Land Value Impacts of Rail Transit Services in San Diego County

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ABSTRACT

Using hedonic price models, appreciable land-value premiums were found for different land uses in different rail-transit corridors that serve San Diego County, though incidences of land-value discounts were also found in the case of single-family housing. The most appreciable benefits were: 46% premiums for condominiums and 17% for single-family housing near Coaster commuter rail stations in the north county; 17% and 10% premiums, respectively, for multi-family housing near East Line and South Line stations; and for commercial properties, 91% premiums for parcels near downtown Coaster stations and 72% for parcels near Trolley stations in the Mission Valley. Positive capitalization impacts were found for multi-family parcels along all Trolley and Coaster corridors, generally in the range of 2% to 6%. Except for the Coaster downtown stations and the Mission Valley corridors, where premiums were very large, commercial properties accrued small or even negative capitalization benefits in other rail-served corridors.

1. INTRODUCTION

If rail-transit investments confer benefits, real estate markets tell us. As long as there is a finite supply of parcels near rail stations, those wanting to live, work, or do business near transit will bid up land prices. The benefits of being well connected to the rest of the region – i.e., being accessible – get capitalized into the market value of land. As the cliché goes, rail-served properties have "location, location, location": residents can more easily reach jobs and shops; more potential shoppers pass by retail outlets; and for employers, the laborshed of workers is enlarged.

This report presents the results of research recently completed on the land-value impacts of rail transit services in the San Diego region. It is a companion to two other reports prepared – one for Santa Clara County, the other for Los Angeles County – on transit's land-value impacts in California.[1] Past studies have been conducted on the land-use impacts of rail transit in San Diego, however most were conducted during the early years of service and none are thought to reflect today's realities. It is important to understand land-market impacts of transit for several reasons: (1) to measure benefits, to the degree they exist, in part to help mediate disputes about impacts of proposed extensions or service improvements; (2) to provide evidence that can be used in crafting financial arrangements as part of public-private joint development deals; and (3) to help in

[1] R. Cervero and M. Duncan, *Rail Transit's Value-Added: Effects of Proximity to Light and Commuter Rail Transit on Commercial Land Values in Santa Clara County, California*, report prepared for the National Association of Realtors and the Urban Land Institute, June 2001; R. Cervero and M. Duncan, *Land Value Impacts of Rail Transit Services in Los Angeles County*, report prepared for the National Association of Realtors and the Urban Land Institute, June 2002.

designing possible new forms of creative infrastructure financing, such as benefit assessments, betterment charges, or other forms of value capture.

The San Diego region is widely recognized as being at the forefront in promoting transit-oriented development, at least in California.[2] In contrast to metropolitan Portland, Oregon, the region has opted for carrots over sticks, choosing to use various incentives that entice private investments near rail stops. The regional planning body, the San Diego Association of Governments (SANDAG), has adopted a land-use distribution element as part of the regional growth management strategy that promotes growth in "transit-focused areas" along existing and planned high-capacity rail lines. The City of San Diego was one of the first municipalities to adopt a Transit Oriented Development (TOD) ordinance, calling for compact, infill development near Trolley stops. Urban Village Overlay Zones have been established near Trolley stations to encourage transit-supportive development. Recently, the Mission Valley light-rail line has become a model for transit-oriented growth in the region. To help San Diego prepare for one million new residents over the next 20 years, many elected officials now openly embrace TOD. Among the notable examples of TOD and joint development are: MTS/James R. Mills Building at the Imperial Trolley Station; American Plaza Transfer Station downtown; Grossmont Center on the East Trolley Line; and the 41-acre mixed-use Hazard Center along the Mission Valley Corridor.[3]

This report is divided into several sections. First, past work on land-value impacts of transit in San Diego County is reviewed. Second, the methodology and data sources used in this study are discussed. Third, descriptive statistics and research results are presented. Last, findings are summarized.

2. BENEFITS OF TRANSIT IN SAN DIEGO

In a 1996 publication prepared by SANDAG, *Economic Contributions of Public Transit in the San Diego Region*, a number of benefits were attributed to public transit services in the region: (1) monetary savings due to congestion relief; (2) economic stimulus of Federal/State funds; (3) air quality improvements; (4) greater labor force participation; (5) reduced energy consumption; (6) expanded tourism; (7) improved traffic safety; (8) increased mobility; and (9) higher economic use of developable land.[4] While conceding that putting a monetary value on these figures is not easy, the study estimated the region received around $295 million annually in economic returns from transit services, far more than the $143 million in tax-funded subsidies that were being spent on transit at

[2] M. Bernick and R. Cervero, *Transit Villages for the 21st Century*, New York, McGraw-Hill, 1997.
[3] Metropolitan Transit Development Board, *Transit-Oriented Development in San Diego*, 2000.
[4] San Diego Association of Governments, *Economic Contributions of Public Transit in the San Diego Region*, San Diego, 1996.

the time. The overall annual rate of return on local investment in transit was placed at 107%.

Because it is very difficult to express benefits like travel-time savings and congestion relief in monetary terms, research on transit's benefits to property owners and consumers has focused on land markets in recent years. Land-value premiums offer an objective, transparent, and tractable means of placing a monetary value on the benefits of being near transit stations.

The first notable study on the impact of Trolley services was SANDAG's 1984 report on *San Diego Trolley: The First Three Years*.[5] Although no effort was made to quantify impacts, interviews with developers and merchants revealed many thought there were advantages associated with being near Trolley stops. Most developers indicated that being near a Trolley station was a "major part of their marketing efforts in leasing space". Around 20 percent of merchants indicated that the Trolley was an "important positive factor in the business remaining in its current location". However, nearly 40 percent of respondents indicated that the Trolley had no impact, positive or negative, on their sales volumes. In truth, these surveys were administered when the Trolley service had been in operation for only a couple of years and focused solely on the South Line connecting downtown to the Mexican border. Often, it takes a number of years for the benefits of being near transit to accrue, thus it was perhaps presumptuous to have expected a chorus of support among developers and businesses at the time of the surveys.

A study that examined impacts a decade or so following the Trolley's opening, relying mainly on qualitative case assessments, concluded relatively little suburban development could be associated with the presence of light-rail stations, though pro-active government involvement led to the clustering of commercial and office development near some downtown stops.[6] The study concluded most stations were located in settings unsuitable for TOD. This study pre-dated the past decade of pro-TOD planning in the county, thus a more up-to-date case-study assessment might reach more positive conclusions.

The first study that tried to place a monetary figure on the value of commercial properties being within close proximity to San Diego Trolley stations was the 1992 study by VNI Rainbow.[7] This analysis examined rents as opposed to land values and used the technique of matched pairs – i.e., simple comparisons of differences in rents among properties that are comparable except some are near rail stops and others are not. Gauging benefits using rental data can be

[5] San Diego Association of Governments, *San Diego Trolley: The First Three Years*, prepared for the Urban Mass Transportation Administration, U.S. Department of Transportation, Washington, D.C., 1996.

[6] W. Graham, *Land use Effects of Light Rail Transit: The San Diego Example*, Department of City Planning, San Diego State University, unpublished Masters Thesis, 1992.

[7] VNI Rainbow Appraisal Service, *Analysis of the Impact of Light Rail Transit on Real Estate Values*, San Diego, Metropolitan Transit Development Board, 1992.

problematic, however in that contract rents do not always capture the full array of concessions received by tenants. Even if contract rents are fairly accurate, they need to be adjusted for occupancy levels to reveal effective rents. This was not done on the VNI Rainbow study. Based on projects built 3 or more years after the 1981 opening of the Trolley line, no measurable differences in monthly rents were found for offices adjacent to downtown trolley stops versus offices of similar quality but in the suburbs. In truth, suburban offices are so fundamentally different than those downtown that such a matched-pair comparison is problematic. In the case of retail businesses, fairly significant benefits were recorded, around $1.35 per square foot (in 1980 currency). In fact, monthly rents for retail establishments adjacent to Trolley stations were, on average, 167% higher than control properties that were one-half block away. Other factors, like pedestrian volumes, could have explained such sharp differences. Nevertheless, the study suggested that the accessibility benefits conferred to downtown retailers by Trolley services were appreciable.

A more rigorous analysis of land-value impacts on single-family homes in San Diego, employing hedonic price models, was carried out by John Landis, Subhrajit Guhathakrurta, and Ming Zhang.[8] Using data for 134 home sales in the City of San Diego in 1990, and controlling for other possible predictors of real-estate prices, the study found appreciable land-value benefits accrued to single-family residences near Trolley stations (in contrast to negative impacts found for other light rail systems in California). The authors noted: “For the typical single-family home in the City of San Diego in 1990, for every meter it was closer to a Trolley station, its 1990 home price increased by $2.72” (p. 29). Outside the city limits, the researchers found insignificant relationships, suggesting “that while the accessibility premium associated with the San Diego Trolley is quite high, it is limited in extent to homes in the City of San Diego” (p. 29). While these results are encouraging, the analysis was limited to single-family homes. In general, past studies have found stronger capitalization benefits for multi-family housing and commercial-office land uses, thus this study failed to shed light on benefits to non-homeowner properties.[9]

3. DATA AND METHODOLOGY

This section presents the data sources and methodology used to conduct the analysis presented in this report.

[8] J. Landis, *Capitalizaiton of Transit Investments into Single-Family Home Prices: A Comparative Analysis of Five California Rail Transit Systems*, Institute of Urban and Regional Development, University of California, Berkeley, Working Paper 619, 1994.

[9] R. Cervero, *Transit-Induced Accessibility and Agglomeration Benefits: A Land Market Evaluation,* Institute of Urban and Regional Development, University of California, Berkeley, Working Paper 691, 1997.

3.1 Data Sources

The primary data source used to carry out this research was *Metroscan*, a proprietary data base maintained by and available from First American Real Estate Solutions, headquartered in Sacramento, California. *Metroscan* contains monthly information on all real-estate sales transactions that are recorded in county assessor offices. For purposes of this study, data observations for commercial and residential properties were selected – in the case of commercial parcels, data were acquired for calendar years 1999, 2000, and 2001 (in order to obtain a sufficient size data base); for residential parcels, sufficient numbers of cases for year 2000 were available and used for the analysis.[10] These dates were also felt to provide a sufficient time lapse for the benefits of proximity to light and commuter rail services in the county to have taken form.

The data allowed separate models to be estimated for four types of land uses: Residential – multi-family housing; Residential – Condominiums; Residential – single-family housing; and Commercial.[11] Since capitalization effects are thought to vary across these land-use categories, separate were carried out.

To ensure reasonably accurate sales price data were used in the analysis, records were only selected for parcels that sold in the year of analysis: 2000 for residential and 1999-2001 for commercial properties. Moreover, records were only selected if the sales price and assessed value of land and structures were within 10 percent of each other, thus removing suspicious cases with extremely high or low sale values (including possibly those that did not involve arms-length transactions). After these steps, the following numbers of records were available for the analysis (in which complete data were available for all variables, including control variables):

- Residential – multi-family housing: 1,495 parcel records
- Residential – condominiums: 9,672 parcel records
- Residential – single-family housing: 14,756 parcel records
- Commercial: 372 parcel records.

For commercial properties, the following land-use designations (and share of the sample) were used in the analysis:

- Commercial General: Offices and Others, 1-3 story buildings (65.6%)
- Commercial Restaurant (6.4%)
- Commercial Offices-Medical (6.4%)
- Commercial: Hotel-Motel (4.7%)

[10] While data were available for the year 2001, the residential analysis was conducted using year 2000 sales data since this time point matched the date of many of the control variables used in the analysis, such as demographic variables from the census.

[11] For multi-family units, analyses were conducted for entire properties, not individual units. For condominiums, analyses were conducted for units (as part of individual sales transactions).

- Commercial: Vacant (4.2%)
- Commercial: Office Condominiums (3.4%)
- Commercial: Bank-Finance (2.4%)
- Commercial: Neighborhood Shopping Center (2.3%)
- Commercial: Community Shopping Center (1.7%)
- Commercial: Offices and Others, 4 story buildings and higher (1.2%)
- Commercial: Grocery-Drug Store (1.1%)
- Commercial: Other (0.4%)

Professional activities (offices, banks, and clinics) constituted more than two-thirds of commercial-property cases. Far more commercial structures were under than over three stories.

Besides price information, *Metroscan* provided various data about parcels and improvements on them, including: structure size, lot size, year built, numbers of bedrooms and bathrooms (for residential parcels), type of use (for commercial parcels), date of sale, and address information. Address data were used to identify the precise longitudinal-latitudinal coordinates of parcels, from which various metrics of location, including the municipality (or census designated place) of a parcel, were computed.

Other key data sources used in the analysis came from SANDAG and the year 2000 U.S. census (summary table file 1A). The primary SANDAG inputs used in the analysis were 1995 employment and household income data, expressed at the traffic analysis zone (TAZ) level. Year-2000 data on TAZ-to-TAZ peak-period highway-network travel times via automobile and transit were also obtained from SANDAG for purposes of computing accessibility indices. Data on population, housing units, and various socio-demographic attributes of census blocks were obtained from the year-2000 census.

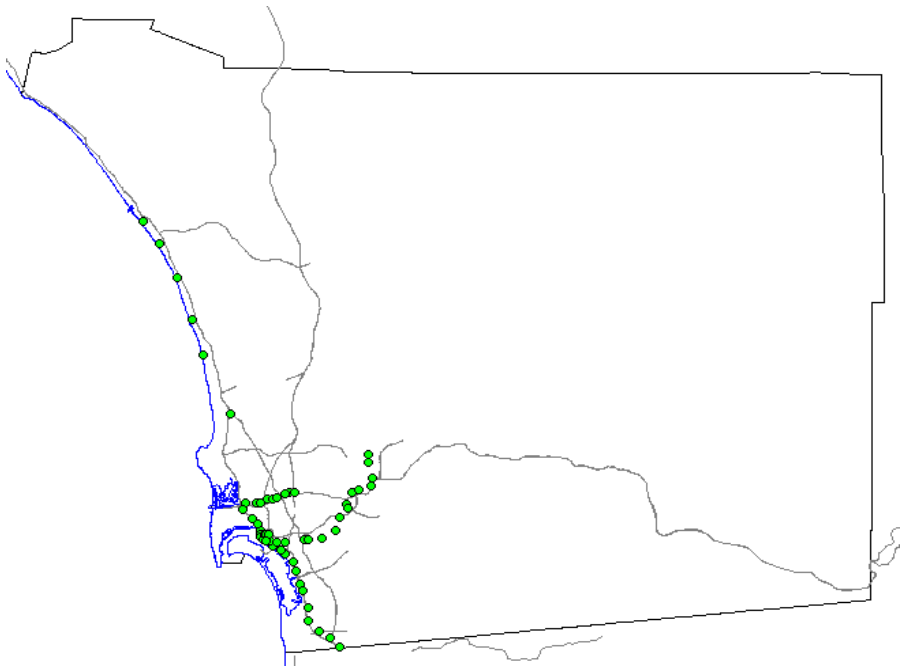
3.2 Methodology: Hedonic Price Modeling

To gauge the value-added associated with being near light and commuter rail stations in San Diego County, a hedonic price model was estimated.[12] Models took the form: $P_i = f(T, A, S, C)$, where: P_i equals the estimated price of parcel i; T is a vector of transportation services, including proximity to transit and highways and accessibility via highway and transit networks; A is a vector of

[12] Hedonic price models are widely considered to be the most rigorous and accurate basis for apportioning factors that influence land values, and more specifically for estimating the land-value premium associated with transportation infrastructure. Hedonic price theory assumes that most consumer goods comprise a bundle of attributes, and that the overall transaction price can be decomposed into the component (or "hedonic") prices of each attribute. See: S. Rosen, Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition, *Journal of Political Economics*, Vol. 82, 1974, pp. 34-55.

property (e.g., structure size and age) and land-use (e.g., type of commercial) attributes; S is a vector of neighborhood socio-demographic characteristics (e.g., racial composition, household income); and C is a vector of controls (e.g., municipality and time-series fixed effects). Municipality fixed-effect (dummy) variables were used to statistically capture the unique attributes of communities, such as quality of schools. This model structure allowed for the influences of various factors (e.g., size of structure; quality of neighborhood) to be statistically controlled so that the influences of proximity to rail transit stops could be isolated and measured.

The Appendix presents the full array of variables that were candidate inputs into the analyses. Many of the variables related to location, proximity to transit, neighborhood attributes, and accessibility were measured using Geographic Information System (GIS) tools. One-quarter and one-half mile buffers were created around all rail transit stops in the County (Map 1) as well as all freeway and grade-separated interchanges and ramps. The one-quarter to one-half mile range is generally considered to be an acceptable walking distance to rail stops. The distance rings that provided the best statistical fits in predicting sales prices were used in the analyses. For purposes of gauging neighborhood attributes (such as neighborhood median household income and racial composition), one-mile buffers around parcels were digitally overlaid onto census blocks. This allowed neighborhood attributes to be gauged for areas of consistent size (around 2,010 acres). Buffers were even created to identify those parcels that were within one and five miles of the Mexican border to account for any possible boundary effects.



Map 1. Location of Rail Transit Stations in San Diego County, 2000

One of the key control variables that accounted for the relative location of parcels was accessibility indices. For residential properties, accessibility to jobs was estimated. Isochronic measures of accessibility gauged the number of jobs within designated travel-time intervals of 15 minutes, 30 minutes, 45 minutes, and one-hour over highway and transit networks. Thus, separate accessibility indicators were computed for auto-highway and transit access to jobs. For commercial properties, accessibility to households (as indicators of relative proximity to consumers and workers) was measured. Accessibility analyses were conducted at the Traffic Analysis Zone (TAZ) level using year-2000 travel-time estimates provided by SANDAG. Thus, indices gauged levels of accessibility for the TAZ that a particular parcel lies within.

Because capitalization effects were thought to vary by transit corridor, the analysis was stratified to measure differences in land-value impacts for the three existing Trolley lines plus downtown Trolley stations as well as the Coaster line (further distinguished by downtown and other Coaster stations). (Map 2 shows the various corridors.) The three Trolley lines were defined as: South Line (portion of the Blue Line south of downtown); East Line (Orange Line outside of downtown); and North Line (portion of Blue Line north of downtown, corresponding mainly to the Mission Valley corridor).

4. DESCRIPTIVE STATISTICS

Table 1 presents summary statistics for some of key variables used in the hedonic price models, broken down by the four land-use types. On average, the most expensive properties were for commercial uses, followed by single-family residences, multi-family housing, and condominiums. Far higher shares of sampled commercial properties were near a Trolley or Coaster station (19%) than other uses; 10% of multi-family housing and condominiums and 4% of single-family homes were near stations. Among land uses, multi-family housing units tended to be closest to freeway interchanges and single-family housing tended to be farthest. Overall, multi-family units were closer to jobs via highway networks than other residential uses – e.g., on average, nearly 800,000 jobs were within 30 minutes auto-highway travel time of multi-family parcels, versus 675,000 for single-family housing.

In terms of property and location attributes, commercial and multi-family housing properties tended to have the largest structures (on average, over 5,000 square feet) and condominiums tended to have the smallest (just over 1,000 square feet). Single-family residences were generally on the smallest lots and commercial structures were on the biggest. In terms of structure age, condominiums were, on average, the newest, and multi-family housing complexes were the oldest. Multi-family projects (many of which were duplexes) also tended to be in the densest settings and, predictably, single-family properties tended to be the sparsest. Single-family parcels were

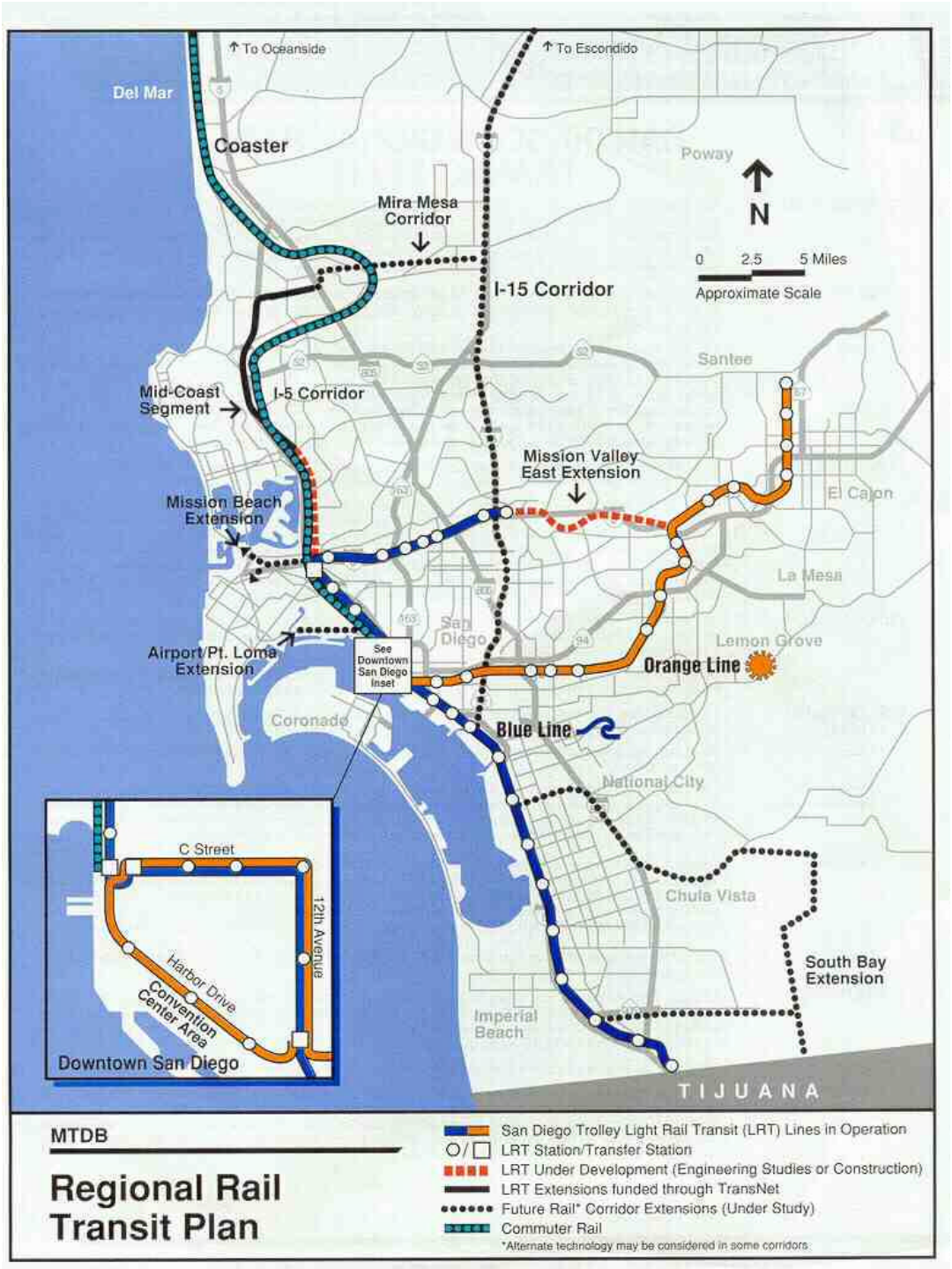


Figure 2. Regional Rail Transit Network and Planned Extensions in San Diego, 2000

Table 1. Descriptive Statistics of Key Variables Used in Hedonic Price Model for Residential Uses

	Mean or Proportion			
	Multi-Family Housing[1]	Condo-miniums[1]	Single-Family Housing	Com-mercial
Sales Price ($, 2000)	384,265	189,396.	395,268	641,321
Transportation Proximity Measures				
LRT (South Line): prop. within ½ mile of station	.01	.01	.01	.02
LRT (East Line): prop. within ½ mile of station	.03	.02	.02	.06
LRT (North Line): prop. within ½ mile of station	.02	.04	.01	.03
LRT (Downtown): prop. within ¼ mile of station	.01	.01	.00	.02
Commuter Rail: prop. within ½ mile of station	.03	.02	.01	.06
Interchange Ramp: network distance, in miles, to nearest freeway ramp	1.37	1.70	1.91	1.58
Transportation Proximity Measures				
Regional Job Accessibility: No. jobs (in 1,000s, in 1995) within 30 minute peak-period auto travel time on highway network	794,374	761,490	675,287	--
Regional Household Accessibility: No. households (in 1,000s) within 30-minute peak-period travel time on highway network	--	--	--	590.393
Property and Location Attributes				
Structure Size (feet)	5,174	1,157	1,887	6,681
Lot Size (feet)	23,263	--[2]	10,795	26,534
Structure Age (years)	42.7	19.5	28.9	35.9
Housing Density: No. of housing units per gross acre within one mile radius of parcel	6.0	3.8	3.4	5.0
Moderate-High Income: Prop. of households within one mile radius of parcel with median annual incomes of $50,000 or more	.34	.54	.56	.37
City of San Diego Location: prop.	.57	.57	.51	.45

Notes:
[1] Statistics for multi-family housing represent entire projects whereas those for condominiums are for individual units.
[2] Since condominium owners jointly own property, no attempt was made to define lot size for individual condos.

generally in the highest income neighborhood, opposite of multi-family structures. Lastly, higher shares of multi-family and condomium properties were in the City of San Diego than single-family or commercial parcels.

5. HEDONIC PRICE MODEL RESULTS

This section presents the hedonic price model results for the four land uses, along with graphs that summarize measured land-value premiums or discounts. Premiums or discounts were estimated using sensitivity-analysis techniques. This involved inputting mean or modal (i.e., most frequently occurring) values into predictive variables of hedonic price models to come up with price estimates for the "typical" property. In all instance, base-case estimates assumed properties were not within one-half mile of a rail station. Holding other factors constant, the price estimates were then revised based on the assumption that the property was within one-half mile (or less) of a rail station on one of the rail lines. Statistically, this amounted to converting the dummy variable for a rail line of interest from a value of 0 to a value of 1. The percentage change in estimated land value under this sensitivity analysis represented the premium, or discount, associated with being near a rail stop.

5.1 Multi-Family Housing Model

Table 2 presents the hedonic price model results for multi-family housing, which mainly consisted of apartment projects. The model has good predictive powers, explaining around 70 percent of the variation in sales prices among some 1,500 multi-family properties sold in year 2000.

There were positive and appreciable capitalization effects enjoyed by apartments and other multi-family parcels near Trolley stops. The largest benefits accrued to parcels near the East Line – from the model, apartment complexes within a half mile of East Line Trolley stops were worth, on average, over $100,000 more than otherwise comparable ones that were beyond walking distance to a station. Weaker, though still positive, effects were found for multi-family units near downtown and Mission Valley stations. In contrast, multi-family housing projects near Coaster stations generally sold at a lower price than otherwise comparable projects, suggesting the existence of a dis-amenity effect (controlling for other factors). The model results also suggest a dis-benefit from being close to freeways (e.g., from noise, fumes, vibrations, headlight glare, etc.), reflected by prices increasing by around $67,000 for every mile a multi-family housing parcel was from a freeway, *ceteris paribus*. However, being near an access point to a freeway (i.e., an on-ramp) created benefit, reflected by the negative sign on the "Interchange Ramp" variable. Overall, the disamenity effect of being near a freeway was larger than the amenity effect of being close to a freeway access point.

Table 2. Multi-Family Housing Properties: Hedonic Price Model Results — Factors Influencing Year 2000 Multi-Family Housing Sales Price in San Diego County; Year 2000 data, unless otherwise noted

Variable	Coeffi-cient	Standard Error	Prob. Value
Rail/Highway Proximity			
LRT (South Line): within ½ mile of LRT station (1=yes; 0=no)	60,051.6	44,681.4	.176
LRT (East Line): within ½ mile of LRT station (1=yes; 0=no)	104,827.4	18,646.5	.000
LRT (Mission Valley Line): within ½ mile of LRT station (1=yes; 0=no)	23,103.7	20,021.2	.320
LRT (Downtown): within ¼ mile of LRT station (1=yes; 0=no)	31,242.3	44,578.4	.484
Commuter Rail: within ½ mile of Coaster station (1=yes; 0=no)	-43,378.8	29,992.1	.148
Highway/Freeway Distance: straightline mileage to nearest grade-separated highway or freeway	66,877.4	14,327.0	.000
Interchange Ramp: network distance, in miles, to nearest freeway ramp	-43,280.2	10,577.4	.000
Accessibility			
Regional Job Accessibility: No. jobs (in 1,000s, 1995) within 1 hour peak-period auto travel time on highway network	524.1	.157.2	.001
Property Attributes			
Structure Size: Square feet	1.36	0.61	.026
Units, total number on parcel	28,622.4	2,645.4	.000
Bathrooms, total number on parcel	8,781.6	1,876.2	.000
Bedrooms, total number on parcel	4,530.4	1,008.7	.000
Structure Age: Years	-508.1	182.3	.005
Neighborhood Attributes			
Housing Density: No. housing units per gross acre within one mile radius of parcel	-5,388.2	1,835.1	.003
Moderate-High Income: Proportion of households within one mile radius of parcel with median annual incomes of $50,000 or more	113,461.8	80,833.1	.161
Neighborhood Profile: proportion of households within one mile radius of parcel of white race	391,033.5	33,618.0	.000
Seniors: proportion of population residing within one mile radius of parcel that is age 65 or more	238,415.6	153,796.0	.121
Vacant Land: proportion of parcels within one mile radius of parcel that are vacant	1,339,402.3	173,776.2	.000
City Fixed Effects (1=yes, 0=no)			
Alpine	57,982.4	137,292.5	.673
Bonita	313,838.7	136,756.0	.022
Bostonia	-82,958.5	49,259.1	.092
Carlsbad	121,912.3	41,420.0	.003
Casa de Oro-Mount Helix	-29,158.0	82,882.4	.725
Chula Vista	60,202.1	41,174.3	.144
Coronado	596,893.5	122,090.7	.000
Crest	-137,497.8	134,428.8	.307
Del Mar	709,904.5	60,031.7	.000
El Cajon	-92,579.0	40,273.9	.022
Encinitas	180,314.9	37,919.8	.000
Escondido	6,527.6	38,616.1	.866
Fallbrook	-81,051.1	57,365.5	.158
Imperial Beach	15,273.7	38,677.6	.693
Julian	-702,765.0	145,148.2	.000
La Mesa	-95,823.1	40,453.0	.018

Table 2 (continued)			
La Presa	-26,263.2	44,259.5	.553
Lake San Marcos	-307,572.6	135,533.9	.023
Lakeside	-214,494.6	74,748.8	.004
Lemon Grove	-23,400.4	40,352.3	.562
National City	72,321.8	41,586.8	.082
Oceanside	34,781.6	44,563.7	.435
Poway	843,223.5	136,158.0	.000
Rainbow	31,532.4	135,371.9	.816
Ramona	-255,531.3	78,891.8	.001
Rancho San Diego	36,569.3	135,044.2	.787
San Diego	66,222.6	35,839.7	.065
San Marcos	51,622.5	57,842.2	.372
Solana Beach	-21,648.4	62,420.5	.729
Spring Valley	-41,454.3	45,238.6	.360
Vista	-1,510.0	38,902.1	.969
Winter Gardens	-222,682.5	57,055.8	.000
Monthly Fixed Effects			
February	-11,604.3	18,269.0	.525
March	-3,806.9	16,946.9	.822
April	13,223.9	17,581.3	.452
May	23,049.8	17,206.9	.181
June	24,328.4	16,676.9	.145
July	38,714.7	17,519.4	.027
August	47,959.8	17,090.4	.005
September	50,864.9	17,587.3	.004
October	40,314.3	18,675.4	.031
November	34,502.2	18,236.0	.059
December	46,772.2	17,293.0	.007
Constant	-111,990.7	50,859.6	.028
Summary Statistics			
No. observations = 1,495			
F Statistic (prob.) = 54.37 (.000)			
R-Squared = .695			

The other variables in the hedonic price model entered in as statistical controls, to remove the influences of other explainers of multi-family housing prices. All control variables had signs that matched *a priori* expectations. All else being equal, multi-family housing in San Diego County sold for more as the following increased: access to regional jobs over the highway network; structure size; numbers of units, bedrooms, and bathrooms; neighborhood income; shares of households made up of white and seniors; and amounts of vacant parcels (reflecting possible real-estate speculative effects). Based on the fixed-effect controls, prices also went up for multi-family parcels sold in certain cities (many, like Del Mar, in the pricier northern part of the county) and in the later portions of year-2000 (based on the positive signs of the month fixed-effect variables relative to the suppressed category of January).[13]

[13] For all models presented, coefficients on the fixed-effect variables should be interpreted with respect to the "suppressed" category. For the municipality fixed-effects, the suppressed category

Figure 1 summarizes the findings on capitalization effects of multi-family parcels. As noted above, these premiums or discounts were estimated by inputting mean or modal statistics for all variables in the predictive model, and through sensitivity analysis, measuring the percentage change in mean price given a change in each rail proximity variable, holding all other factors constant.[14] As shown, apartments near East Line stations enjoyed the biggest premiums – on average, around 17 percent. Multi-family housing parcels near the South Line Trolley stops also accrued appreciable benefits, around 10 percent. Along the Mission Valley corridor and downtown, smaller, though hardly inconsequential, premiums were measured, in the range of 4 to 5 percent. Apparently, being near commuter-rail stops in the wealthier North County tended to depress multi-family real-estate prices.

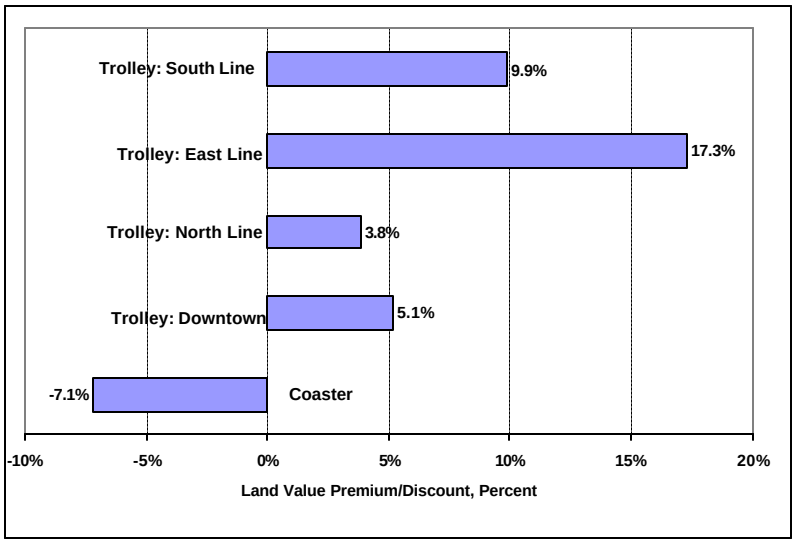


Figure 1. Multi-Family Housing Land-Value Premiums or Discounts, by Rail Line

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was unincorporated portions of San Diego County as well as other (usually small) municipalities and census designated places (CDP) not included in the model. For the monthly fixed-effect variable, the suppressed category is January – thus all premiums or discounts are with respect to the first month of the calendar year.

[14] In the sensitivity analysis, mean values (from Table 1) were inputted into the model, and the dummy for each "rail proximity" variable was systematically "turned on", holding all other input values constant. Besides the mean statistics from Table 1, other assumed values for this scenario were: a highway distance of 0.9 miles; 2 unit duplexes; 2 and 3 total bathrooms and bedrooms, respectively; a non-moderate-to-high income neighborhood; around half of units being in predominantly white neighborhoods without high shares of seniors; few vacant parcels; and a sales transaction within the City of San Diego.

5.2 Condominiums

Findings from the hedonic price modeling of condominium units in San Diego County are presented in Table 3. There were far more usable records of sales transactions for condominiums in the *Metroscan* data base than there were for multi-family housing. An even better fitting hedonic price model was derived for condominium projects, accounting for nearly three-quarters of the variation in sale price among 9,672 transactions in year 2000.

Table 3 reveals very similar patterns were found for condominiums as with multi-family housing, with one notable exception: rather than there being a dis-amenity affect, there was a large and significant premium associated with condominium parcels near Coaster stations. Apparently, there is a huge difference in the effects of being near a commuter-rail station depending on whether a multi-family property comprises for-sale or rental units. One can surmise that in the higher-end North County where many young professional workers with downtown jobs reside, owning a condo within an easy walk of a Coaster station confers benefits – on average, a value-added of some $85,000.

Many of the control variables in Table 3 show similar relationships as in the case of the multi-family housing model. Condominium prices rose with job accessibility, structure size, surrounding housing and employment densities, neighborhood income levels, shares of white households, and numbers of nearby vacant parcels. Prices also tended to be higher in the North County. They also generally rose throughout year 2000. Condominium prices generally fell, however, with number of bedrooms and bathrooms. While at first glance this might seem counter-intuitive, this is not necessarily so given the existence of the control variable "structure size". This means that for two condominiums with the same square footage, the one with fewer bedrooms and bathrooms tends to be worth more – i.e., consumers prefer fewer but larger bedrooms and bathrooms, plus more living space, than vice-versa. The positive sign on the density variable suggests for-sale units like condominiums generally fetch higher prices in more compact and walkable settings as long as the neighborhood is desirable (as reflected by the proxy control variable, neighborhood income).

The same approach was followed in estimating typical premiums for condominium projects.[15] The results are summarized in Figure 2. Most notable is the 46% premium associated with condominiums near Coaster stations. Outside of downtown, condominiums near Trolley stations accrued price premiums of 3% to 6.5%. Downtown, the typical premium was around 2%.

[15] Besides the mean statistics for condominiums from Table 1, the following assumptions were made in deriving premiums using the model estimates of price for the "typical" condominium sale: a two bedroom, two bathroom unit in a moderate-to-high income and predominantly white neighborhood in the City of San Diego.

Table 3. Condominium Properties: Hedonic Price Model Results — Factors Influencing Year 2000 Condominium Sales Price in San Diego County; Year 2000 data, unless otherwise noted

Variable	Coeffi-cient	Standard Error	Prob. Value
Rail/Highway Proximity			
LRT (South Line): within ½ mile of LRT station (1=yes; 0=no)	6,442.5	6,297.3	.306
LRT (East Line): within ½ mile of LRT station (1=yes; 0=no)	11,917.6	4,691.9	.011
LRT (North Line): within ½ mile of LRT station (1=yes; 0=no)	5,539.6	7,373.8	.453
LRT (Downtown): within ¼ mile of LRT station (1=yes; 0=no)	4,144.8	3,782.9	.273
Commuter Rail: within ½ mile of Coaster station (1=yes; 0=no)	85,232.1	6,728.7	.000
Interchange Ramp: network distance, in miles, to nearest freeway ramp	7,655.0	714.6	.000
Accessibility			
Regional Job Accessibility: No. jobs (in 1,000s, in 1995) within 30 minute peak-period auto travel time on highway network	71.9	10.1	.000
Property Attributes			
Structure Size: Square feet	217.3	3.2	.000
Bathrooms, total number on parcel	-3,514.0	1,927.9	.068
Bedrooms, total number on parcel	-15,129.1	1,500.6	.000
Structure Age: Years	-1,577.6	98.7	.000
Neighborhood Attributes			
Housing Density: No. of housing units per gross acre within one mile radius of parcel	5,731.6	450.7	.000
Employment Density: No. of workers per gross acre within one mile radius of parcel	1,092.4	182.3	.000
Moderate-High Income: Proportion of households within one mile radius of parcel with median annual incomes of $50,000 or more	22,242.5	8,215.5	.006
White Race: proportion of households within one mile radius of parcel of white race	103,272.1	5,085.0	.000
Vacant Land: proportion of parcels within one mile radius of parcel that are vacant	917,470.4	26,625.9	.000
City Fixed Effects (1=yes, 0=no)			
Bonita	54,456.1	15,250.8	.000
Bonsall	-52,311.4	14,891.6	.000
Bostonia	-14,093.5	12,390.0	.255
Carlsbad	-16,921.3	6,723.7	.012
Chula Vista	9,432.5	7,888.2	.232
Coronado	182,581.9	13,646.0	.000
Del Mar	308,280.1	15,630.0	.000
El Cajon	-20,095.2	8,623.0	.020
Encinitas	73,104.8	7,688.6	.000
Escondido	17,501.1	7,598.6	.021
Hidden Meadows	-22,233.2	23,907.5	.352
Imperial Beach	49,590.7	11,604.0	.000
La Mesa	-11,253.6	9,006.3	.212
La Presa	10,497.8	9,822.5	.285
Lake San Marco	7,340.5	12,177.7	.547
Lakeside	-27,289.2	10,402.9	.009
Lemon Grove	15,221.3	16,754.2	.364
National City	16,701.2	15,212.3	.272
Oceanside	18,202.7	6,971.2	.009

Table 3 (continued)			
Poway	10,829.7	9,687.2	.264
Ramona	-62,290.8	23,480.5	.008
Rancho San Diego	27,078.1	11,109.4	.015
San Diego	27,273.7	7,755.7	.000
San Marcos	19,484.8	9,381.3	.038
Santee	-10,607.9	8,385.9	.206
Solana Beach	103,707.6	10,176.2	.000
Spring Valley	16,147.4	10,176.2	.112
Vista	32,874.4	7,596.0	.000
Winter Gardens	-8,558.4	10,286.4	.405
Monthly Fixed Effects			
February	2,188.0	3,777.6	.562
March	-552.0	3,476.2	.874
April	8,133.7	3,533.6	.021
May	12,790.9	3,467.9	.000
June	11,057.3	3,404.7	.001
July	17,103.5	3,558.9	.000
August	20,402.4	3,441.7	.001
September	25,678.8	3,494.2	.000
October	30,076.1	3,837.9	.000
November	30,149.3	3,564.0	.000
December	33,485.6	3,646.6	.000
Constant	-240,085.0	10,310.9	.000
Summary Statistics			
No. observations = 9,672			
F Statistic (prob.) = 467.8 (.000)			
R-Squared = .735			

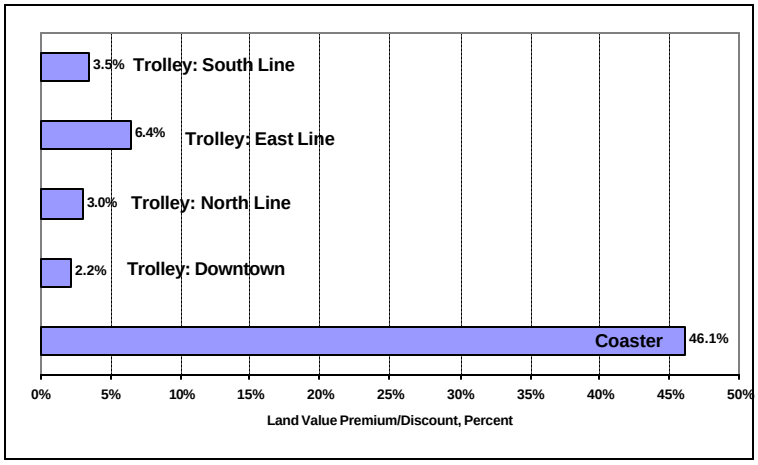

Figure 2. Condominium Land-Value Premiums, by Rail Line

5.3 Single-Family Housing

While multi-family units often enjoy benefits from being near rail transit, frequently the opposite holds for single-family housing, especially in the case of established, middle-income neighborhoods.[16] This seems to be the case in San Diego County. Table 4 shows that land-value premiums only accrued to single-family housing units within a half mile of rail stations on the southern Trolley line and the northern Coaster line.[17] Along other Trolley corridors, home prices generally fell within a half-mile ring of stations. There was a stronger increase in single-family home prices with distance from on-ramps than there was a decline with distance to the nearest freeway, suggesting that, overall, properties generally went for more when they were a reasonable buffer distance away from busy roads. Table 4 also reveals that single-family homes fetched more not only as access to jobs via automobile (within 30 minutes peak time) increased but also as employment access via transit (within 30 minutes time) rose. The model had reasonably good predictive powers, explaining around 60 percent of the variation in single-family housing prices over a lot of year-2000 transactions – nearly 15,000 in all.

Control variables from Table 4 matched expectations. Single-family home prices generally rose: with structure size and number of bathrooms; in predominantly white neighborhoods with higher incomes; and in North County communities known for having good schools. The sign on the lot size variable was negative (though not significant at the .05 probability level), suggesting parcels that devote more land to structures than open space tend to be worth more in the marketplace. While the sign on the housing density variable is positive, suggesting homes in more built-up areas sell for more, the average density of single-family neighborhoods was still fairly low (3.4 units per gross acre, from Table 1), suggesting this is not capturing so much the effects of "high density" as much as sales-transacted parcels being in fairly mature, built-up areas. Based on the longitudinal monthly variable, single-family home prices tended to rise steadily during year 2000.

Expressing the hedonic price results in premium terms, Figure 3 shows that the "typical" single-family home within a half mile of a non-downtown Coaster station reaped a premium benefit of around 17%.[18] There was a negligible benefit to single-family homes on the south line and a dis-benefit for detached, single-family properties sold near East Line and Mission Valley Line stations. The disamenity effect was probably greatest for single-family homes near park-and-ride lots.

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[16] Cervero, 1997, *op cit.*

[17] There were no year-2000 single-family sales transactions in downtown San Diego, including near the downtown Coaster station.

[18] In the sensitivity analysis, besides statistics from Table 1, it was assumed single-family houses were 1.5 miles from a highway or freeway, were within a 15-minute transit ride of 2,100 jobs, had three bedrooms and two bathrooms, and were in predominantly white neighborhoods where median annual household incomes were below $100,000.

Table 4. Single-Family Housing Properties: Hedonic Price Model Results — Factors Influencing Year 2000 Condominium Sales Price in San Diego County; Year 2000 data, unless otherwise noted

Variable	Coeffi-cient	Standard Error	Prob. Value
Rail/Highway Proximity			
LRT Straightline Distance, in miles	-5,659.3	393.7	.000
LRT (South Line): within ½ mile of LRT station (1=yes; 0=no)	6,774.8	21,495.6	.753
LRT (East Line): within ½ mile of LRT station (1=yes; 0=no)	-17,643.0	9,456.3	.062
LRT (North Line): within ½ mile of LRT station (1=yes; 0=no)	-48,707.6	23,720.6	.040
Commuter Rail Straightline Distance, in miles	-12,308.3	537.8	.000
Commuter Rail: within ½ mile of Coaster station (1=yes; 0=no)	78,597.9	29,389.6	.007
Highway/Freeway Distance: straightline mileage to nearest grade-separated highway or freeway	-8,762.5	3,195.9	.006
Interchange/Ramp: network distance, in miles, to nearest freeway ramp	13,295.3	2,258.5	.000
Accessibility			
Regional Job Accessibility, Highway: No. jobs (in 1,000s, 1995) within 30 minute peak-period auto travel time on highway network	1,042.0	160.4	.000
Regional Job Accessibility, Transit: No. jobs (in 1,000s, 1995) within 15 minute peak-period transit travel time on highway network	6,286.5	710.2	.000
Property Attributes			
Structure Size: Square feet	185.9	3.2	.000
Lot Size: Square feet	-0.2	0.1	.181
Bathrooms, total number on parcel	25,014.7	3,299.4	.000
Bedrooms, total number on parcel	-26,745.5	1,862.4	.000
Structure Age: Years	-1,253.4	433.9	.000
Neighborhood Attributes			
Housing Density: No. housing units per gross acre within one mile radius of parcel	13,107.7	1,047.8	.000
High Income: Proportion of households within one mile radius of parcel with median annual incomes of $100,000 or more	360,920.5	18,402.0	.000
White Race: Proportion of households within one mile radius of parcel of white race, 2000	206,309.1	8,396.3	.000
City Fixed Effects (1=yes, 0=no)			
Alpine	5,709.2	18,307.0	.755
Bonita	-31,117.5	24,885.2	.211
Bonsall	34,974.5	39,212.6	.372
Bostonia	-26,603.0	28,258.7	.347
Carlsbad	-33,554.9	14,261.6	.019
Casa de Oro-Mount Helix	-20,405.0	16,914.9	.228
Chula Vista	25,738.0	12,681.6	.042
Coronado	221,993.2	49,017.3	.000
Crest	-124,676.0	67,615.7	.065
Del Mar	698,474.4	33,843.3	.000
El Cajon	37,649.2	13,253.5	.005
Encinitas	82,333.5	12,307.3	.000
Escondido	76,107.3	8,889.6	.000
Fallbrook	11,536.8	14,782.3	.435
Harbison Canyon	-47,815.4	39,635.7	.228
Imperial Beach	53,427.7	20,845.0	.010
Jamul	-163,140.3	25,452.1	.000

Table 4 (continued)			
La Mesa	26,721.5	14,290.9	.062
La Presa	49,763.4	15,695.9	.002
Lake San Marcos	-81,246.3	20,415.7	.000
Lakeside	81,316.3	24,370.6	.001
Lemon Grove	40,123.2	15,876.1	.012
National City	82,990.6	22,306.1	000
Oceanside	4,666.2	10,966.3	.670
Poway	82,139.4	11,479.3	.000
Rainbow	232,189.5	48,416.2	.000
Ramona	-11,092.5	19,462.9	.569
Rancho San Diego	-97,290.4	20,042.3	.000
San Diego	70,773.9	10,451.1	.000
San Marcos	16,470.9	14,396.2	.253
Solana Beach	208,629.9	21,743.2	.000
Spring Valley	15,504.1	20,385.1	.447
Valley Center	-12,142.2	18,377.9	.509
Monthly Fixed Effects			
February	14,432.8	7,617.7	.058
March	13,946.2	7,089.9	.049
April	33,141.5	7,225.7	.000
May	36,783.8	7,170.5	.000
June	35,965.7	6,979.0	.000
July	40,187.1	7,301.0	.000
August	40,287.3	7,078.0	.000
September	55,293.4	7,325.4	.000
October	59,156.5	7,615.8	.000
November	63,087.4	7,403.8	.000
December	50,977.5	7,304.6	.000
Constant	-1,202.1	20,523.8	.953
Summary Statistics			
No. observations = 14,756			
F Statistic (prob.) = 351.4 (.000)			
R-Squared = .605			

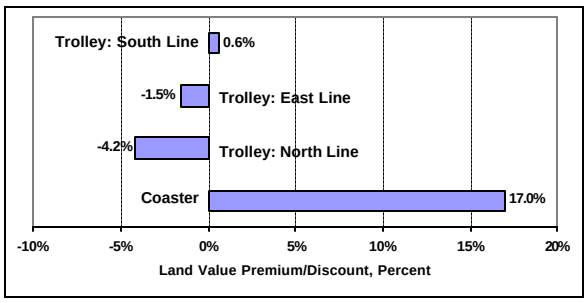

Figure 3. Single-Family Housing Land-Value Premiums or Discounts, by Rail Line

5.4 Commercial Properties

For commercial uses, properties that were near Mission Valley Trolley stations and the downtown Coaster station reaped large and positive land-value premiums, as revealed in Table 5. More modest benefits accrued to offices and retail establishments near downtown Trolley stations and dis-benefits were measured for properties near South Line and East Line Trolley stops. Also, the farther a commercial property was from a freeway interchange, the more its land value declined. The commercial hedonic price model provided a very good statistical fit, explaining 83 percent of the variation in commercial sales prices.

Control variables from Table 5 align with expectations. Commercial properties were worth more as the number of households that could be reached within 30-minutes peak auto travel time increased. Values also rose with structure and lot sizes. Holding other factors constant, commercial properties used for offices, retail stores, restaurants, and hotels tended to go for more than those used for community shopping centers, grocery or drug stores, and theaters. There was some evidence of agglomeration and comparison-shopping benefits, based on the positive sign on the employment density variable. Commercial values also tended to be higher in higher-income and predominantly white neighborhoods. There was also a boost in value for commercial properties near the Mexican border, reflecting the benefits of being near one of the world's busiest border crossings. As with residential uses, being in a higher-income, North County municipality raised commercial land prices. And based on the annual fixed-

Table 5. Commercial Properties: Hedonic Price Model Results — Factors Influencing Commercial Sales Price in San Diego County; Year 2000 data, unless otherwise noted

Variable	Coeffi-cient	Standard Error	Prob. Value
Rail/Highway Proximity			
LRT (South Line): within ½ mile of LRT station (1=yes; 0=no)	-104,266.8	364,845.9	.775
LRT (East Line): within ½ mile of LRT station (1=yes; 0=no)	-12,795.6	194,455.4	.887
LRT (Mission Valley Line): within ½ mile of LRT station (1=yes; 0=no)	813,124.2	272,515.2	.003
LRT (Downtown): within ¼ mile of LRT station (1=yes; 0=no)	50,196.4	48,659.6	.352
Commuter Rail: within ½ mile of Coaster station (1=yes; 0=no)	-111,917.0	53,977.1	.004
Commuter Rail: within ¼ mile of downtown Coaster station (1=yes; 0=no)	1,143,027.5	539,776.1	.035
Interchange Ramp: network distance, in miles, to nearest freeway ramp	-39,749.2	43,403.9	.360
Accessibility			
Regional Household Accessibility: No. households (in 1,000s) within 30-minute peak-period travel time on highway network	1,260.1	57.0	.000
Property and Land Use Attributes			
Structure Size: square feet	79.0	4.5	.000
Lot Size: square feet	4.6	1.4	.001
Community Shopping Center (1=yes; 0=no)	-439,009.1	262,213.9	.095
Grocery or Drug Store (1=yes; 0=no)	-354,610.5	297,241.4	.234
Restaurant (1=yes; 0=no)	293,487.6	118,874.3	.014
Theater (1=yes; 0=no)	-6,968,965	673,874.5	.000
Hotel or Motel (1=yes; 0=no)	325,410	136,386.4	.018
Office or Store: 4 stories or more (1=yes; 0=no)	1,360,015.7	532,562.3	.011
Neighborhood Attributes			
Employment Density: No. of workers per gross acre within one mile radius of parcel	4,616.2	4,611.8	.318
High Income: Proportion of households within one mile radius of parcel with median annual incomes of $75,000 or more	1,547,778.1	361,383.9	.000
White Race: Proportion of households within one mile radius of parcel of white race, 2000	341,834.6	153,574.0	.027
Mexican Border: Parcel within one mile radius of Mexican border	774,284.2	404,153.6	.056

Table 5 (continued)

City Fixed Effects (1=yes, 0=no)			
Carlsbad	1,508,673.6	447,135.5	.001
El Cajon	-132,761.8	200,797.1	.509
Escondido	234,878.2	215,800.9	.277
Fallbrook	681,952.1	389,122.3	.081
Imperial Beach	255,566.1	505,143.9	.613
Jamul	-565,445.9	523,916.4	.281
La Mesa	-303,409.6	233,767.7	.195
Lake San Marcos	1,122,134.6	533,843.4	.036
National City	-454,056.2	403,189.3	.261
Oceanside	394,732.7	287,561.2	.171
Ramona	506,982.0	632,454.9	.423
San Diego	75,921.3	145,994.2	.603
San Marcos	209,401.5	281,247.9	.457
Santee	-578,614.3	370,348.4	.119
Solanabe	-453,710.3	504,815.5	.369
Valley Center	365,500.3	565,070.7	.518
Vista	207,948.6	242,746.3	.003
Annual Fixed Effects (1=yes, 0=no)			
Year 2000	168,480.0	56,518.5	.003
Year 2001	189,540.3	91,718.5	.040
Constant	-1,312,708.0	401,028.6	.001
Summary Statistics			
No. observations = 372			
F Statistic (prob.) = 40.24 (.000)			
R-Squared = .830			

effect dummy, commercial property values steadily rose between 1999 and 2001.[19]

In percentage terms, Figure 4 reveals substantial bonuses for commercial properties near the Coaster station in downtown San Diego and along the Mission Valley Line.[20] These are huge premiums, and suggest that offices, retail shops, restaurants, and other commercial uses reap substantial benefits near rail stations in major business-retail settings. Outside of these two settings, the only other premium was recorded near downtown Trolley stations – a far more modest 4.4% capitalization benefit. Along the East Line, there appeared to be a small dis-benefit and in the case of the Trolley's South Line and the Coaster corridor outside of downtown, the dis-amenity effect was even larger – on average, almost 10 percent.

[19] For commercial land uses, annual longitudinal dummy variables performed statistically better than monthly dummy variables. The suppressed annual variable was the year 1999.

[20] For the sensitivity test, it was assumed that, in addition to the statistical values from Table 1, commercial properties comprised offices and retail shops, and were in San Diego neighborhoods with 7.5 workers per gross acre that were predominantly white and with average incomes.

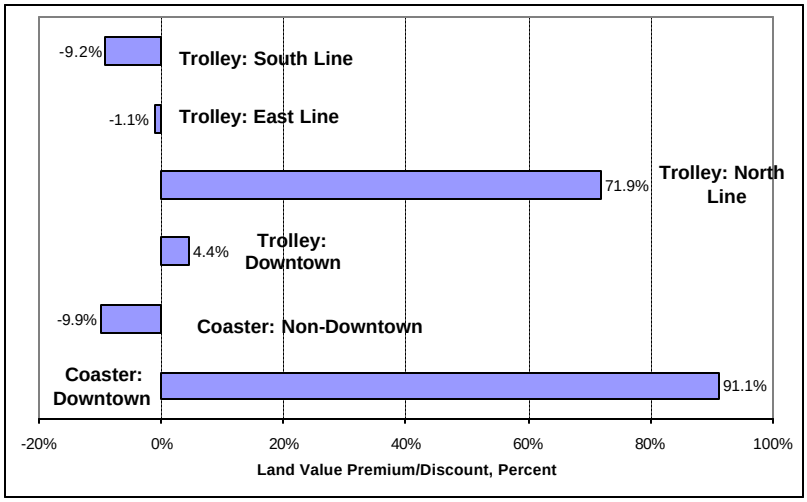

Figure 4. Commercial Land-Value Premiums or Discounts, by Rail Line

6. CONCLUSION

Overall, rail transit services in the San Diego region confer appreciable land-value benefits to residential and commercial properties, though relationships vary considerably by type of land use and corridor. In general, the biggest premiums were recorded for commercial properties, notably in downtown San Diego and along the Mission Valley Trolley corridor, however the largest dis-amenity effects also appeared for commercial uses as well – specifically, along the South Line and Coaster corridor. For condominiums, premiums were measured for all corridor, with the largest benefit accruing to properties near commuter rail stations in the North County. Multi-family parcels also reaped positive benefits from being near Trolley stations, especially along the East Trolley line; for those near Coaster stations, however, being near rail stops seemed to depress land values. And for single-family housing, benefits accrued to properties near Coaster stations and along the South Trolley line; elsewhere there appeared to be a dis-benefit associated with homes lying a half-mile ring of a Trolley stop.

APPENDIX

Variable	Description
id	internal id number from transcad
parcel	parcel id number from metroscan
city_gis	city where the parcel is located, as defined by the census place GIS layer
city_met	city where the parcel is located, as defined in the metroscan database; this includes places within the city of San Diego such as La Jolla
zip	zipcode as defined in the metroscan database
mex1	within 1 mile of Mexican border (dummy)
mex5	within 5 miles of Mexican border (dummy)
cty1	within 1 mile of San Diego County boundary (dummy)
cty5	within 5 miles of San Diego County boundary (dummy)
dt	in downtown San Diego (dummy)
dt_sl	straight line distance from downtown San Diego (horton plaza)
dt_nohwy	network distance from downtown San Diego (horton plaza) not using limited access roads
dt_hwy	network distance from downtown San Diego (horton plaza) using limited access roads
lrt_sl	straight line distance from the nearest trolley station
lrt_nohw	network distance from the nearest trolley station not using limited access roads
lrt_hwy	network distance from the nearest trolley station using limited access roads
cr_sl	straight line distance from the nearest coaster station
cr_nohwy	network distance from the nearest coaster station not using limited access roads
cr_hwy	network distance from the nearest coaster station using limited access roads
hway_sl	straight line distance from the nearest limited access road
ramp_sl	straight line distance from the nearest ramp to a limited access road
ramp_net	network distance from the nearest ramp to a limited access road
shore_sl	straight line distance from the shoreline
landuse	land use description from metroscan
usecduse	land use code with land use description from metroscan
price	sales price from most recent sale as recorded in metroscan
docdate	date of most recent sale as recorded in metroscan
prvprice	sales price from previous scale as recorde in metroscan
prvdate	date of previous sale as recorded in metroscan
assdland	assesed value of land recorded in metroscan
assdstr	assessed value of structure recorded in metroscan
assdtot	total assessed value of parcel recorde in metrocan
yearblt	year the stucture was built from metroscan
sqft_str	structure square footage from metroscan
sqft_lot	lot square footage from metroscan
totunits	number of units on parcel from metroscan
bathroom	number of bathrooms on parcel from metroscan
bedrooms	number of bedrooms on parcel from metroscan
garagesp	number of garage spaces on parcel from metroscan
stories	building stories form metroscan
lotfront	lot frontage in feet from metroscan
pcntimpd	percent of parcel that is improved from metroscan, scale 0 -100
elschdis	elementary school district from metroscan

hischdis	high school district from metroscan
fullpric	metroscan definition of whether full price was paid
deedtype	type of deed of sale from metroscan
vesttype	from metroscan
multipar	metroscan definition of whether the parcel sale included multiple parcels
txrtarea	tax rate area from metroscan
taxamt	tax ammount from metroscan
a60emp	number of jobs (1995) within 60 minutes (2000 travel times) by auto
a45emp	number of jobs (1995) within 45 minutes (2000 travel times) by auto
a30emp	number of jobs (1995) within 30 minutes (2000 travel times) by auto
a15emp	number of jobs (1995) within 15 minutes (2000 travel times) by auto
t60emp	number of jobs (1995) within 60 minutes (2000 travel times) by transit
t45emp	number of jobs (1995) within 45 minutes (2000 travel times) by transit
t30emp	number of jobs (1995) within 30 minutes (2000 travel times) by transit
t15emp	number of jobs (1995) within 15 minutes (2000 travel times) by transit
a60hh	number of households (2000) within 60 minutes (2000 travel times) by auto
a45hh	number of households (2000) within 45 minutes (2000 travel times) by auto
a30hh	number of households (2000) within 30 minutes (2000 travel times) by auto
a15hh	number of households (2000) within 15 minutes (2000 travel times) by auto
a60pop	number of people (2000) within 60 minutes (2000 travel times) by auto
a45pop	number of people (2000) within 45 minutes (2000 travel times) by auto
a30pop	number of people (2000) within 30 minutes (2000 travel times) by auto
a15pop	number of people (2000) within 15 minutes (2000 travel times) by auto
t60hh	number of households (2000) within 60 minutes (2000 travel times) by transit
t45hh	number of households (2000) within 45 minutes (2000 travel times) by transit
t30hh	number of households (2000) within 30 minutes (2000 travel times) by transit
t15hh	number of households (2000) within 15 minutes (2000 travel times) by transit
t60pop	number of people (2000) within 60 minutes (2000 travel times) by transit
t45pop	number of people (2000) within 45 minutes (2000 travel times) by transit
t30pop	number of people (2000) within 30 minutes (2000 travel times) by transit
t15pop	number of people (2000) within 15 minutes (2000 travel times) by transit
sqft_lnd	land area within 1 mile radius from 2000 census block data
sqft_wtr	water area within 1 mile radius from 2000 census block data
pop	population within 1 mile radius from 2000 census block data
pop65up	population age 65 and over within 1 mile radius from 2000 census block data
pop_work	working age population (between 18-64) within 1 mile radius from 2000 census block data
pop_fem	female population within 1 mile radius from 2000 census block data
pop_wht	white population within 1 mile radius from 2000 census block data
pop_blk	black population within 1 mile radius from 2000 census block data
pop_aind	american indian population within 1 mile radius from 2000 census block data
pop_asia	asian population within 1 mile radius from 2000 census block data
pop_pacf	pacific islander population within 1 mile radius from 2000 census block data
pop_hisp	hispanic (all races) population within 1 mile radius from 2000 census block data
pop_age	average age of population within 1 mile radius from 2000 census block data
units	housing units withit 1 mile radius from 2000 census block data
unit_occ	occupied housing units withit 1 mile radius from 2000 census block data
unit_own	owner occupied housing units withit 1 mile radius from 2000 census block data
hh_size	average size of households within 1 mile radius from 2000 census block data

hh	households within 1 mile radius from Sandag 2000 TAZ data
hh10k	households with income < 10k within 1 mile radius from Sandag 2000 TAZ data
hh14k	households with income 10k-14k within 1 mile radius from Sandag 2000 TAZ data
hh24k	households with income 15k-24k within 1 mile radius from Sandag 2000 TAZ data
hh34k	households with income 25k-34k within 1 mile radius from Sandag 2000 TAZ data
hh49k	households with income 35k-49k within 1 mile radius from Sandag 2000 TAZ data
hh74k	households with income 50k-74k within 1 mile radius from Sandag 2000 TAZ data
hh99k	households with income 75k-99k within 1 mile radius from Sandag 2000 TAZ data
hh100k	households with income >= 100k within 1 mile radius from Sandag 2000 TAZ data
emp95	jobs within 1 mile radius from Sandag 1995 TAZ data
lrtq	within 1/4 mile of nearest trolley station (dummy)
lrth	within 1/2 mile of nearest trolley station (dummy)
crq	within 1/4 mile of nearest coaster station (dummy)
crh	within 1/2 mile of nearest coaster station (dummy)
unt16_60	parcel with 16-60 units from metroscan (dummy)
unt2_4	parcel with 2-4 units (dummy)
unt5_15	parcel with 5-15 units from metroscan (dummy)
unt61up	parcel with >= 61 units from metroscan (dummy)
condo	parcel is condo from metroscan (dummy)
duplex	parcel is duplex from metroscan (dummy)
vacant_r	parcel is vacant residential from metroscan (dummy)
co_op	parcel is co-operative from metroscan (dummy)
shp_cmty	parcel is community shopping center from metroscan (dummy)
grcy_drg	parcel is grocery or drug store (large chain) from metroscan (dummy)
hot_mot	parcel is hotel/motel from metroscan (dummy)
shp_nbh	parcel is neighborhood shopping center from metroscan (dummy)
off_cond	parcel is office condominium from metroscan (dummy)
off_med	parcel is medical/dental/vetrinary office from metroscan (dummy)
misc	parcel is radio station/bank/miscellaneous from metroscan (dummy)
shp_reg	parcel is regional shopping center from metroscan (dummy)
restaura	parcel is restaurant from metroscan (dummy)
theater	parcel is theater from metroscan (dummy)
story1_3	parcel is 1-3 story miscellanious store building from metroscan (dummy)
stroy4up	parcel is 4 or more story offices or stores from metroscan (dummy)
vacant_c	parcel is vacant commericial from metroscan (dummy)
alpine	in the city of Alpine from 2000 census places (dummy)
bonita	in the city of Bonita from 2000 census places (dummy)
bonsall	in the city of Bonsall from 2000 census places (dummy)
borrego	in the city of Borrego Springs from 2000 census places (dummy)
bostonia	in the city of Bostonia from 2000 census places (dummy)
carlsbad	in the city of Carlsbad from 2000 census places (dummy)
casadeor	in the city of Casa de Oro/Mount Helix from 2000 census places (dummy)
chulavis	in the city of Chula Vista from 2000 census places (dummy)
coronado	in the city of Coronado from 2000 census places (dummy)
crest	in the city of Crest from 2000 census places (dummy)
delmar	in the city of Del Mar from 2000 census places (dummy)
elcajon	in the city of El Cajon from 2000 census places (dummy)
encinita	in the city of Encinitas from 2000 census places (dummy)

escondid	in the city of Escondido from 2000 census places (dummy)
fallbroo	in the city of Fallbrook from 2000 census places (dummy)
graniteh	in the city of Granite Hills from 2000 census places (dummy)
harbison	in the city of Harbison Canyon from 2000 census places (dummy)
hiddenme	in the city of Hidden Meadows from 2000 census places (dummy)
imperial	in the city of Imperial Beach from 2000 census places (dummy)
jamul	in the city of Jamul from 2000 census places (dummy)
julian	in the city of Julian from 2000 census places (dummy)
lamesa	in the city of La Mesa from 2000 census places (dummy)
lapresa	in the city of La Presa from 2000 census places (dummy)
lsanmarc	in the city of Lake San Marcos from 2000 census places (dummy)
lakeside	in the city of Lakeside from 2000 census places (dummy)
lemongro	in the city of Lemon Grove from 2000 census places (dummy)
national	in the city of National City from 2000 census places (dummy)
oceansid	in the city of Oceanside from 2000 census places (dummy)
poway	in the city of Poway from 2000 census places (dummy)
rainbow	in the city of Rainbow from 2000 census places (dummy)
ramona	in the city of Ramona from 2000 census places (dummy)
ranchosd	in the city of Rancho San Diego from 2000 census places (dummy)
sandiego	in the city of Bonsall from 2000 census places (dummy)
sdestate	in the city of San Diego Country Estates from 2000 census places (dummy)
sanmarco	in the city of San Marcos from 2000 census places (dummy)
santee	in the city of Santee from 2000 census places (dummy)
solanabe	in the city of Solana Beach from 2000 census places (dummy)
springva	in the city of Spring Valley from 2000 census places (dummy)
valleyce	in the city of Valley Center from 2000 census places (dummy)
vista	in the city of Vista from 2000 census places (dummy)
winterga	in the city of Winter Gardens from 2000 census places (dummy)
month	month of most recent sales transaction (during 2000) from metroscan
previd	defines whether previous sale is also in 2000 (= 1) and if this sale replaced a missing value for most recent sale (= 2)
jan	sold in january from metroscan (dummy)
feb	sold in february from metroscan (dummy)
mar	sold in march from metroscan (dummy)
apr	sold in april from metroscan (dummy)
may	sold in may from metroscan (dummy)
jun	sold in june from metroscan (dummy)
jul	sold in july from metroscan (dummy)
aug	sold in august from metroscan (dummy)
sep	sold in september from metroscan (dummy)
oct	sold in october from metroscan (dummy)
nov	sold in november from metroscan (dummy)
dec	sold in december from metroscan (dummy)
year	year sold from metroscan
y99	sold in 1999 from metroscan (dummy)
y00	sold in 2000 from metroscan (dummy)
y01	sold in 2001 from metroscan (dummy)
dec	sold in december 2000 from metroscan (dummy)

p_inc10	prop. of households with income < 10k within 1 mile radius from Sandag 2000 TAZ data
p_inc14	prop. of households with income 10k-14k within 1 mile radius from Sandag 2000 TAZ data
p_inc24	prop. of households with income 15k-24k within 1 mile radius from Sandag 2000 TAZ data
p_inc34	prop. of households with income 25k-34k within 1 mile radius from Sandag 2000 TAZ data
p_inc49	prop. of households with income 35k-49k within 1 mile radius from Sandag 2000 TAZ data
p_inc74	prop. of households with income 50k-74k within 1 mile radius from Sandag 2000 TAZ data
p_inc99	prop. of households with income 75k-99k within 1 mile radius from Sandag 2000 TAZ data
p_inc100	prop. of households with income >= 100k within 1 mile radius from Sandag 2000 TAZ data
p_vacant	prop. of housing units within 1 mile that are vacant from 2000 census block data
p_own	prop. of occupied units within 1 mile that are owner occupied from 2000 census block data
p_popold	prop. of population within 1 mile age >= 65 from 2000 census block data
p_popyng	prop. of population within 1 mile age < 18 from 2000 census block data
p_white	prop. white population within 1 mile from 2000 census block data, scale
p_black	prop. black population within 1 mile from 2000 census block data, scale
p_asian	prop. asian population within 1 mile from 2000 census block data, scale
p_hispan	prop. hispanic (all races) population within 1 mile from 2000 census block data
p_aindia	prop. american indian population within 1 mile from 2000 census block data
p_pacifi	prop. pacific islander population within 1 mile from 2000 census block data
den_pop	population per acre within 1 mile from 2000 census block data
den_unit	units per acre within 1 mile from 2000 census block data
den_emp	jobs per acre within 1 mile from 1995 Sandag TAZ data
str_age	age of structure (2002 - year built) from metroscan
lrt_dt	closest trolley station on downtown segment (dummy)
lrt_s	closest trolley station on south segment (dummy)
lrt_n	closest trolley station on north segment (dummy)
lrt_e	closest trolley station on east segment (dummy)
lrt_dt_q	within 1/4 mile of trolley station on downtown segment (dummy)
lrt_dt_h	within 1/2 mile of trolley station on downtown segment (dummy)
lrt_s_q	within 1/4 mile of trolley station on south segment (dummy)
lrt_s_h	within 1/2 mile of trolley station on south segment (dummy)
lrt_n_q	within 1/4 mile of trolley station on north segment (dummy)
lrt_n_h	within 1/2 mile of trolley station on north segment (dummy)
lrt_e_q	within 1/4 mile of trolley station on east segment (dummy)
lrt_e_h	within 1/2 mile of trolley station on east segment (dummy)
cr_dt_q	within 1/4 mile of downtown coaster station (dummy)
cr_dt_h	within 1/2 mile of downtown coaster station (dummy)
view	parcel has view from metroscan (dummy)
pool	parcel has pool from metroscan (dummy)