000	29%	36%	67%	27%	30%	57%	23%	43%	66%	24%	35%	58%	25%	36%	63%
$35,000 - <$50,000	23%	26%	51%	20%	22%	42%	18%	31%	49%	17%	25%	42%	20%	27%	47%
$50,000 - <$75,000	19%	20%	40%	16%	17%	33%	15%	23%	38%	14%	19%	33%	17%	20%	37%
$75,000 - <$100,000	16%	15%	32%	14%	13%	27%	13%	17%	30%	11%	14%	25%	14%	15%	30%
$100,000 - <$250,000	13%	10%	23%	12%	8%	20%	10%	12%	21%	9%	10%	19%	12%	10%	22%
TOTAL	22%	18%	42%	28%	19%	47%	22%	27%	48%	29%	28%	57%	24%	23%	48%

Fig. 2: Distribution of Households by Income by Neighborhood Type

St. Louis															
		% of HHS in	% in		% of HHS in	% in		% of HHS in	% in		% of HHS in	% in			% in
Income Category	# of HHS	Quad	Region	# of HHS	Quad	Region	# of HHS	Quad	Region	# of HHS	Quad	Region	# of HHS		Region
$0-<$20,000	n														

Tampa, FL MSA

Profile: Tampa, FL MSA

Combined Housing and Transportation Category:	Low H, High T
Housing Market:	Hot Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	31%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	4%, Small Expanding Rail System

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 37% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 56%. These households pay 24% to 41% of their income for housing and transportation (Fig. 1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 26% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 78%. These households pay 45% to 111% of their income for housing2pa4.52 39 Tm02 Tc0.0004%6% : HŦ5.4(on C)5.5(5.53by)5.1mighboe(nei)5.5()6. T0.05.53bpe

Tampa Bay Area

Commuter Characteritics	Below Avg H&T	Above Avg H	Above Avg H & T	Above Avg T	All
All Commuters	392,986	157,394	215,466	175,573	941,419
% Transit	1%	1%	3%	0%	1%
Time all	25.6	25.1	24.8	27.7	25.7
Distance all	8.9	8.2	7.4	10.9	8.8
Speed All	20.6	19.7	18.3	22.9	20.3
Transit Commuters					
Time Transit	37.1	44.5	45.6	48.6	43.7
Distance Transit	6.3	6.6	5.6	8.5	6.1
Speed Transit	13.0	11.9	9.4	13.7	10.9
Auto Commuters					
Time Car	25.5	24.8	24.1	27.6	25.5
Distance Car	9.0	8.2	7.5	10.9	8.9
Speed Car	20.6	19.8	18.6	22.9	20.5

Household Expenditures by Income and Proximity to Employment
Tampa, FL MSA

Expenditures by Income	Central City EC	Other ECs	Outside an EC
$0-<$20,000			
% Income on Housing	51%	56%	54%
% Income on Transport.	53%	55%	63%
% Income on H+T	104%	112%	117%
$20,000 - <$35,000			
% Income on Housing	24%	28%	28%
% Income on Transport.	32%	34%	39%
% Income on H+T	56%	62%	67%
$35,000 - <$50,000			
% Income on Housing	20%	20%	21%
% Income on Transport.	22%	25%	28%
% Income on H+T	42%	45%	49%
$50,000 - <$75,000			
% Income on Housing	16%	17%	17%
% Income on Transport.	17%	18%	20%
% Income on H+T	33%	35%	37%
$75,000 - <$100,000			
% Income on Housing	14%	13%	14%
% Income on Transport.	11%	13%	15%
% Income on H+T	25%	26%	29%
$100,000 - <$250,000			
% Income on Housing	10%	10%	11%
% Income on Transport.	7%	8%	10%
% Income on H+T	18%	18%	21%
Average of All Incomes			
% Income on Housing	31%	31%	26%
% Income on Transport.	28%	27%	25%
% Income on H+T	58%	58%	51%
Owner Median Income	$49,681	$41,947	$45,556
Renter Median Income	$22,221	$25,256	$29,584
Median Income	$29,915	$32,068	$41,054

Washington, DC PMSA

Profile: Washington, DC PMSA

|	
Combined Housing and Transportation Category:	High H, Low T
Housing Market:	Hot Single Family Market
Households earning 30-50% HAMFI with Severe Burden:	13%
Affordable Housing Shortage:	Medium
Transportation: % Non-Auto Commute, Rail Transit System Size, 2003 Congestion:	13%, Large Rail System
Jobs-Housing: % of Pop. living near an Employment Center (EC), % of Jobs in ECs:	35%, 48%

Center for Neighborhood Technology with Virginia Tech

Metro Summary

Housing / Transportation Costs by Income

Of the four types of neighborhoods, Below Average Housing & Transportation cost neighborhoods have the greatest share of households in the region, 40% (Fig. 2). Households earning $50,000 or more are the majority of households in these neighborhoods, at 78%. These households pay 25% to 45% of their income for housing and transportation (Fig.1).

Above Average Housing & Transportation cost neighborhoods have the second greatest share of households in the region, 27% (Fig. 2). Households earning less than $50,000 annually are the majority of households in these neighborhoods, at 58%. These households pay 49% to 113% of their income for housing and transportation (Fig. 1).

Fig. 1: H+T Costs by Income by Neighborhood Type

Washington Income Category	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T	% H	% T	% H&T
$0-<$20,000	70%	57%	130%	67%	45%	111%	55%	70%	125%	59%	54%	113%	62%	55%	117%
$20,000 - <$35,000	42%	34%	78%	37%	25%	62%	33%	42%	75%	33%	32%	65%	36%	33%	69%

echnology with Virginia Tech
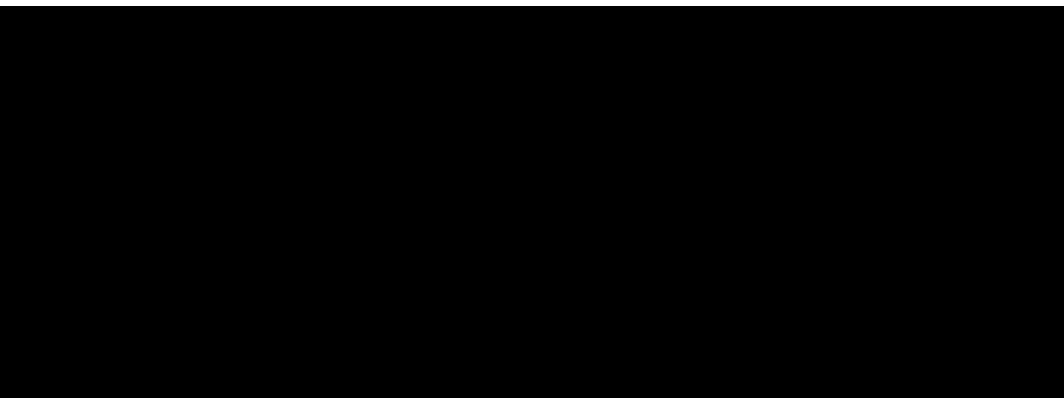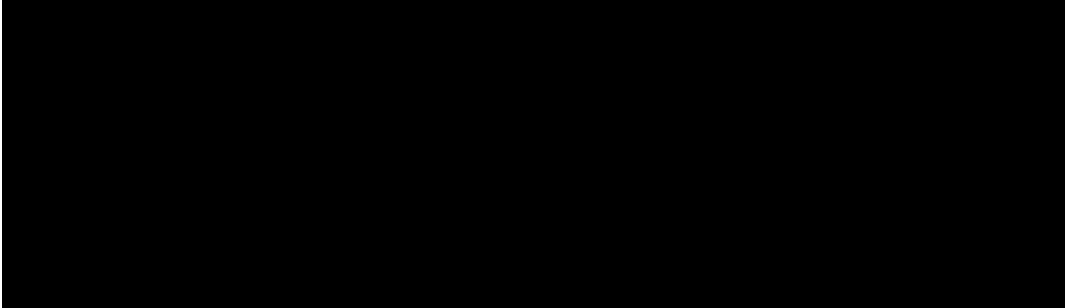
380   Anchorage, AK MSA

Housing Cost Model

Variable	Coef.	Sig.
Constant	146.0623	0.0000
(Log) Housing Unit Density	0.1493	0.5779
Distance to Nearest Employment Center	-0.2521	0.0658
Jobs Per Square Mile	-2.0E-05	0.4964
Median Commute Time	0.2470	0.0503
(Log) Median Household Income	-11.0667	0.0000
% of Housing Units Affordable	-1.7745	0.5043
Adjusted R-Square	0.8393	

Transportation Cost Model

Variable	Coef.	Sig.
Constant	1.8848	0.0000
(Log) Housing Unit Density	-0.0115	0.0000
Distance to Nearest Employment Center	-0.0004	0.6880
Jobs Per Square Mile	-8.6E-07	0.0005
Median Commute Time	-0.0008	0.4387
(Log) Median Household Income	-0.1443	0.0000
% of Housing Units Affordable	0.0074	0.7276
Adjusted R-Square	0.9260	

520   Atlanta, GA MSA

Housing Cost Model

Variable	Coef.	Sig.
Constant	114.7708	0.0000
(Log) Housing Unit Density	0.8779	0.0000
Distance to Nearest Employment Center	-0.0342	0.0414
Jobs Per Square Mile	5.3E-06	0.2843
Median Commute Time	0.0001	0.9969
(Log) Median Household Income	-8.4652	0.0000
% of Housing Units Affordable	-2.4529	0.0004
Adjusted R-Square	0.7495	

Transportation Cost Model

Variable	Coef.	Sig.
Constant	2.5718	0.0000
(Log) Housing Unit Density	-0.0153	0.0000

Center for Neighborhood Technology with Virginia Tech

4472   Los Angeles-Riverside-Orange County, CA CMSA

Housing Cost Model   Transportation Cost Model

Variable	Coef.	Sig.
Constant	130.2212	0.0000
(Log) Housing Unit Density	0.2579	0.0000
Distance to Nearest Employment Center	-0.0536	0.0000

St. Louis, MO-IL MSA

ng Cost Model

	Coef.	Sig.
	155.5542	0.0000
using Unit Density	0.5353	0.0000
to Nearest Employment Center	-0.0180	0.3401
Square Mile	1.8E-05	0.0269
Commute Time	0.0444	0.1082
dian Household Income	-12.1482	0.0000
using Units Affordable	-8.6257	0.0000
R-Square	0.7781	

Transportation Cost Model

Variable	Coef.	Sig.
Constant	2.7720	0.0000
(Log) Housing Unit Density	-0.0180	0.0000
Distance to Nearest Employment Center	-0.0004	0.0401
Jobs Per Square Mile	-1.3E-06	0.0000
Median Commute Time	-0.0010	0.0001
(Log) Median Household Income	-0.2154	0.0000
% of Housing Units Affordable	-0.0434	0.0000
Adjusted R-Square	0.9255	

San Diego, CA MSA

Center for Neighborhood Technology with Virginia Tech

7602   Seattle-Tacoma-Bremerton, WA CMSA

<u>Housing Cost Model</u>   <u>Transportation Cost Model</u>

Variable	Coef.	Sig.
Constant	107.3800	0.0000
(Log) Housing Unit Density	0.3641	0.0000
Distance to Nearest Employment Center	0.0215	0.2617
Jobs Per Square Mile	1.1E-05	0.0001
Median Commute Time	0.0544	0.0007
(L BMe9fBT1		

Los Angeles Metro Area – Congestion compared to incomes and employment center locations
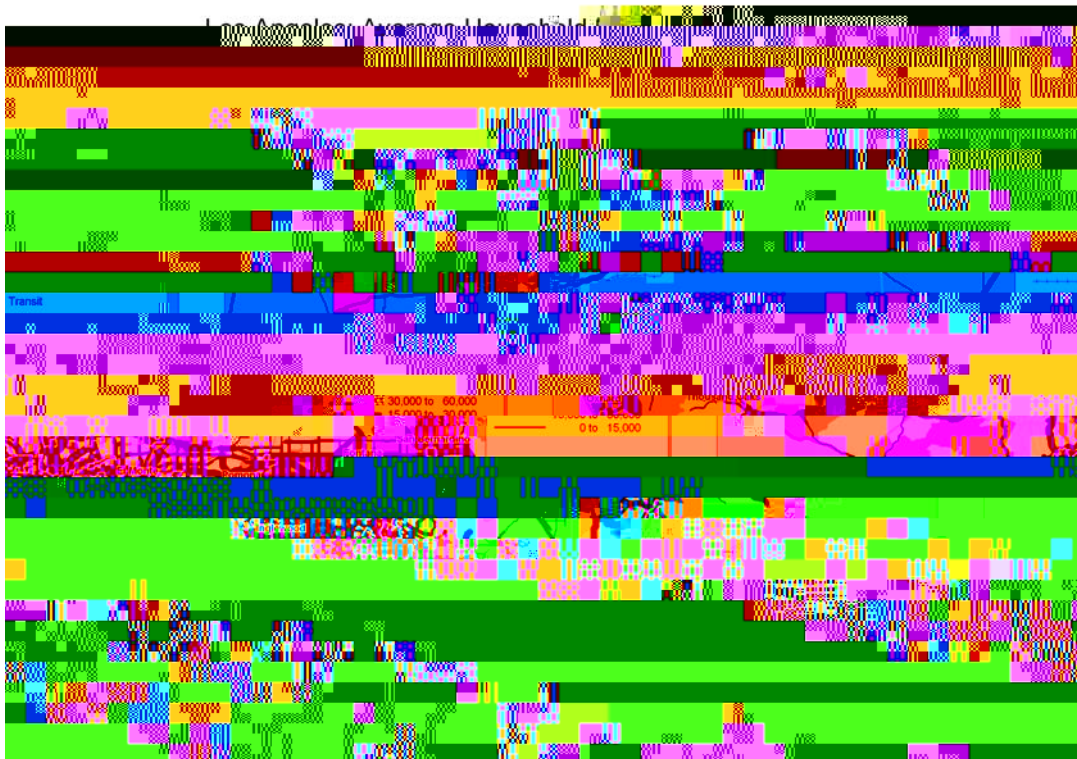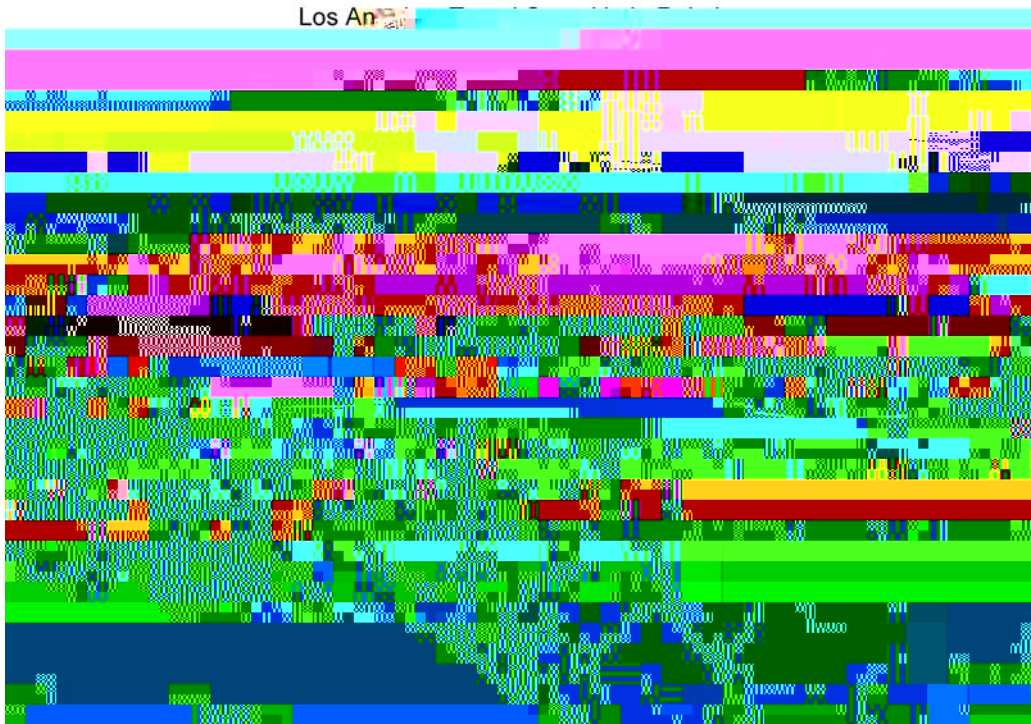
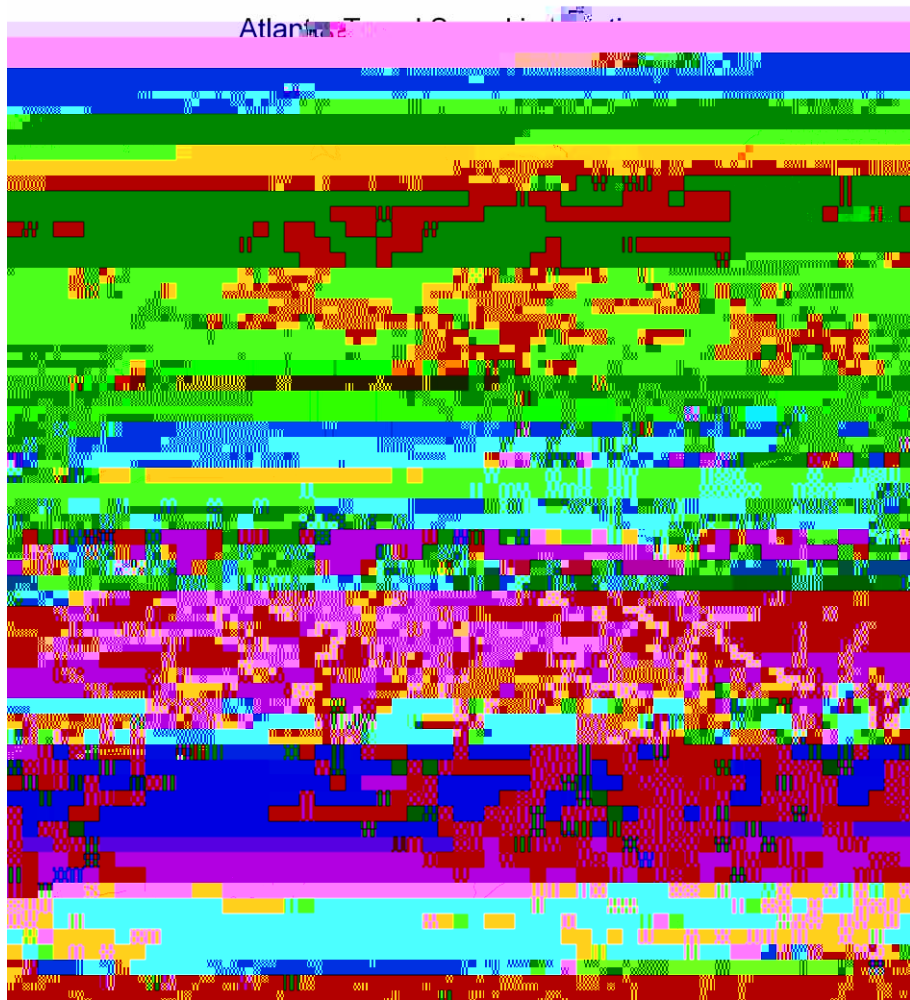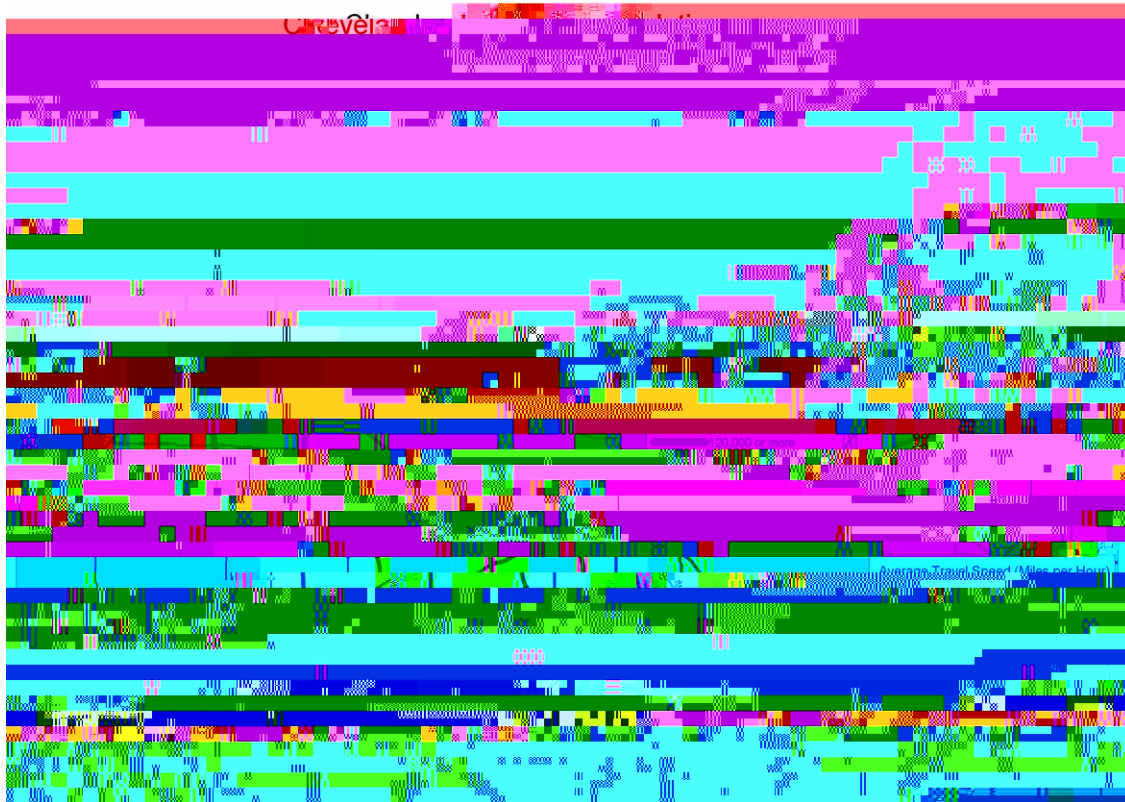# Portland Metro Area – Congestion compared to incomes and employment center locations

Center for Neighborhood Technology with Virginia Tech
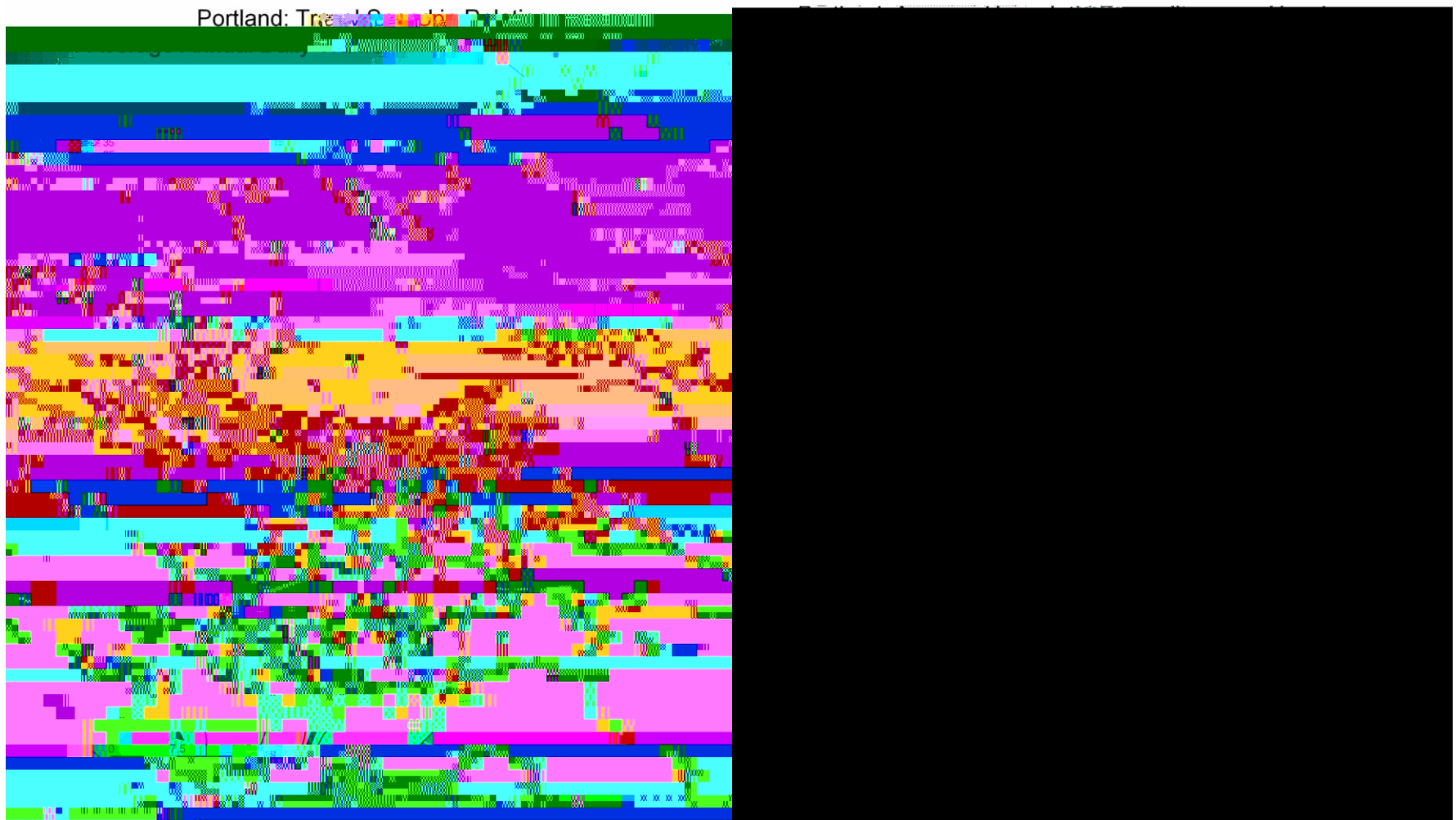
Denver Metro Area – Congestion compared to incomes and employment center locations

Center for Neighborhood Technology with Virginia Tech
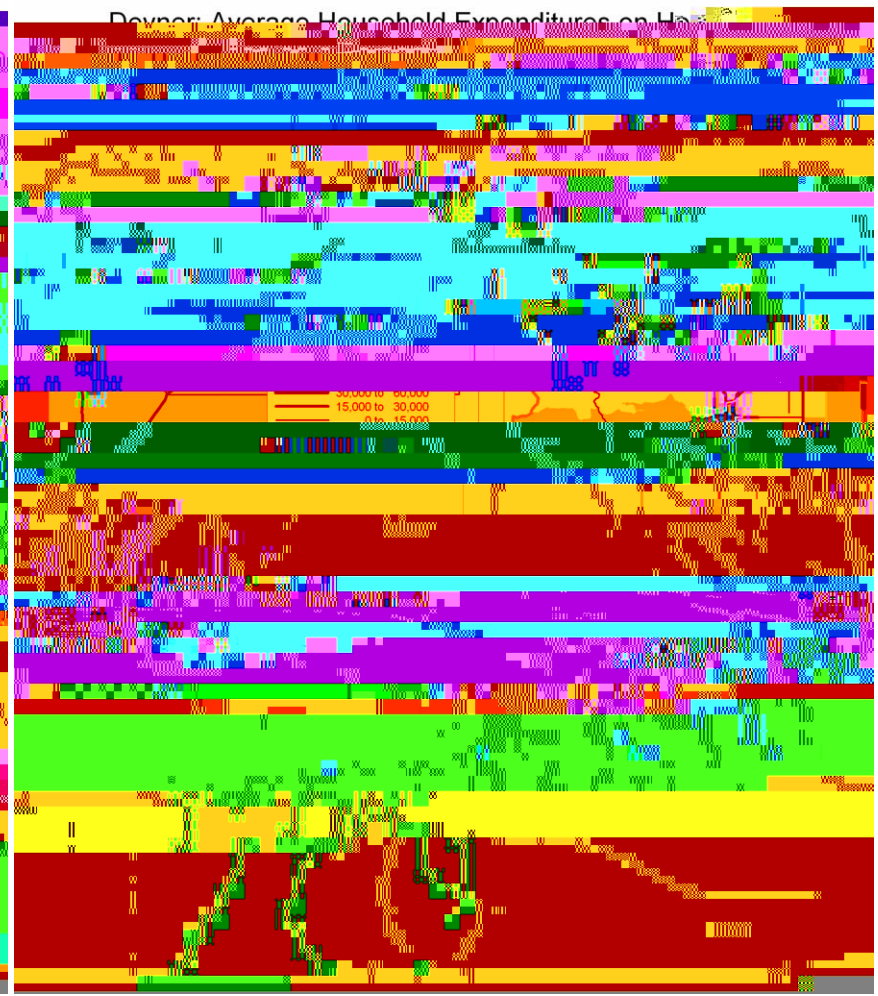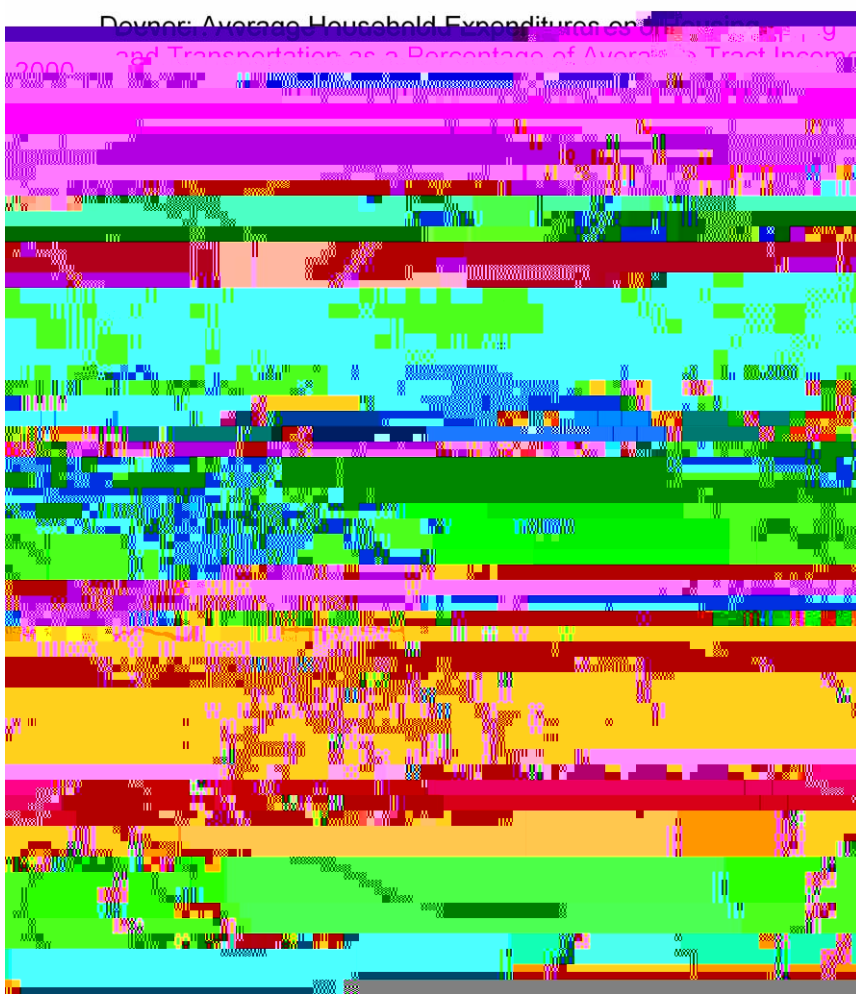
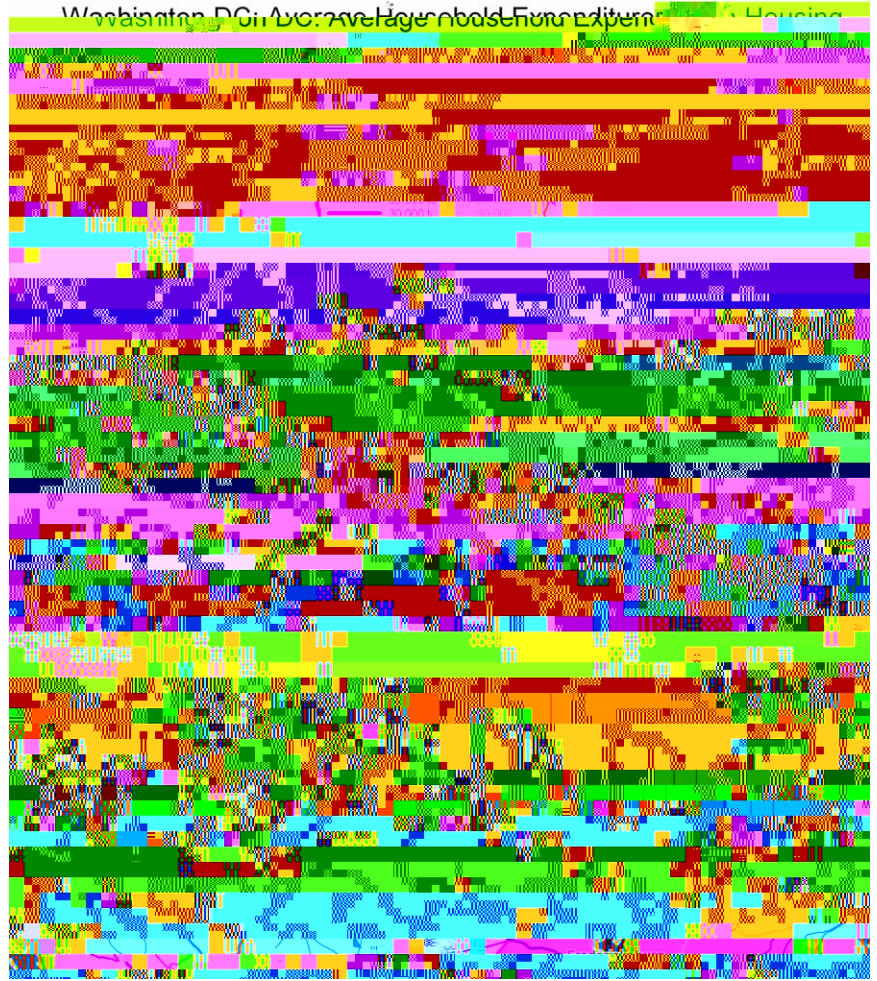# Houston Metro Area – Congestion compared to incomes and employment center locations
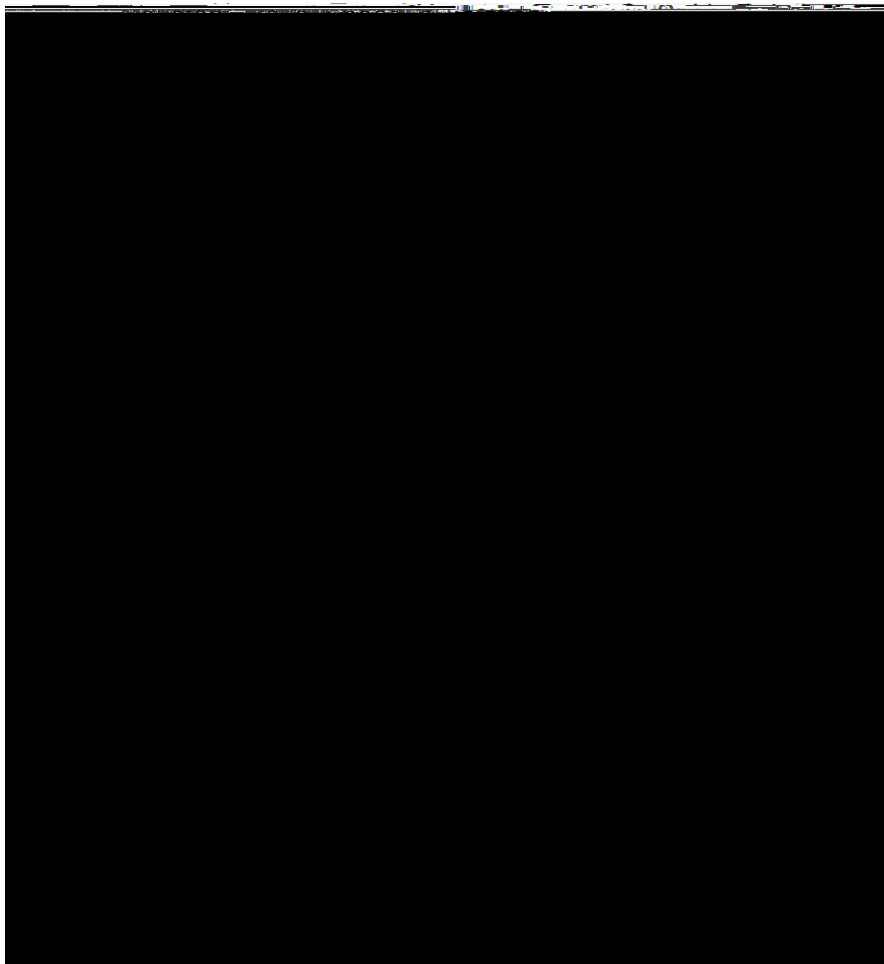
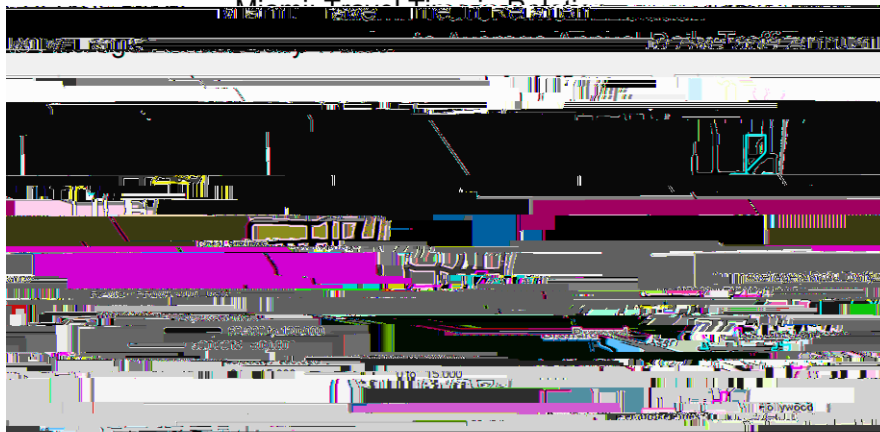# Atlanta Metro Area – Congestion compared to incomes and employment center locations
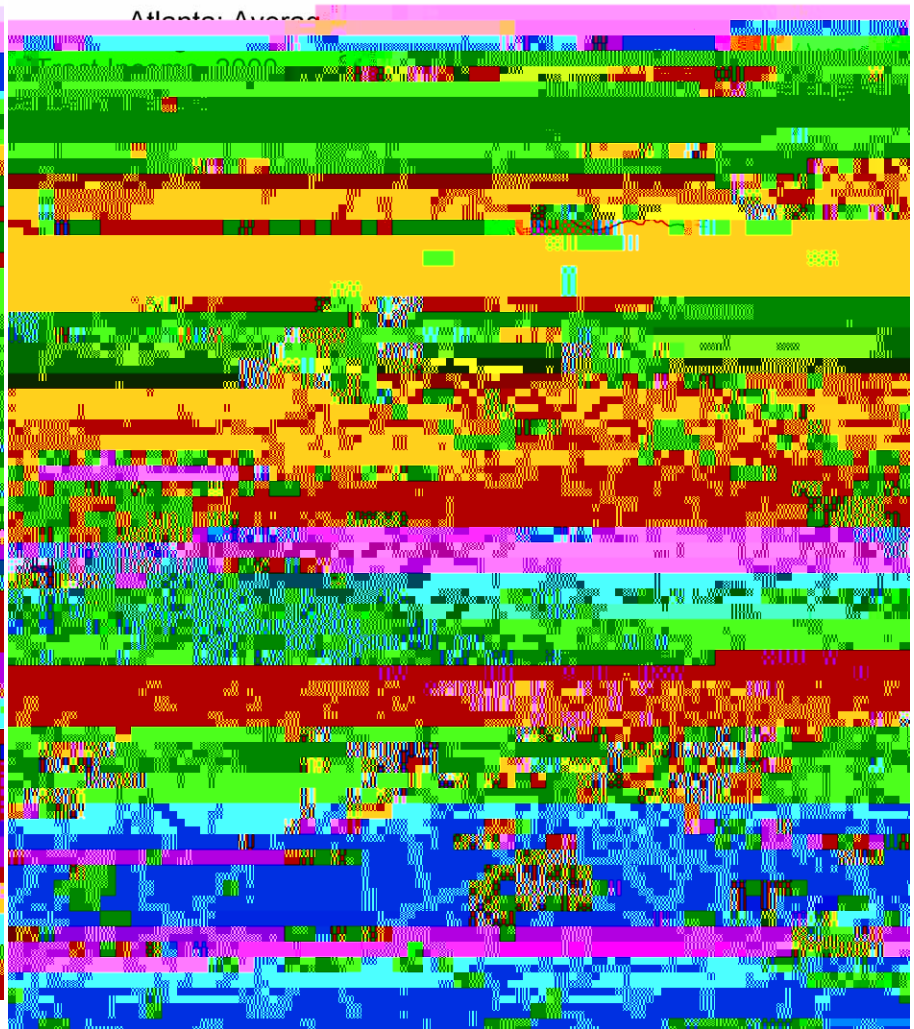
Cleveland Metro Area – Congestion compared to incomes and employment center locations

Washington D.C. Metro Area – Congestion compared to incomes and employment center locations

Center for Neighborhood Technology with Virginia Tech

Miami Metro Area – Congestion compared to incomes and employment center locations

Center for Neighborhood Technology with Virginia Tech

Appendix C. Technical Appendix

To perform the analysis, we needed to obtain reliable measures of household income, rental and ownership housing costs by income, household transportation costs by income, jobs and employment locations, and other socioeconomic measures of households by income and by place. In this section we explain how we derived or gathered each measure at the census tract level.

Household Incomes

To begin, we first had to identify specific incomes in multiple income bins at the census tract level that would roughly approximate to the standard HUD measures of income, e.g. 30%, 50%, 80%, and 100% of a region's Area Median Income (AMI). The census provides a count of each household by income at the tract level in 16 income bins and uses these bins for several other indicators, such as the percentage of income on housing by income, tenure by income, age of head of householder by income, etc. Therefore, at the tract level, we present the incomes by a nominal vale in six bins rather than as a percentage of AMI since AMI is not available for the 29,628 tracts. A translation table between dollar values and percent AMI for each region is in Table AX in the Appendix.

The census category of income at the tract level was not specific enough for our calculations. The income bin grouping at the tract level leaves two large bins at the bottom and the top that could have wide variation. The bottom bin is "less than $10,000" and the upper income bin is "$200,000 or more". The middle bins are in $5,000 to $10,000 increments. At the same time, there are more groupings than we needed for this analysis. Therefore, we both consolidated the bins from 16 bins to 6 bins, and then within each bin, calculated an average income for the households within each cohort (e.g. $17,982 rather than $15,000 to $19,999) in order to have a specific point rather than a range. The table below shows the income distribution results available at the tract level from the Census for a tract in California. We use both the Family and Non-Family Income fields (P76 and P79) to obtain the count of all households by income. Households in Group Quarters are excluded.

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[1] In 2000, there were 105,480,101 households in the U.S. according to the 2000 Census, SF1.

[2] Some households were excluded from the sample if they were in census tracts with fewer than 100 households, or if they lived in group quarters, such as dormitories.

[3] We compared tracts in 1990 and 2000 that had the same boundaries each decennial census for eight regions; Portland, Los Angeles, San Francisco, Dallas, Chicago, Denver, Pittsburgh, and Atlanta.

[4] Other studies have noted this…

Table 4. Income Distribution by Census Tract

Tract 402.02, Riverside County, CA	P. 76 Family Income	P. 79 Non-Family Income	Total
Total:	543	234	777
Less than $10,000	21	13	34
$10,000 to $14,999	40	37	77
$15,000 to $19,999	30	41	71
$20,000 to $24,999	21	12	33
$25,000 to $29,999	33	15	48
$30,000 to $34,999	49	32	81
$35,000 to $39,999	38	13	51
$40,000 to $44,999	19	0	19
$45,000 to $49,999	9	0	9
$50,000 to $59,999	59	11	70
$60,000 to $74,999	84	30	114
$75,000 to $99,999	97	21	118
$100,000 to $124,999	28	9	37
$125,000 to $149,999	6	0	6
$150,000 to $199,999	9	0	9
$200,000 or more	0	0	0

Tract 402.02, Riverside County, CA	H.73 Renter Costs	H.97 Mortgage costs
Total:	225	375
Less than $10,000:	17	0
Less than 20 percent	0	0
20 to 24 percent	0	0
25 to 29 percent	0	0
30 to 34 percent	7	0
35 percent or more	10	0
Not computed	0	0
$10,000 to $19,999:	49	43
Less than 20 percent	0	0
20 to 24 percent	0	0
25 to 29 percent	0	0
30 to 34 percent	6	0
35 percent or more	35	43
Not computed	8	0
$20,000 to $34,999:	48	53
Less than 20 percent	14	29
20 to 24 percent	0	0
25 to 29 percent	14	0
30 to 34 percent	0	0
35 percent or more	20	24
Not computed	0	0
$35,000 to $49,999:	27	40
Less than 20 percent	21	9
20 to 24 percent	0	12
25 to 29 percent	0	0
30 to 34 percent	0	8
35 percent or more	6	11
Not computed	0	0
$50,000 to $74,999:	23	143
Less than 20 percent	11	42
20 to 24 percent	12	56
25 to 29 percent	0	38
30 to 34 percent	0	7
35 percent or more	0	0
Not computed	0	0
$75,000 to $99,999:	49	55
Less than 20 percent	49	33
20 to 24 percent	0	14
25 to 29 percent	0	0
30 to 34 percent	0	0
35 percent or more	0	8
Not computed	0	0
$100,000 or more:	12	32
Less than 20 percent	0	32
20 to 24 percent	0	0
25 to 29 percent	0	0
30 to 34 percent	0	0
35 percent or more	0	0
Not computed	12	0
$150,000 or more:	Not computed	9
Less than 20 percent	Not computed	9
20 to 24 percent	Not computed	0
25 to 29 percent	Not computed	0
30 to 34 percent	Not computed	0
35 percent or more	Not computed	0

Summarizing the 28 metros by renters, owners, and all households, we found 31% of renters are paying more than 35% of their income on housing compared to 18% of owners. Overall, 23% of households are paying more than 35%.

Percent of Households Paying 35% or more of Income by Income in 28 Metros (Census 2000, SF3, H.97, H.73)

Income	Rent	Own	All
Less than $10,000	65%	70%	66%
$10,000 to $19,999	70%	54%	65%
$20,000 to $34,999	31%	39%	34%
$35,000 to $49,999	8%	25%	17%
$50,000 to $74,999	3%	12%	9%
$75,000 to $99,999	1%	5%	4%
$100,000 or more	0%	2%	2%
TOTAL	*31%*	*18%*	*23%*

Again we used the PUMS 5% sample to cross tab the six income bins by the average percentage of income households in each bin were spending on housing. These results were then applied to each specific "percent of income" bin for each income bin for each tract within a PUMA. The summary results at the regional level are displayed below.

On average, households earning less than $35,000 were spending between 31% and 58% of their income on housing.

Note: For the highest income bin, we limited our analysis to households earning <$250,000. This eliminated 5,386,480 household records and reduced total households in our analysis to 41,761,305. Extremely high incomes above $250,000 would have greatly skewed the analysis for this income bin.

MSA	<$ 20,000	$20,000 to <35,000	$35,000 to <50,000	$50,000 to <$75,000	$75,000 to <$99,000	$100,000 to <$250,000	N
Anchorage	65%	35%	26%	22%	18%	14%	55
Atlanta	59%	33%	25%	20%	16%	14%	660
Baltimore	58%	33%	26%	21%	17%	14%	1070
Boston--Worcester-Lawrnece	56%	33%	25%	21%	18%	14%	1219
Chicago--Gary--Kenosha, IL	59%	31%	24%	20%	18%	14%	2055
Cincinnati	51%	26%	21%	18%	15%	12%	476
Cleveland--Akron	52%	27%	21%	18%	15%	12%	872
Dallas-Fort Worth	57%	29%	22%	18%	16%	13%	1050
Denver-Boulder	59%	33%	25%	21%	18%	14%	614
Detroit	55%	27%	21%	18%	15%	12%	1567
Honolulu	61%	35%	27%	22%	20%	16%	210
Houston-Galveston	56%	27%	21%	17%	15%	12%	878
Kansas City, MO	51%	26%	20%	17%	14%	12%	493
Los Angeles--Riverside	63%	36%	27%	23%	20%	16%	3356
Miami--Fort Lauderdale	63%	35%	27%	21%	18%	14%	623
Milwaukee--Racine	54%	28%	21%	18%	16%	13%	453
Minneapolis--St. Paul	54%	30%	23%	19%	16%	13%	741
New York--North	64%	36%	27%	22%	19%	15%	5072
Philadelphia--Wilmington	57%	31%	24%	19%	17%	13%	1568
Phoenix--Mesa	58%	31%	23%	19%	16%	13%	692

average household transportation cost within a census tract given the household's income and size.

The household transportation costs consist of a combination of auto ownership auto use and transit use and therefore the model estimates each cost separately. This allows each to be estimated separately based on the neighborhood and the household size and income. These three components are the dependent variables in the model and are affected by the combination of seven independent variables about the built environment and two independent household variables, household size and income. Together, these nine variables represent the independent place-based neighborhood characte

	> $20,00	$20,000 - $30,000	$30,000 - $50,000	$50,000 - $75,000	$75,000 - $100,000	>= $100,000	All Households
Anchorage							

density is higher than or equal to the chosen minimum density threshold are assigned to the cluster. The area of the first employment center cluster is now defined.

7. Continue adding polygons in step 6 until there are no new adjacent polygons to add to the cluster.

8. To identify the remaining employment center clusters, remove the polygons that have been assigned to an employment center cluster from the list and repeat steps 4 through 7 until there are no more polygons that have a job density above or equal to the minimum density threshold.

9. We chose a weighted center to find the employment geographical center so we can definne a center point from which to measure distance..

10. The final step is to choose only those employment centers that have at least 5000 jobs associated with them.

The total number of jobs is a measure of employment used in the transportation model, and in our classification of job access. We use the gravity model to measure the employment density in the area of each tract. That is, for a given tracts we the sum of all the number of jobs in every other tract in the region divided by the square of the distance, included in that sum is also the number of jobs in the census tract itself. Note that although this measure has units of "jobs/square mile" and therefore an job density measure, it should only be interpreted as a relative measure of job access.

The following map shows the employment centers with a background of the job density measure.
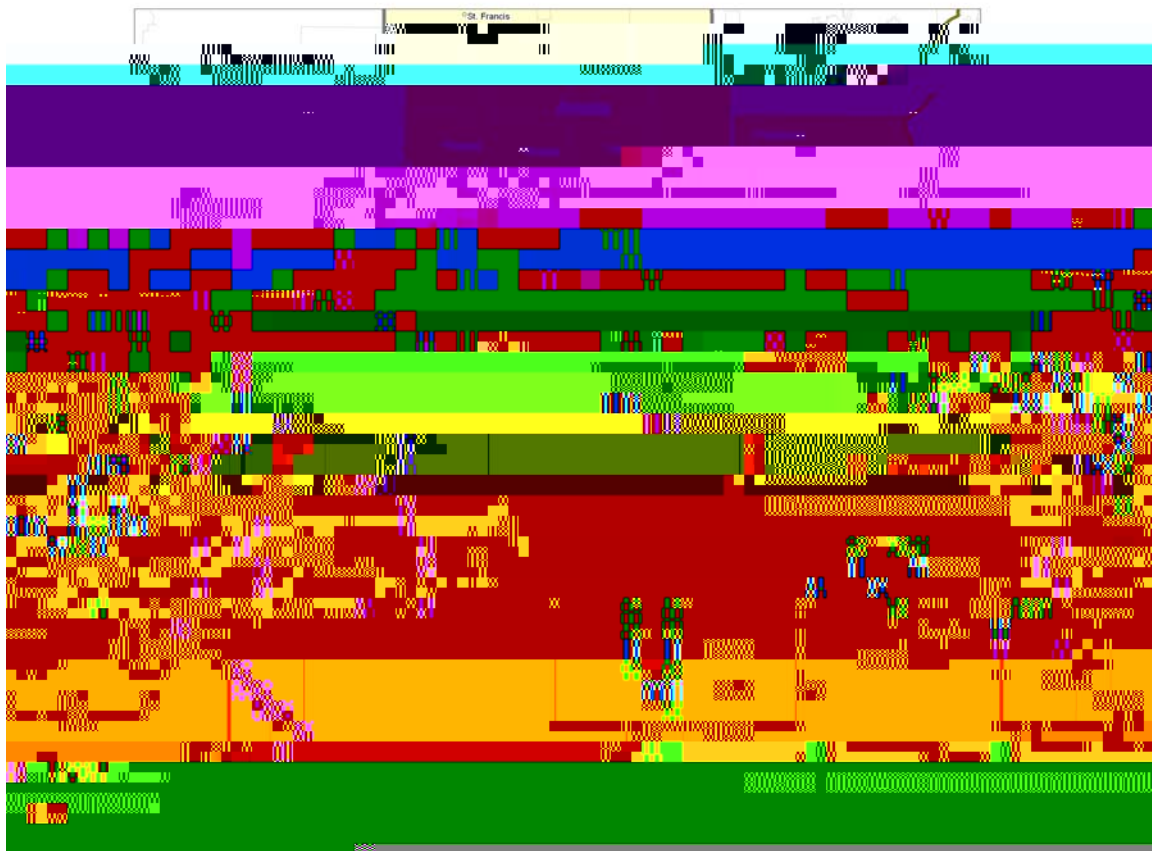
Figure 7. Employment Center clusters in Minneapolis/St. Paul region.

Worker Commuting Characteristics

In order to define commuter characteristics and congestion, we looked at four different but

Overall

**Auto
Commuters**

The following graphs show these data. Note that the overall fit gives 20.4 mph for the average speed. This speed recall is not the average speed of the vehicle transporting the worker since it is a direct line from the center of the two census tracts but this makes for a good surrogate for congestion as the map on page xx shows.
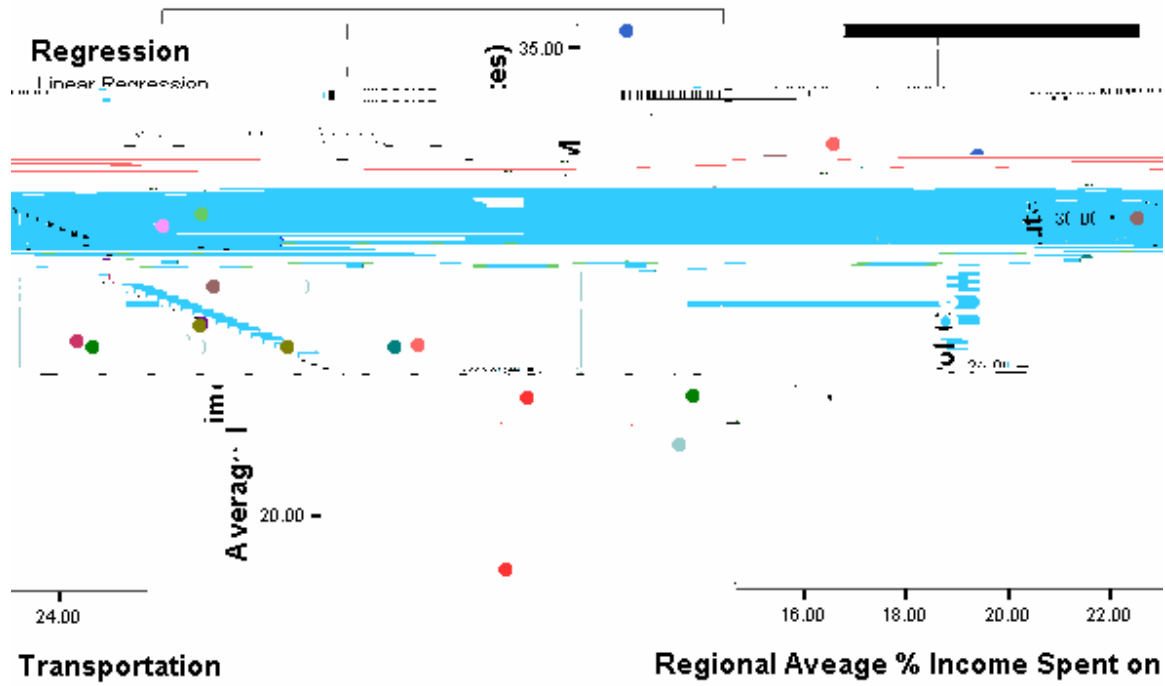
We believe there is much more that can be done with this measure, but for this study we limit it here.