Transit's Dirty Little Secret:
Analyzing Transit Patronage in the U.S.

Portland State University

November 2007

Brian D. Taylor, AICP

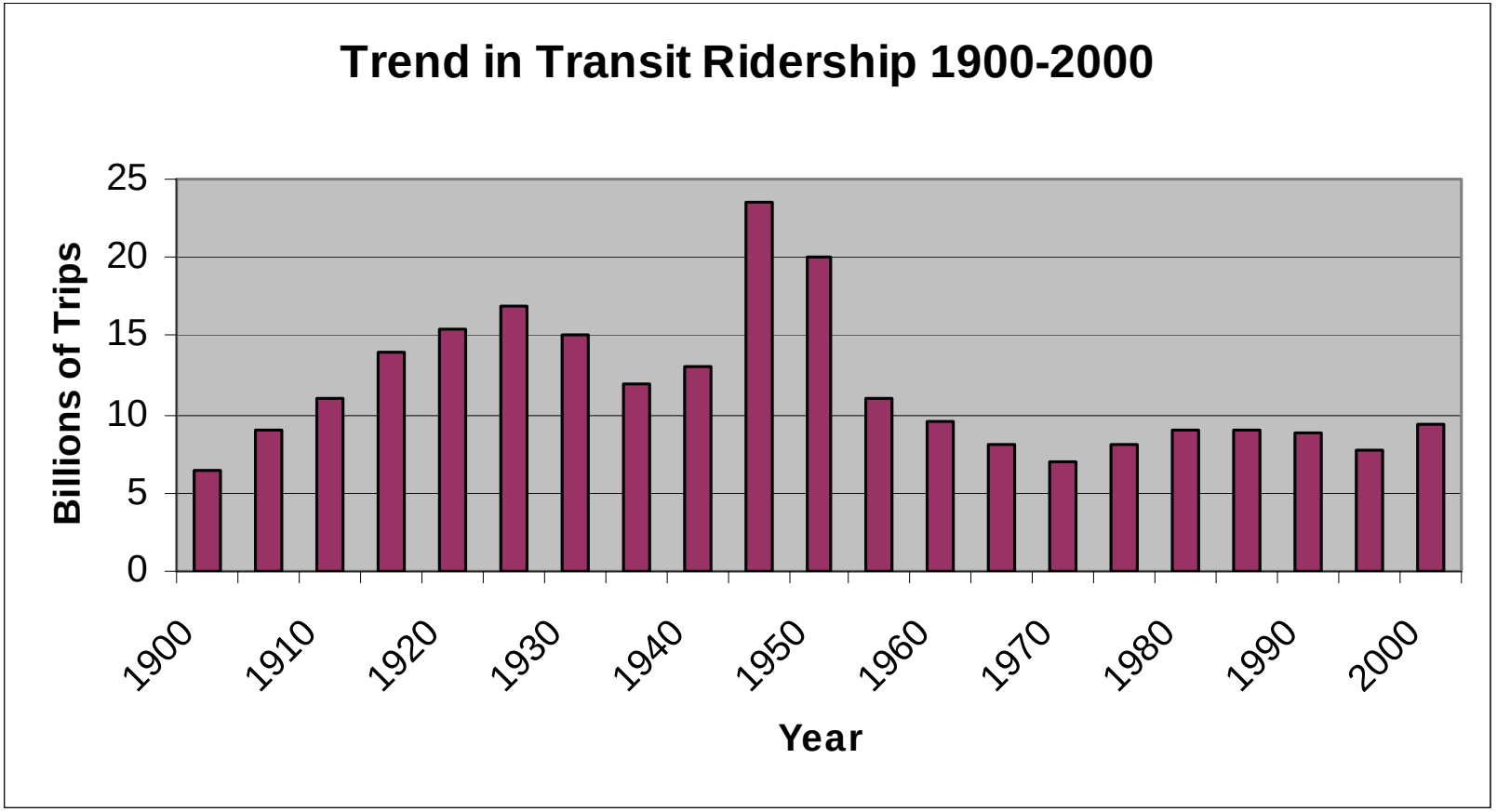
Professor of Urban Planning

Director, UCLA Institute of Transportation Studies

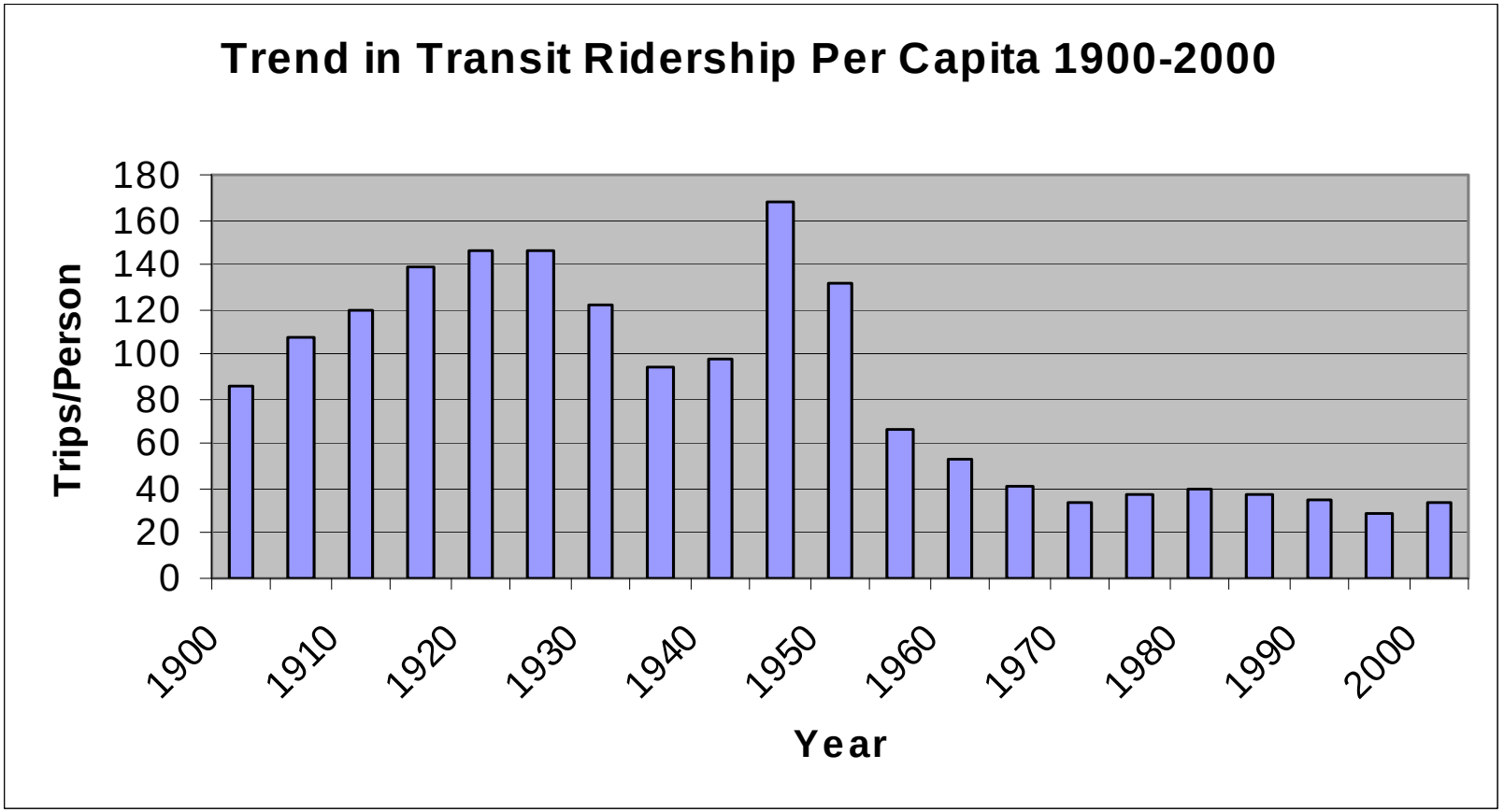
UCLA

Institute of Transportation Studies

Transit Patronage Has Been Relatively Flat For Four Decades



Fewer than 40 trips per capita since 1965



What of Transit's Market Share?

- ***Metropolitan Trips in 2001***
  - 3.2% public transit
  - 86.4% private vehicles

What of Transit's Market Share?

- ***Metropolitan Trips in 2001***
  - 3.2% public transit
  - 86.4% private vehicles
- ***Poor Metropolitan Workers 2000***
  - 11 times more likely to commute by private vehicle than by transit

What of Transit's Market Share?

- ***Metropolitan Trips in 2001***
  - 3.2% public transit
  - 86.4% private vehicles
- ***Poor Metropolitan Workers 2000***
  - 11 times more likely to commute by private vehicle than by transit
- ***Poor Metropolitan Workers in households with no vehicles in 2000***
  - 38.1% more likely to commute by private vehicle than by transit

Why all of this driving?

- ***Average journey-to-work time in 2000***
  - Public transit: 56.0 minutes
  - Private vehicles: 22.9 minutes

Why all of this driving?

- ***Average journey-to-work time in 2000***
  - Public transit: 56.0 minutes
  - Private vehicles: 22.9 minutes
- ***Goods movements and personal business travel growing fastest***
  - Errands now outnumber work trips by more than 2.5:1
  - Increasing share of peak hour trips are chained into tours

Trends in Travel and Transportation Investments

- ***Between 1993 and 2003…***
  - Miles of new freeway: + 3.6%
  - Vehicle miles of freeway travel: + 35.4%

Trends in Travel and Transportation Investments

- ***Between 1993 and 2003…***
  - Miles of new freeway: + 3.6%
  - Vehicle miles of freeway travel: + 35.4%
  - Service miles of rail transit: + 26.7%
  - Rail transit ridership: + 23.1%

Trends in Travel and Transportation Investments

- ***Between 1993 and 2003…***
  - Miles of new freeway: + 3.6%
  - Vehicle miles of freeway travel: + 35.4%
  - Service miles of rail transit: + 26.7%
  - Rail transit ridership: + 23.1%
  - Overall transit ridership: + 11.0%
  - Inflation-adjusted government subsidies of transit: + 57.1%

Public Investment in Transit is Waxing in the U.S.

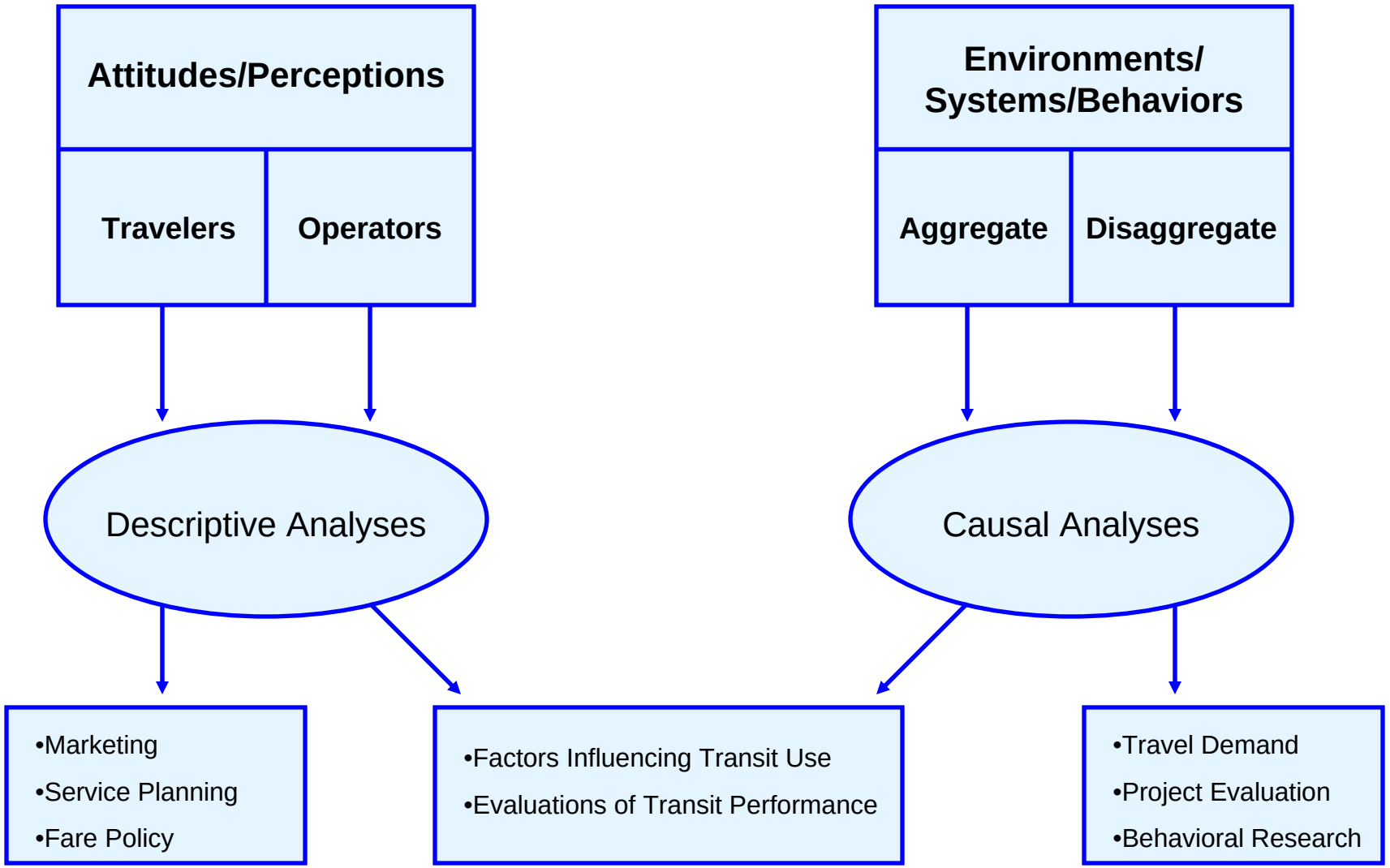
- Between 2000 and 2004…
  - Annual patronage on public transit increased 2.3% (to 9.6 billion trips)

Public Investment in Transit is Waxing in the U.S.

- Between 2000 and 2004…
  - Annual patronage on public transit increased 2.3% (to 9.6 billion trips)
  - But total inflation adjusted subsidy expenditures per unlinked passenger trip increased almost 8 times faster (18%) to $3.68 (in 2006 dollars).

So What Explains Overall Transit Ridership?

Two General Approaches to Transit Ridership Research



Descriptive Analyses

- Largely subjective

Descriptive Analyses

- Largely subjective
- Tend to look only at systems that have increased ridership
  - A methodological necessity?
  - Inhibits causal inference

Descriptive Analyses

- Largely subjective
- Tend to look only at systems that have increased ridership
  - A methodological necessity?
  - Inhibits causal inference
- Causality implied, not tested

Descriptive Analyses

- Largely subjective
- Tend to look only at systems that have increased ridership
  - A methodological necessity?
  - Inhibits causal inference
- Causality implied, not tested
- Tend to attribute changes to internal actions rather than to external factors

Aggregate Causal Analyses

- Mostly empirical case studies of one or a few agencies
  - Allow researchers to get better quality and a wider array of data
  - Allow for more conceptual development of models

Aggregate Causal Analyses

- Mostly empirical case studies of one or a few agencies
  - Allow researchers to get better quality and a wider array of data
  - Allow for more conceptual development of models
- Fewer empirical studies of many agencies
  - Analyzing many agencies and outcomes produces more robust results
  - Results are more likely generalizable to other places and systems

Problems with Aggregate Causal Analyses

- Studies of one or a few agencies may not be generalizable

Problems with Aggregate Causal Analyses

- Studies of one or a few agencies may not be generalizable
- Significant problem of collinearity of variables analyzed

Problems with Aggregate Causal Analyses

- Studies of one or a few agencies may not be generalizable
- Significant problem of collinearity of variables analyzed
- Serious endogeneity problem between service supply variables and demand

Problems with Aggregate Causal Analyses

- Studies of one or a few agencies may not be generalizable
- Significant problem of collinearity of variables analyzed
- Serious endogeneity problem between service supply variables and demand
- Models often are not fully specified; inconsistency in variables included in the models

Problems with Aggregate Causal Analyses

- Studies of one or a few agencies may not be generalizable
- Significant problem of collinearity of variables analyzed
- Serious endogeneity problem between service supply variables and demand
- Models often are not fully specified; inconsistency in variables included in the models
- Some variables are difficult to quantify (e.g., friendly drivers)

So What Explains Overall Transit Ridership?

- ***External*** (or environmental or control) factors

So What Explains Overall Transit Ridership?

- ***External*** (or environmental or control) factors

- ***Internal*** (or policy or treatment) factors

External (Environmental) versus Internal (Policy) Factors

External Factors

Factors exogenous to systems and transit managers

- Population
- Employment levels and growth
- Fuel prices
- Income
- Parking policies
- Residential and employment relocation

Internal Factors

Factors subject to the discretion of transit managers

- Level of service
- Service quality
- Fare levels and structures
- Service frequency and schedules
- Route design
- Marketing and information programs

What Explains Transit Ridership: A Conceptual Model

Transit Patronage

What Explains Transit Ridership: A Conceptual Model

Regional Geography

- Population
- Population Density
- Regional Topography/Climate
- Metropolitan Form/Sprawl
- Area of Urbanization
- Employment Concentration/Dispersion

What Explains Transit Ridership: A Conceptual Model

Metropolitan Economy
- Gross Regional Product
- Employment Levels
- Sectoral Composition of Economy
- Per Capita Income
- Land Rents/Housing Prices

What Explains Transit Ridership: A Conceptual Model

Population Characteristics
- Racial/Ethnic Composition
- Proportion of Immigrant Population
- Age Distribution
- Income Distribution
- Proportion of Population in Poverty

What Explains Transit Ridership: A Conceptual Model

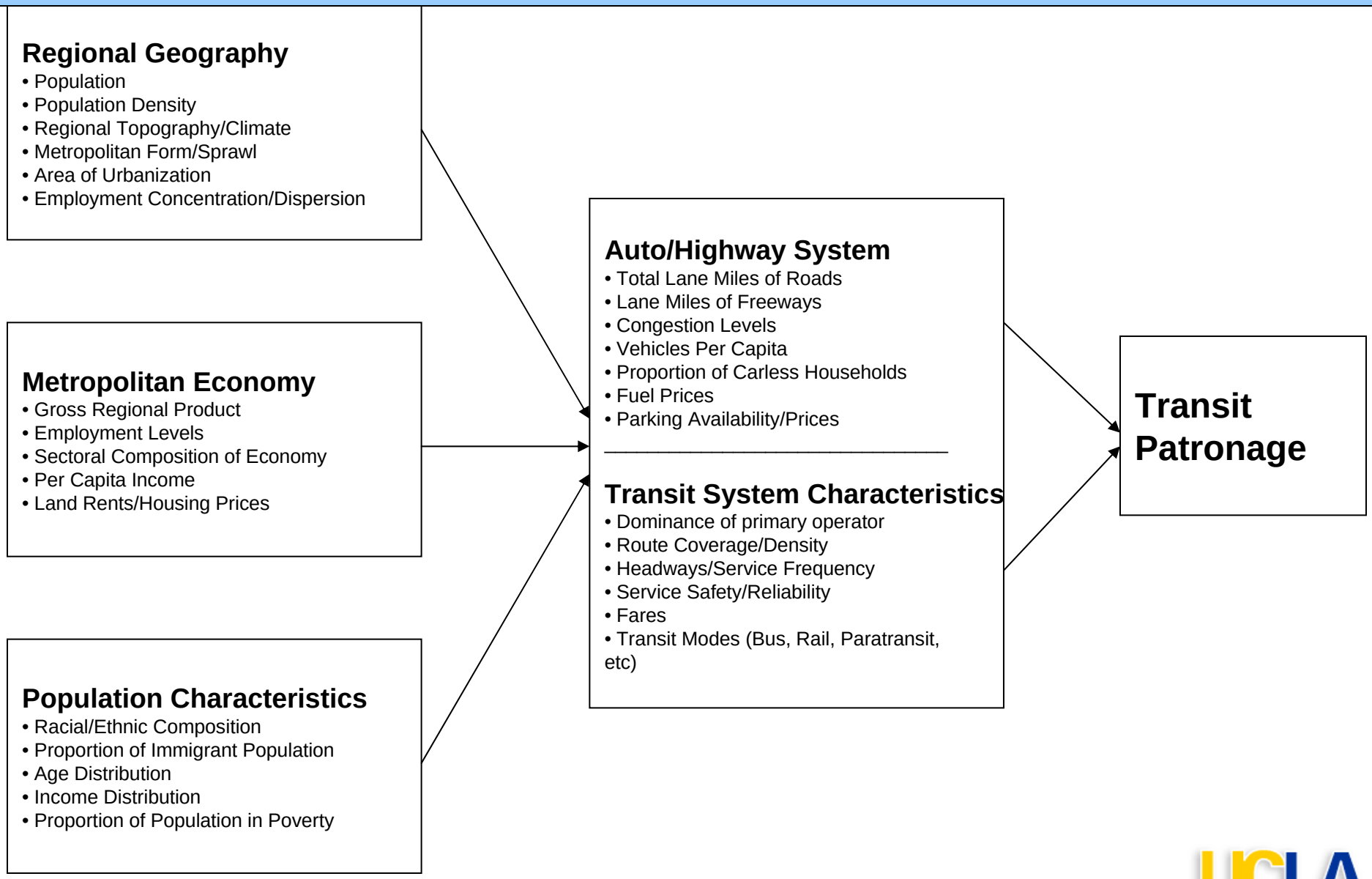
Auto/Highway System

- Total Lane Miles of Roads
- Lane Miles of Freeways
- Congestion Levels
- Vehicles Per Capita
- Proportion of Carless Households
- Fuel Prices
- Parking Availability/Prices

Transit System Characteristics

- Dominance of primary operator
- Route Coverage/Density
- Headways/Service Frequency
- Service Safety/Reliability
- Fares
- Transit Modes (Bus, Rail, Paratransit, etc)

What Explains Transit Ridership: A Conceptual Model



Operationalizing the Conceptual Model

- ***Data***: Drawn from multiple sources
  - National Transit Database
  - U.S. Census of Population
  - Federal Highway Administration
  - Bureau of Labor Statistics
  - Transit Cooperative Research Program
  - Almanac of American Politics

Operationalizing the Conceptual Model

- ***Data***: Drawn from multiple sources
  - National Transit Database
  - U.S. Census of Population
  - Federal Highway Administration
  - Bureau of Labor Statistics
  - Transit Cooperative Research Program
  - Almanac of American Politics
- ***Units of Analysis***: 265 U.S. Urbanized Areas

Operationalizing the Conceptual Model

- ***Data***: Drawn from multiple sources
  - National Transit Database
  - U.S. Census of Population
  - Federal Highway Administration
  - Bureau of Labor Statistics
  - Transit Cooperative Research Program
  - Almanac of American Politics
- ***Units of Analysis***: 265 U.S. Urbanized Areas
- ***Variable Construction***: Log-linear form fit data best

Operationalizing the Conceptual Model

- ***Data***: Drawn from multiple sources
  - National Transit Database
  - U.S. Census of Population
  - Federal Highway Administration
  - Bureau of Labor Statistics
  - Transit Cooperative Research Program
  - Almanac of American Politics
- ***Units of Analysis***: 265 U.S. Urbanized Areas
- ***Variable Construction***: Log-linear form fit data best
- ***Dependent Variables***: Total UZA ridership and per capita UZA ridership

Operationalizing a Conceptual Model of Transit Riderhsip

Category Variable	Used	Source	Variable Construction	Ex Rela
Regional Geography				
Population	Yes	Census 2000 SF3	Total Population	
Population Density	Yes	Census 2000 SF3	Population ÷ Geographic Area	
Regional Topography/Climate	*No*	*Not Collected*		
Metropolitan Form/Sprawl	No	Transit Cooperative Research Program	Metropolitan Sprawl Index	
Area of Urbanization	Yes	Census 2000 SF3	Geographic Land Area	
Employment Concentration/Dispersion	*No*	*Not Collected*		
Metropolitan Economy				
Gross Regional Product	*No*	*Not Collected*		
Employment Levels	Yes	Census 2000 SF3	Unemployed ÷ Labor Market Participants	
Sectoral Composition of Economy	*No*	*Bureau of Labor Statistics*	*Not Constructed*	
Personal/Household Income	Yes	Census 2000 SF3	Median Household Income	
Land Rents/Housing Prices	No	Census 2000 SF3	Median Rent	
Proportion of Population in Poverty	Yes	Census 2000 SF3	Poverty Population ÷ Total Population	
Income Distribution	*No*	*Census 2000 SF3*	*Not Constructed*	
Population Characteristics				
Racial/Ethnic Composition	Yes	Census 2000 SF3	Given Race/Ethnic Population ÷ Total Population	
Proportion of Immigrant Population	Yes	Census 2000 SF3	Immigrant Population ÷ Total Population	
Age Distribution	No	Census 2000 SF3	Given Age Group Population ÷ Total Population	
Proportion of Population in College	Yes	Census 2000 SF3	Enrolled College Students ÷ Total Population	
Political Party Affiliations	Yes	2000 Almanac of American Politics	Percent of Votes Cast for Democrat in 2000 Presidential Election	
Auto/Highway System				
Total Lane Miles of Roads	Yes	FHWA Highway Statistics 2000	Total Lane Miles	
Vehicle Miles Per Capita	Yes	FHWA Highway Statistics 2000	Daily Vehicle Miles Travelled Per Capita	
Lane Miles of Freeways	Yes	FHWA Highway Statistics 2000	Freeway Lane Miles	
Congestion Levels	*No*	*TTI: Urban Mobility Study*	*Not Constructed*	
Vehicles Per Capita	*No*	*Census 2000 SF3*	*Not Constructed*	
Proportion of Carless Households	Yes	Census 2000 SF3	Zero Vehicle Households ÷ Total Households	
Fuel Prices	Yes	Bureau of Labor Statistics	Average Price per Gallon of Gas	
Non-Transit/Non-SOV Trips	Yes	Census 2000 SF3	Non-Transit and Non-SOV Commutes ÷ All Commutes	
Parking Availability/Prices	*No*	*Not Collected*		
Transit System Characteristics				
Dominance of Primary Transit Operator	Yes	NTD 2000	VRH of Largest Operator ÷ Total VRH	
Route Coverage/Density	Yes	NTD 2000	Route Miles ÷ Land Area	
Headways/Service Frequency	Yes	NTD 2000	VRM ÷ Route Miles	
Service Safety/Reliability	*No*	*Not Collected*		
Fares	Yes	NTD 2000	Total Revenues ÷ Unlinked Trips	
Transit Modes	*No*	*NTD 2000*	*Not Constructed*	

The Endogeneity Problem Common to Many Previous Studies

		Adj R-Sq	0.9733
Variable	Parameter Estimate	Pr > |t|	Standardized Estimate
Intercept	-5.94265	0.0008	0
Revenue Hours	*1.06456*	*<.0001*	*0.83418*
Population Density	0.10873	0.2254	0.01908
Total Population	0.10496	0.1303	0.06436
% Voting Democrat in 2000 Presidential Elections	0.23700	0.1538	0.01789
Median Income	0.65461	0.0003	0.06730
Average Gas Price	0.73675	0.0391	0.02745
Percent Carless Households	0.60709	<.0001	0.09209
Percent Recent Immigrant	0.11828	0.0005	0.05266
Percent African American	-0.01551	0.5195	-0.00961
Transit Fare	-0.35421	<.0001	-0.10798
Percent Population Enrolled in College	0.14714	0.0180	0.03805
Service Level	0.04849	0.3687	0.01330
Dominant Operator	0.29820	0.0518	0.02602
Freeway Lane Miles	0.00008985	0.9982	0.00005865

Developing a Two Stage Model to Account for Circular Causality between Service Supply and Consumption

- ***First Stage***: Predict *Service Supply* using an array of independent variables

Developing a Two Stage Model to Account for Circular Causality between Service Supply and Consumption

- ***First Stage***: Predict *Service Supply* using an array of independent variables
- ***Second Stage***: Predict *Service Consumption* using an array of independent variables, including an instrumental variable to predict service supply estimated in the first stage

First Stage:
Predicting Overall Levels of Service Supply

		Adj R-Sq	0.8216
Variable	Parameter Estimate	Pr > |t|	Standardized Estimate
Intercept	-5.44638	<.0001	0
Total Population (lnpop)	1.15134	<.0001	0.89730
Percent Voting Democrat in 2000 Presidential Election (ln_dem)	0.71598	0.0071	0.07121

Urbanized Areas with the Greatest Deviations in Service Supply from Those Predicted by the First Stage Model

	Name	Unlinked Trips	Vehicle Revenue Hours	Total Population
Undersupply ↑	Kingsport TN-VA Urbanized Area	53,872	5,957	95,766
	Montgomery, AL Urbanized Area	21,363	9,657	196,892
	Lewiston-Auburn, ME Urbanized Area	123,492	11,295	50567
	Key West, FL Urbanized Area	350,222	14,734	35,866
	Greenville, SC Urbanized Area	578,508	33,015	302,194
	Port Arthur, TX Urbanized Area	160,776	14,616	114,656
	St. Joseph, MO-KS Urbanized Area	171,298	23,539	77,231
	Hagerstown, MD-WV-PA Urbanized Area	290,725	28,036	120,326
	Phoenix--Mesa, AZ Urbanized Area	35,812,539	1,057,971	2,907,049
	Benton Harbor-St. Joseph, MI Urbanized Area	27,805	3,899	61,745
Oversupply ↓	Olympia-Lacey, WA Urbanized Area	2,782,800	126,744	143,826
	Bremerton, WA Urbanized Area	3,538,482	119,046	178,369
	Bellingham, WA Urbanized Area	2,918,916	86,818	84,324
	Seaside-Monterey-Marina, CA Urbanized Area	4,016,332	189,351	125,503
	Johnstown, PA Urbanized Area	1,534,473	63,654	76,113
	Ithaca, NY Urbanized Area	2,571,605	115,688	53,528
	Athens-Clarke County, GA Urbanized Area	1,363,068	39,472	106,482
	Florence, SC Urbanized Area	179,295	35,369	67,314
	Rome, GA Urbanized Area	966,960	24,990	58,287
	Iowa Falls, IA Urban Cluster	1,256,482	45,716	4,908

Second Stage:
Testing Environmental and Policy Variables

		Adj R-Sq	0.9105
Variable	**Parameter Est**	**Pr > |t|**	**Std Estimate**
Intercept	-3.22843	0.0412	0
Predicted Revenue Hours	1.03798	<.0001	0.74293
Population Density	0.48687	0.0030	0.08545
Unemployment Rate	-0.22606	0.1975	-0.03159
Average Gas Price	1.45192	0.0288	0.05410
Percent Carless Household	1.17548	<.0001	0.17831
Percent Recent Immigrant	0.15396	0.0137	0.06854
Percent African American	***-0.06940***	***0.1310***	***-0.04302***
Transit Fare	-0.45460	<.0001	-0.13858
Service Level	0.51214	<.0001	0.14048
Freeway Lane Miles	0.01571	0.8153	0.01025
Percent Population Enrolled in College	0.24687	0.0108	0.06384

Urbanized Areas with the Highest and Lowest Proportions of African-Americans

Rank	Urbanized Area	Population	% African-American	Region
1	Albany, GA	95,611	56.6%	South
2	Jackson, MS	293,192	50.7%	South
3	Montgomery, AL	197,017	49.9%	South
4	Memphis, TN--MS--AR	971,282	46.4%	South
5	Savannah, GA	208,885	44.0%	South
6	New Orleans, LA	1,009,015	43.2%	South
7	Danville, VA	50,608	42.6%	South
8	Shreveport, LA	275,094	42.3%	South
9	Alexandria, LA	78,525	41.9%	South
10	Monroe, LA	113,947	40.9%	South
256	Bellingham, WA	84,499	0.7%	Pacific NW
257	Pocatello, ID	62,514	0.7%	Pacific NW
258	Boise City, ID	272,656	0.6%	Pacific NW
259	Medford, OR	128,797	0.5%	Pacific NW
260	Redding, CA	105,258	0.5%	Pacific NW
261	Billings, MT	100,051	0.4%	Pacific NW
262	Laredo, TX	175,841	0.4%	South
263	Logan, UT	76,141	0.4%	Pacific NW
264	Wausau, WI	68,281	0.3%	Midwest
265	Missoula, MT	69502	0.2%	Pacific NW

Second Stage:
Final Total UZA Ridership Model

	Adj R-Sq	0.9105
Variable	Parameter Estimate	Pr > |t|	Standardized Estimate
Intercept	-1.85237	0.1899	0
Predicted Revenue Hours	1.08126	<.0001	0.77391
Population Density	0.42365	0.0086	0.07435
Percent Carless Households	1.19041	<.0001	0.18057
Percent of Recent Immigrants	0.19278	0.0015	0.08582
UZA in the South	-0.12621	0.0014	-0.07823
Transit Fare	-0.42660	<.0001	-0.13004
Service Level	0.50284	<.0001	0.13793
Percent Population Enrolled in College	0.22837	0.0182	0.05905

Per Capita Ridership Models: First Stage

	Adj R-Sq		0.2921
Variable	Parameter Estimate	Pr > |t|	Standardized Estimate
Intercept	-4.99749	<.0001	0
Population Density	0.76335	<.0001	0.37337
Percent Carless Households	0.66520	<.0001	0.28856
UZA in the South	-0.19278	0.0168	-0.13223

Second Stage:
Final Per Capita UZA Ridership Model

	Adj R-Sq		0.7111
Variable	Parameter Estimate	Pr > |t|	Standardized Estimate
Intercept	-9.38827	0.0003	0
Predicted Revenue Hours	1.23006	<.0001	0.45166
Total Land Area	0.19365	<.0001	0.20245
Median Income	0.92123	0.0009	0.17614
Percent Non-Transit/SOV Commute	1.12844	<.0001	0.24220
Transit Fare	-0.51532	<.0001	-0.29327
Service Level	0.48399	<.0001	0.24600

Observed Influence of the Independent Variables on the Outcome Variables

	Absolute Transit Service/Ridership			*Per Capita Transit Service/Ridership*		
	First Stage: Service Levels	Second Stage: Full Model	Second Stage: Parsimonious	First Stage: Service Levels	Second Stage: Full Model	Second Stage: Parsimonious
Regional Geography						
Predicted Transit Service Levels		+	+		+	+
Population	+					
Population Density		+	+	+		
Metropolitan Form/Sprawl						
Area of Urbanization					+	+
Metropolitan Economy						
Unemployment Levels		-				
Personal/Household Income					+	+
Land Rents/Housing Prices						
Proportion of Population in Poverty						
Population Characteristics						
% African-American		-	-	-		
Proportion of Immigrant Population		+	+		+	
Age Distribution						
Percent Enrolled College Students		+	+			
Percent Democratic	+					
Auto/Highway System						
Total Lane Miles of Roads						
Vehicle Miles of Travel Per Capita					-	
Lane Miles of Freeways		+				
Proportion of Carless Households		+	+	+		
Fuel Prices		+			+	
Non-Transit/Non-SOV Trips					+	+
Transit System Characteristics						
Dominance of Primary Transit Operator					+	
Route Coverage/Density						
Headways/Service Frequency		+	+		+	+
Fare Levels		-	-		-	-

Conclusions I

- Total and per capita UZA ridership are primarily a function of external factors

Conclusions I

- Total and per capita UZA ridership are primarily a function of external factors:
  - *Regional Geography* (regional location, population, population density, and land area)

Conclusions I

- Total and per capita UZA ridership are primarily a function of external factors:
  - *Regional Geography* (regional location, population, population density, and land area)
  - *Metropolitan Economy* (median household income)

Conclusions I

- Total and per capita UZA ridership are primarily a function of external factors:
  - *Regional Geography* (regional location, population, population density, and land area)
  - *Metropolitan Economy* (median household income)
  - *Population Characteristics* (percent Democratic voters, African-American, recent immigrants, and college students)

Conclusions I

- Total and per capita UZA ridership are primarily a function of external factors:
  - *Regional Geography* (regional location, population, population density, and land area)
  - *Metropolitan Economy* (median household income)
  - *Population Characteristics* (percent Democratic voters, African-American, recent immigrants, and college students)
  - *Auto/Highway System* Characteristics (0 vehicle households, VMT/capita, commuting via carpools, walking, biking, etc.)

Conclusions II

- It's more difficult to predict per capita service levels at the UZA level because transit patronage is so strongly associated with metropolitan area population

Conclusions II

- It's more difficult to predict per capita service levels at the UZA level because transit patronage is so strongly associated with metropolitan area population
  - Per capita ridership is largely a function of the physical size of the UZA, its economic vitality, and use of non-sov/transit modes

Testing the Sensitivity of Policy Variables in Predicting Total UZA and Per Capita Transit Ridership

Total Ridership Models	**R^2**
Environmental Variables Only	85.7%
Environmental + Policy Variables	90.9%
Percent Change in Adjusted R^2	**6.1%**
Per Capita Ridership Models	
Environmental Variables Only	44.6%
Environmental + Policy Variables	70.4%
Percent Change in Adjusted R^2	**57.7%**

Testing the Sensitivity of Policy Variables in Predicting Total UZA Transit Ridership
(Assuming Average Values for All Control Variables)

	5th Percentile	95th Percentile	% Difference
Average Fare per Unlinked Boarding	$0.95	$0.20	-78.9%
Predicted Total UZA Boardings	1,997,654	3,877,349	94.1%
Annual Service Miles per Route Mile	2,340	12,803	447.2%
Predicted Total UZA Boardings	1,706,643	4,011,662	135.1%

Testing the Sensitivity of Policy Variables in Predicting Per Capita Transit Ridership

(Assuming Average Values for All Control Variables)

	5th Percentile	95th Percentile	% Difference
Average Fare per Unlinked Boarding	$0.95	$0.20	-78.9%
Predicted Per Capita Boardings	7.1	15.6	119.7%
Annual Service Miles per Route Mile	2,340	12,803	447.2%
Predicted Per Capita Boardings	6.4	15.1	135.9%

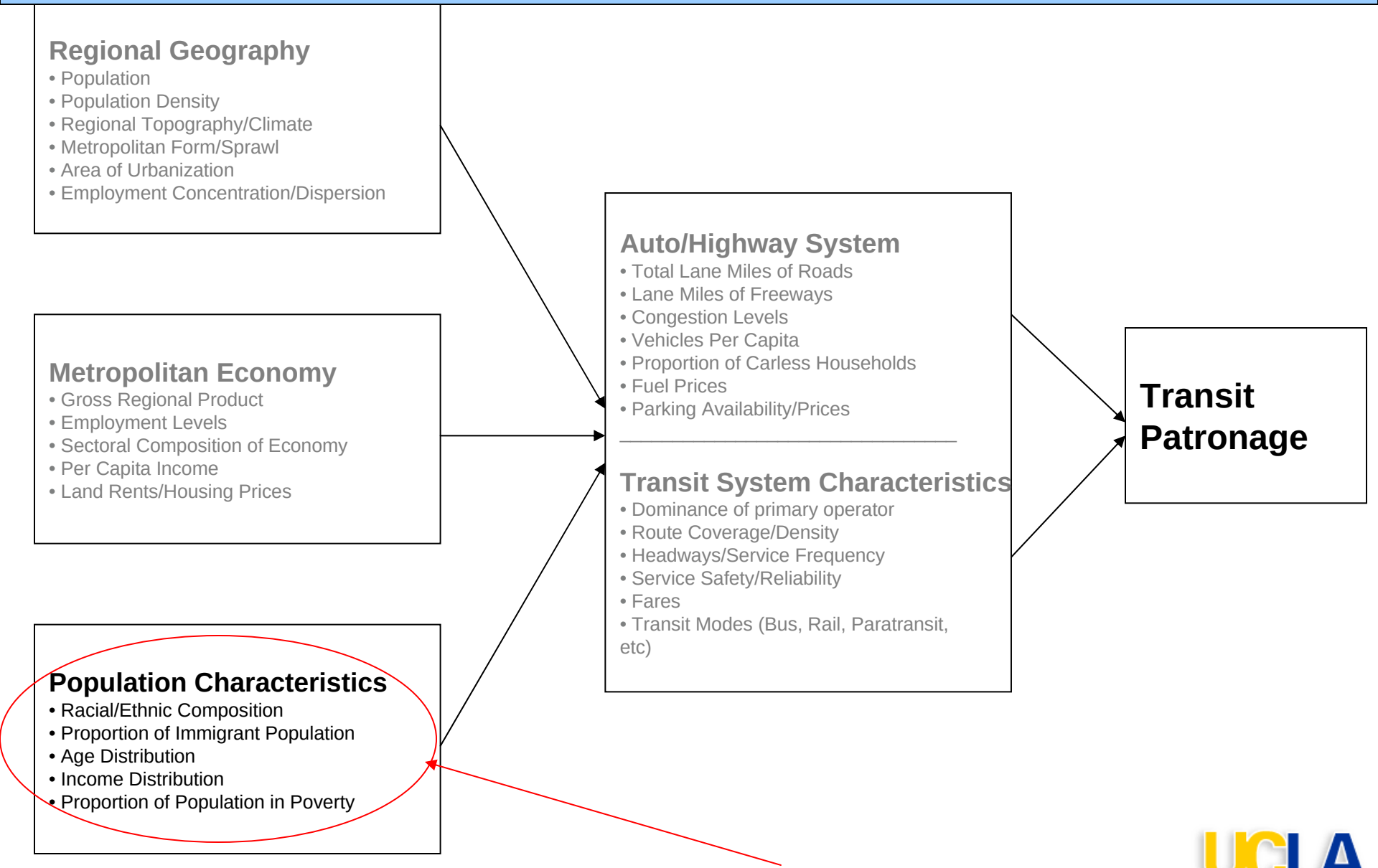
Conclusions III

- But, transit policy and planning do matter
  - After controlling for external factors, variation in transit service frequency and fare levels are associated with about a doubling (or halving) of total and per capita UZA ridership

Conclusions III

- But, transit policy and planning do matter
  - After controlling for external factors, variation in transit service frequency and fare levels are associated with about a doubling (or halving) of total and per capita UZA ridership
- Given the relatively strong observed effects of fare policy and service frequency on transit use
  - Rapidly declining productivity in the face of significant new investments in capital-intensive modes in selected corridors clearly warrants further evaluation

What Explains Transit Ridership: A Conceptual Model



Public Investment in Transit, Especially Rail Transit, is Waxing in the U.S.

- Between 1990 and 2004…
  - Total inflation-adjusted public expenditures on transit were up 52%

Public Investment in Transit, Especially Rail Transit, is Waxing in the U.S.

- Between 1990 and 2004…
  - Total inflation-adjusted public expenditures on transit were up 52%
  - Inflation-adjusted expenditures on rail transit grew 13% faster than the growth in bus expenditures

2004 Public Transit Expenditures by Mode

- Buses:
  - 61% of transit passengers
  - 48% of all (capital and operating) expenditures

2004 Public Transit Expenditures by Mode

- Buses:
  - 61% of transit passengers
  - 48% of all (capital and operating) expenditures

- Rail:
  - 37% of all passengers (mostly in NY)
  - 48% of all transit expenditures

Who Uses Public Transit?

- Who rides buses and trains?

Who Uses Public Transit?

- Who rides buses and trains?
- How is this changing over time?

Who Uses Public Transit?

- Who rides buses and trains?
- How is this changing over time?
- What are the implications for the public subsidy of transit?

Methodology

- **Data**: 1977, 1983, 1990, and 1995 National Personal Travel Surveys (NPTS) and 2001 National Household Travel Survey (NHTS), weighted

Methodology

- **Data**: 1977, 1983, 1990, and 1995 National Personal Travel Surveys (NPTS) and 2001 National Household Travel Survey (NHTS), weighted

- **Unit of analysis**: individual day-trips

Methodology

- **Data**: 1977, 1983, 1990, and 1995 National Personal Travel Surveys (NPTS) and 2001 National Household Travel Survey (NHTS), weighted

- **Unit of analysis**: individual day-trips

- **Variables**: Many records from later years were aggregated to conform with categories used in earlier years

Median Household Incomes of Metropolitan U.S. Trip-Makers in 2001

Trip Type	Travel Mode	Median Income	% of Private Vehicle
Work Trips	Private Vehicle	$57,500	100.0%
	Rail Transit	$67,500	117.4%
	Bus Transit	*$27,500*	*47.8%*
	Non-Motorized	$42,500	73.9%
	Other	$67,500	117.4%
	All Modes	$57,500	100.00%

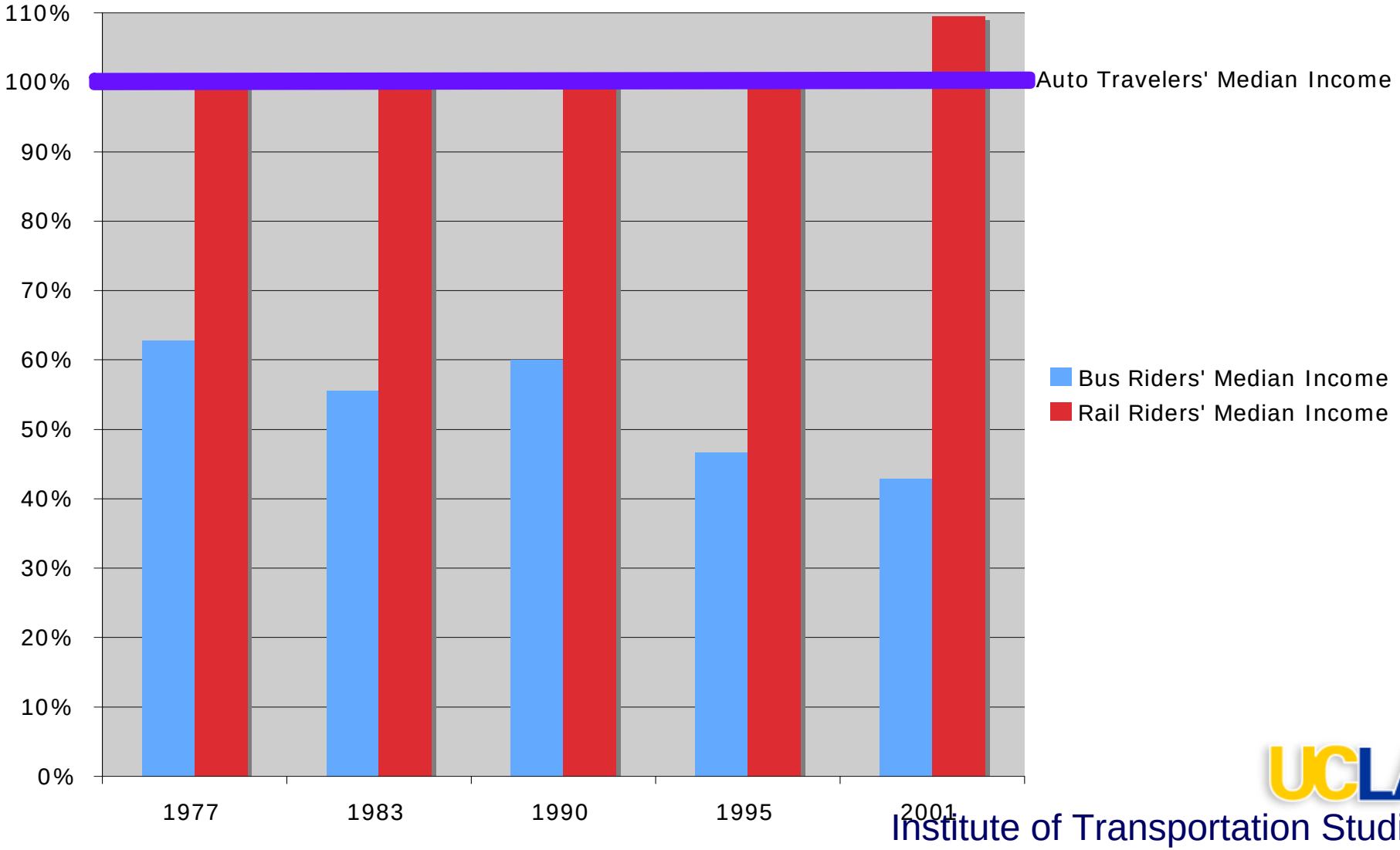
Source: 2001 National Household Transportation Survey

Median Household Incomes of Metropolitan U.S. Trip-Makers in 2001

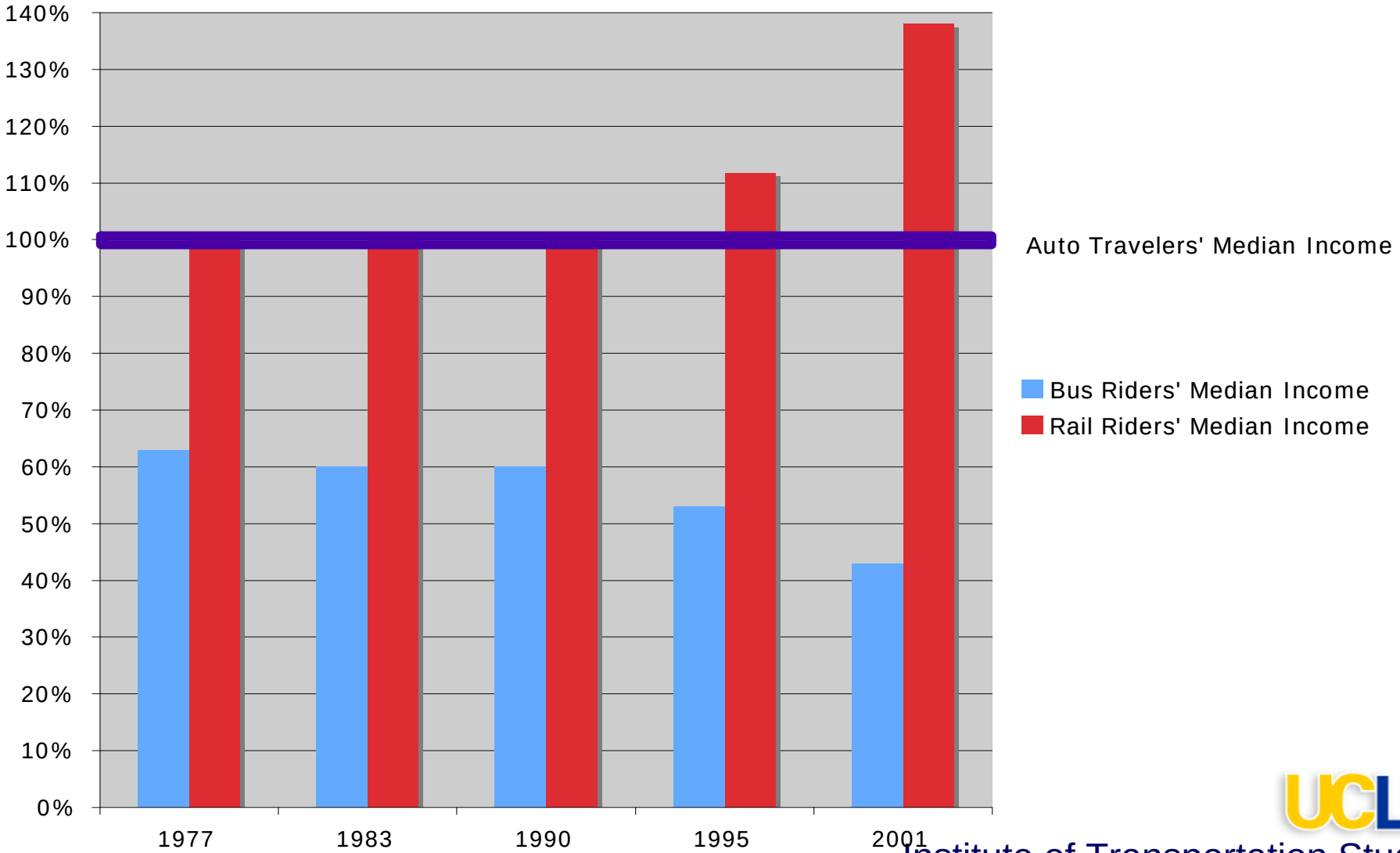
Trip Type	Travel Mode	Median Income	% of Private Vehicle
Non-Work Trips	Private Vehicle	$52,500	100.0%
	Rail Transit	$47,500	109.5%
	Bus Transit	*$17,500*	*33.3%*
	Non-Motorized	$47,500	90.5%
	Other	$47,500	90.5%
	All Modes	$52,500	100.0%

Source: 2001 National Household Transportation Survey

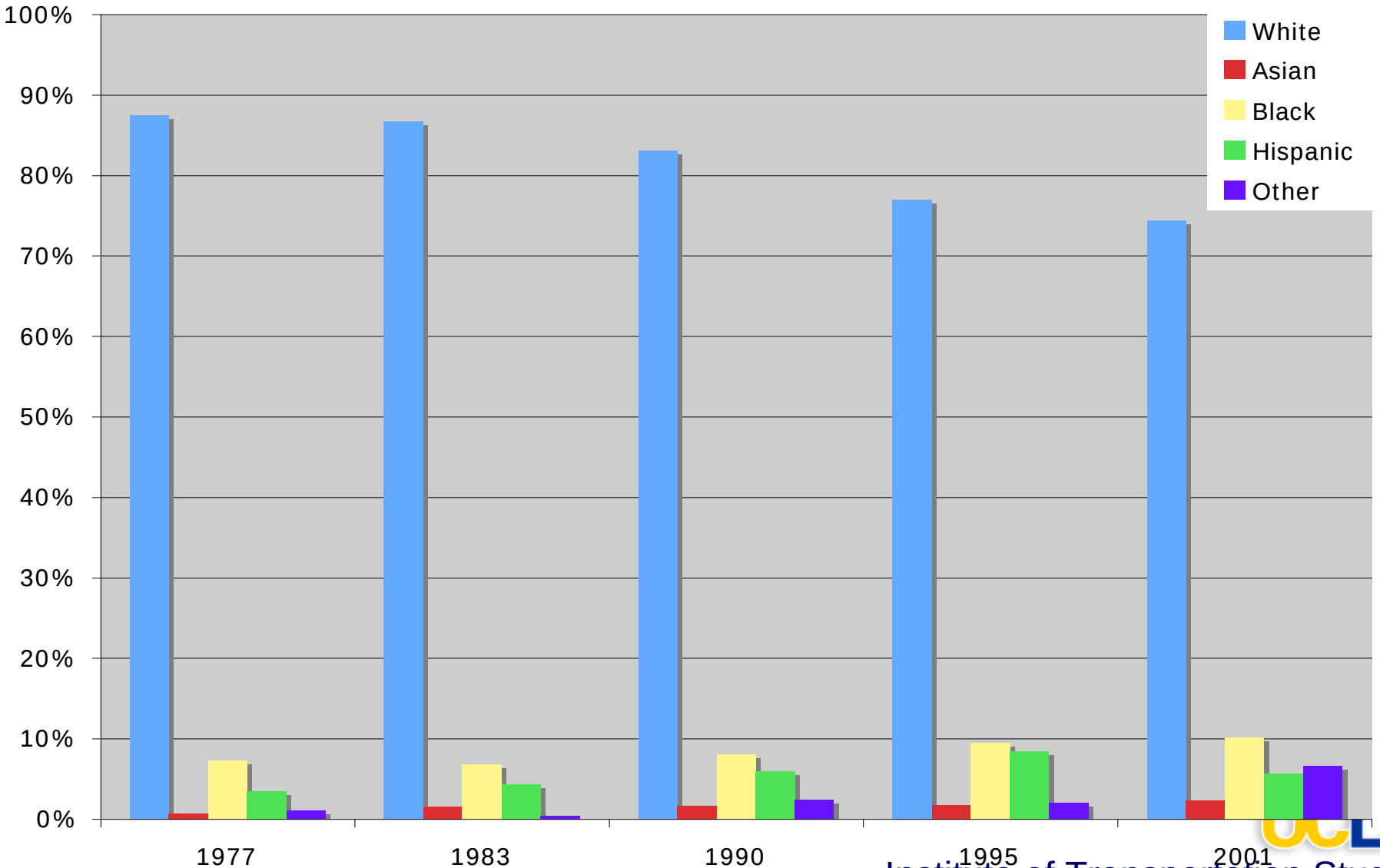
Trends in Transit Riders' Median Income as a Share of Auto Travelers' Median Income – 1977 to 2001 (All Trips)



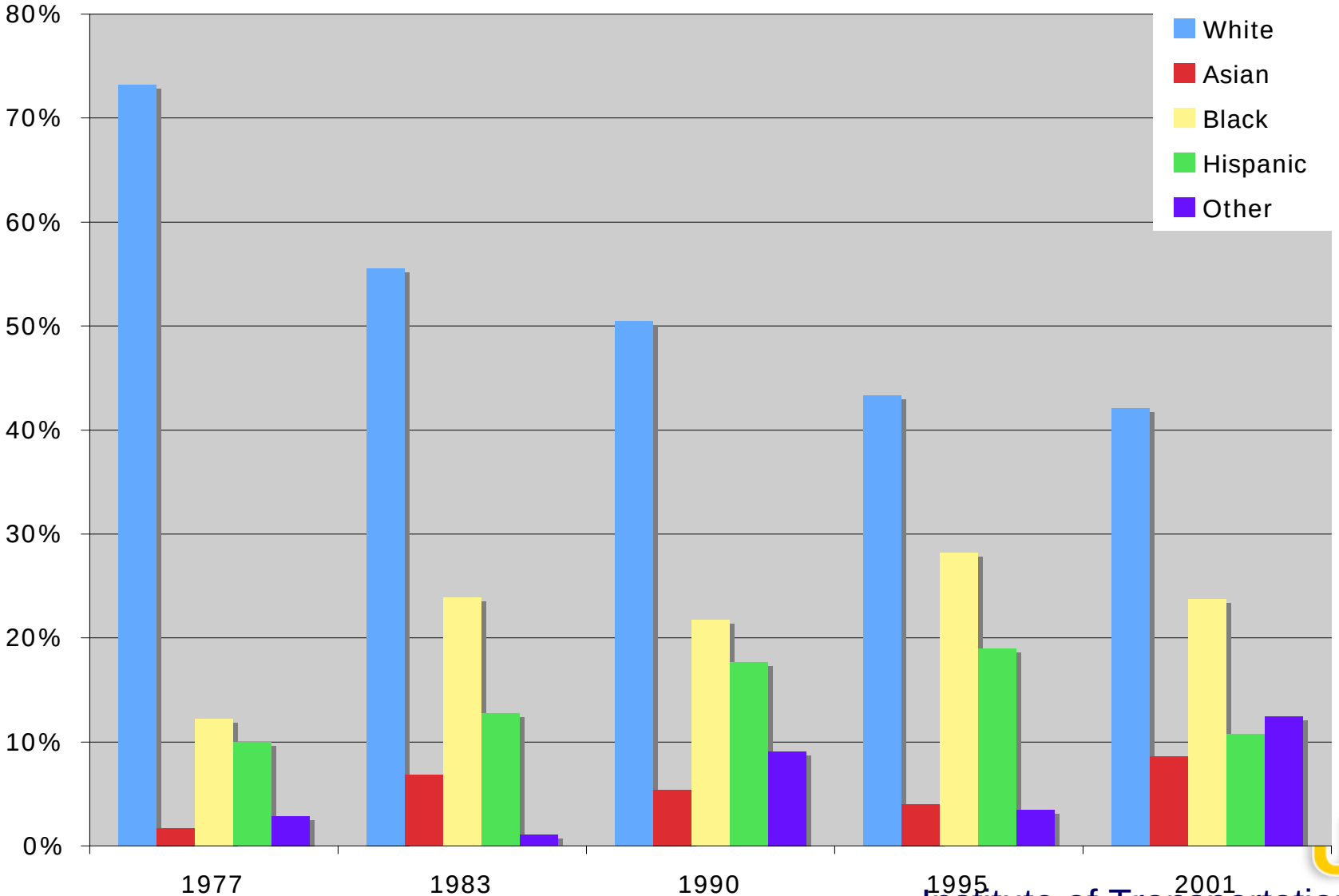
Trend Transit Riders' Median Income as a Share of Auto Travelers' Median Income – 1977 to 2001 (All Trips, excluding New York)



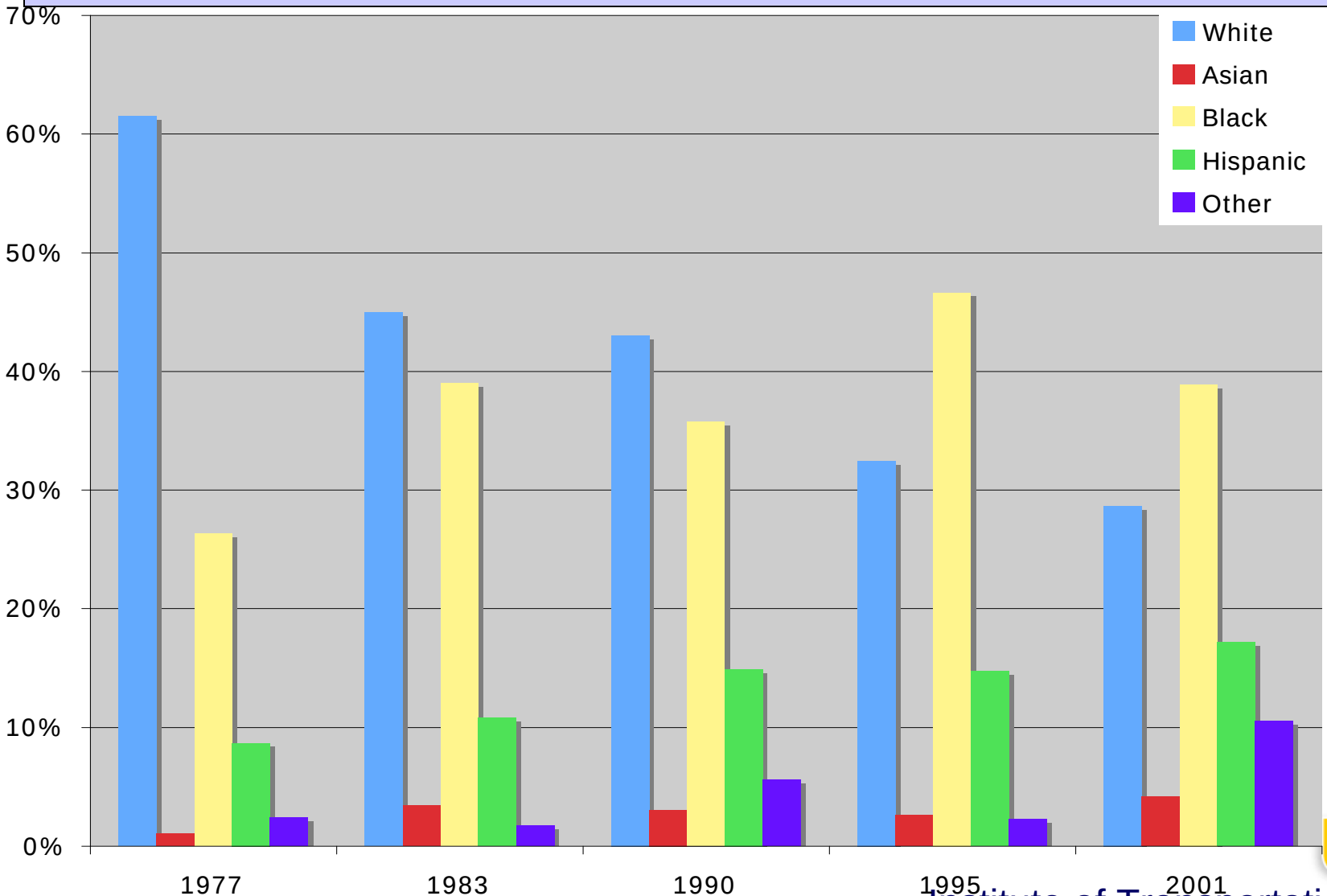
Trends in Ethnic Composition of Private Vehicle Travelers – 1977 to 2001 (All Trips)



Trend in Ethnic Composition of Rail Riders – 1977 to 2001 (All Trips)



Trends in Ethnic Composition of Bus Riders – 1977 to 2001 (All Trips)



Findings

- Bus riders are becoming poorer and less white over time, relative to auto travelers

Findings

- Bus riders are becoming poorer and less white over time, relative to auto travelers

- In contrast, rail travelers are becoming wealthier relative to auto travelers over time, with rail patrons outside of New York particularly well off

Findings

- Bus riders are becoming poorer and less white over time, relative to auto travelers

- In contrast, rail travelers are becoming wealthier relative to auto travelers over time, with rail patrons outside of New York particularly well off

- In 2001, bus riders outside of New York came from households with incomes 58% *lower* than auto travelers
  - while rail riders came from households with income 38% *higher* than auto travelers

Conclusions IV

- Bus transit, in other words, can be increasingly viewed as a social service for the poor

Conclusions IV

- Bus transit, in other words, can be increasingly viewed as a social service for the poor

- "Why do the Poor Live in Cities?" (Glaeser, Kahn, and Rappaport 2000)
  - Better access to public transit and social services

Conclusions IV

- Bus transit, in other words, can be increasingly viewed as a social service for the poor

- Why do the Poor Live in Cities?
  - Better access to social services – public transit first and foremost among them

Conclusions IV

- Bus transit, in other words, can be increasingly viewed as a social service for the poor

- This is an important role and a compelling rationale for substantial public subsidies of transit

Conclusions V

- But in a public policy environment where redistributive social policies are increasingly scrutinized and questioned…
  - transit's central role as a social service for the poor is not widely touted by transit managers

Conclusions V

- Instead, goals like…
  - congestion reduction,
  - environmental improvement, and
  - and transit-oriented development are emphasized

Conclusions V

- Instead, goals like…
  - congestion reduction,
  - environmental improvement, and
  - and transit-oriented development are emphasized

- With considerable political success
  - inflation-adjusted public subsidies of transit increased nationwide 52% between 1990 and 2004

Conclusions VI

- That most transit users are bus riders,

Conclusions VI

- That most transit users are bus riders,
- That most bus riders are poor,

Conclusions VI

- That most transit users are bus riders,
- That most bus riders are poor, and
- That they are growing poorer and poorer relative to rail and private vehicle travelers over time

Conclusions VI

- That most transit users are bus riders,
- That most bus riders are poor, and
- That they are growing poorer and poorer relative to rail and private vehicle travelers over time

- Has become transit's dirty little secret

Comments? Questions?

btaylor@ucla.edu
www.its.ucla.edu

Research Assistants:

Brent Boyd

Kendra Breiland

Camille Fink

Hiroyuki Iseki

Douglas Miller

Norman Wong

UCLA
Institute of Transportation Studies

Aggregate Causal Analyses: What's Typically Missing?

- Highway system and auto access measures

Aggregate Causal Analyses: What's Typically Missing?

- Highway system and auto access measures
- Transit service quality measures (frequency, reliability, comfort, convenience, etc.)

Aggregate Causal Analyses: What's Typically Missing?

- Highway system and auto access measures
- Transit service quality measures (frequency, reliability, comfort, convenience, etc.)
- Political and budgetary measures

Aggregate Causal Analyses: What's Typically Missing?

- Highway system and auto access measures
- Transit service quality measures (frequency, reliability, comfort, convenience, etc.)
- Political and budgetary measures
- Detailed characteristics of traveling population