How Do We Know It’s Affordable?

Scott Bernstein, Center for Neighborhood Technology
New Tools to Make Your Funding Case
Railvolution, Los Angeles, October 17 2012

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Purpose

• Review open access web-based tools that provide both regional and small area data useful in planning for and scoping out potential economic and environmental impact from transit and TOD investments
• Housing + Transportation Affordability Index
• Abogo
• National TOD Data Base
• Forthcoming tools—HUD’s Locational Affordability Index—December 2012
• Forthcoming reports—Losing Ground—October 18 2012
An Urban Asset: Location Efficiency = A Measure of Accessibility & Convenience & a Spatial Analogue to Thermodynamic Efficiency

- Density, Transit Access (Proximity, Frequency, Connectivity), and Amenities Determine Transportation Demand
- Statistics Used to Estimate Likely Travel Demand
- Demand is Verified by Measuring Vehicle Ownership and Extent of Use
- Demand is Then Valued in Dollars and Cents
How is Location Efficiency Determined—Explain Using Regression?

(Memorize This…Or…..)

\[
\frac{Veh}{Hh} = 4.722 \left(22520 + \frac{H}{RA}\right)^{-0.3471} \left(1-e^{-\left(0.000112\frac{\$}{P}\right)^{1.2386}}\right) \left(1+1.0519\frac{P}{H}\right)^{Tr} + 60.312^{-0.2336}
\]

\[
\frac{VMT}{Veh} = 103860.504 + \left(\frac{H}{TA}\right)^{-0.0419} \left(1+0.02759\frac{P}{H}\right)^{-0.0704\sqrt{Ped}} - 0.01743\left(\frac{\$}{P}\right) - 22136
\]

Peer-reviewed by
Brookings and National Academy of Sciences 2008
How Housing Affordability is Usually Calculated—Then and Now

• Historically: Traced to 19th Century ideal—A Week’s Pay for a Month’s Rent
• Today benchmark affordability is defined as housing costs/Income less than or equal to 30 Percent of target population AMI
• Problem—Doesn’t include cost of transportation
How the Standard Index is Used

• Describe a typical household’s housing expense
• Analyze trends & compare different HH types
• Administer rules defining who can have subsidies
• Define housing needs for public policy purposes
• Predict the ability of a HH to pay rent or mortgage
• Select HHs for a rental unit or mortgage
• Counsel a household or person to help them identify methods of lowering the cost of living and/or identify a specific program opportunity to help them do so

• Problem—Doesn’t Include the Cost of Location
What is the Housing + Transportation Affordability Index?

A tool to measure the 2 largest household costs – *housing and transportation* – by neighborhood.

**H+T Affordability Index Equation**

\[
H+T \text{ Index} = \frac{(Housing \ Costs + Transportation \ Costs)}{Income}
\]

By measuring these costs, the H+T Affordability Index is also measuring the quality, attractiveness, and convenience, of the neighborhood.
Data Used in Estimating Travel Demand and Costs

**Neighborhood Characteristics**

- Household Density
  - Net Residential Density
  - Gross Density
- Street Connectivity and Walkability
  - Average Block Size
  - Intersection Density
- Transit Access
  - Transit Connectivity Index
  - Transit Access Shed
- Jobs Access
  - Employment Accessibility Index

**Household Characteristics**

- Household Income
  - Per Capita Income
- Household Composition
  - Average Household Size
  - Average Commuters per Household

**HH Travel Demand**

- Auto Ownership
  + Auto Use (VMT)
  + Public Transit Use

**Times Unit Costs**

- Fixed
- Variable

**Total Transportation Costs**
Effect of ‘Drive ‘til You Qualify’: Transport Costs Can Exceed Housing Costs for HHs Earning $20-$50,000

- Transportation emissions can also equal or exceed emissions from residential energy
- Creates “driving to green buildings” challenge
Housing + Transportation Costs Vary by Place Across the US

Percentages for working families with incomes between $20k - $50k

Metropolitan Miami
28% for T + 31% for H = 59%

Metro Tampa
33% for T + 25% for H = 59%
What We Found Nationally in our 2010 and 2012 Studies of all US Regions

- 2010 using 2000 data—69% of US metro communities “affordable” using housing-only index; dropped to 39% using new Index setting goal of keeping H+T at < 45% of household income
- 2012 using 2005-2009 data—76% of communities look “affordable” using housing-only index, drops to 28% using H+T Index
- Household income nationally increased 21% 2000-2009, but housing increased 37% and transportation 39% respectively
Rising Housing and Transportation Costs vs. Incomes for the Median-Income Household in the Largest 25 Metro Areas (costs and income are not adjusted for inflation)

NOTE: Households in this figure include renters and homeowners carrying a mortgage. On subsequent pages, our analysis focuses on all renters and owners, including homeowners who own their home outright.

Source: Housing + Transportation (H+T®) Affordability Index applied to 2000 Census data and 2006-2010 American Community Survey data (Center for Neighborhood Technology and Center for Housing Policy).
Chicago MSA 1999-2008
The Big Squeeze—

• Growth in median income was $854/month

• Growth in H+T costs was $803

• **Left just $51/month for all other expense increases, e.g., food, medical, mortgage resets**

• Better in places with more transport choice, worse in the exurbs

Median Grew from $51046 to $61295
Mean Grew from $67768 to $82623
The Housing + Transportation Affordability Index is an innovative tool that measures the true affordability of housing based on its location. When transportation costs are added to the housing affordability equation, the number of affordable neighborhoods (in yellow) declines. Compare affordability maps where you live.

The H+T Index provides a comprehensive view of affordability, one that includes the cost of housing and transportation at the neighborhood level. Learn more about the index and the methods behind it.

H+T Index information has implications for consumers, planners, and policymakers. Learn how the data is being used across the country.

See how nearly 130,000 neighborhoods are affected when you expand the traditional measure of affordability to include transportation costs.

http://htaindex.org
Drop Down Menu Allows Selection of Variables
Mirror Images—Net Residential Density Versus Extent of Driving Per Household Per Year

Net Density = 0-263 HH/Residential Acre, Avg. = 2.46
Travel = 7500-31600 VMT/HH/Year, Avg. = 18300
Mirror Images Again—Net Density Versus Household Vehicle Ownership

Net Density = 0-263 HH/Residential Acre, Avg. = 2.46

Vehicle Ownership = 0.51-2.41 Autos/HH, Avg. = 1.68
If you build it, operate it frequently and connect it regionally, they will ride it.
Putting it All Together—For HHs Earning Median Income, Housing Costs 28.2% and Transportation 21.8% of Income, H+T Index = 50%

Increases # HHs Who Cannot Afford From 1.2 Million to 2.1 Million
Shrinking Up Even More—For HHs Earning Only 80% of Area Median Income, Housing Costs 35.2%, Transportation 27.3%, and the H+T Index = 62.5%
How Looking Only at Housing Costs Misleads Shoppers—At This Location in Schaumburg

H=29% But H+T =53%
But While This Red Line Neighborhood Looks Too Expensive, H=35% and H+T=45%
With Lower Extent of Travel, GHG Emissions/HH for Transportation on the Right-Hand Map’s Location Are One-Half What They Are In Schaumburg
The Map on the Right Shows Urban Form and Advantage, While the Map on the Left Shows the Lack Thereof
Indexes “To Go”

- [http://abogo.cnt.org](http://abogo.cnt.org)
- Works on mobile platform
- Type in address or key identifier
- Produces local T-costs and HH GHG emissions
- Slider tool for updating gas prices
Foreclosure Prevention—Can This Predict…

Chicago Foreclosure Rates Highest in Areas of High T-Cost and Extensive Use of Variable Rate Financing
Urban Resilience in Action—From 2000-2008, Gas Costs Rose 3% in Most Location Efficient and 9% in the Most Location Efficient Places, Respectively.
Can Gas Price Spikes & Location Efficiency Help Provide Early Warning of Defaults and Foreclosures?

- 26-week moving averages
  - Gas prices

- Foreclosures drop with transit connectivity
- Foreclosures increase with VMT > 15,000

- Foreclosure filings –spikes follow gas price spikes with 6-9 month lag
We Can Use This Knowledge To—

• Protect consumers against “hidden” costs by providing better information
• Analyze trends & compare across HH types
• Define housing needs for public policy purposes
• Encourage coordination of housing and transportation policies
• Inform State planning for housing, e.g. workforce
• Predict the ability of a household to pay rent or mortgage
• **Improve financial / housing counseling**
• **Help make the case for and package alternative financing for accelerated transit system build-out**
Index is Being Adopted At Several Levels

- HUD and DOT are using to screen sustainable communities and TIGER grant applications
- Metropolitan Planning Organizations in Bay Area, Chicago, DC and elsewhere using to re-screen, prioritize Long Range Transportation Plan investments
- Experimental counseling tools—Phoenix, East Bay, Chicago—link users with locally available resources—called Equity Express

- Metropolitan Transportation Commission in Bay Area used to justify helping capitalize Transit Oriented Development investment fund
- State of Illinois new act requires five agencies to screen investments
- City of El Paso Texas now uses to direct affordable housing to areas of low transportation costs
- Portland, others using to help create a typology of TODs that takes affordability and equity into account
Data Now Available for all 6,000 Existing and Planned Station Areas—1/4 and ½ Mile Buffers—70,000 Measures Total

http://toddata.cnt.org
Rate of System Growth & Ease of Development

Make a Difference

HH Growth

Transit Shed HH Growth

Chicago  New York  Philadelphia  Boston  SF Bay  Los Angeles  Portland OR
Extent of Transit Shed Helps Promote Choice

2009 Percent Taking Public Transit, Walking or Biking to Work


Legend:
- Percent Public Transit 2009
- Percent Walking to Work 2009
- Percent Biking To Work 2009
Denver’s Existing Fixed Guideway Transit Network—45 stations in Denver, 9 outside—New Lines Result in Doubling to 57 City and 57 Suburban Station Areas
Denver—Provide Estimates of Tandem Community Economic & Environmental Benefits

**Economic**

- Fewer cars owned per household
- Fewer vehicle-miles traveled per HH per year
- 2/3 less exposure to gas price spikes and their effects
- Results in a 5-10% reduction in the cost of living at this income level, and higher amounts for lower income
- $2.5-$5 Billion annual regional savings, $75-$150 Billion by 2035; up to $500 M annually available for debt service
- Travel time savings due to less congestion

**Environmental**

- Less automotive travel leads to less fuel consumption & lower emissions
- Less emissions accelerates Denver regional attainment with National Ambient Air Quality Standards and achieves transportation conformity goals
- For CO2, equates to 478-956 Metric Tons per Day, or a 1.75-3.5 % reduction in metropolitan GHG inventory, and a 4-8% contribution toward meeting Greenprint Denver goals
- Similar analyses can produce equivalent benefits for VOCs and Nox
The Downeaster as a Model for Continued and Enhanced Regional Cooperation and Strategy
Downeaster Expansion Benefits Study in 2008
Projected by 2030 from $40 Million Expansion-

- Cumulative construction of $7.2B
- Const/rehab of 42k hu + 6.8M sf commercial
- Over 17,000 jobs
- $244 million in annual transport cost savings

- $2.4 B in annual resident and visitor purchasing power
- $75 M in annual new state and local tax revenue

Study resulted in approval
Construction to be complete 2012
Location Efficient Mortgage Demo 2000-2005, Idea Was Well Received, No Foreclosures Seems to Have Outperformed Market

Chicago Tribune

Skip the car, buy a house

There’s a lot of hand-wringing nowadays about suburban sprawl and the need for “smart growth.”
But like the weather, nobody’s doing much about it.
Much of the home-buying public still opts for wide-open spaces along the metropolitan fringe. And despite thoughtful warnings from civic and regional groups, political realities in Illinois militate against significant governmental action.

Now comes a modest but innovative pilot program that just might make a small difference. Maybe even a big difference—if it educates the public about the true cost of living “out there.”

It’s called the Location Efficient Mortgage, or LEM, and it has been developed by environmental groups such as Chicago’s Center for Neighborhood Technology along with Fannie Mae, the government-chartered, stockholder-owned repurchaser of home mortgages.

It works like this: Participating lenders, in evaluating applicants, take into consideration how close the dwelling is located to public transportation. If it’s so close the applicant can live without a car, or a working couple can get by with just one, the estimate of disposable income is increased, and with it, the size of the mortgage for which they qualify.

A couple jointly earning $60,000 and buying into Chicago’s transit-rich Edgewater neighborhood, for instance, would qualify for a home selling for $212,218. Out in the boonies, under traditional guidelines, the limit would be $158,364.

And there are sweeteners. LEMs are not subject to income limits and they offer more flexibility, including lower down payments, than conventional mortgages. The City of Chicago, moreover, is offering vouchers worth $900 toward the purchase of energy-efficient appliances to the first 100 LEM borrowers.

Downsides? There’s mandatory counseling. And for now it’s limited to Chicago and three West Coast cities.

The ultimate value of LEM, however, may be to show, in ways people readily understand, that sprawl does impose costs. Some of that cost is paid, knowingly and gladly, by those who choose to live “out there.” Much of it, however, is hidden, and paid indirectly by those who live “back here.”

For more information about LEMs call 1-800-732-6643.
Where Has it Been Tried

- LEM’s in Seattle, Chicago, San Francisco, and Los Angeles (Fannie Mae and local lenders)

- Take the T Home Mortgage in Boston (Fannie Mae and state housing finance)

- Smart Commute Mortgages in several dozen cities (Fannie Mae plus local lenders)
Buying Time to Help Redevelopment
Play Catch-up: Structured TOD Funds

- SF Bay Area: Land purchase is expensive and new development takes time for revenue to meet yield expectations
- Local planning agency, puts up $10 Million challenge grant for solution
- Non-profit Community Development Financial Institution, LIIF, organizes $40 million matching from foundations and two investing banks (Morgan Stanley and Citibank)
- $50 Million is used as revolving fund for land acquisition and “off-balance-sheet” holding fund
- Similar funds under development in Denver, Twin Cities, Cook County IL

Fruitvale Transit Village
Oakland CA — 12 Acres
To Identify How Smarter Use of Underutilized Freight Yard Land Could Revitalize Older Communities Using Transit and Cargo-Oriented Development—Blue Island Illinois

- Traditional “main street” downtown land-locked between Cal-Sag Channel and short-line freight yard, prevents expansion
- Develops and executes plan to trade a 90 acre brownfield along same train line for the 30-acre yard, enabling industrial expansion and dedicated truck highway to remove cargo traffic from residential and downtown area
- Waterfront area opened, enabled mixed-use development
- Opening downtown and waterfront enables both cargo- and transit-oriented development
Leading to Local Site Access
Improvements in Harvey IL, South Cook County, Connects Green Time Zone to Global Shipping

- CN Intermodal expansion
- Makes TIME Zone a destination for Prince Rupert Island BC, Canada shippers

13,400 new jobs
$2.3 Billion in new income
$232 million in new tax revenue
96 million fewer vehicle miles traveled
46,000 MT of CO2 eliminated
Recent Chicago Studies

*Prospering in Place* highlights the communities where

- Transit-oriented development
- Cargo-oriented development
- Employment oriented transit

will yield the greatest return to the region and guide 2040 plan’s implementation.
Complements high level economic plans:

- World Business Chicago (OCED)
- Organization of Economic Co-Operation and Development (OECD)
- Both of these address how to better intersect the global economy
- Prospering in Place addresses how to reduce the 70% of regional GDP derived from personal consumption and put the savings to work, locally
Employment-Oriented Transit

4 of top 5 job centers lack transit service:
- O’Hare/NW Suburbs
- Oak Brook
- Lombard
- Naperville
Economic Impact Analysis—Moving Up the Ladder from System to Community Benefits

- System Performance
  - System Conditions
  - Utility & Connectivity
  - Operational Finances

- Benefit-Cost & Cost Effectiveness
  - Travel Time
  - Travel Costs
  - Safety
  - Equity
  - Accessibility

- Regional Economic Development
  - Short Term Employment
  - Employment and Employment Shifts
  - Induced Development
  - Value Capture
  - Fiscal Impacts

- Livability
  - Environmental
  - Health
  - Land & Resource Use
  - Walkability, Pedestrian Friendliness

www.ssti.us/2012/05/economic-effects-of-transportation-investments/
Shopping for Economic Impact Tools

### SISTI State Smart Transportation Initiative

**Colorado DOT Investment Screen Toolkit**

- Analyze economic impacts of recent transportation investments in Colorado.
- Develop performance metrics that measure economic impacts to the system, programs, and projects.
- Recommended scoring systems for economic benefit of projects.
- Enhanced Benefit:Cost Tool as used in TIGER applications.

#### Economic Impact Measure

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**Economic Impact Measurement Table**

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**Examples**

- Household Income Information (Cambridge, MA)
- Interstate Development Tools (Property Data)
- Regional Economic Accounts
- American Roadside Directory
- Economic Data (NBER and other Geographies)
- CNT (Center for Transportation Planning and Economics)

**Programs**

- Environmental Studies (GIS, AI) BPR
- American Community Survey/Adverse Surveys
- 3-4-5 Index
- Affordable Housing Index
- Transit-Oriented Development
- Washington State Freight Aggregated GTF Data
- Traffic Analysis Zone (Capacity, Traffic-Volume-Based)
- Surface Transportation Efficiency Analysis Model (STEA)
- Highway Economics Programming System - State (WEDS & PPA)
- Intelligent Transportation Systems
- Aggregate Route Optimization (MUTRAN)
- Optimal Step Travel Demand (O-Step Procedure)
- Activity-Based Travel Demand
- Integrated Transportation & Land Use (TRW/Portland)
- TRIP

**Regional Economic Development**

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<th>Regional Economic Analysis</th>
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<td>IMPLAN</td>
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<td>NIE (National Income and Expenditure)</td>
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<td>NIPA (National Income and Product Accounts)</td>
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**Community of Interest**

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<td>Enhanced Benefit:Cost Tool as used in TIGER applications</td>
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Chicago Policies: Accelerated Green Permitting for Buildings—Need to Do the Same for Whole Neighborhoods Near Transit
Coming Soon

- Losing Ground—CNT and Center for Housing Policy—Updates A Heavy Load: The Combined Burden of Housing and Transportation Costs on Working Families, October 18 2012
- HUD Locational Affordability Index—Builds off the H+T Index for greater variety of household incomes, updated data—December 2012
- All Transit—Provides data layers for fixed guideway and bus service in US—Winter 2013
Observations and Recommendations

- Community and regional leaders need to prioritize reducing the cost of living to complement efforts toward globalization and international connections.
- The money is actually there to do this—Chicago metro households spend $30 Billion/Year on inadequate transportation, businesses another $15 Billion—LA shows this is a cash flow problem only.
- In Chicago, investment capital is bypassing the region and we’re “leaking” wealth rather than building it.
- The policies which accomplish location efficiency can deliver climate protection and economic security and help align and coordinate these efforts.
- Cities are the solution, not the problem.
Thank You!

- Scott@cnt.org
- www.cnt.org
- Affordability Index, http://htaindex.org
- TOD Data Base, http://toddata.cnt.org
- Center for Housing Policy http://www.nhc.org/about/Center-Mission-Goals.html