



# **The Link Between Infrastructure & Housing Attainability**

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# Outline

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- The Supply Linkage
- The Leverage Linkage
- The Density Linkage
- The Regional Accessibility Linkage
- The Walking-Distance Linkage



# The Supply Linkage – Theory

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- Theory
  - Housing demand in excess of supply increases prices.
  - Insufficient infrastructure supply in the face of demand reduces buildable land supply and thus reduces housing supply thereby increasing prices.
  - Infrastructure expansion commensurate with development demand sustains the housing pipeline thus moderating housing price increases.



# The Supply Linkage – Evidence

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- Overlooked research question.
- Metro Portland, OR requires infrastructure concurrent with demand. Studies housing prices lower than West Coast metros.
- Burge & Ihlanfeldt at FSU found that impact fees increase supply of affordable housing. Why?
  - Impact fees are used to provide infrastructure concurrent with growth
  - Impact fees reduce/eliminate affordable housing NIMBYism.



# The Leverage Linkage – Theory

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- Clear infrastructure planning can determine external funding sources that may be cultivated over time.
- Short-term revenue streams such as impact fees, cash proffers, local budget allocations can leverage external funding sources.
- As external funds are leveraged infrastructure is expanded and moderates the housing demand-supply relationship, moderating prices.



# The Leverage Linkage – Evidence

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- Another overlooked research question.
- Ihlanfeldt & Shaughnessy at FSU found that impact fees are capitalized backward in the land market but increase the value of homes despite sustaining affordable housing supply. Why?
  - Impact fees create stable infrastructure provision the market is willing to pay for.
  - Impact fees leverage state funds especially for roads, schools, and open spaces.
  - Other studies show impact fees sustain affordable housing supply by reducing NIMBYism.



# The Density Linkage – Theory

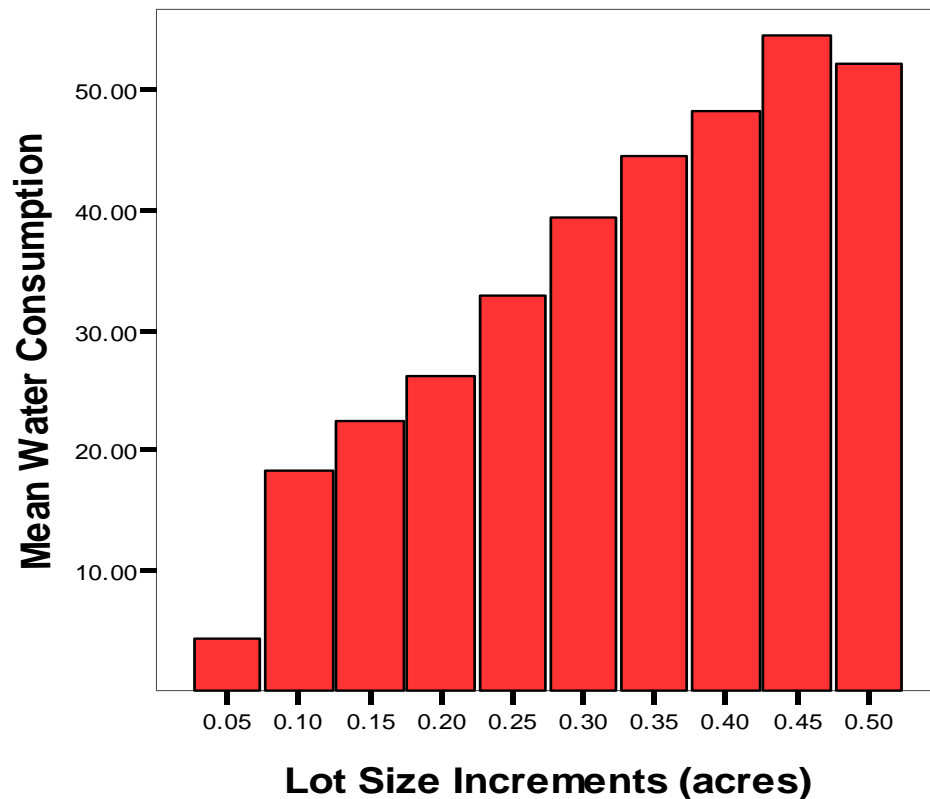
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- ❑ Many (not all) infrastructure elements are sensitive to density.
- ❑ Utilities → Capital and maintenance costs decline per unit with increasing density.
- ❑ Public safety → Capital and operating costs decline per unit with increasing density in response area even accounting for congestion effects.
- ❑ Schools → Capital costs decline per unit with increasing density as older schools sustain critical mass of attendance.

# The Density Linkage – Evidence

**Mean Water Consumption by Lot Size (Grouped in .05 acre increments)**

5 Year Average for June Water Consumption

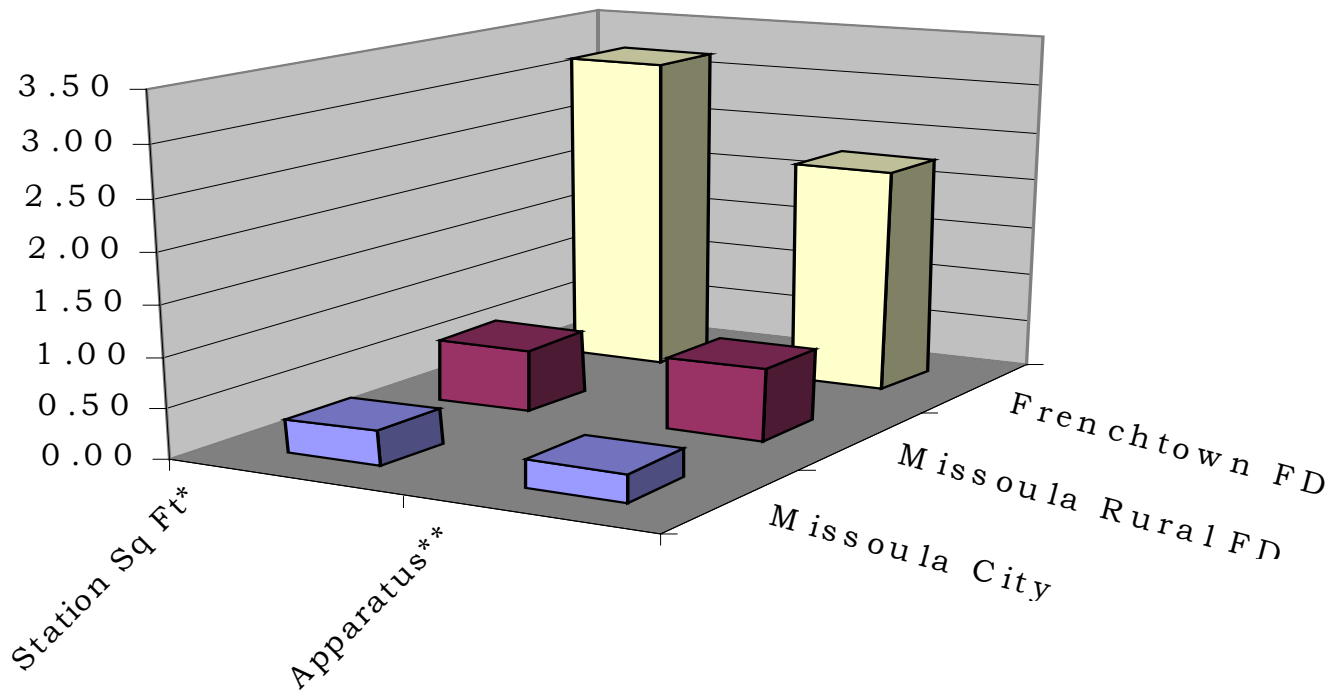




# The Density Linkage – Evidence

## Fire District Level Of Service Comparison

	Missoula City	Missoula Rural FD	Frenchtown FD
Station Sq Ft*	0.34	0.63	3.20
Apparatus**	0.27	0.72	2.27



\* per person and job

\*\* per 1,000 persons and jobs

# The Density Linkage – Evidence

## Trip Distribution by Density, 2001

Housing Units Per Square Mile	Private Motor Vehicle	Bus	Rail	Bicycle	Walk	All Other Modes
26 – 750	97.0%	0.5%	0.3%	0.1%	1.7%	0.5%
751 - 2,000	95.4%	1.1%	1.2%	0.3%	1.4%	0.6%
2,001 - 4,000	92.4%	2.8%	1.6%	0.4%	2.4%	0.4%
4,001 - 6,000	82.4%	7.4%	3.2%	1.4%	5.0%	0.7%
6,000+	56.6%	13.7%	18.7%	1.4%	8.6%	0.9%
All	90.9%	2.90	2.5%	0.5%	2.8%	0.5%

Source: Nationwide Household Transportation Study 2001.



# The Density Linkage – Evidence

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<u>Units/Acre</u>	<u>Total Costs/Unit</u>
3	\$37,368
10	\$28,544
15	\$25,421
30	\$20,509

James E. Frank, *The Costs of Alternative Development Patterns: A Review of the Literature*, Washington: Urban Land Institute, 1989. Figures in 2000 dollars.



# The Density Linkage – Evidence

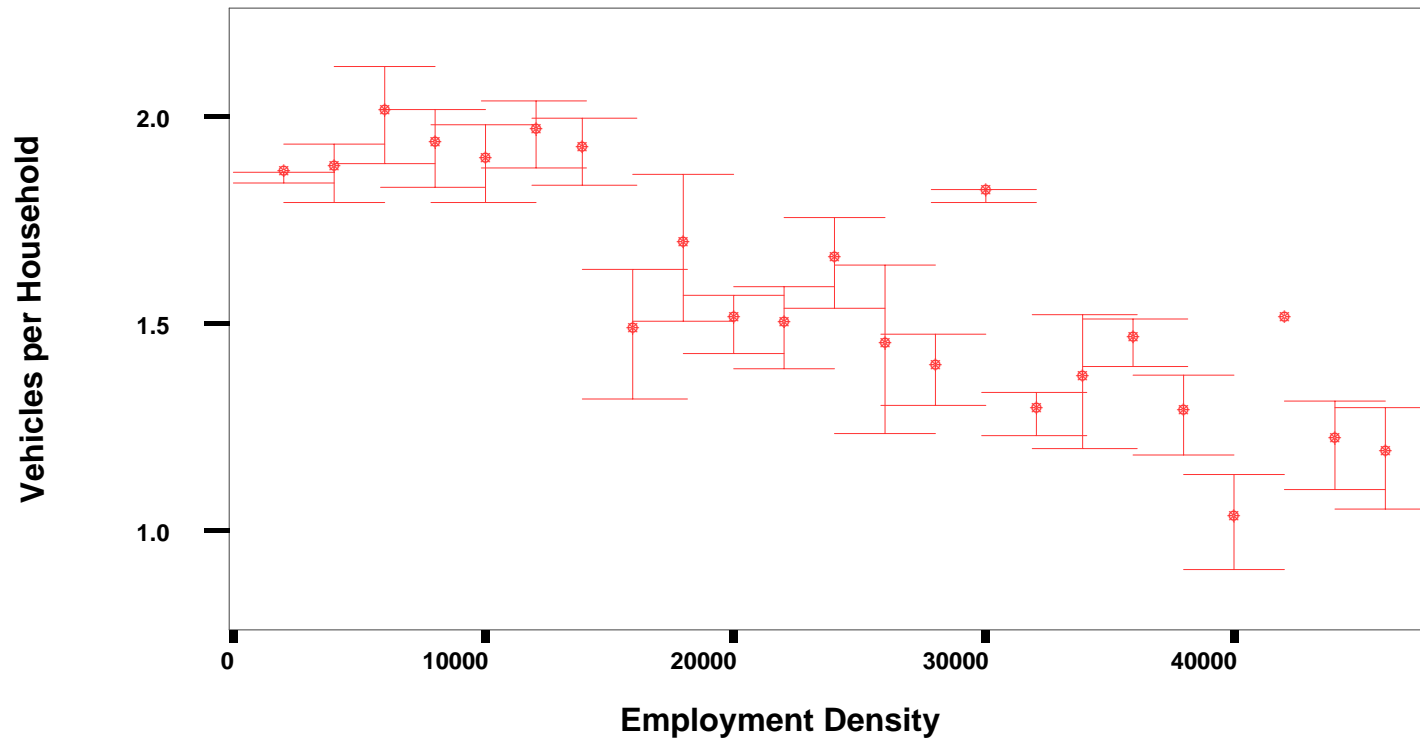
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<b>Urban Form</b>	<b>Cost/Unit</b>
Compact	\$9,252
Contiguous	\$11,230
Linear	\$16,387
Scattered	\$19,638

James B. Duncan & Associates, *The Search for Efficient Urban Growth Patterns: A Study of the Fiscal Impacts of Development in Florida*, Tallahassee: Florida Department of Community Affairs, 1989, adapted from p. 13.

# Regional Accessibility Linkage – Theory

At greater employment densities, households own fewer autos





# More Cars = Higher Total Costs

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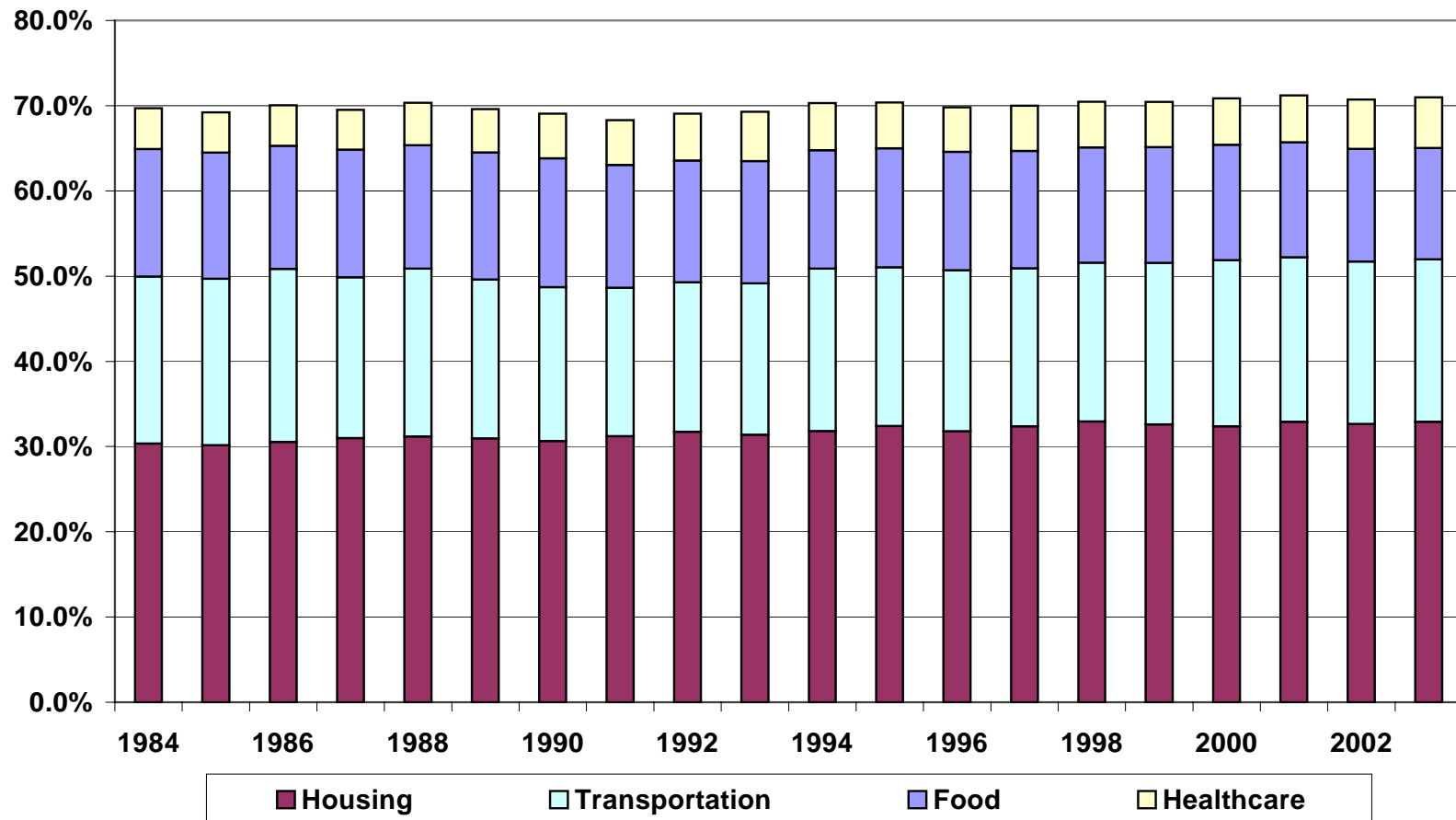
## H+T Affordability Index Equation

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

Center for Neighborhood Technology, Carrie Makarewicz Virginia Tech. October 2006.

# Total Household Costs

Major Household Expenditures 1984-2002



Source: Consumer Expenditure Survey for all consumer units, Bureau of Labor Statistics 1984-2002



## Transit Zones & Affordability Index

Income & Expenditures	High Transit Use	Medium Transit Use	Low Transit Use
<b>\$20-\$35K</b>			
% T	16%	22%	30%
% H+T	47%	52%	62%
<b>\$35-\$50K</b>			
% T	12%	16%	22%
% H+T	36%	39%	47%

Proximity to transit without density, services, jobs, and walkability will not alone lower transportation costs



# Walking-Distance Linkage – Current View

<b>Jurisdiction</b>	<b>Distance of District Boundary</b>
Seattle, WA	$\frac{1}{4}$ -mile radius from LRT station
Hillsboro, OR	1,300-ft radius from LRT station
Portland, OR	$\frac{1}{4}$ -mile radius from LRT station
Washington County, OR	$\frac{1}{2}$ -mile radius from LRT station; $\frac{1}{4}$ mile radius from primary bus routes
San Diego, CA	2,000-ft radius from transit stop



# Walking-Distance Linkage – Research

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## Perth Study of Distances Walked to Access transit

- 10.5% came from within 1,312 feet
- 22.5% came from 1,312 – 2,625 feet
- 12% came from 2,625 – 3,280 feet
- 34% came from 3,280 – 6,562 (1.24 miles) feet
- 14.5% came from 1.24 – 1.86 miles



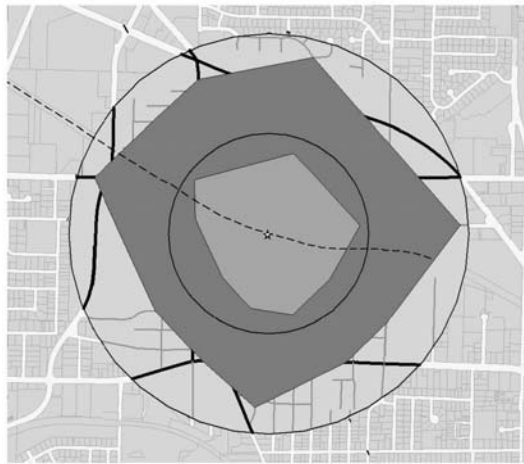
# Walking-Distance Linkage – Research

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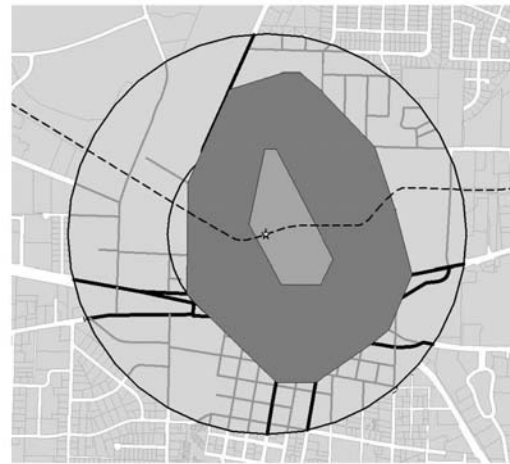
## 10-Minute Walking Distances

- Walk-in-the-Park (saunter)
  - 10 minutes = 1,500 feet (1/4 mile)
- Business walk
  - 10 minutes = 3,000 feet (1 kilometer)
- New York walk
  - 10 minutes = 3,900 feet (3/4 mile)

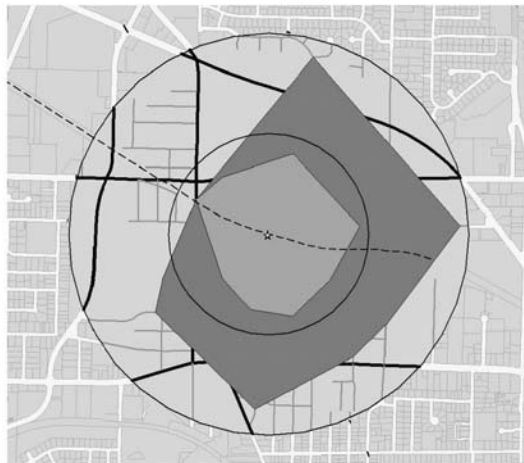
# Walking-Distance Linkage – Revised



(d)



- ☆ Transit Stop
- - - Light Rail
- Major Road
- Minor Road
- Quarter Mile
- Half Mile



(e)

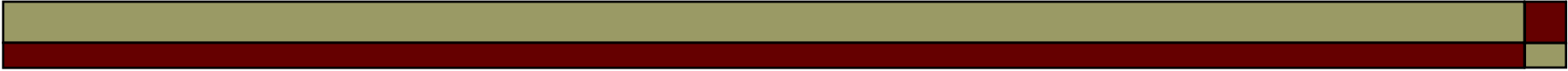




# Review

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- ❑ Infrastructure supply commensurate with demand moderates housing prices; increases supply.
- ❑ Affordable housing supply promoted when infrastructure provided concurrent with demand.
- ❑ Infrastructure supply enhanced with long-range planning and leveraging external funds.
- ❑ Infrastructure costs decline with density.
- ❑ New view of TODs suggests the appropriate radius is 1 kilometer (or more).



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***THANK YOU!***