

vision42:

**The Value of Rail Transit Access
to Residential Properties of
Manhattan**

Summary of Findings

- ***The Relationship of Price to Access***

- *By modeling over 5,000 recent condo sales in Manhattan, statistical analysis shows that 55% of their value can be explained by a multivariate relationship to 5 easily measured variables, including distance to the nearest subway station.*

- ***The Implications for Recent Condo Sales in vision42 Corridor***

- *When applied to nearly 350 recent condo sales in the study area, results show that as distance to a station declined by 5%, the price per unit rose by 1%, all other explanatory factors being equal (unit size, age, passenger volume, crime rate).*

- *Thus, with vision42 in service, a condo unit price would increase on average by \$74 per unit for every 1 foot closer to a LRT platform.*

- *And, all recent condo sales would likely have risen by \$18.2 million, or 5.8% with LRT access.*

- ***The Implications for All High-Rise Housing in vision42 Corridor***

- *Property values of all high-rise housing -- including co-ops and recent rentals – would be enhanced 7.3% by LRT access, or \$1.78 billion.*

- *Prices on future units in Hudson Yards and Con Edison sites could be enhanced 10.6% by LRT service, or \$772 million.*

- *Thus, the aggregate benefit of LRT access on existing and future housing values is estimated at \$2.55 billion in current dollars -- fivefold the cost of an LRT system on 42nd St.*

Summary of Findings

- ***The Implications for a 10th Avenue Subway Station***

- *Now under consideration, after having been dropped for cost savings, a 10th Avenue station at 41st Street would also confer benefits on nearby residences by providing access to the #7 Subway line extension.*
- *The model shows that values on future Hudson Yards housing would be enhanced 8.2%, or reap more benefit to prices than conferred by LRT access at 7.9%.*
- *However, existing housing, including new rental developments, would likely increase by only 3.0%, compared to 7.3% with LRT service, and future housing on the Con Edison site would not benefit at all from a 10th Avenue station.*

- ***The Aggregate Difference***

- *In the aggregate, for all existing and future high-rise housing between 37th and 47th Streets, river-to-river in Manhattan, the provision of LRT service on 42nd Street would far outweigh the benefits to housing value of a 10th Avenue subway station.*
- *The aggregate difference is estimated to be \$1.5 billion, or the margin between a \$2.55 billion gain with block-to-block LRT access and a \$1.03 billion gain with access to a 10th Avenue subway station.*

The Value of Rail Transit Access to Residential Properties of Manhattan

- **Need for & Feasibility of New Research:**

- Prior analysis estimated a positive financial impact of *vision42* on commercial property values in a 10 block study area of the proposed 42nd Street LRT, running river to river in midtown Manhattan*
- Comparable residential impacts were minimal or missing based on equations modeled on citywide housing relationships to transit access
- Considerable changes occurred in property values and housing types since the transit access relationships were modeled in the 1990s
- Availability of a Department of Finance file reporting 20,000 property sales in NYC between July 1, 2009 & June 30, 2010 provided >6,200 records of residential property sales in Manhattan

* Available on www.vision42.org

The Value of Rail Transit Access to Residential Properties of Manhattan

- **Research Approach:**
 - Literature Search
 - Data Base Development
 - Econometric Analysis
 - Application of Model Results to LRT Study Area

Literature Search

*THE VALUE OF RAIL TRANSIT ACCESS TO RESIDENTIAL
PROPERTIES OF MANHATTAN*

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AN AUTO FREE LIGHT RAIL BOULEVARD FOR 42ND STREET

Literature Search

- Regional Plan Association, *The ARC Effect*, July 2010
 - Hedonic price modeling of 45,000 home sales within 2 miles of NJ TRANSIT stations demonstrated that 3 recent improvements –Midtown Direct Service, the Montclair Connection, & Secaucus Junction – increased nearby home values by nearly \$23,000 on average or \$11 billion cumulatively. Homes within walking distance of stations gained up to \$34,000 in property value.
- Center for Transit Oriented Development, *Capturing the Value of Transit*, November 2008
 - A review of 20+ analyses of land use effects of fixed guideway systems in the US demonstrates that transit can measurably increase property values. A range of value premiums were identified, from +2% to 18% on condominiums within 2,640 feet of San Diego trolley stations to +45% on Santa Clara County apartments within 1,320 feet of VTA Light Rail stations.
- Parsons Brinckerhoff, *The Effect of Rail Transit on Property Values: A Summary of Studies*, February 2001
 - 10 rapid/commuter rail and 9 light rail transit studies performed between 1993 and 2001 focused on residential and commercial property value impacts. LRT systems overwhelmingly show rising home values closer to stations, ranging as high as \$2,000 more between the station and 200 feet away.

Data Base Development

*THE VALUE OF RAIL TRANSIT ACCESS TO RESIDENTIAL
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Data Base Development

Some 35 data series were compiled to characterize 6,200 observations of residential property sales in Manhattan. Stratified by building type & tenure, they were comprised of dependent & independent variables, parcel-specific & neighborhood location, from an array of data sources:

- Building type & tenure
 - 123 Family – Owner (143 homes)
 - Walkup – Condo (301 units)
 - Walkup – Rental (220 buildings)
 - Walkup – Co-op (3 buildings)
 - Elevator – Condo (5,388 units)
 - Elevator – Rental (73 buildings)
 - Elevator – Co-op (5 buildings)
 - Cond-op (1 unit, 2 buildings)
 - Loft – (8 buildings)

Data Base Development (cont'd)

- Dependent variables
 - PRICE building type-tenure
 - PR_UGSF building type-tenure (price per unit gross square foot)
- Independent variables
 - WDST (airline distance to nearest subway station)
 - NGBHD (neighborhood)
 - SBWY (subway station)
 - PRCNT (police precinct)
 - CD (community district)
 - PUMA (public use microdata area)
 - ZIP (zip code area)
 - BLDG_U (building or unit)
 - RUNIT (residential units in building)
 - TUNIT (total units in building including commercial)
 - LSF (land square feet of building)
 - BGSF (gross square feet of building)
 - YRBLT (year built)
 - PSGR09 (average weekday ridership by station, 2009)
 - PSGRAVE (3 year average weekday ridership by station, 2007, 2008, 2009)
 - PSGRTRD (% change in average weekday ridership by station, 2007-2009)
 - ESTAB (number of establishments in zip code area, 2008)
 - EMP (number of jobs in zip code area, 2008:Qtr I)
 - PAYRL (annual payroll in zip code area, 2008)
 - AVEWG (average annual wage in zip code area, 2008)
 - AVESTAB (average jobs per establishment in zip code area, 2008)
 - POVERTY (% population in poverty in PUMA, 2006-2008)
 - MINRATE (% population minority in PUMA, 2006-2008)
 - VACRATE (% housing units vacant in PUMA, 2008)
 - MDHSLDY (median household income in PUMA, 2006-2008)
 - ELFHSLD (ratio of employed labor force to households in PUMA, 2006-2008)
 - MDRENT (median rent of rental occupied units in PUMA, 2006-2008)
 - MNOWNVAL (mean value of owner occupied units in PUMA, 2006-2008)
 - AVTRTIME (average journey-to-work travel time of workers residing in PUMA, 2006-2008)
 - OPSPC (% open space of gross land area in CD, 2010)
 - CRTOT (total crimes reported in precinct, 2009)
 - BURG (burglary crimes reported in precinct, 2009)
 - ROBB (robbery crimes reported in precinct, 2009)

Data Base Development (cont'd)

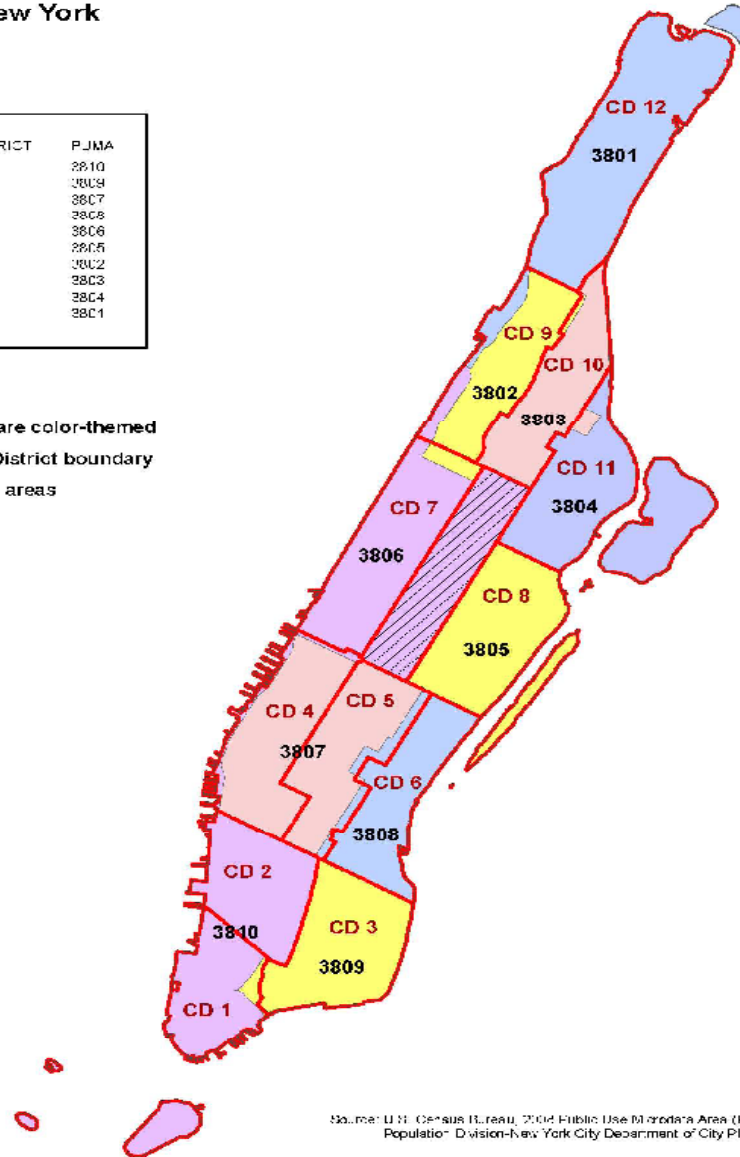
- Data sources:
 - NYC Department of Finance, Rolling Property Sales File, July 1, 2009 to June 30, 2010
 - www.nyc.gov/html/dof/html/property/property_val_sales.shtml
 - GIS Analysis of Parcel Distance to Transit Stations
 - NYC DCP PLUTO GIS
 - MTA Subway GIS layer
 - CommunityVIZ Spatial Analysis modeling software
 - Transit Data
 - MTA, 2007 Subway Ridership
 - MTA, December and Full Year 2009 Subway Ridership Report
 - Socio-economic & Other Data
 - *2008 County Business Patterns*
 - *2006-2008 American Community Survey*
 - *2008 Housing Vacancy Survey*
 - *2010 PLUTO file of NYC Department of Planning*
 - *2009 NYC Police Department Crime Reports by Precinct*

Data Base Development (cont'd)

Public Use Microdata Area (PUMA) and Community District Equivalencies Manhattan, New York

COMMUNITY DISTRICT	PUMA
MN 1 & 2	3810
MN 3	3809
MN 4 & 5	3807
MN 6	3808
MN 7	3806
MN 8	3805
MN 9	3802
MN 10	3803
MN 11	3804
MN 12	3801

- 3801 PUMA areas are color-themed
- CD 1 Community District boundary
- Joint Interest areas



Source: U.S. Census Bureau, 2000 Public Use Microdata Area (PUMA)
Population Division-New York City Department of City Planning

Econometric Analysis

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Econometric Analysis

- In a built environment, where development has already taken place, the appropriate method of determining real estate value relationships is the use of multivariate regression analysis. This method of econometrics incorporates an array of explanatory independent variables in estimating a price function.
- While the choice of dependent variable is clear, in this case price per unit, the choice of independent variables necessitates a process of stepwise analysis, testing potential factors to construct a more explanatory – or better fitting -- relationship.
- In this process, we were guided by theory, prior related research studies, data availability, and tests for co-linearity in variation between variables.
- Available explanatory factors were drawn from measures of transit access and ridership levels, building type and tenure, and neighborhood characteristics of development, public amenity, diversity and security. Unavailable factors included measures of market condition and real estate quality.

Econometric Analysis: Tests

- The output of econometric modeling is judged by several tests of statistical significance for each explanatory variable – the “*t-Statistic*” and “*Probability*” – and the equation as a whole – the *Adjusted R-squared* and the *Durbin-Watson statistic*:
 - Assuming a 5% risk of the independent variables not being statistically significant, the “*t-Statistic*” should have a value of 2 or greater, while the “*Prob.*” should measure 0.05 or less.
 - The *R-squared* measures the percent of variation in the dependent variable explained by relationship to the independent variables. As such, it predicts the goodness of fit and varies between 0 and 1, with a value of 1.0000 representing perfect fit. The *Adjusted R-squared* indicates how well a regression line approximates the relationship in real multivariate data. When modeling cross-sectional data, such as this analysis, the value of R^2 is far less significant than the “*t-Statistic*”.
 - The *Durbin-Watson statistic* tests for autocorrelation in data with a value that always lies between 0 and 4. If the *Durbin-Watson* is less than 1.0, there is substantial evidence of positive serial correlation, while a value of 2.0 indicates no autocorrelation.

Econometric Analysis: Tests

- Based on successive testing, the following equations were specified by building type & tenure using *Eviews*, econometric modeling software. All had statistically significant coefficients for explanatory variables, but relatively weak R^2 , or measures of best fit:

