

MAKING DO:
HOW WORKING FAMILIES IN SEVEN U.S. METROPOLITAN AREAS
TRADE OFF HOUSING COSTS AND COMMUTING TIMES

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1. INTRODUCTION

Prior and concurrent research commissioned by the Center for Housing Policy has demonstrated the degree to which America's working families must struggle with high transportation costs as well as excessive housing payments. According to the Center for Housing Policy's 2005 Report, *Something's Gotta Give: Working Families and the Cost of Housing*:

- Working families—those that earn between the minimum wage and 120% of area median income—that spend more than 50% of their income for housing, spend another 7.5% of their income to meet their daily transportation needs, including, critically, commuting to work.
- When the cost of transportation is considered together with the cost of housing, the percentage of working families paying more than half of their total income increases from 8.3% to 44.3% of all working families.
- For many working families, the tradeoff between housing and transportation costs is not a choice. Finding housing that working families can afford means commuting long distances to work.

These are national findings. In a more recent and detailed analysis of housing and transportation costs in 28 of the nation's largest metropolitan areas, a research team from the Center for Neighborhood Technology and Virginia Tech found that:

- High transportation costs dramatically reduce housing choice. Assuming that housing and transportation costs together should comprise no more than 50% of the income of working families (defined as those earning 80% or less of area median income), only 17% of housing units could be regarded as affordable. If transportation costs were not included, the share of housing units affordable to working families would rise to 40%.
- The degree of hardship varies widely by metropolitan area. Including transportation costs, the share of the metropolitan housing stock affordable to working families varied from a low of just 1% in the Tampa–St. Petersburg metropolitan area to a high of 30% in the Washington, D.C., region.
- In 20 of the 28 metropolitan areas studied, housing affordable to working families was far more distant from job opportunities than housing affordable to median-income families. The imbalance between affordable housing and job opportunities was particularly notable in “hot” ownership markets such as New York, Boston, Atlanta, and San Francisco.

Based on cross-tabulations of the Decennial Census and the Census Bureau's Consumer Expenditure Survey, these two research efforts tell a convincing story of the difficult housing and transportation choices facing America's working families. It is a story of family budgets stretched to the breaking point by expensive housing, a lack of affordable transportation alternatives, and federal and state housing policies that never seem to connect the two.

How are America's working families coping with their meager choices? Some are economizing by living in crowded or lower-quality housing. Many are driving long distances to work. Others are spending inordinate time commuting on local buses. Most are living paycheck to paycheck and foregoing other necessities.

These responses are not particularly surprising. In a market economy, choice is mostly a matter of income. We accept that less well-off families will have fewer choices than wealthier ones. Still, having *fewer* choices is not the same thing as having *few* choices or *no* choices. Similarly, at some point, there may be nothing more to tradeoff. In many American metropolitan areas, working family households are confronted with few housing choices *and* with few transportation choices. In such circumstances, the issue is not whether choices are limited, but whether choices are *so limited* as to be a matter of public policy concern.

This is an easy question to ask, but a hard one to answer. Census data allows analysts to identify national-scale household and consumer choices (through the annual Consumer Expenditure Survey) or geographically-specific patterns of housing and commute cost (through the decennial census), but not both. Understanding where and for whom housing and transportation choices are especially limited requires using Census data in some new ways and with different techniques.

This report explores how working families in seven major metropolitan regions (Atlanta, Chicago, Dallas–Ft. Worth, Los Angeles, New York City, the San Francisco Bay Area, and Baltimore–Washington) tradeoff housing and commuting costs, and how their tradeoffs differ from those of wealthier families. It is organized into five sections. Beyond this brief introduction, the report consists of five parts. Section 2 introduces the PUMS (Public Use Microdata Sample) database, upon which this analysis is based, and presents the procedures used to identify the seven case study metropolitan regions. Section 3 presents a series of descriptive statistics comparing the housing and transportation choices confronting different types of working families in each of the seven case study metropolitan regions. Section 4 develops a series of statistical “bid-rent” models to contrast the housing and transportation tradeoffs made by working families versus upper-income families. Section 5 looks at the tradeoff issue through the lens of residential location to examine the types of neighborhoods favored by working families. Section 6 summarizes the research results and explores their implications for public policy.

2. APPROACH

This report explores how working families in seven major metropolitan areas tradeoff housing and commuting costs, and how their tradeoffs differ from those of wealthier families. It makes use of a select set of individual and household observations from the 2000 Census known as the Public Use Microdata Sample (PUMS). Using PUMS data has both advantages and disadvantages. On the advantage side, PUMS data, which come from the 2000 Census long form, are as close as we can get to real people, real households, and real working families. On the disadvantage side, PUMS data provide a great deal of detailed information on individuals and their characteristics, but intentionally blur the details of where they live to protect confidentiality. Instead of identifying neighborhood-level geographic details (e.g., census tracts), PUMS data locate responding individuals and households in collections of urban neighborhoods and suburban communities known as PUMAs, Public Use Microdata Areas. Individual PUMA boundaries are drawn so as to contain 100,000 or more persons, and although generally contiguous, do not necessarily match existing municipal boundaries.

Identifying Working Families

The first step in our analysis is to identify the characteristics that describe working families and that distinguish them from other types of households. This was done in consultation with research staffs at the Center for Housing Policy and the Center for Neighborhood Technology. *Working families* (WFs) are distinguished from other non-poor households—henceforth, referred to as *upper-income households* (UIs)—by a combination of income and earnings: they include families with (i) total earnings from wages and salaries of at least the full-time minimum wage equivalent of \$10,712 (\$6,650 in 1990); (ii) wages and salaries representing at least half of household income; and (iii) total household income of less than or equal to 120 percent of HUD-adjusted area median family income. All three criteria must apply for a household to be considered a working family.

The Revealed Choices of Recent Movers

Metropolitan areas are constantly changing. Neighborhoods move in and out of fashion. New sizes and forms of housing and job centers supplement and replace older ones. Residents and businesses are constantly readjusting their locations in search of greater accessibility to jobs, other businesses, shopping, a nicer home or workplace, better public services, greater status, a preferred mix of neighbors and land uses, and better housing and real estate values. Moreover, many move, not by choice, but because of circumstances beyond their control, such as eviction.

The range of housing and travel choices is constantly changing as well. Inner-city neighborhoods, which fifty years ago were victims of middle-class white-flight, are today re-attracting new types of households and new generations of families. Because change is ongoing, we cannot reliably compare the choices and constraints faced by working

family households in the 1970s, 1980s, or early 1990s to the choices being made—or precluded from being made—today. This is the problem with looking at all neighborhood residents at one moment in time. Because some moved in decades ago, while others are recent arrivals, it conflates the decisions of earlier generations of movers with those of today's movers.

Fortunately, the Census Bureau provides a pathway out of this dilemma. One of the questions on the 2000 Census long form is whether respondents lived in their current residence prior to 1995. The answers to this question enable us to distinguish a subset of PUMS respondents known as *recent movers*. The choices facing recent movers and their decisions in response to those choices provide a lens on actual household location decision-making processes.

That's the good news. The bad news is that the Census Bureau does not ask recent movers *why* they moved. This means that it is difficult to know what combination of push-pull factors shape the housing and commute choices of recent movers. Did they move in response to dissatisfaction with their old home or neighborhood? Because they liked their new home and neighborhood better? Because they changed jobs and regions? To downsize or upsize their home? To be closer to their parents or children? Because their lease was up, or they were evicted? None of these motivation drivers are listed in the PUMS data. These data gaps present significant, but not insurmountable, difficulties for researchers trying to figure out how and why households make location and transportation choices.

Characterizing Neighborhoods and Communities

When it comes to deciding where to live and how to get around, we start from the presumption that working families have fewer and less advantageous choices than upper-income households. Compared to their upper-income counterparts, working families must choose from among older and smaller homes, often in neighborhoods with lower-quality public services, especially public schools. When their preferred bundle of housing and neighborhood characteristics is not available in the homeownership market, we would presume that working families are more likely to rent. On the transportation side, we hypothesize that working families would typically have less access to private vehicles than upper-income families and would tend to live in neighborhoods that, while perhaps centrally located, are more distant and therefore less accessible via public transit to the full range of regional employment, shopping, and cultural opportunities.

Because choosing a home also entails choosing a location and a set of commute mode alternatives, understanding the set of housing and transportation options available to working families requires being able to understand their locational choices. Unfortunately, as noted earlier, PUMS data cannot be used to identify precise locations. They can, however, be used to identify different PUMA types.

PUMA types are sets of Public Use Microdata Areas with comparable housing stocks, residential densities, and regional accessibility levels. In simple terms, they are sets of contiguous urban neighborhoods and suburban communities that offer a distinct set of

housing and public service choices. Based on extensive statistical comparisons among 30 of the largest metropolitan areas, we identified five distinct and robust PUMA types: (i) primary central city neighborhoods; (ii) secondary central city neighborhoods; (iii) inner suburbs; (iv) outer suburbs; and (v) fringe suburbs. Note that this list does not include rural, exurban, or non-metropolitan PUMAs.

The PUMA identification process proceeded in two steps. We first developed a statistical model for classifying individual PUMAs according to their housing density (calculated at the census tract level), their employment density (calculated at the zip code level), their average housing stock age (calculated by PUMA), and their distance to each metropolitan area's closest designated central city. The same model was used to classify 1990 PUMAs and 2000 PUMAs. Owing to changes in PUMA geography and housing–job characteristics, PUMAs were allowed to change type between 1990 and 2000, but only upward, as from a younger and less dense PUMA type in 1990 to an older and more dense PUMA type in 2000.

Figure 1 maps these four characteristics to the different PUMA types. The set of *primary central city PUMAs* consists of PUMAs with an average (2000) residential density of 12 dwelling units per acre; an average (2000) employment density of 14 jobs per acre; an average housing stock age of 51 years; and location within the MSA's primary central city.¹ *Secondary central city PUMAs* are similar to primary central city PUMAs in that they are surrounded by suburbs, but they tend to have lower densities and younger housing stock. *Inner suburban PUMAs* have lower housing and employment densities than central city PUMAs, a somewhat younger housing stock, and are more distant from the core city. The key distinction between inner suburban PUMAs and *outer suburban PUMAs* is in the age of their housing stock and their distance from the central city; in a few cases, housing and employment densities in outer suburban PUMAs were higher than in inner suburban PUMAs. *Suburban fringe PUMAs* have much lower densities, much younger housing stock, and are far more distant from the MSA central city than are inner and outer suburban PUMAs.

Having classified PUMAs statistically, we then applied a few common sense rules to deal with any remaining anomalies. We stipulated that there should be no “leapfrog” PUMAs. For example, central city PUMAs should not be seen outside suburban PUMAs. In a few cases, we readjusted our individual PUMA classifications to insure that each PUMA type included a sufficient number of individual PUMAs. Last, we ensured that all primary central city PUMAs and secondary central city PUMAs were predominantly located within each region's respective primary central city and/or secondary central city.

¹ Because PUMA boundaries do not correspond to central city, suburb, or metropolitan area boundaries, the PUMAs designated here as “primary central city” were not all located within the MSA's central city.

Figure 1: Characteristics of Different PUMA Types

2000 PUMA Characteristics	Primary Central City PUMAs	Secondary Central City PUMAs	Inner Suburban PUMAs	Outer Suburban PUMAs	Suburban Fringe PUMAs
Average Residential Density (dwelling units per acre)	12.1 du/acre (range is 1.0 - 104)	2 du/acre (range is .1 to 5.3)	3.5 du/acre (range is 0 to 17.9)	1.1 du/acre (range is 0 to 4.3)	.4 du/acre (range is 0 to 2.3)
Average Employment Density (jobs per acre)	14.4 jobs/acre (range is .7 - 456)	2.1 jobs/acre (range is .4 to 5.6)	2.8 jobs/acre (range is .1 to 13.2)	1.1 jobs/acre (range is 0 to 4.7)	.3 jobs/acre (range is 0 to 3)
Median Housing Stock age (years)	51	44	41	33	28
Average Distance from Primary Central City (miles)	4.7	3.1	10.0	17.4	34.0

Choosing the Case Study Metropolitan Areas

PUMS data are a sample of a sample. The Census respondents included in the PUMS 2000 database are a small sample of the one in six U.S. households who responded to the 2000 Census long-form survey. Large enough for robust analysis at the national level, PUMS databases are much smaller when separated into metropolitan area subsets. When subdivided further—for example, into recent movers vs. non-movers and different types of working families living in different PUMAs—the number of PUMS observations per category starts to become uncomfortably small. Based on an initial survey of the number of PUMS observations in the 95 largest U.S. metropolitan areas, we selected a set of 30 MSAs and CMSAs (Consolidated Metropolitan Statistical Areas) to represent a broad cross-section of census regions, stratified as well by travel-time delay and housing elasticity. This initial set of MSAs—which included Atlanta, Baltimore–Washington, D.C., Boston, Buffalo, Chicago, Cleveland, Dallas, Denver, Detroit, Houston, Kansas City, Las Vegas, Los Angeles–Riverside–Orange County, Miami, Minneapolis–St. Paul, New York–Northern New Jersey–Connecticut, New Orleans, Norfolk, Oklahoma City, Orlando, Philadelphia, Phoenix, Pittsburgh, Portland, Providence, Salt Lake City, San Antonio, San Diego, San Francisco–San Jose–Oakland, and Seattle—was further culled by eliminating those metropolitan areas without the requisite number of observations to support a robust analysis of how different types of working families make different housing and transportation tradeoffs, and the need to add consistent data on school quality and transportation costs from sources external to the PUMS. This left a total of seven case study metropolitan regions: Atlanta, Baltimore–Washington, D.C., Chicago, Dallas–Ft. Worth, Greater Los Angeles, New York City, and the San Francisco Bay Area.

While necessary to guarantee statistical reliability, the net effect of this successive culling process was to eliminate certain MSAs with large populations of working families that would otherwise be of great interest. These include declining or stable MSAs such as

Detroit and St. Louis, as well as slower growing MSAs like Boston, Cleveland, and Minneapolis–St. Paul with lower rates of intra-metropolitan residential mobility.

This culling process also introduces certain issues of bias. In general, the number and range of residential and transportation choices increases with metropolitan area size. Bigger places offer more choices. In focusing only on large metropolitan areas, we will therefore tend to overstate the range of housing and transportation choices available to America's working families, and therefore understate the difficulties those families face, especially in smaller and shrinking metropolitan areas.

Figure 2 summarizes the number of PUMAs classified as primary central city, secondary central city, inner suburb, outer suburb, and suburban fringe in each of the seven case study metropolitan areas. It also includes the names of examples of each PUMA type. Appendix A presents the PUMA classifications in map form for each case study MSA.

Not surprisingly, the distribution of PUMA types differs markedly across the seven case study metropolitan areas. The majority of PUMAs in the Atlanta region, for example, are outer suburban and suburban fringe PUMAs. This reflects the fact that almost all of the Atlanta region's recent population growth has occurred in its outer areas while its central cities and inner suburbs have remained more or less stagnant.

PUMAs in the Chicago region, by contrast, are evenly distributed across the different PUMA types, with Gary (Indiana), Aurora, and Joliet each functioning as secondary central cities. Most of Chicago's inner suburban PUMAs are independent municipalities, as are all of its outer suburban PUMAs. Suburban fringe growth in the Chicago region slowed in the 1970s and 1980s but then picked up again in the 1990s.

Most residents of the Dallas–Ft. Worth MSA live outside the region's two central cities. This results in a PUMA distribution that is heavily weighted toward large inner and outer suburban communities. While older than its outer suburban PUMAs, Dallas's inner suburban PUMAs are still fairly young. Its suburban fringe PUMAs mostly consist of unincorporated county lands.

Whether measured in terms of land area or population, the Greater Los Angeles urban region is the country's largest. It is also the only one of the seven case study regions in which population growth continues to occur in all five PUMA types. The region's 20 central city PUMAs include most of the City of Los Angeles as well as several surrounding older suburbs and job centers. Its four secondary central cities are all much smaller and are located at the region's urban edge. The Greater Los Angeles region's inner suburbs are an extremely diverse lot, and include large and dense municipalities such as Anaheim, Burbank, Glendale, and Santa Ana; as well as somewhat smaller, newer, and wealthier low-density communities like Costa Mesa. Home to the L.A. region's affordable family housing in the 1980s and 1990s, outer suburban communities like Montclair, Rancho Cucamonga and Canoga Park are now beyond the financial reach of most of the region's family households. To find affordable housing in the Greater Los Angeles region, more and more households have to travel eastward 90 miles or more to newer edge cities like Apple Valley, Moreno Valley, and Lancaster.

Figure 2: Atlanta, Chicago, Dallas/Ft. Worth, Los Angeles, New York, San Francisco, and Washington DC/Baltimore: PUMA Types and Examples

Metropolitan Region	Number of PUMAs and Example Neighborhoods and Communities				
	Primary Central City PUMAs	Secondary Central City PUMAs	Inner Suburban PUMAs	Outer Suburban PUMAs	Suburban Fringe PUMAs
Atlanta	5 PUMAs Atlanta (4), East Point		4 PUMAs Atlanta (4)	16 PUMAs Alpharetta, Decatur, Lawrenceville, Marietta, Roswell, Sandy Springs	8 PUMAs Cummings, Douglasville, Stockbridge, Monroe
Chicago	16 PUMAs Chicago (15), Oakland Park	4 PUMAs Aurora, Carpentersville, Gary, Joliet	13 PUMAs Bedford Park, E. Chicago, Highland Park, Oak Lawn, Skokie, Waukeegan	15 PUMAs Antioch, Batavia, Hoffman Estates, Lisle, Oak Forest, Waukeegan	14 PUMAs Beecher, DeKalb, Kanakee, Kenosha (WI)
Dallas-Fort Worth	4 PUMA Dallas (4)	1 PUMA Central Ft. Worth	12 PUMAs Arlington, Garland, Irvington, Mesquite, University Park	17 PUMAs Aubrey, Crowley, Plano, Richardson	4 PUMAs McKinney, Eastern Dallas Metro, Western Ft. Worth
Greater Los Angeles	20 PUMAs Los Angeles (13), Burbank, Long Beach, Hawthorne, Huntington Park	4 PUMAs Oxnard, Riverside, San Bernardino, Ventura	41 PUMAs Anaheim, Burbank, Pasadena, Pomona, Costa Mesa, Fullerton, Glendale, Norwalk, Santa Ana	22 PUMAs Canoga Park, Corona, Montclair, Ontario, Rancho Cucamonga, Thousand Oaks	23 PUMAs Apple Valley, Banning, Camarillo, Lancaster, Moreno Valley, Palmdale, Riverside Hills
New York City	44 PUMAs Bronx (9), Brooklyn (16), Manhattan (1), Queens (5), Jersey City	4 PUMAs Bridgeport (CT), New Haven (CT), Stamford (CT)	43 PUMAs E. Newark (NJ), Elizabeth (NJ), Flushing (NY), Fort Lee (NJ), Port Chester (NY), Yonkers (NY)	49 PUMAs Asbury Park (NJ), Brewster (NY), Cliffwood (NJ), Edison (NJ), Meridan (CT), Paramus (NJ), Poughkeepsie (NY)	15 PUMAs Andover (NJ), Bayville (NJ), Brookville (NJ), Middletown (NY)
San Francisco Bay Area	11 PUMAs San Francisco (7), Oakland (2), San Jose	2 PUMAs Santa Cruz, Santa Rosa	15 PUMAs Alameda, Burlingame, Milpitas, Richmond, San Jose (3), Sunnyvale	18 PUMAs Benicia, Fremont, Lafayette, Pittsburg, Petaluma, San Jose (3)	10 PUMAs Antioch, Fairfield, Livermore, Napa County
Washington, D.C & Baltimore	10 PUMAs Arlington, Alexandria, Baltimore (4), Washington (4)		16 PUMAs Bethesda (MD), College Park (MD), Kensington (MD), Silver Spring (MD)	11 PUMAs Columbia (MD), Frederick (MD), Gaithersberg (MD), Reston (VA), Tyson's Corner (VA)	22 PUMAs Anapolis (MD), Baldwin (MD), Hagerstown (MD), Leesburg (VA), Stafford (VA)

The New York City metropolitan region includes more PUMAs—155 in total—than any other U.S. urban region, including 44 central city PUMAs. Every New York City PUMA is a central city PUMA, as is Jersey City. The region’s four secondary central city PUMAs are all in Connecticut, a 60–90 minute train trip from Manhattan. Having developed in the first half of the 20th century, most of New York’s 43 inner suburban PUMAs are conveniently accessible by commuter rail, something that is true of no other American metropolitan area. New York’s 49 outer suburban PUMAs are an extremely diverse and distant lot, united only by the rate of their post-War population growth and their location along one of the region’s suburban commuter rail corridors. Like Chicago, suburban growth in the New York region took a break in the 1970s and 1980s, only to pick up with renewed energy in the 1990s.

The San Francisco Bay Area is unique among U.S. metropolitan areas in that it includes three central cities, only one of which (San Jose) is extremely large in terms of area and population. Even so, because San Jose is a fairly young city and its densities are low, six of its seven PUMAs are suburban. San Francisco’s seven PUMAs and Oakland’s two PUMAs, by contrast, are all central city PUMAs. Most of the San Francisco Bay Area’s 15 inner suburban PUMAs ring the central San Francisco Bay, while most of its 18 outer suburban PUMAs are adjacent to the more northern San Pablo Bay. Except in a very few depressed and isolated central city and older suburban neighborhoods, all of the region’s affordable housing—affordable being a very relative term in coastal California—is located in one of the Bay Area’s 10 suburban fringe PUMAs, where, as the saying goes, “You drive until you qualify.” Of the three case study urban regions with a commuter rail system built in the 1970s—Atlanta, San Francisco, and Washington, D.C.—the San Francisco Bay Area is the only one in which newer suburban PUMAs are well served by regional transit.

The two poles of the Washington, D.C.–Baltimore urban region are linked by Interstate 95, Civil War history, the Baltimore–Washington Airport, and almost nothing else. Almost all the region’s population growth over the last fifty years has occurred around Washington, D.C., and mostly along its southern rim. The Washington, D.C.–Baltimore combined urban region includes 10 central city PUMAs, 16 inner suburban PUMAs (mostly in Maryland), 11 outer suburban PUMAs (evenly distributed between Maryland and Virginia), and 22 suburban fringe PUMAs, most of which are in Virginia. Much of the Washington, D.C.–Baltimore region’s recent employment growth has occurred in its outer (Virginia) suburbs such as Tyson’s Corner and Reston. This also has been true for the Atlanta and Dallas regions, making Washington, D.C., a bit of a triple with those other sunbelt MSAs.

Two Complementary Modeling Approaches

Housing and transportation choices can be analyzed two ways: either as a series of continuous tradeoffs subject to an income or budget constraint, or as a series of discrete neighborhood location decisions involving housing and transportation considerations. The first approach assumes that households can choose their housing bundles and transportation options from along a continuum, and that (for a given income) the decision

to spend more on housing requires spending less on transportation. The opposite is also true: spending more on transportation would mean spending less on housing. The continuous approach is consistent with the bid-rent model that lies at the core of contemporary urban economics. It is also easier to analyze statistically.

The second discrete choice approach, which is somewhat harder to model, does not assume that housing and transportation choices can be continuously varied. Instead, when deciding where to live, households must choose from among particular bundles of housing and transportation services that may or may not be advantageous.

Neither approach is inherently superior to the other. Both yield interesting and fresh insights, and we have elected to pursue both: the continuous tradeoff approach in Section 4, and the discrete tradeoff approach in Section 5.

3. A CLOSER LOOK AT THE DIFFERENCES BETWEEN WORKING FAMILIES AND UPPER-INCOME HOUSEHOLDS

Working families are notably different from upper-income families. In addition to—or perhaps because of—their lower incomes, working families make up different types of households. They live in different neighborhoods and communities. They are far more likely to rent their dwelling units than to own them. Even when they do own their own homes, they face much higher housing cost burdens. The one area in which working families and upper-income families seem indistinguishable, at least upon first look, is in their commuting behavior. Both groups commute by car in similar proportions, and both groups take about the same time to commute to work, although they typically work in different types of jobs and in different locations.

Before exploring these differences through the use of statistical models—which hold certain attributes constant in order to focus on others—we use this chapter to separately explore differences in household type, residential location, housing outcomes, and commuting behavior between working families and upper-income households. Note that these comparisons are limited to the seven case study metropolitan areas and apply solely to *recent movers*—those households who changed their residential location between 1996 and 2000. As a group, recent mover households are far more likely than non-movers to rent, slightly more likely to commute by public transit than car and, depending on the metropolitan area, somewhat more likely to live in a central city neighborhood than in the suburbs. The other big difference between recent movers and non-movers is how much more recent movers pay for housing. This is true even in affordable housing markets. Among working families in the Atlanta metropolitan area, for example, the median monthly housing cost (as of 2000) for recent mover homeowners was \$2,066, versus just \$1,318 for non-movers. Among Atlanta working family renters, the median rent for recent movers was \$765 per month; for non-movers, it was only \$664 per month. Similar differences between recent mover and non-mover housing costs are evident in the six other case study metropolitan areas.

In most other respects—where they choose to live, how they organize themselves into households, how much income they earn, and how far they commute—recent movers are virtually identical to non-movers. Appendix B compares the characteristics of recent movers and non-movers for each of the seven case study metropolitan areas.

Differences in Household Type

How do working families differ from upper-income ones? We first consider differences in household type (see Figure 3). Regardless of metropolitan area, working families (WF) are far more likely to include children than are upper-income (UI) households. In all seven case study regions, the largest WF household category by far was *married-couples with children*. Depending on the region, this group typically comprised 40% to 49% of WF households. The largest UI household group, by contrast, was *single-person*

households; depending on the region, they typically accounted for between 33% and 39% of UI households.

Children were the dividing line between WF and UI households in all seven of the case study metropolitan areas shown in Figure 3. If children were present, a household was two to four times more likely to be a WF household; if they were absent, the same household was three to five times more likely to be a UI household.

The New York region was typical in this respect. *Married-couples with children* comprised 46.5% of WF households in the New York region in 2000, but only 20.9% of UI households. *Single-parent households* in the New York Region accounted for 14.1% of WF households but only 3.1% of UI households. Among New York's *multiple-family households with children* household category, at 9.3% to 1.3%, the split between WF and UI households was even more extreme.

Among *households without children*, the split ran the other way, dramatically favoring UI households over WF households. Of the six household types profiled in Figure 3, the only one in which the presence of children did not form a hard dividing line between WF and UI households was *multiple-family households without children*.

Figure 3: Atlanta, Chicago, Dallas/Ft. Worth, Los Angeles, New York, San Francisco, and Washington, D.C./Baltimore: Working Family Household Types, 2000

Metropolitan Region	% Married-couples with children	% Married-couples without children	% Single-parent Family	% Single-person HHs	% Multiple families with children	% Multiple families without children	Total - All HHs
Atlanta							
Working Families	44.1%	8.9%	15.0%	10.2%	8.8%	13.0%	100%
Upper-Income Families	18.8%	28.3%	2.8%	34.8%	1.0%	14.2%	100%
Chicago							
Working Families	47.5%	8.6%	14.6%	10.2%	8.5%	10.6%	100%
Upper-Income Families	17.9%	26.2%	3.0%	38.6%	1.0%	13.2%	100%
Dallas/Ft. Worth							
Working Families	46.5%	9.5%	14.5%	10.7%	8.0%	10.9%	100%
Upper-Income Families	20.6%	27.9%	3.0%	36.8%	1.1%	10.5%	100%
Greater Los Angeles							
Working Families	48.9%	6.6%	14.4%	6.4%	13.5%	10.2%	100%
Upper-Income Families	21.1%	23.2%	4.8%	32.6%	2.4%	15.8%	100%
New York City							
Working Families	46.5%	9.1%	14.1%	9.7%	9.3%	11.3%	100%
Upper-Income Families	20.9%	25.4%	3.1%	35.1%	1.3%	14.2%	100%
San Francisco Bay Area							
Working Families	42.0%	9.8%	11.6%	10.5%	9.9%	16.2%	100%
Upper-Income Families	17.5%	26.0%	2.5%	33.3%	1.9%	18.8%	100%
Washington, D.C./Baltimore							
Working Families	40.9%	9.3%	15.3%	12.5%	8.9%	13.1%	100%
Upper-Income Families	16.4%	27.6%	2.8%	37.4%	1.4%	14.4%	100%

Source: 2000 PUMS data. Estimates are for recent movers only.

Differences in Residential Location

Differences in residential location between WF households and UI households are not as large as differences in household type. Indeed, they tend to be quite small. Depending on the region, suburban PUMAs were favored by 50%–65% of WF households, and by similar shares of UI households (see Figure 4).

Where residential location preference differed, it was more likely to be a matter of region than class. Regardless of whether they were members of WF or UI households, residents of New York City and Washington, D.C.–Baltimore were more likely to live in downtown PUMAs while residents of Dallas–Ft. Worth and Atlanta were less likely to live downtown. Chicago residents avoided inner suburban PUMAs while residents of Dallas and Washington, D.C.–Baltimore favored them. Compared to the other four metropolitan regions, fringe suburban PUMAs were most popular among residents of Chicago, New York City and Greater Los Angeles regions.

This is not to say that the residential location choices of working families exactly mirrored those of upper-income families. Among the places where they most differed:

- In Atlanta, WF households were more likely to live in outer suburban PUMAs than were UI households.
- In Chicago, WF households were far less likely to live in central city PUMAs and much more likely to live in inner suburban PUMAs than UI households.
- In Dallas–Ft. Worth, UI households were more likely than WF households to live in outer suburban PUMAs.
- In the Greater Los Angeles region, WF households were notably more likely than UI households to live in downtown PUMAs and less likely to live in outer suburban PUMAs.
- In New York City, WF households were far more likely to live in older, suburban communities than UI households and less likely to live in the outer ring.
- In Washington, D.C.–Baltimore, WF households were somewhat less likely to live in central city PUMAs than UI households, and somewhat more likely to live in fringe suburban PUMAs.

Housing Tenure, Costs, and Burdens

The housing cost, housing burden, and homeownership rate estimates reported in this section apply solely to recent movers, and not to non-movers. They thus provide a more accurate picture of contemporary housing choices and outcomes. Housing costs are for 2000, while income estimates are for 1999. Housing costs are reported on a monthly basis while incomes are reported annually. For homeowners, monthly housing costs include principal and interest payments, property taxes and insurance, and utilities. For renters, monthly housing costs (gross rents) include contract rent and utilities.

Working families are far less likely to own their homes than upper-income households (Figure 5). Among the seven case study metropolitan areas, homeownership rates averaged 16% lower for WF households than for UI households. Working family homeownership rates as of 2000 were highest in Atlanta (at 46.8%), and lowest in the Greater Los Angeles region (32.7%).

Measured in absolute terms, WF households paid considerably less for housing in 2000 than did UI households. This was true for both owners and renters. Among metropolitan regions, the typical monthly housing cost differential between WF and UI homeowners ranged from just \$200 in Chicago (with WF homeowners paying \$1,640 per month and UI homeowners paying \$1,840 per month) to \$592 in the San Francisco Bay Area. Among renters, the housing cost differential between WF and UI households ranged from \$97 per month in Atlanta to \$278 in Washington, D.C.–Baltimore.

Figure 4: Atlanta, Chicago, Dallas/Ft. Worth, Los Angeles, New York, San Francisco, and Washington, D.C./Baltimore: Where Working Families Reside, 2000, by PUMA Type

Metropolitan Region	% living in Central City PUMAs	% living in Secondary Central City PUMAs	% living in Inner Suburban PUMAs	% living in Outer Suburban PUMAs	% living in Suburban Fringe PUMAs	Total - All HHs
Atlanta						
Working Families	16.9%	na	29.5%	35.7%	17.9%	100%
Upper-Income Families	20.5%	na	28.7%	30.3%	20.5%	100%
Chicago						
Working Families	18.7%	5.6%	19.9%	27.7%	28.0%	100%
Upper-Income Families	26.3%	3.2%	12.2%	28.8%	29.5%	100%
Dallas/Ft. Worth						
Working Families	9.7%	2.0%	49.4%	30.6%	8.3%	100%
Upper-Income Families	10.2%	0.6%	46.7%	36.4%	6.1%	100%
Greater Los Angeles						
Working Families	23.8%	4.1%	22.8%	28.6%	20.7%	100%
Upper-Income Families	19.5%	2.6%	23.2%	32.5%	22.2%	100%
New York City						
Working Families	24.3%	3.3%	28.1%	22.4%	21.9%	100%
Upper-Income Families	27.5%	2.1%	17.1%	30.0%	23.3%	100%
San Francisco Bay Area						
Working Families	19.0%	5.6%	25.7%	32.8%	16.9%	100%
Upper-Income Families	21.2%	3.3%	29.5%	31.7%	14.3%	100%
Washington, D.C./Baltimore						
Working Families	20.9%	na	33.2%	33.5%	12.4%	100%
Upper-Income Families	25.4%	na	30.6%	35.0%	9.0%	100%

Source: 2000 PUMS data. Estimates are for recent movers only.

Figure 5: Atlanta, Chicago, Dallas/Ft. Worth, Los Angeles, New York, San Francisco, and Washington, D.C./Baltimore: Housing Tenure, Burdens, and Costs, 2000

Metropolitan Region	by Housing Tenure		Housing Costs and Burdens					
	% Owner-occupants	% renters	<u>Owners:</u> Average monthly housing cost	<u>Renters:</u> Average monthly rent	<u>Owners:</u> Average household income	<u>Renters:</u> Average household income	<u>Owners:</u> Average housing cost burden	<u>Renters:</u> Average housing cost burden
Atlanta								
Working Families	46.8%	53.2%	\$1,472	\$753	\$55,500	\$34,400	0.36	0.30
Upper-Income Families	65.4%	34.6%	\$1,793	\$850	\$97,500	\$61,000	0.25	0.18
Chicago								
Working Families	46.2%	53.8%	\$1,640	\$680	\$60,000	\$33,000	0.36	0.29
Upper-Income Families	60.6%	39.4%	\$1,840	\$830	\$97,500	\$62,000	0.25	0.18
Dallas/Ft. Worth								
Working Families	38.7%	61.3%	\$1,650	\$640	\$52,000	\$30,500	0.41	0.29
Upper-Income Families	54.3%	45.7%	\$2,217	\$750	\$100,000	\$56,000	0.29	0.18
Greater Los Angeles								
Working Families	32.7%	67.3%	\$1,778	\$733	\$55,000	\$31,600	0.42	0.33
Upper-Income Families	50.6%	45.4%	\$2,267	\$917	\$103,500	\$63,000	0.29	0.19
New York City								
Working Families	35.8%	64.2%	\$2,073	\$792	\$65,500	\$35,800	0.41	0.31
Upper-Income Families	51.3%	48.7%	\$2,322	\$982	\$120,000	\$75,000	0.25	0.18
San Francisco Bay Area								
Working Families	35.3%	64.7%	\$2,218	\$983	\$72,000	\$44,000	0.40	0.32
Upper-Income Families	50.7%	49.3%	\$2,810	\$1,261	\$135,000	\$89,200	0.28	0.18
Washington, D.C./Baltimore								
Working Families	44.7%	55.3%	\$1,627	\$758	\$62,000	\$35,900	0.35	0.28
Upper-Income Families	59.9%	40.1%	\$1,970	\$910	\$107,000	\$70,400	0.24	0.17

Source: 2000 PUMS data. Estimates are for recent movers only. |

Note: Housing costs include utilities

Differences in housing costs between WF households and UI households pale before differences in household income. At the high end, in the San Francisco Bay Area, the average UI homeowner earned an income of \$135,000 in 1999, versus \$72,000 for the average WF homeowner—a difference of \$63,000. Even in lower-cost Atlanta, where the average UI homeowner earned \$97,500 in 1999, the income differential between WF and UI households was a fairly stiff \$42,000.

Because renters typically earn less than homeowners, the income differentials between WF and UI renters were somewhat smaller. They ranged from \$26,100 in Dallas to \$45,200 in the San Francisco Bay Area.

Bringing together income and housing costs into a single measure, housing cost burden, reveals the true differences between WF and UI households. Among homeowners, WF households typically paid between 35% and 42% of their incomes toward mortgage payments, property taxes, and utilities. UI homeowners, by contrast, devoted just 24%–29% of their incomes toward housing costs. Among the case study metropolitan areas, the burden differential between WF and UI homeowners was relatively constant, but largest in New York City (+16%). This combination of very high housing cost burdens and a large WF–UI housing cost burden differential is indicative of housing markets that provide ready choices to upper-income homebuyers but is devoid of choice to working families seeking to become homeowners.

Among renters, WF households typically devoted 29%–33% of their monthly income toward housing costs. For UI households, rent burdens were a much lower 17%–19% of household income. Unlike the homeownership case, the gap between WF and UI rent burdens hardly varied across the different case study MSAs.

In sum, whereas upper-income households pay a lot for housing and get a lot relative to their incomes, working family households pay a lot but get somewhat less. This is true regardless of metropolitan area.

Commute Modes and Times

Americans rely heavily on cars. This is as true for working families as it is for upper-income families. Even in the case of daily commuting—which is the type of trip best served by public transit—an overwhelming majority of WF and UI households take their cars (see Figure 6). Among working families in the seven case study metropolitan areas, the drive-alone use of the private car comprises between 64% and 95% of commuting trips. Similar percentages apply for upper-income households. The New York City region, with its extensive subway and commuter rail service is at the bottom of this spread, while Dallas–Ft. Worth is at the top.

In Chicago, WF commuters are slightly more likely to drive to work than UI commuters. The opposite is true in the Greater Los Angeles region, where WF commuters are slightly less likely to drive. Elsewhere, the WF and UI commuters drive in almost exactly the same percentages.

The picture is slightly different for public transit commuters. In Atlanta, Dallas–Ft. Worth, and the Greater Los Angeles region, WF commuters are far more likely to take public transit to work than are UI commuters. (Both groups, however, are 15–40 times more likely to drive.) In Chicago and New York City, on the other hand, WF commuters are slightly less likely to take public transit than UI commuters. This is more a function of the types of communities served by commuter rail than of any underlying preference.

Regardless of the metropolitan area, WF commuters are more likely to walk or bicycle to work than are UI commuters, although as in the case of public transit, the overall mode share of walking and bicycling is far less than that of driving. Among WF households, walking and bicycling is most popular in the New York City and San Francisco Bay Area regions and least popular in Atlanta and Dallas–Ft. Worth.

Although they tend to work in somewhat different locations—UI breadwinners are more likely to work in downtown and suburban office buildings while their WF counterparts are more likely to work throughout the metropolitan area—both groups take about the same time to drive to work. In six of the seven case study MSAs, *driver* commuting times for WF and UI commuters average 28–31 minutes. Average commute times in Dallas–Ft. Worth are lower at 26 minutes.

Commuting by transit typically takes much longer, on the order of 15–20 minutes longer, depending on the region. In the New York City region, for example, the typical transit rider takes 48–50 minutes to get to work; the average driver takes only 29–31 minutes. Working family transit riders in Atlanta, Chicago, and Dallas–Ft. Worth take somewhat longer on average to get to work than their UI counterparts. In the Greater Los Angeles region, by contrast, WF transit users get to work an average of five minutes faster than their UI counterparts.

Except in Atlanta, pedestrian and bicycle commuters get to work much faster than their driver counterparts and much, much faster than transit commuters. Among pedestrian and bicycle commuters, the travel time differential between WF and UI travelers is small, and tends to slightly favor WF commuters.

In sum, the key differences in commute patterns are between drivers, transit users, and pedestrians, and not between working families and upper-income households. Both economic groups tend to favor driving over transit or walking in the same proportions—although these proportions differ slightly among metropolitan regions—and both groups take about the same time to travel to work.

Figure 6: Atlanta, Chicago, Dallas/Ft. Worth, Los Angeles, New York, San Francisco, and Washington, D.C./Baltimore: Commute Modes and Times, 2000

Metropolitan Region	Commute Modes and Times						
	% Commuting trips by car (drive-alone)	% Commuting trips by public transit	% Commuting trips by walking or bicycling	% Commuting trips by other modes	Average commuting time by car (minutes)	Average commuting time by public transit	Average commuting time by walking or bicycling
Atlanta							
Working Families	92.0%	5.2%	2.5%	0.3%	30	47	23
Upper-Income Families	93.0%	2.1%	1.4%	3.5%	29	42	36
Chicago							
Working Families	82.0%	13.0%	4.7%	0.3%	29	48	18
Upper-Income Families	76.0%	17.0%	4.0%	3.0%	30	45	20
Dallas/Ft. Worth							
Working Families	94.5%	2.5%	3.1%	0.0%	26	46	18
Upper-Income Families	95.0%	1.0%	1.5%	2.5%	26	44	30
Greater Los Angeles							
Working Families	87.0%	7.1%	5.0%	0.9%	28	46	19
Upper-Income Families	92.0%	1.9%	2.3%	3.8%	28	51	20
New York City							
Working Families	64.0%	28.0%	7.3%	0.7%	29	50	17
Upper-Income Families	61.0%	30.0%	6.2%	2.8%	31	48	17
San Francisco Bay Area							
Working Families	82.0%	10.0%	6.3%	1.7%	28	45	18
Upper-Income Families	81.0%	11.0%	4.4%	3.6%	29	44	21
Washington, D.C./Baltimore							
Working Families	83.0%	12.0%	4.6%	0.4%	30	45	19
Upper-Income Families	82.0%	11.0%	3.7%	3.3%	31	44	20

4. HOW WORKING FAMILIES TRADEOFF HOUSING AND TRANSPORTATION COSTS

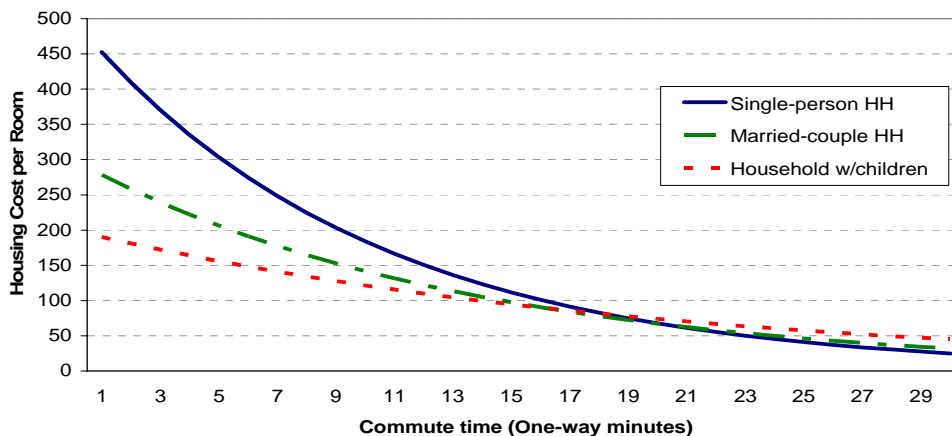
Approach

In this section, we explore how working family households continuously tradeoff housing and transportation costs.

For the past fifty years, William Alonso’s theory of “bid rents,” adapted from earlier theories of agricultural land prices, has framed our understanding of how the tradeoff between housing and transportation costs shapes metropolitan spatial structure. At its simplest, bid-rent theory holds that housing and commuting are bundled “goods,” with households who face a fixed budget continuously trading off one for the other according to their incomes, demographic characteristics, and lifestyle preferences. Some households opt to live far out on the metropolitan fringes preferring bigger homes and lower housing costs, but at the expense of higher commuting costs and times. Stereotypically, these include young families with modest incomes and children. Other households choose to live closer to urban centers and, correspondingly, more job opportunities. The shorter commutes they enjoy also come at a price: higher housing costs per square foot of living space.

Figure 7 presents a series of archetypal bid-rent curves. Following long-standing conventions, transportation costs are measured in time as well as dollar terms. Different types of households will have different specific bid-rent curves, depending on their size, income and preferences, but all bid-rent curves have the same general shape, indicating that the trade-off between housing and transportation costs is a non-linear one.

Figure 7: Archetypal Bid-Rent Curves for Different Household Types



Initially put forth as a proposition, Alonso’s “bid-rent” trade-off theory can be investigated empirically using PUMS data. Rather than lump all PUMS observations together, we identified separate bid-rent curves for different household types depending on their: (1) family type; (2) household income; (3) housing ownership status; and (4) recent mover status (whether or not they moved between 1995 and 2000). The tested models each took the following form:

$$\text{Eq.[1] } \log(\text{Housing Cost per Room}) = f[\log \text{ of (Commute Time of all workers by all modes, Family Type, Income Thirds, Age of household head, Education by household head, Homeowner status, Recent mover status, Neighborhood population density, Metropolitan Area fixed effect, Interactive terms)}]$$

Expressing this equation in log-log form serves two purposes. First, it captures the already-noted tendency for bid-rent curves to follow a non-linear form. Second, it allows us to interpret the coefficient estimates as elasticities, through which we can observe the percentage change in the value of the dependent variable (housing cost) for a one percent change in the value of one or more independent variables—in this case, commute time—holding the other independent variables constant. Elasticities are a good, efficient way to summarize the results of tradeoff models. Specifically, the sensitivity of housing costs to changes in each of the independent variables can easily be compared in elasticity form (since log-log expressions standardize influences).

Housing Cost, the dependent variable, is expressed on a per-room basis to account for differences in dwelling size. Commute time was expressed as minutes per worker. While a full expression of generalized commuting costs (time as well as monetary expenditures for car usage, parking, bus fares, etc.) would have been preferred, the absence of all but commuting time data from PUMS precluded this. With the imputed value of commute times set at around one-half the prevailing hourly wage rate of large metropolitan areas, commute times are by far the largest component of any generalized cost expression.

Family type, household income, age and educational attainment of the head of household, and homeownership and recent mover status are each included as separate independent variables in order to investigate different combinations of household characteristics. Household income was represented through a three-category series of income thirds, with *working families indicated by the lowest income third*.² Neighborhood population density was also included to reflect the fact that different metropolitan locations come with different amenity and public service characteristics that, for the most part, vary with neighborhood age and density.

² Thirds break the sample of interest, sorted low-to-high, into three groups of equal size. When used to categorize income, thirds are less common than quartiles (4 groups) or quintiles (5 groups); however, in the current case, the use of single quartiles and quintiles would tend to undercount the number of working families.

Rather than test separate models for each of the case study metropolitan areas, a single model was tested with metropolitan fixed effect dummy variables included to account for inter-MSA differences. This was done for the sake of simplicity, as well as to maximize the number of observations per household type, income third, housing tenure, and mover status.

Of particular importance in estimating and mapping bid-rent curves were the set of interactive terms. These make it possible to capture the influences of changing commuting times on housing costs for each of the household types and income groups studied. Nine interactive terms were included in the model:

- Lowest Income Third * log (Commute Time)
- Middle Income Third * log (Commute Time)
- Single Parent Family * log (Commute Time)
- Married/Domestic Partners, with Children * log (Commute Time)
- Married/Domestic Partners, with no Children * log (Commute Time)
- Multiple Families, with Children * log (Commute Time)
- Multiple Families, with no Children * log (Commute Time)
- Homeowner * log (Commute Time)
- Non-mover * log (Commute Time)

The household type and income third variables were coded as 0/1 “dummy” variables. A value of 1 indicates that the surveyed PUMS household takes on a particular characteristic; a value of 0 indicates that they do not. Four interaction variables were purposely not included in the model in order to serve as the statistical referents. The excluded interaction variables combine commute time with, alternately, households in the highest income third, single-person households with no children, renters (non-homeowners), and recent movers.

The use of a bid-rent framework to analyze housing and transportation tradeoffs introduces a number of complications, one which is easy to deal with, and one which is not. The easy-to-deal-with complication concerns the spatial distribution of jobs. Alonso’s bid-rent model was originally developed with reference to the *monocentric city* wherein jobs are concentrated downtown. Of course, the post-World War II era of job decentralization has given rise to *polycentric* and *edgeless* city forms. This posed little problem in our analyses since commute times were recorded by individual PUMS worker-respondents with reference to residences and job sites, regardless of location. Because the bid-rent curves estimated for this analysis are based on commute times independent of workplace location, they are hereafter referred to as *non-centric bid-rent curves*.

The second complication is more problematic. While we have chosen to explore housing costs as a function of commute times (e.g., housing cost is the dependent variable in Equation [1] and commute time is an independent variable), in fact, the two costs are more likely co-dependent, or what economists call “endogenous.” Whereas demographic and lifecycle preferences regarding commute times might sway residential location choice, the opposite could also be true: housing and location preferences may affect the

willingness of households to tolerate different commute times. Under such conditions where housing costs and commute times have a two-way causal relationship, the use of standard model estimation approaches such as ordinary least squares can produce biased results. One way to cope with this problem is to create an instrument variable for the co-dependent predictor, which in our case was the “Commute Time” variable. Along with other non-endogenous variables in the equation, school test scores by PUMA were used in constructing the instrument. Besides being a variable outside of the equation, it was included as an instrument under the logic that some households (notably, those with children) would willingly accept longer commute times in return for living in areas with good schools.

Results

Equation [1] was estimated using ordinary least squares regression. As noted above, all seven case study metropolitan areas, all household types, and all household income thirds were combined to ensure that the results would be statistically robust, even in cases of very small sub-samples. Detailed model results and goodness-of-fit statistics are presented in Appendix C.

The estimated model parameters were then used along with a range of possible commute times (varying from 18 to 40 minutes) to simulate specific housing and transportation tradeoff curves (i.e., bid-rent curves) for each major household type, income level, tenure form, and mover group. Other independent variables were represented at their mean or modal values as appropriate.

Family Types: Figure 8 shows the constructed bid-rent curves for the three family types with children. Of the three family types in which children are present, *married-couple/domestic partner households with children* (married-with-children, for short) are most sensitive to changes in commute time, as revealed by the relatively steep slope. Married-with-children households living near work sites and averaging a relative short commute (18–20 minutes, one-way) pay a relatively high premium of \$500 to \$570 per room per month. Given that the mean commute time of surveyed households from the seven metropolitan areas was around 29 minutes, for these households, obtaining short commutes comes at a relatively high price for housing.

Compared to married-with-children households, the bid-rent curve for *multiple-family households with children* (multiple-with-children, for short) is flatter; and for *single-parent households*, it is flatter still. For longer distance commutes, these non-traditional families average higher housing cost outlays per room than the traditional nuclear family, an indication that they face more constraints and have fewer choices.

Figure 9 presents the bid-rent curves for the three family types without children. Compared to the households with children, all of these family types have relatively flat bid rent curves. For *single-person households*, the bid rent curve is essentially horizontal, suggesting factors other than proximity to workplace weigh in on residential choice for this group. *Married couples or domestic partners without children* appear to tradeoff housing outlays and commuting costs the most among these three categories. This may

be a legacy effect of having had children in the past, in anticipation of having children in the future, or just simply in recognition of the fact that home values tend to rise fastest in neighborhoods with good schools.

Figure 8: Estimated Non-centric Bid-Rent Curves for Households with Children

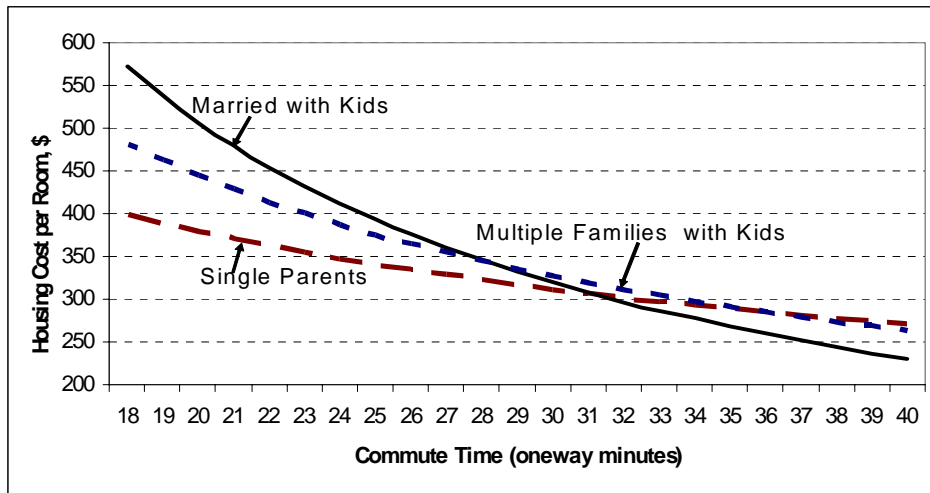
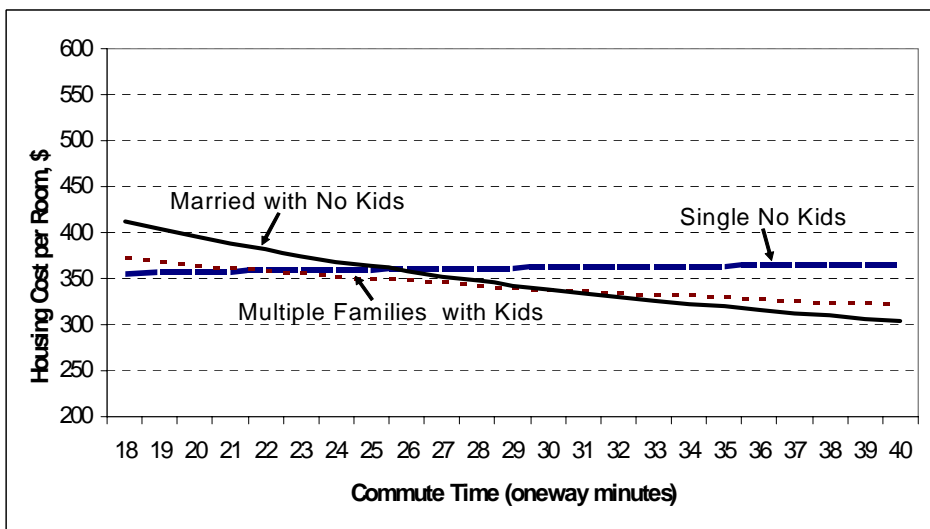
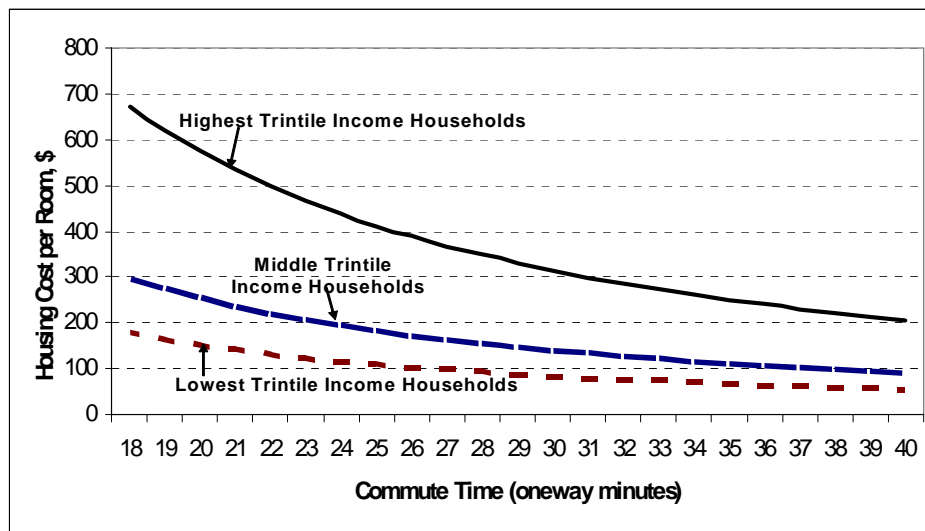


Figure 9: Estimated Non-centric Bid-Rent Curves for Households without Children



Household Income: As Figure 10 shows, the estimated bid-rent curves were steepest for the highest income households (i.e., those in the highest income third), suggesting a greater sensitivity to commutes, and preference for minimizing commute times. This is consistent with prior research, including early work by Alonso, showing higher income households have the most residential location choices and their willingness to pay a rent premium erodes rapidly as commute distances rise. Working family households, on the other hand, who are mostly in the lowest-income third, face more location constraints and have fewer choices, yielding a flatter bid-rent curve.

Figure 10: Estimated Non-centric Bid-Rent Curves by Household Income Thirds



Tenure: There was little difference in commute sensitivity between owner-occupant and renter households. This is revealed by the similar slopes of the bid-rent curves in Figure 11. While there is a clear income effect, suggested by non-homeowners spending less for housing per room along the commute-time spectrum, the degree of sensitivity was similar regardless of ownership status.

Mover Status: PUMS respondents who had moved during the 1995–2000 period (i.e., *recent movers*) clearly viewed housing and transportation as a bundled good, more so than non-movers (Figure 12). Indeed, the fact that these households chose to move during the late 1990s could be an artifact of sensitivity to factors like commuting times. Mover-households who enjoyed short commutes of 18–20 minutes (particularly in light of the deteriorating traffic conditions in the seven large metropolitan areas studied) paid a high premium for this benefit—on average, between \$700 and \$800 per room per month.

Figure 11: Estimated Non-centric Bid-Rent Curve by Homeownership Status

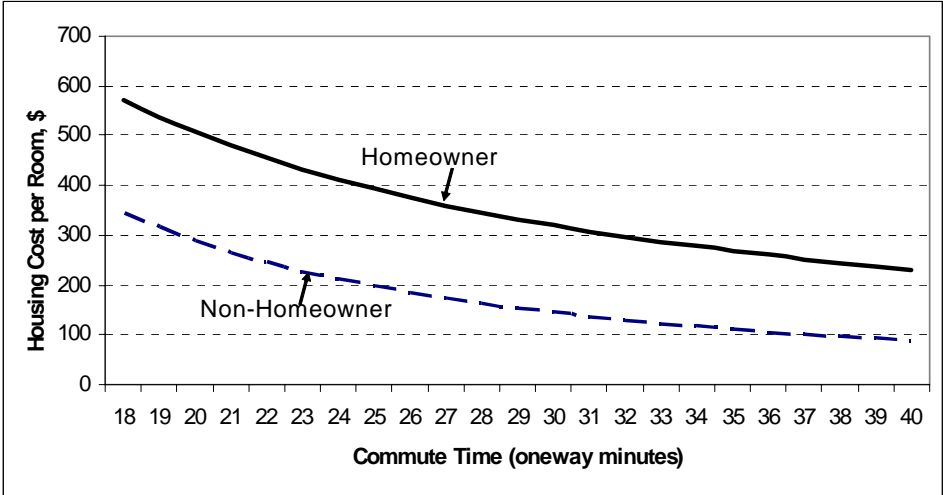
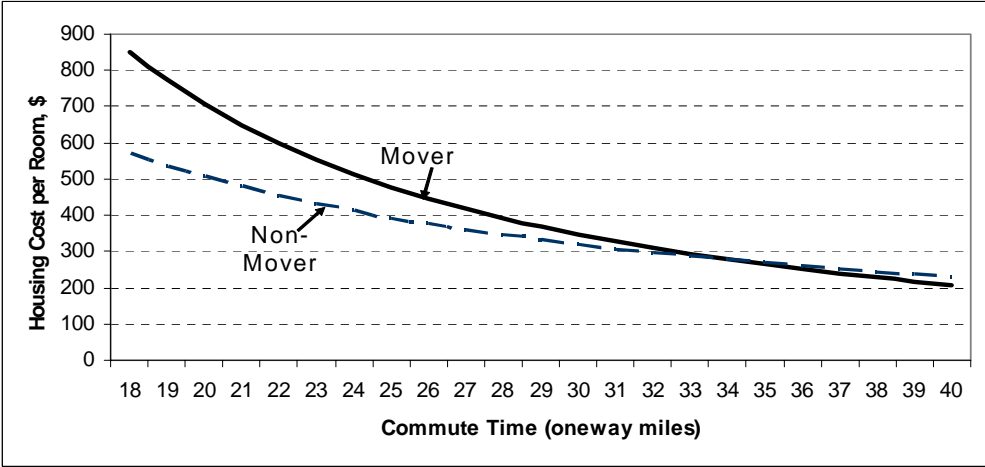


Figure 12: Estimated Non-centric Bid-Rent Curve by Recent Mover Status



Elasticities

One convenient way to condense and summarize these relationships is through the use of elasticities. As noted earlier, one of the principal advantages of using log-log equations such as Equation [1] is that the estimated coefficients can be directly interpreted as elasticities, or indices of sensitivity between housing costs and commute times.

We would expect all such elasticities to be negative, indicating that an increase in commuting costs or times will elicit a reduction in housing expenditures. Elastic relationships are those in which an elasticity value is less than -1.0. This means that a 1% increase in the cost of one item—in this case travel—will cause households to scale back their expenditures in another area, housing in this case, by more than 1%. Inelastic relationships are those in which an elasticity value is between 0 and -1. In the inelastic case, a 1% increase in the cost of the one item will cause households to scale back their expenditures on other goods by less than 1%. *Inelastic relationships are typically characterized by a lack of choice.*

Elasticities were calculated for each household group by summing estimated coefficients across the commute time variable and their respective commute time interaction terms (e.g., Married/Domestic Partners, with Children * log [Commute Time]). Building on these calculations, Figure 13 and discussions that follow explore how each household group would lower its housing bid given a 10% increase in commuting time.

Family Types: Consistent with the bid-rent curve results, the housing cost outlays of *married and domestic partner households with children* were most sensitive to commute time: all else being equal, a 10% increase in average commuting time led to a 2.6% decline in housing costs. Other household types, including multiple-family households with children and single-parent households were less sensitive to changes in commuting time. This indicates that they have fewer tradeoff options.

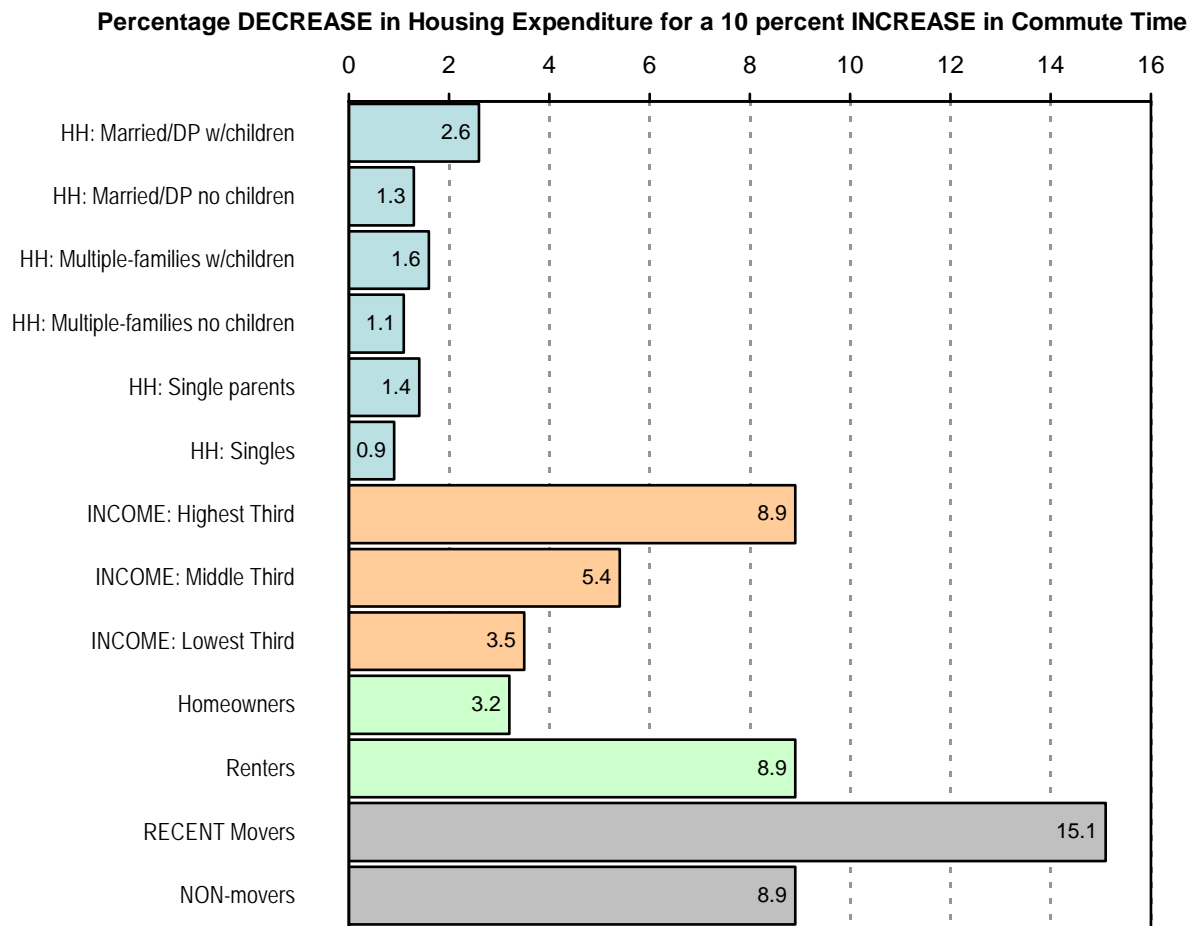
Household Income: Upper-income households were most inclined to tradeoff commute and housing expenditures, ostensibly because of wider choices. Among those in the highest income category, every 10% increase in average commute time was associated with an 8.9% decrease in housing expenditures, holding other factors constant. The housing preferences of *working families*—those in the lowest income third—were far more inelastic, an indication of a lack of choice. Confronted with a 10% increase in commuting time, working families were able to reduce their housing expenditures by only 3.5%.

Tenure: Renters move much more frequently than homeowners and are able to fine-tune their housing and transportation choices accordingly. Among renters, every 10% increase in commute time was associated with an 8.9% decrease in housing expenditures. Among homeowners, a 10% increase in commuting time was associated with a 3.2 percent cutback in housing expenditures.

Mover Status: Given their recent actions, it is not surprising that *recent movers* are much, much more sensitive to housing costs and commute times than non-movers, and in

a much better position to adjust their housing–commute tradeoffs. Among those households who moved between 1995 and 2000, all else being equal, a 10% increase in commute times was associated with a 15.1% decrease in housing expenditures. Among non-movers, by contrast, the same 10% increase in commuting time would lead them to reduce their housing expenditures by only 8.9%.

Figure 13: The Effects of a Ten Percent Increase in Commuting Times on Housing Expenditures



5. THE RESIDENTIAL LOCATION & COMMUTING CHOICES OF WORKING FAMILIES

Approach

Having previously explored how working families continuously tradeoff commute times with housing costs, we now turn to the related question of how and why they make actual residential location and commute choices; and how, if at all, their choices are different from those made by upper-income households. Whereas tradeoffs are continuous—like the bid-rent curves shown in the previous section—choices are mutually exclusive and discrete. Choosing to live in a suburban neighborhood precludes living in a central city neighborhood in much the same way the choosing to drive alone to work precludes taking public transit. Analyzing how and why families choose where to live and how to commute requires the use of a series of statistical techniques known as *discrete choice models*.

Most households choose their residential location and commute mode simultaneously. They may choose to buy an older single-family home in an inner suburban neighborhood that affords them good public transit service to work. Or they may choose to live in a new home in an outer suburb in which the only mode that provides convenient access to work is the private car. Or they may choose to live in an apartment tower in a central city neighborhood where they can walk to work. It is our hypothesis that working families have systematically fewer such choices available to them than upper-income families.

To test this hypothesis, we decompose the residential location–commute mode choice into two choices: the choice of residential neighborhood first as represented by a particular PUMA type, followed by the choice of commute mode. In statistics parlance, the choice of commute mode is said to be “nested” within the choice of residential location. This may not be a reasonable assumption, particularly for those households lacking access to a car. Car-less households may find their residential choices limited to communities in which they can walk, bike, or take public transit to work. Still, given that most American households, particularly family households, *do* have access to a car (if not own one outright), our assumption regarding the nested nature of commute and housing choices is probably quite reasonable.

The general structure of the nested PUMA type/commute mode model is as follows:

Eq. [2] Choice of PUMA Type_i = f {Household income, Household size, Tenure preference, Condominium ownership preference, Gender and age of household head, Average high school test scores by PUMA, Auto accessibility to work by occupation}

Eq [3] Choice of Commute Mode_j conditional on PUMA choice_i = f {Household auto availability, Number of available vehicles per worker in the household, Auto accessibility to work by occupation, Tripmaker gender, Tripmaker age}.

The subscript i in the equation [2] indicates whether the household moved to a primary central city PUMA, a secondary central city PUMA, an inner suburban PUMA, an outer suburban PUMA, or a suburban fringe PUMA. The subscript j in equation [3] indicates whether the household commuted to work by driving alone, by carpooling, by taking transit, or by walking or bicycling. A central feature of the PUMA type model (equation [2]) is the inclusion of average high school test scores as summarized at the PUMA level. Particularly for families with children, the availability of a good public education is of paramount concern when deciding where to live; and although test scores are an imperfect measure of educational quality, they are the only such measure available for all seven MSAs.

The statistical procedure used to estimate these models is known as multinomial logistical regression, or multinomial *logit* for short. The term multinomial means that the household may choose from among more than two types of commute modes and two types of residential locations. Because logit is a more powerful statistical procedure than ordinary regression, we can test different models for different family types and MSAs, something we could not do in our previous tradeoff analysis. Separate logit models were tested for each case study MSA and for married-couple families with children, married-couple families without children, multiple-family households with and without children, single-parent households, and single-person households. As in the previous section, domestic partner households were coupled with married-couple families. The good part about testing more models is that we gain more detailed insights. The bad part is that there is a lot more output. Altogether, 84 different models were tested, one for each MSA and distinct family type. Because we are interested in understanding *contemporary revealed preferences*, the PUMS observations used to test the models were limited to recent movers. Estimated coefficients and goodness-of-fit statistics for each metropolitan area are presented in Appendix D-1 through D-7.

Once the various choice models have been estimated statistically, the results can be used with representative working family profiles to compare the housing location and commuting outcomes of working families with those of comparable families with higher incomes. To say that these outcomes are preferences or choices doesn't quite ring true. In many cases, working families choose to live where they do, or commute by a particular mode, only because they lack the range of choices available to wealthier families. To the extent that these outcomes represent household preferences, they are typically constrained preferences.

Residential Location Choices

Figure 14 compares the housing location choice outcomes of working families to those of similar upper-income families. These results are presented for each combination of case study metropolitan area and PUMA type. Because different types of working families have different housing and public service requirements, they are also presented by household type.

Figure 14: The Neighborhood Location Preference of Working Family vs. Upper Income Households

Metropolitan Region	Household Type	Working Family Outcome Probability / Comparable, Upper-income Household Outcome Probability				
		Central City PUMAs	Secondary Central City PUMAs	Inner Suburban PUMAs	Outer Suburban PUMAs	Suburban Fringe PUMAs
Atlanta	Married/domestic partners, children	0.14	na	0.42	1.49	3.98
	Married/domestic partners, no children	0.76	na	0.29	4.53	0.00
	Multiple families, children	3.15	na	sample too small	0.25	sample too small
	Multiple families, no children	0.30	na	0.84	1.73	0.00
	Single, children	2.66	na	0.94	0.97	0.00
	Single, no children	sample too small	na	sample too small	sample too small	0.00
Chicago	Married/domestic partners, children	0.34	1.36	0.95	0.93	1.08
	Married/domestic partners, no children	1.45	1.37	1.48	1.28	0.76
	Multiple families, children	9.15	19.60	1.62	0.66	0.44
	Multiple families, no children	0.52	0.83	0.87	1.03	1.74
	Single, children	1.37	5.35	2.74	0.78	0.31
	Single, no children	0.63	2.05	2.01	0.85	1.33
Dallas/Fort Worth	Married/domestic partners, children	0.50	0.54	0.95	0.95	1.66
	Married/domestic partners, no children	0.40	2.58	0.78	1.09	1.54
	Multiple families, children	sample too small	sample too small	0.98	0.37	0.27
	Multiple families, no children	1.18	2.75	1.22	0.49	0.30
	Single, children	1.63	sample too small	1.49	0.57	1.28
	Single, no children	0.67	3.92	0.89	1.27	1.48
Los Angeles	Married/domestic partners, children	1.93	1.17	1.39	0.93	0.78
	Married/domestic partners, no children	3.67	1.54	2.01	0.65	0.21
	Multiple families, children	3.89	10.35	2.62	0.79	0.32
	Multiple families, no children	1.54	2.22	1.01	0.62	0.83
	Single, children	2.63	2.36	1.13	0.74	0.55
	Single, no children	1.22	1.96	0.82	0.82	1.10
New York City	Married/domestic partners, children	1.11	2.08	1.29	0.64	1.39
	Married/domestic partners, no children	sample too small	0.69	2.35	0.42	0.53
	Multiple families, children	6.02	2.08	2.37	0.37	0.46
	Multiple families, no children	4.08	1.14	2.74	0.40	0.39
	Single, children	2.17	3.82	2.80	0.48	0.40
	Single, no children	0.49	1.45	1.22	0.86	1.36
San Francisco	Married/domestic partners, children	2.77	0.35	1.06	1.14	0.62
	Married/domestic partners, no children	2.34	1.20	1.44	1.28	0.49
	Multiple families, children	1.21	0.90	1.28	0.90	0.69
	Multiple families, no children	0.60	5.78	0.67	1.19	2.64
	Single, children	3.20	0.51	1.46	0.96	0.58
	Single, no children	0.74	4.08	0.81	0.92	2.43
Washington, D.C./Baltimore	Married/domestic partners, children	0.50	na	0.53	1.32	sample too small
	Married/domestic partners, no children	1.31	na	4.03	0.06	sample too small
	Multiple families, children	4.18	na	3.36	0.45	0.04
	Multiple families, no children	2.61	na	3.52	0.42	sample too small
	Single, children	0.96	na	1.55	0.60	sample too small
	Single, no children	na	na	na	na	na

The numbers presented in Figure 14 are *probability ratios*. They are calculated by dividing the estimated probability that a working family will “choose” to live in a particular PUMA type, divided by the probability that a similar, but wealthier, household will choose to live in that same PUMA type. Numerical values greater than one indicate that working families are more likely to reside in a PUMA type than wealthier families. Numerical values less than one indicate that working families are less likely than comparable wealthier families to reside in a PUMA type. Numerical values of one indicate there is no difference between the location choices of working and wealthy families.

Given that how varied housing and workplace opportunities are across the seven case study metropolitan areas, and the differing housing needs of different families, it is not all that surprising to find that the residential choices of working families also vary a great deal.

Let’s begin by focusing on the choices made by married-couple working families with children. In the Atlanta region, married-couple working families with children are much less likely than similar upper-income families to live downtown or in older suburban locations, and more likely to live further out. Working family households consisting of married-couples with children, for example, are 86% less likely to live in one of Atlanta’s central city PUMAs (based on a probability ratio of .14) and 49% more likely (based on a probability ratio of 1.49) to live in one of its outer suburban PUMAs than are wealthier married-couple-with-children families.

Dallas–Ft. Worth and Washington, D.C., are similar to Atlanta: working family households of married-couples with children are much less likely to live in downtown and older suburban neighborhoods, and much more likely to live in newer suburban areas and fringe communities.

In the Chicago region, by contrast, working family households of married-couple families with children are much less likely to live in or near downtown Chicago, but more likely to live in one of the region’s other downtown cores. New York is similar to Chicago in the sense that married-couple working families tend to favor secondary downtown over newer suburban communities, but different in that they also favor living in New York City’s downtown neighborhoods.

The two west coast urban regions are very different in this regard. Married-couple working families with children who live in the Los Angeles and San Francisco regions are much, much more likely to choose to live in older central city neighborhoods, and less likely to choose to live in a newer suburban community.

What of single-parent working families? How do their housing and location outcomes differ? Compared to similar upper-income families, and regardless of the metropolitan region, single-parent families are much more likely than their wealthier counterparts to live in a central city neighborhood, a secondary central city neighborhood, or an older suburban community. This is especially true on the West Coast where single-parent working families are 163% more likely to live in a downtown Los Angeles PUMA (based

on a probability ratio of 2.63), and 220% more likely to live in a San Francisco central city PUMA (based on a probability ratio of 3.20), than are single-parent families with higher incomes. Conversely, single-parent working families are slightly less likely to live in newer suburban communities and unlikely to live at the urban fringe. The degree to which these outcomes are the result of unconstrained preferences or are reflective of the high cost of suburban housing and the limited availability of suburban jobs is hard to say. The fact that single-parent working families so consistently choose to live in or near regional centers is probably due to the greater availability of public services and the proximity of family members and other supportive institutions in those locations. Racial discrimination is also likely to play some role.

Multiple-family households are America's fastest growing household type. Where are working family households of multiple-families most likely to live? Mostly in the same types of central city and inner suburban neighborhoods as single-parent working families. Indeed, of all the different types of working families, multiple-household working families are most consistently drawn to central city and older suburban neighborhoods; and least attracted to newer suburban communities. In New York, for example, working families of multi-family households (with children) are 500% more likely to live in a central city PUMA, 108% more likely to live in a secondary central city PUMA, 137% more likely to live in an inner suburban neighborhood, but 63% less likely to live in an outer suburban neighborhood and 54% less likely to live on the suburban edge. This outcome pattern is consistent with the observation that many multiple-family households are also immigrant households who tend to cluster in neighborhoods with other immigrant households of similar background and origin.

Finally, we come to working family households without children. Where are they choosing to live? Except in Los Angeles, where they are also living downtown, working-class singles are mostly choosing to live in secondary city and older suburban neighborhoods, leaving downtown locations and newer suburban communities to wealthier singles. Likewise, married-couple working families without children (many of whom are "empty nesters") are eschewing newer suburban communities for more established suburban and downtown neighborhoods. This is especially true in the more cosmopolitan downtowns of New York City, San Francisco, and Los Angeles.

Commute Choices

There are so many possible combinations of region, household type, PUMA type, and commute mode that it is impossible to represent, let alone understand, the complete pattern of residential and commute choices. So, instead of focusing on the typical commute mode choice, which is almost always the use of a private car to drive alone, we focus on *atypical choices*: those circumstances in which working families choose different commute modes compared to their wealthier counterparts. (A complete listing of commute probability ratios is included as Appendix D-8). As with location choice, above, all of these results are based on the revealed preferences of households who moved between 1995 and 2000.

Among households who moved to central city PUMAs, working family commuters, especially those with children, were more likely than upper-income commuters to carpool to work. Carpooling was especially popular among working family commuters in the Dallas and Los Angeles metropolitan regions, both of which are characterized by multiple and dispersed job centers. Of the seven case study MSAs, Los Angeles is the only one in which working family commuters were consistently more likely to take public transit to work. By contrast, up the California coast in San Francisco, working family commuters were less likely to take public transit to work. Working family commuters living in central city PUMAs were neither more nor less likely to walk or bicycle to work than wealthier commuters. The exception to this is Dallas–Ft. Worth, where working family commuters were much, much less likely to walk to work.

Among households who moved to secondary central city PUMAs, working family commuters in the New York, Los Angeles, and San Francisco regions were much more likely to carpool to work than wealthier families. In Chicago, working family commuters who lived in secondary central cities, such as Gary or Joliet, were less likely to commute via public transit. In other respects and locations, the commute mode choices of working family commuters living in secondary city PUMAs were the same as those of their upper-income counterparts.

Among households who moved to inner suburban PUMAs, working family commuters in five of the case study regions (Atlanta, Chicago, Dallas–Ft. Worth, Los Angeles, and New York) were much more likely to carpool to work than similar wealthier commuters. Except in Los Angeles and New York City, working family residents of older suburban neighborhoods were neither more nor less likely to commute to work by walking or public transit. In Los Angeles, working family commuters were much more likely to take the bus to work. In New York, they were much more likely to walk.

Owing to its sparser availability and lower quality of service, public transit was generally much less popular among working family residents of outer suburban PUMAs. Compared to their wealthier cohorts, working family residents of outer suburban PUMAs in New York and San Francisco were somewhat more likely to walk to work.

Last, among households who moved to newer and more distant suburban fringe PUMAs, working family commuters were consistently more likely to carpool to work than wealthier families. The one exception to this finding was in Washington, D.C.–Baltimore, where carpooling was no more popular among working families than among other families.

In sum, regardless of where they choose to reside, working families tend to favor the private automobile as a commute mode in roughly the same proportions as wealthier families. Where working family commuters most differ from their wealthier counterparts is in their greater preference for carpooling; in their greater indifference to public transit (except in far-flung Los Angeles, where bus service is the only feasible alternative to the private car for many low-income households); and in the New York region where they are more likely to walk.

Do Working Families Have Fewer and Inferior Choices?

Having used PUMS data to uncover the housing location and commuting choices made by working families, we now turn to the question of whether those choices are more limited or inferior to the choices made by comparable upper-income families. Certainly they are more expensive, if only by virtue of the fact that working families have lower incomes. But are they also more disadvantageous?

To find out, we sorted the different MSAs and PUMA-types in reverse housing cost order, from highest to lowest (Figure 15). Generally speaking, we would expect most households to prefer to pay less for housing than to pay more. Those who *must* pay more have fewer choices.

As a further indication of housing choice, we also calculated the average housing cost burdens faced by recent movers in each of the PUMA types. Housing cost burden is the ratio of housing cost to household income. Most U.S. households pay less than 25% of their income on housing costs. A housing cost burden of 35% or more is indicative, not only of extreme financial hardship, but also of a profound lack of housing choice; were more housing choices available households would not have to pay as dearly for housing, and housing cost burdens would presumably fall.

In the transportation domain, having a choice means being able to select from among multiple modes with comparable levels of service. To identify those PUMAs where working families had fewer commute choices, we sorted the different MSAs and PUMA types according to the ratio of *average commute time via public transit* to *average commute time by private car* (Figure 16). In PUMAs where this ratio is particularly high—on the order of 1.5 or greater, commuters must spend an average of 50% longer traveling to their work place destination by public transit than by car. The only reason for most commuters to endure such a hardship, we would presume, is because they do not have access to a private car or carpool opportunities. We also estimated the average cost of commuting. As with housing, we would expect most households to want to minimize this cost.

A few clarifications and qualifications are in order before reviewing the results of these comparisons. All estimates and ratios were drawn from the 2000 Census PUMS recent mover subset. Average housing costs were estimated by computing the tenure-weighted average of monthly rents and monthly mortgage costs. These costs, drawn from the responses of recent movers to insure their currency, were multiplied by 12 to yield an annual housing cost estimate.

When used to compare housing costs and burdens across different locations, this method assumes an “apples-to-apples comparison,” or as it is more commonly known, a “constant-quality” comparison. This means we would assume the housing quality bundles in central city PUMAs to be identical to the housing quality bundles in suburban PUMAs. In the real world, this is decidedly not the case. Whether in terms of house size, lot size, or the quality of local public services, suburban residents generally get far more for their housing dollar than do central city residents. While this assumption does

not affect the calculation of housing cost burdens, it does point to the fact that the set of housing choices in central city PUMAs are fundamentally different than the set of housing choices in suburban or fringe PUMAs.

On the commuting choice side of the ledger, we use *average commute times based on transit and auto trips made by working families*, and not by all commuters. This was done in recognition that working family commuters are more likely to work at different jobs in different locations than are upper-income commuters. Fifty years ago, most blue-collar and low-skilled job opportunities were in manufacturing industries located in central cities. Today, most low-skilled jobs are in the retail and service sectors in suburban locations. Because most urban highway and public transit systems were designed and built to move workers from suburban subdivisions to downtown workplaces—and not from central city neighborhoods to suburban job centers—blue-collar and low-wage workers have faced a widening “spatial mismatch” between their commuting needs and the ability of urban transportation system to meet those needs. Using generalized commute times rather than commute times keyed to working families would gloss over the spatial mismatch issue, and give the false impression that working families have more commute options than they really do.

Figure 15 lists the different metropolitan area-PUMA combinations in reverse order of annual housing cost (as of 2000); average housing cost burdens are also listed. To make the connection to working families, the last set of columns in Figure 16 lists the types of working family households which, based on the results of our prior discrete choice models, are most likely to live in the different PUMA types. A single “X” means that working families are 30%–49% more likely to live in a particular PUMA type than are comparable wealthier families; a “XX” means they are 50%–99% more likely, and a “XXX” means they are 100% more likely to live in that PUMA type.

- Average housing costs are much higher in Atlanta’s fringe and outer suburban PUMAs than they are in its central city and inner suburban PUMAs—by as much as 50%. Housing cost burdens are higher as well. The working family households most likely to live in these high-housing-cost/high-housing-burden PUMAs are married-couple families with children, married-couple families without children and multiple-family households without children. Single-parent families and multiple-family households with children are more likely to live in Atlanta’s central city neighborhoods where, despite lower average housing costs, housing is only slightly more affordable.
- Housing costs in the Chicago region rise with distance from the city center. Among recent movers, average housing costs ranged from a low of \$14,000 in Chicago’s central city PUMAs to a high of \$22,590 in its extent suburban PUMAs. Despite this difference in housing costs, housing cost burdens were similar throughout the Chicago region, except in central city PUMAs where they were somewhat lower. Chicago’s working families are much more likely to live in its central city, secondary central city, and inner suburban PUMAs where they face lower absolute housing costs than in the rest of the region but comparable housing cost burdens.

- Average annual housing costs in the Dallas–Ft. Worth region in 2000 ranged from a low of \$11,131 in the Ft. Worth area to \$21,110 in the region’s toniest suburbs. Because incomes followed a somewhat different pattern, households living in suburban fringe communities faced the highest cost burdens (41%), while central city residents faced the lowest (29%). Working families *without* children are more likely to live in and around Ft. Worth, where absolute housing costs were fairly low, but housing cost burdens are not. Working families of married-couples *with* children are much more likely to live in fringe suburban communities where housing is least affordable.
- Regardless of their composition, working families in the Greater Los Angeles region are much more likely to live in or near downtown Los Angeles; in a secondary central city neighborhood such as Anaheim or Riverside; or in an older suburban community. As of 2000, average housing costs were lower in these older communities. Except in secondary central city PUMAs, housing was also more affordable.
- Housing in the New York City region is least expensive in central city neighborhoods (due largely to the concentration of public housing units within the five boroughs) and more expensive further out. Affordability trends run the opposite way. Relative to incomes, housing is most affordable in central city and older suburban PUMAs, and least affordable in new communities near the suburban fringe. In New York, as in Los Angeles, working families are consistently more likely to live in lower-cost and more affordable locations.
- The San Francisco Bay Area is unique among the seven case study metropolitan areas in that its most expensive (and least affordable) housing is in its inner suburban communities. Its least expensive housing is in certain central city neighborhoods, most notably those in Oakland. Among recent movers, housing cost burdens were typically highest in central city and inner suburban PUMAs. These two PUMA types were favored by all types of working families except married-couples without children and single-person households.
- Housing costs and housing cost burdens in the Washington, D.C.–Baltimore metropolitan area are the highest of any of the seven case study regions. Housing costs are especially high among the region’s outer suburban and suburban fringe PUMAs. Except for married-couples with children who bear the brunt of these high costs, working families in the Washington, D.C.–Baltimore region are more likely to live in central city and inner suburban neighborhoods where housing costs and cost burdens are somewhat lower.

The results of these comparisons indicate that working families disproportionately locate wherever they can find affordable housing—“affordable” being a relative term—and that there are fewer affordable choices available to working families with children (especially single-parent and multiple-family households) than those without.

Figure 15: Metro Areas and PUMA Types where Working Families Face Disadvantageous Housing Choices

Metropolitan Region	PUMA Type (sorted from high to low average yearly housing cost)	Average Yearly Housing Cost	Average Housing Cost Burden	"X" indicates whether working family HHs are present in much greater proportions than comparable upper-income households					
				Married-couple WITH Children	Multiple-families WITH Children	Single-parent families	Married-couple W/O Children	Multiple Families W/O Children	Single persons
Atlanta	Suburban fringe	\$23,107	36%	XXX					
Atlanta	Outer suburb	\$19,314	31%	X			XXX	XX	
Atlanta	Inner suburb	\$15,462	28%						
Atlanta	Central city	\$14,563	30%		XXX	XXX			
Chicago	Suburban fringe	\$22,589	32%					XX	X
Chicago	Outer suburb	\$20,853	32%						
Chicago	Secondary central city	\$16,824	32%	X	XXX	XXX	X		XXX
Chicago	Inner suburb	\$16,753	32%		XXX	XXX	X		XXX
Chicago	Central city	\$14,001	29%		XXX	X	X		
Dallas/Ft. Worth	Outer suburb	\$21,110	35%						
Dallas/Ft. Worth	Suburban fringe	\$19,641	41%	XXX			XX		X
Dallas/Ft. Worth	Inner suburb	\$15,461	30%						
Dallas/Ft. Worth	Central city	\$12,077	29%			X			
Dallas/Ft. Worth	Secondary central city	\$11,131	33%				XXX	XXX	XXX
Los Angeles	Suburban fringe	\$19,721	33%						
Los Angeles	Outer suburb	\$19,338	31%						
Los Angeles	Secondary central city	\$16,287	32%			XXX	XXX	XXX	XX
Los Angeles	Inner suburb	\$15,939	29%	X	XXX		XX		
Los Angeles	Central city	\$10,526	26%	XX	XXX	XXX	XXX	XX	
New York City	Outer suburb	\$24,456	31%						
New York City	Suburban fringe	\$23,533	32%	X					X
New York City	Inner suburb	\$15,877	28%		XXX	XXX	XXX	XXX	
New York City	Secondary central city	\$14,455	29%	XXX	XXX	XXX	XXX	XXX	X
New York City	Central city	\$10,091	20%		XXX	XXX	XXX	XXX	
San Francisco	Inner suburb	\$23,731	32%			X	X		
San Francisco	Secondary central city	\$23,323	30%					XXX	XXX
San Francisco	Outer suburb	\$21,273	28%						
San Francisco	Suburban fringe	\$17,418	29%					XXX	XXX
San Francisco	Central city	\$13,535	23%	XXX		XXX	XXX		
Washington, D.C./Baltimore	Outer suburb	\$26,082	35%	X					
Washington, D.C./Baltimore	Suburban fringe	\$25,033	41%						
Washington, D.C./Baltimore	Inner suburb	\$20,876	32%		XXX	XX	XXX	XXX	
Washington, D.C./Baltimore	Central city	\$15,070	30%		XXX		X	XXX	

Key: X indicates working families are likely to be present at 30-49% greater concentration than wealthier families
 XX indicates working families are likely to be present at 50-99% greater concentration than wealthier families
 XXX indicates working families are likely to be present at 100%+ greater concentration than wealthier families

Figure 16, which focuses on transportation choice and burden, has a similar format to Figure 15. It lists the different metropolitan area-PUMA type combinations in reverse order of the ratio of *average commute time via transit* to *average commute time via private automobile*. Average commute costs are also listed. To make the connection to working families, the last set of columns in Figure 16 lists the types of working family households which, based on the results of our prior discrete choice models, are most likely to live in the different PUMA types. A single “X” means that working families are 30%–49% more likely to live in a particular PUMA type than are comparable wealthier families; a “XX” means they are 50%–99% more likely, and a “XXX” means they are 100% more likely to live in that PUMA type.

- With most of Atlanta’s jobs near or beyond the region’s Perimeter Freeway, working families who live in downtown neighborhoods take almost twice as long to commute to their jobs by public transit as by private car. Working family commuters who live in inner and outer suburban areas must also contend with infrequent public transit service. The types of working families most likely to suffer from a lack of timely public transit service are multiple-family households with children, and single-parent households in central city PUMAs; and married-couple and multiple-family households without children in outer suburban PUMAs.
- Chicago’s extensive rail and bus public transit system provides good corridor service from suburbia to downtown Chicago, but poor service to suburban job centers and employment opportunities in secondary central city neighborhoods. For Chicago’s working families, excess public transit commute times vary from a high of 147% in suburban fringe PUMAs, to a low of 33% in central city PUMAs. The types of working families most likely to face excessively lengthy transit commutes are multiple-family households without children, single-parent and single person households, and multiple-family households with children.
- In no part of the Dallas–Ft. Worth metropolitan area does public transit offer commuter service that is competitive with private vehicles. For working families, excess public transit commute times vary from a high of 100% in suburban fringe PUMAs, to a low of just 70% in central city locations. Dallas’s infrequent transit service reduces travel choices for everyone, not just working families. Those working families who are most disadvantaged are married-couple and single-parent family households living in suburban fringe communities.
- Among working families, public transit commute times exceed auto commute times by 70–75% just about everywhere in the Greater Los Angeles area. The types of working family households most consistently disadvantaged by the comparatively poor quality of public transit service in Los Angeles are married-couple households without children, multiple-family households with and without children, and single-parent households.

Figure 16: Metro Areas and PUMA Types where Working Families Face Disadvantageous Commuting Choices

Metropolitan Region	PUMA Type (sorted by the ratio of transit-to-auto commute time)	Average transit commute time/ Average auto commute time	Average Annual Commute Cost	"X" indicates whether working family HHs are present in much greater proportions than comparable upper-income households					
				Married- couple WITH Children	Multiple- families WITH Children	Single- parent families	Married- couple W/O Children	Multiple Families W/O Children	Single persons
Atlanta	Central city	182%	\$764		XXX	XXX			
Atlanta	Inner suburb	165%	\$948						
Atlanta	Outer suburb	156%	\$1,092	X			XXX	XX	
Atlanta	Suburban fringe	111%	\$1,149	XXX					
Chicago	Suburban fringe	247%	\$1,094					XX	X
Chicago	Secondary central city	220%	\$947	X	XXX	XXX	X		XXX
Chicago	Outer suburb	210%	\$927						
Chicago	Inner suburb	159%	\$698		XXX	XXX	X		XXX
Chicago	Central city	133%	\$487		XXX	X	X		
Dallas/Ft. Worth	Suburban fringe	199%	\$1,136	XXX			XX		X
Dallas/Ft. Worth	Inner suburb	182%	\$885						
Dallas/Ft. Worth	Outer suburb	172%	\$1,059						
Dallas/Ft. Worth	Secondary central city	170%	\$807				XXX	XXX	XXX
Dallas/Ft. Worth	Central city	169%	\$740			X			
Los Angeles	Inner suburb	177%	\$748	X	XXX		XX		
Los Angeles	Outer suburb	175%	\$880						
Los Angeles	Secondary central city	173%	\$870		XXX	XXX	XXX	XXX	XX
Los Angeles	Suburban fringe	172%	\$994						
Los Angeles	Central city	169%	\$597	XX	XXX	XXX	XXX	XX	
New York City	Outer suburb	240%	\$987						
New York City	Suburban fringe	237%	\$1,087	X					X
New York City	Secondary central city	186%	\$790	XXX	XXX	XXX			X
New York City	Inner suburb	182%	\$642		XXX	XXX	XXX	XXX	
New York City	Central city	138%	\$348		XXX	XXX	XXX	XXX	
San Francisco	Suburban fringe	201%	\$1,069					XXX	XXX
San Francisco	Outer suburb	184%	\$940						
San Francisco	Inner suburb	184%	\$837			X	X		
San Francisco	Secondary central city	161%	\$951					XXX	XXX
San Francisco	Central city	148%	\$576	XXX		XXX	XXX		
Washington, D.C./Baltimore	Suburban fringe	200%	\$1,150						
Washington, D.C./Baltimore	Outer suburb	177%	\$1,065	X					
Washington, D.C./Baltimore	Inner suburb	168%	\$904		XXX	XX	XXX	XXX	
Washington, D.C./Baltimore	Central city	150%	\$668		XXX		X	XXX	

Key: X indicates working families are likely to be present at 30-49% greater concentration than wealthier families
 XX indicates working families are likely to be present at 50-99% greater concentration than wealthier families
 XXX indicates working families are likely to be present at 100%+ greater concentration than wealthier families

- New York City has the best public transit service in the nation, at least in four of the five boroughs. Beyond the city proper, the quality of public transit service to working family commuters vis-à-vis the private car falls off considerably. Among New York's fringe and outer suburbs, for example, working family commute times by public transit exceed auto commute times by 140%. Among the New York region's older and closer-in neighborhoods, public transit commute times exceed auto commute times by 80% or more. These excess public transit commute times adversely impact almost all of New York's working family households, many of whom live in secondary central city and inner suburban PUMAs.
- The transit situation for working families in the San Francisco Bay Area parallels that of New York: only those working family commuters who live in central city neighborhoods enjoy public transit service that offers comparable travel times to the private car. The types of working family households most disadvantaged by the comparatively poor quality of suburban transit service in the San Francisco region are typically multiple-family households without children and single-person households.
- The private car has a difficult time competing with public transit within Washington, D.C.'s Metro corridors. Everywhere else in the Washington, D.C.–Baltimore region transit consistently loses out among working family commuters. This is as true in central city neighborhoods as it is on the suburban fringe. The types of working families in the Washington, D.C.–Baltimore area most likely to face excessively lengthy transit commutes are multiple-family households with and without children, and married-couple families without children living in the region's inner suburban communities.

Summary

Which working families in which locations suffer most from a *combined* lack of affordable housing and quality public transit service? As with housing and transportation separately, the answer differs by region. In Atlanta, it's an either-or thing: working families living in fringe communities suffer from high housing cost burdens and working families living downtown suffer from inferior public transit service, but no group suffers from both. Whereas working family housing burdens are fairly consistent across the Chicago region, all working families, except those living in Chicago's central neighborhoods, suffer from adverse transportation choices. In the Dallas–Ft. Worth region, working families of married-couples (with and without children) living in suburban fringe neighborhoods are most disadvantaged. A similar result holds in the Washington, D.C.–Baltimore region. All working families living in or near central Los Angeles have more housing and more transportation choices. Those who live further out suffer from higher housing payment burdens and longer commutes. The same is true in the New York metropolitan area. In the San Francisco Bay Area, working families who live in central city neighborhoods have greater access to affordable housing and quality transportation service, but those who live in nearby inner suburban neighborhoods face some of the region's least affordable housing.

6. SUMMARY AND POLICY OPTIONS

Summary

Poor Americans pay an extraordinary share of their incomes for housing. According to the Census Bureau's most current American Community Survey, an astonishing 75% of renters and 65% of homeowners with incomes less than \$20,000 spent more than 30% of their income for housing in 2004. The situation for near-poor and moderate-income households was not much better. Among renter households with incomes between \$20,000 and \$35,000, half spent more than 30% of their incomes for housing in 2004; among homeowners of similar income, 38% spent more than 30% of their incomes on housing.

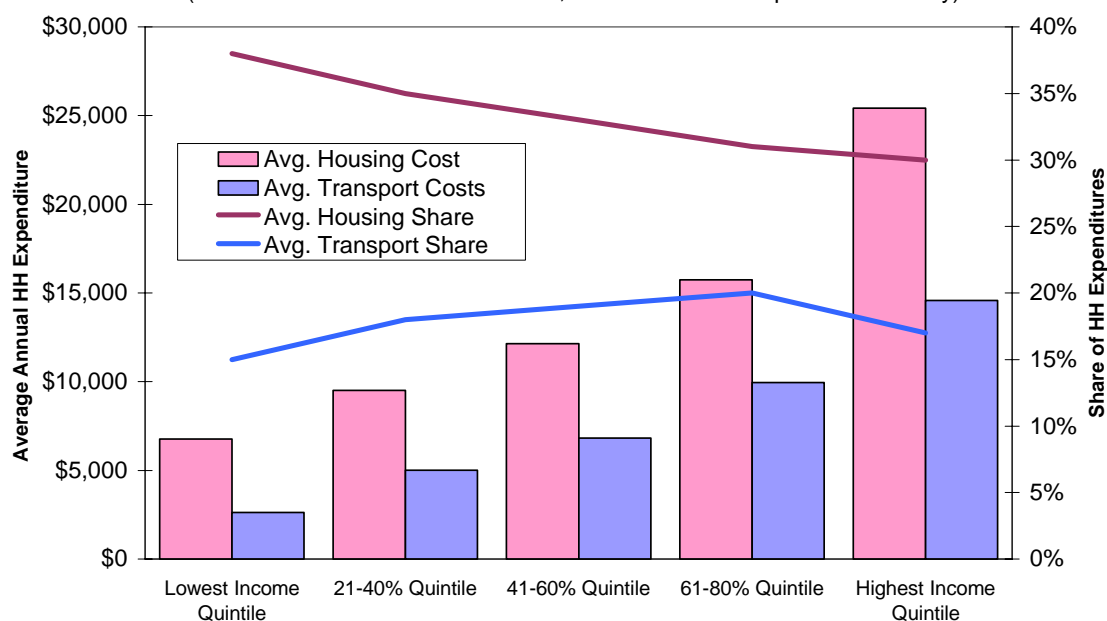
When added to the high cost of getting around—according to the Bureau of Labor Statistic's Consumer Expenditure Survey, in 2004, American households spent an average of \$7,800, or 18% of their income, on transportation—housing expenditures accounted for exactly one-half of the pre-tax income of American households. Among the poorest one-fifth of American households, housing and transportation accounted for 52.6% of the family budget in 2004.

As Figure 17 shows, nationally, this excess burden problem is principally one of high housing costs. Among the poorest 20% of American households, housing costs comprise 38% of household budgets while transportation costs comprise 15%. Among the wealthiest 20%, housing costs account for 30% of household budgets and transportation costs account for 17%. As their incomes increase, American households devote a lesser share of their earnings to housing but a greater share to transportation.

Why do American households devote such large percentages of their incomes to housing and transportation costs? The answer to this question, as with much in American society, is a matter of income. On the housing side, wealthy households value privacy, exclusivity, high-quality public services (and low taxes), amenities such as views, and the opportunity to live near other wealthy people. Poorer households value these same attributes, but lack the incomes to compete with their wealthier counterparts. On the transportation side, the principal difference between poor and wealthy households is in the number, age, and value of their cars. Wealthy households own more cars, newer cars, and more expensive cars than poorer households.

But, whereas poorer households have many fewer housing choices than wealthy households, their vehicle and commuting mode choices aren't quite so limited. Thanks to the size and vitality of the used car market and the low price of gasoline in America (at least by world standards, in the year 2000), only a small fraction of American households cannot afford to own a car. Nationwide, according to the 2004 Consumer Expenditure Survey, 88% of American households own or have access to at least one vehicle. (Some car-less households could afford to own a car, but prefer not to.) Among income quintiles, only the poorest fifth of American households have an auto-accessibility level that is less than this average.

Figure 17: Average Yearly Housing and Transportation Costs and Burdens by Income Quintile
 (Source: Bureau of Labor Statistics, 2004 Consumer Expenditure Survey)



Nor is transit accessibility necessarily a matter of income. Among working families, average commute times and distances by public transit are only slightly longer than for upper-income families. And when it comes to walking, working families generally live in neighborhoods that are more pedestrian friendly than do upper-income households.

This is not to say that poor households have the same richness of transportation choices as wealthier ones. They clearly do not. The quality and degree of transportation choices, just like the quality and degree of housing choices, are much greater for wealthier households than for poorer ones. *This enables wealthier households to achieve a more advantageous tradeoff between housing quality and affordability and transportation mobility.* And because the supply of housing locations is fixed—at least in the short run—to the degree that wealthy households are able to choose the most advantageous neighborhoods, they consign poorer households to less advantageous locations.

Income is not the only important dimension to choice. Household type, residential location, and metropolitan area also matter a great deal. According to the tradeoff analysis presented in Section 4, of *households with children*, single-parent families and multiple-family households have significantly fewer housing–transportation tradeoff options than married-couple families. The same is also true for *households without children*: married-couple households have more housing–transportation tradeoff options than single-person households, and multiple-family households have fewer tradeoff options than married-couple households. Section 4 also affirms the critical importance of household income in determining housing–transportation tradeoff options.

Location also matters—both inter-metropolitan and intra-metropolitan location. Inter-metropolitan locations matter because different metropolitan areas are characterized by different housing market conditions, different work locations, and different levels of roadway and public transit service. Intra-metropolitan location matters due to neighborhood-based differences in house size, age, school quality, and transit service.

Consider the inter- and intra-metropolitan revealed choice differences identified in Section 5. In the Atlanta metropolitan area, working family households with children are most likely to live in outer suburban and suburban fringe communities, where housing is more expensive and local transit service is poor. The same pattern is evident in the Dallas–Ft. Worth region: working families have been pushed to the outer suburbs where they face high housing costs and lengthy and expensive commutes. In Chicago, working families are more likely to live in central city and older suburban neighborhoods, where housing is generally more affordable and where public transit service is better. In the Greater Los Angeles region, working families are far more likely to live downtown or in the region’s close-in, older suburbs where housing is more affordable and transit service is better (if overcrowded). Working families are also more likely to live in inner suburban communities in the San Francisco Bay Area where they can enjoy reasonably good-quality bus service. This comes at a price, however, as the Bay Area’s inner suburban communities are generally its least affordable. In the New York City region, working-family households are more likely to live close to New York City where they can best take advantage of that region’s most affordable housing and superior public transit service. A similar pattern is evident in the Washington, D.C.–Baltimore region.

In short, working families—especially those with children—usually locate to take advantage of affordable housing opportunities. Sometimes, as in the cases of New York, Chicago, Los Angeles, and Washington, D.C.–Baltimore, the more affordable neighborhoods also have good-quality transit service. In Atlanta and Dallas–Ft. Worth, by contrast, working families have been pushed to the outer suburbs where housing is dear and transit service is essentially non-existent. And then there are the outliers like San Francisco where working families disproportionately live in neighborhoods with good transit service but must pay, by national standards, exorbitant housing prices and rents.

Policy Options—A Quick Survey

What does this research tell us about what might be done to relieve the ultra-high housing and transportation costs confronting so many of America’s working families? Because the nature and severity of the problem varies so widely by metropolitan area and family type, it is difficult to conceive of a one-size-fits-all (or even a one-size-fits-a-few) policy approach.

Conceptually at least, one can differentiate alternate policy approaches according to whether they come at the issue from a housing cost, housing choice, transportation cost, transportation choice, or income perspective. Let us consider each approach in turn.

From a *housing cost* perspective, the easiest, most direct, and most effective way to relieve the excessive housing and transportation cost burdens faced by so many working-families would be to subsidize them using a means-tested gap-subsidy program like the Section 8 housing program. Given the size of the federal budget deficit, the tremendous cost of such a program, Congress's long-standing indifference to housing subsidies, and the Bush Administration's outright hostility to housing programs for poor households, this approach is a clear non-starter.

From a *housing choice* perspective, the preferred approach would be to encourage the increased production of new infill housing in locations with good transit accessibility. Increasing the supply of housing would put downward pressure on housing prices and rents and potentially, at least, add to the ridership base for public transit. Given the difficulties of planning, siting, and financing new infill housing—particularly for moderate-income households—and the potential for gentrification, it is not immediately obvious that this type of strategy would be successful. Nonetheless, to the degree that many cities and metropolitan areas are already pursuing infill strategies as part of locally-initiated urban regeneration and smart growth efforts, this strategy is certainly worth pursuing at the federal, state, metropolitan, and municipal levels.

From a *transportation cost* perspective, it is difficult to see how any level of government could structure an administratively workable transportation subsidy program for working families other than through the tax code. Aside from issues of fairness, subsidizing drivers would have the perverse effect of increasing the demand for travel and therefore traffic congestion. Subsidizing transit users (other than by reducing fares) would be an administrative nightmare. Besides, almost all empirical studies reveal public transit use to be price inelastic, suggesting that the ridership benefits of such a program are likely to be small. Worthwhile initiatives like the Locationally Efficient Mortgage (LEM) program may help provide working families access to a wider variety of housing choices, but they do little to reduce total burdens.

There is somewhat greater potential on the *transportation choice* side. To the extent that public transit service quality and the convenience of walking can be meaningfully enhanced, there is some evidence suggesting that some travelers will shift modes. However it is done, boosting the coverage and frequency of local public transit service is likely to be extremely expensive and therefore require a dedicated revenue source, with at least some of the funds coming from transit users themselves. Nonetheless, by European and Asian standards, transit service in America is not particularly expensive. As recent experiences in London indicate, transit fare increases that result in visible and substantial improvements in service may be quickly accepted by the transit-riding public. Given that the annual user costs of public transit are generally far less than the capital and operating cost of owning a late-model car, this approach may make a fair amount of sense in those locations where activity patterns and densities can support increased transit use. And as we have seen, many of these same locations and neighborhoods are already home to working families.

Promoting walking is a longer-term project. It will require re-engineering public rights-of-way in old and new suburban communities, and a patient and careful attention to

linking trip origins and destinations. Given the right models and incentives, it can be done; however, the pay-offs will likely take long to materialize and are unlikely to principally benefit working families.

It is on the *income-side* that the greatest potential lies. Through a mechanism similar to the Earned Income Tax Credit (EITC), it should be possible to institute a targeted, means-tested and sliding-scale program to increase the effective incomes of those working family households who face the greatest housing and transportation cost burdens. Such a program might work as follows: households earning less than 80% of area-adjusted median income (AMI) and spending more than 50% of their annual income on a combination of housing and transportation costs would be eligible for a tax credit which would bring their combined housing and transportation payment burden down to a 40% level. This approach would have several advantages. It goes directly to the problem of inadequate income. Through the use of AMI, it could be structured to account for local variations in housing and transportation costs. The amount of the credit could be capped to limit over-allocation to high-income/high-cost markets. And, it could be targeted toward those particular working family household types (e.g., those with children and at least one full-time wage-earner) whose housing and transportation choices are most limited. As with its model, the EITC, the negative effect of such a program on federal tax revenues would likely be small. The positive effect on over-burdened working family households, on the other hand, could be huge.

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