

# Travel Data User's Forum

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## Employment Data: Uses, Sources, and Challenges

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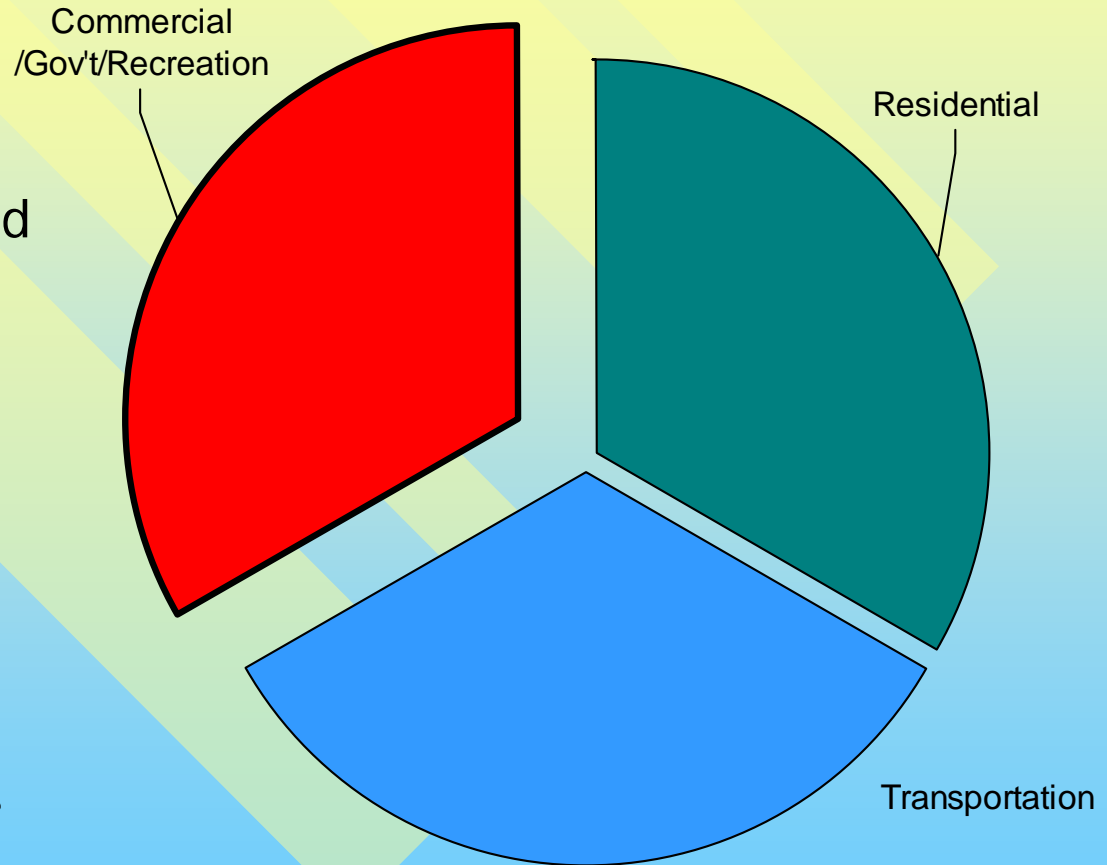
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*[www.travelbehavior.us](http://www.travelbehavior.us)*

# Commercial use represents about a third of urban area land-use

Commercial uses require 1,000-1,500 square feet of land per capita.

The type and distribution of commercial and residential land-use gives each city its unique character.

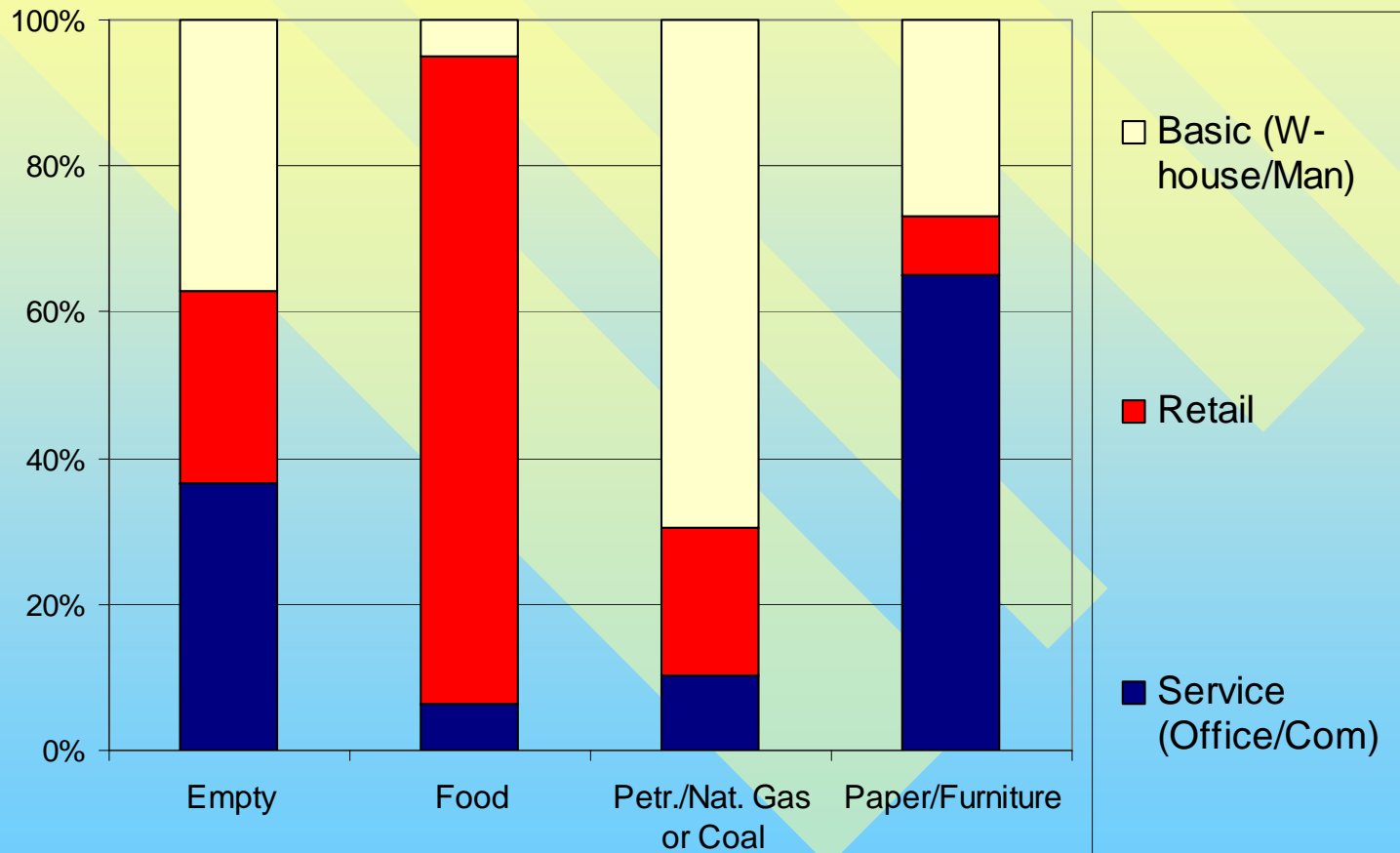
Travel on the system to move people and freight between residences and establishments gives each city its unique traffic patterns.



Source: Chicago Areas Transportation Study, 1956

# Commercial sites attract freight and truck trips

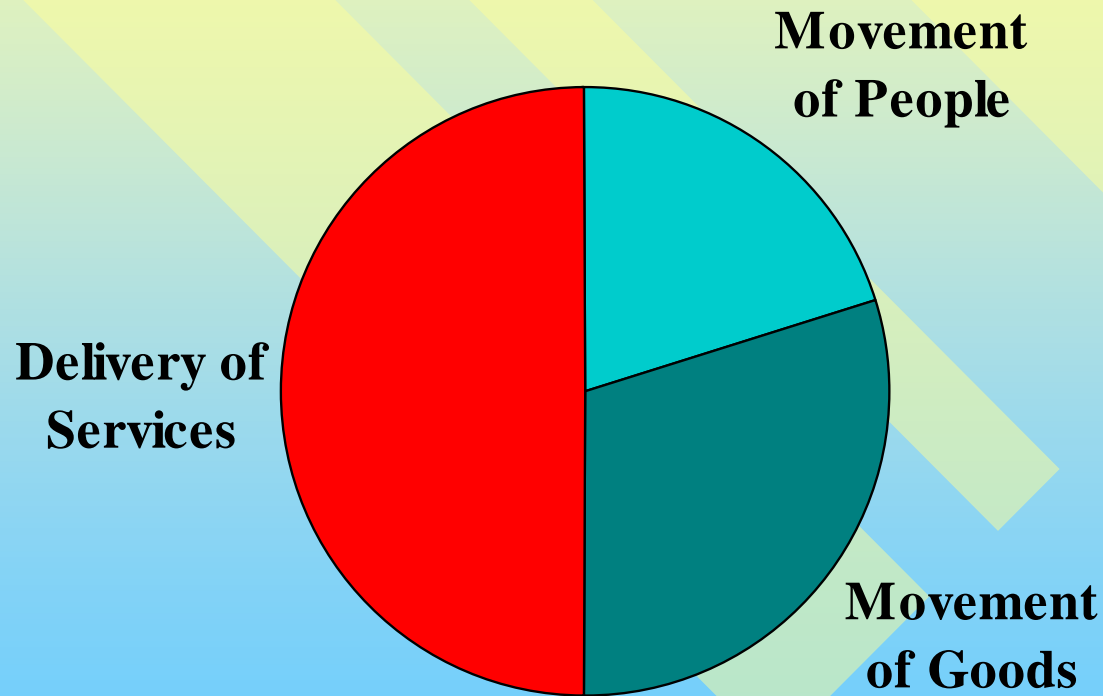
Percent of Cargo by Type by Land-use at Destination



Source: North Carolina Commercial Vehicle Survey, author's analysis

# But delivery of services is a large (and growing) portion of urban VMT

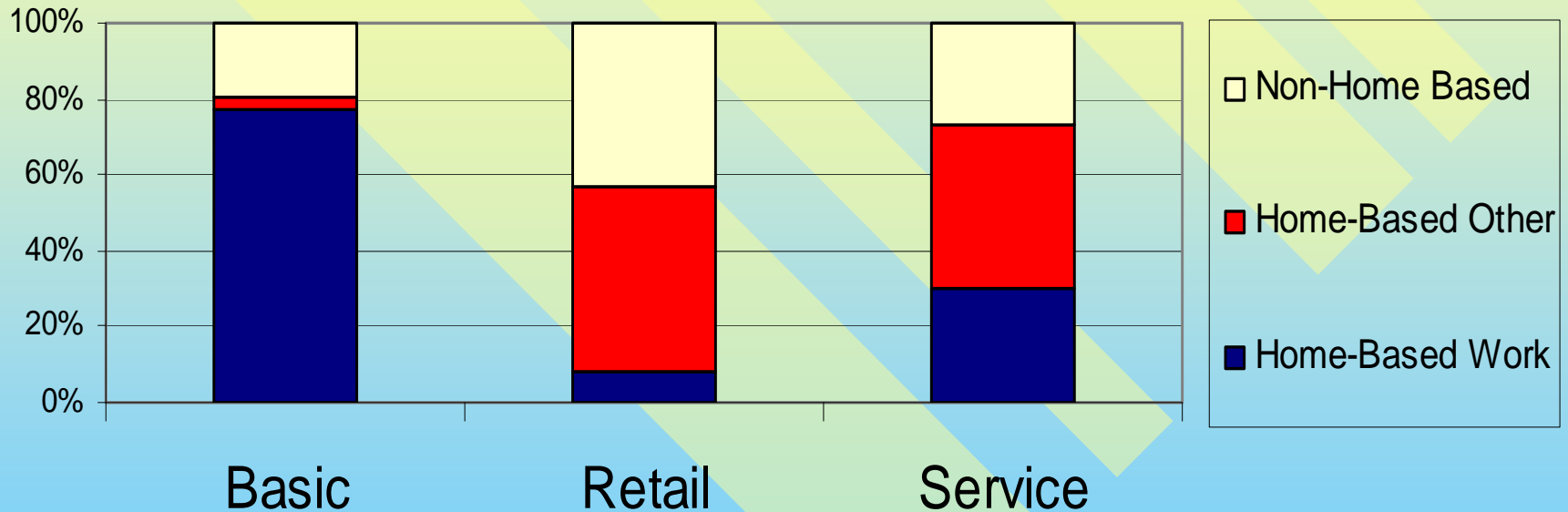
Proportion of Urban VMT by Commercial Vehicles



Source: “Accounting for Commercial Vehicles in Urban Transportation Models”, FHWA, 2004

# Commercial sites also attract person trips

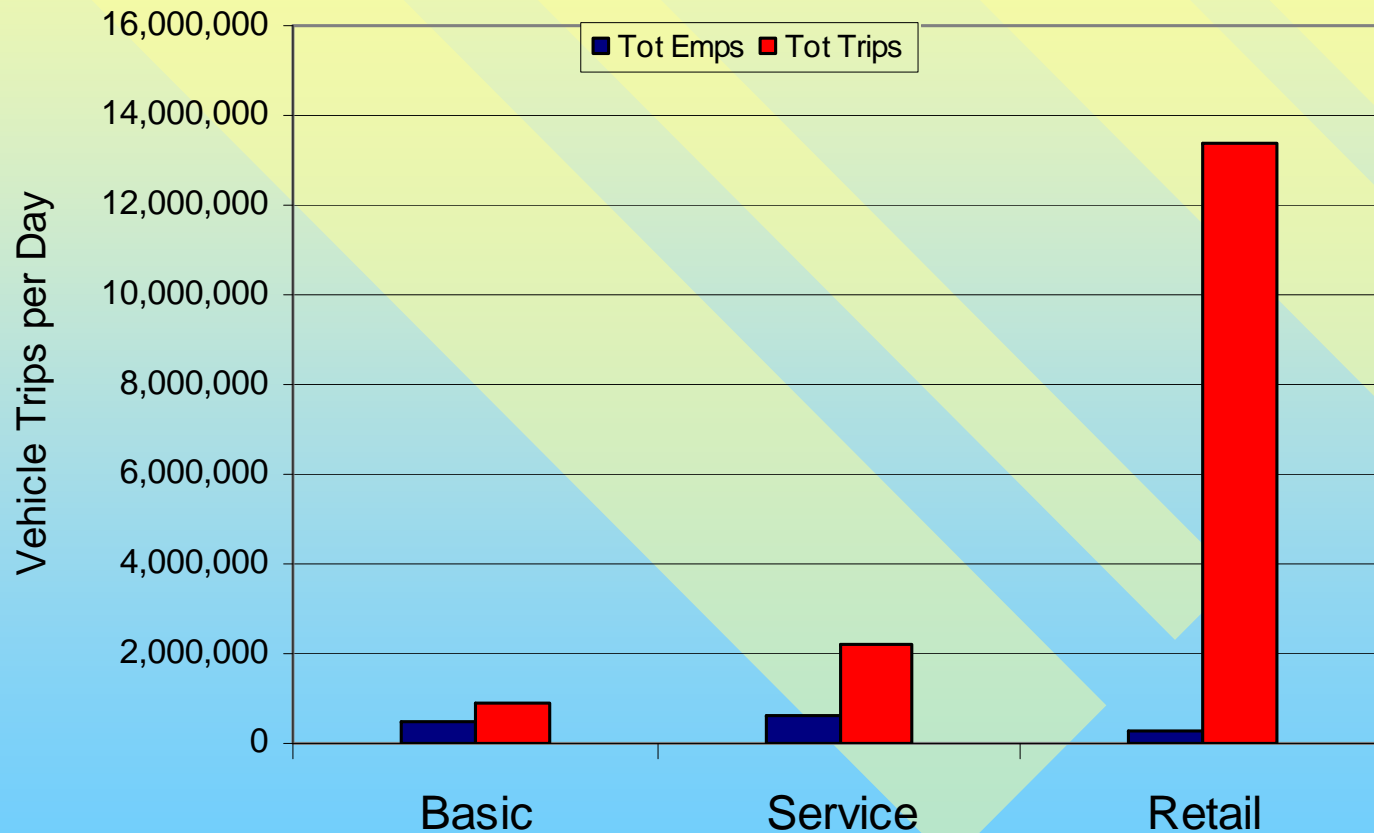
Percent of Trips by Trip Type



Source: Averages from DFW, ARC, Cleveland and Pittsburgh Establishment Surveys, Author's analysis

# A LOT of person trips

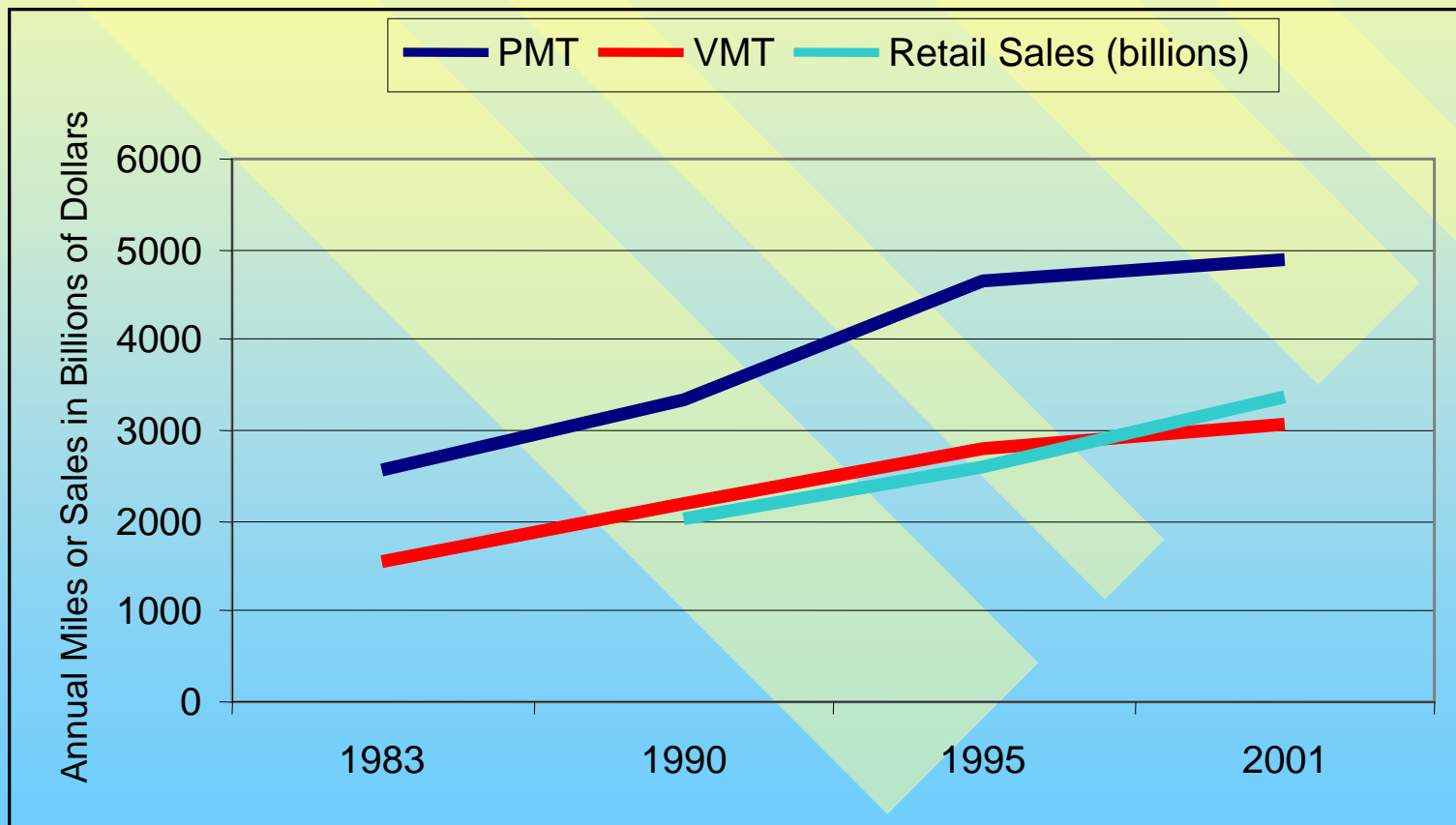
Number of Employees by Type and Vehicle Trips Generated--Atlanta, GA



Source: ARC Establishment Survey, author's analysis

# Shopping and errands are half of all trips; and increase non-home-based travel

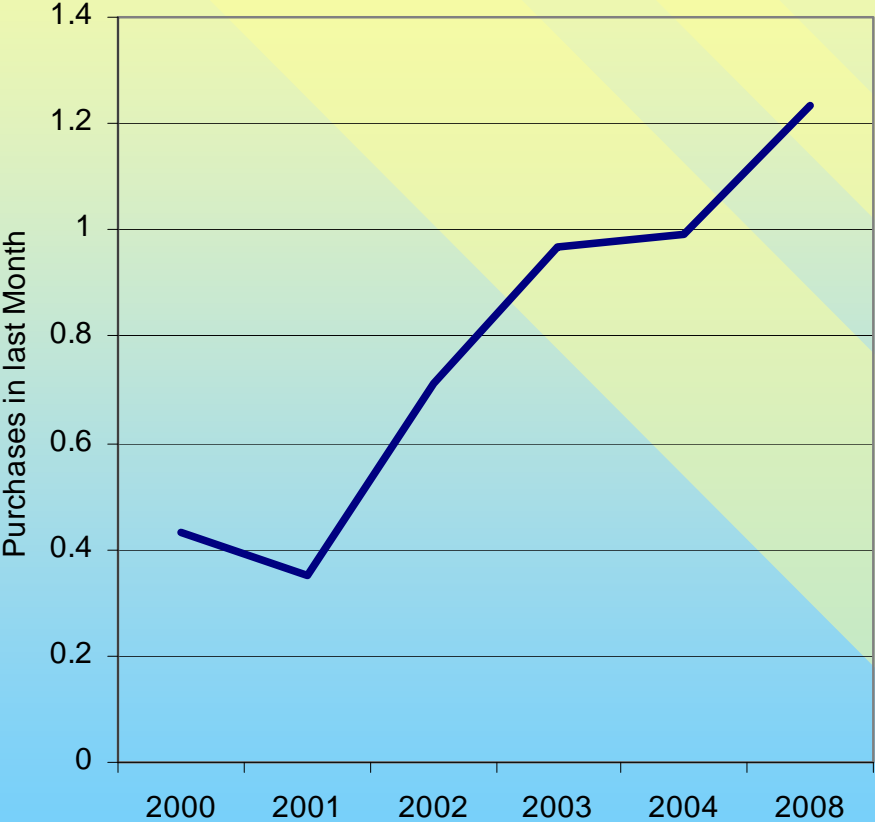
## PMT and VMT for shopping has doubled since 1983



Source: NHTS data series

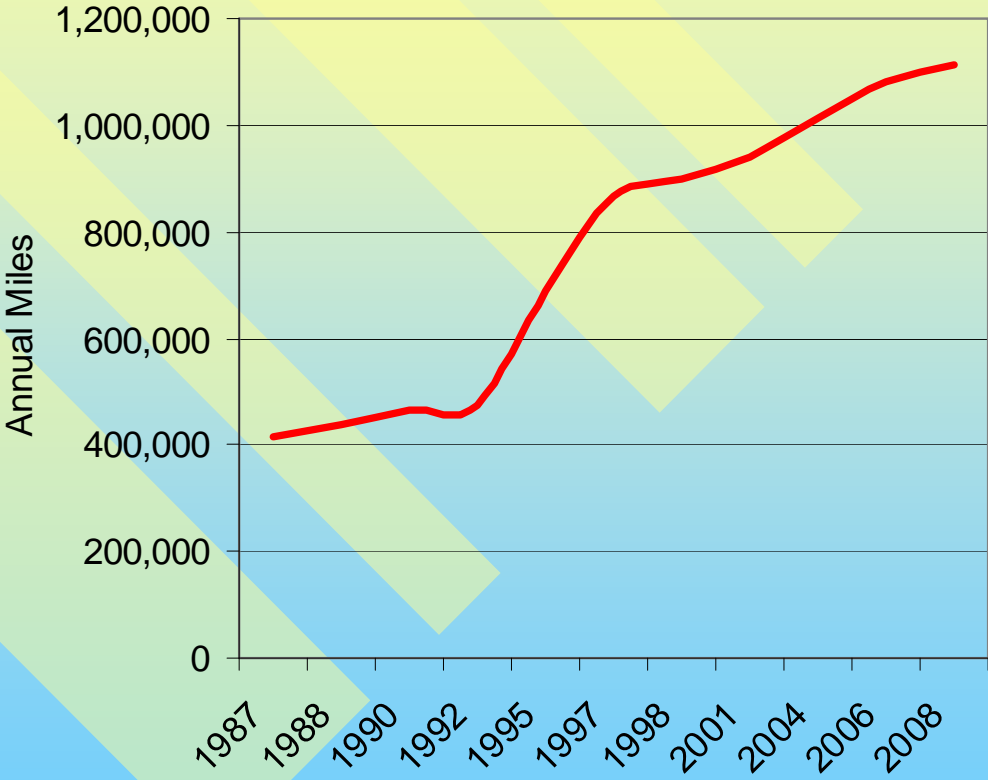
# But internet shopping may be changing the vehicle type, time, and destinations of “freight” delivery

Average Number of On-Line Purchases



Source: USPS HDS Data, 2008 from NHTS

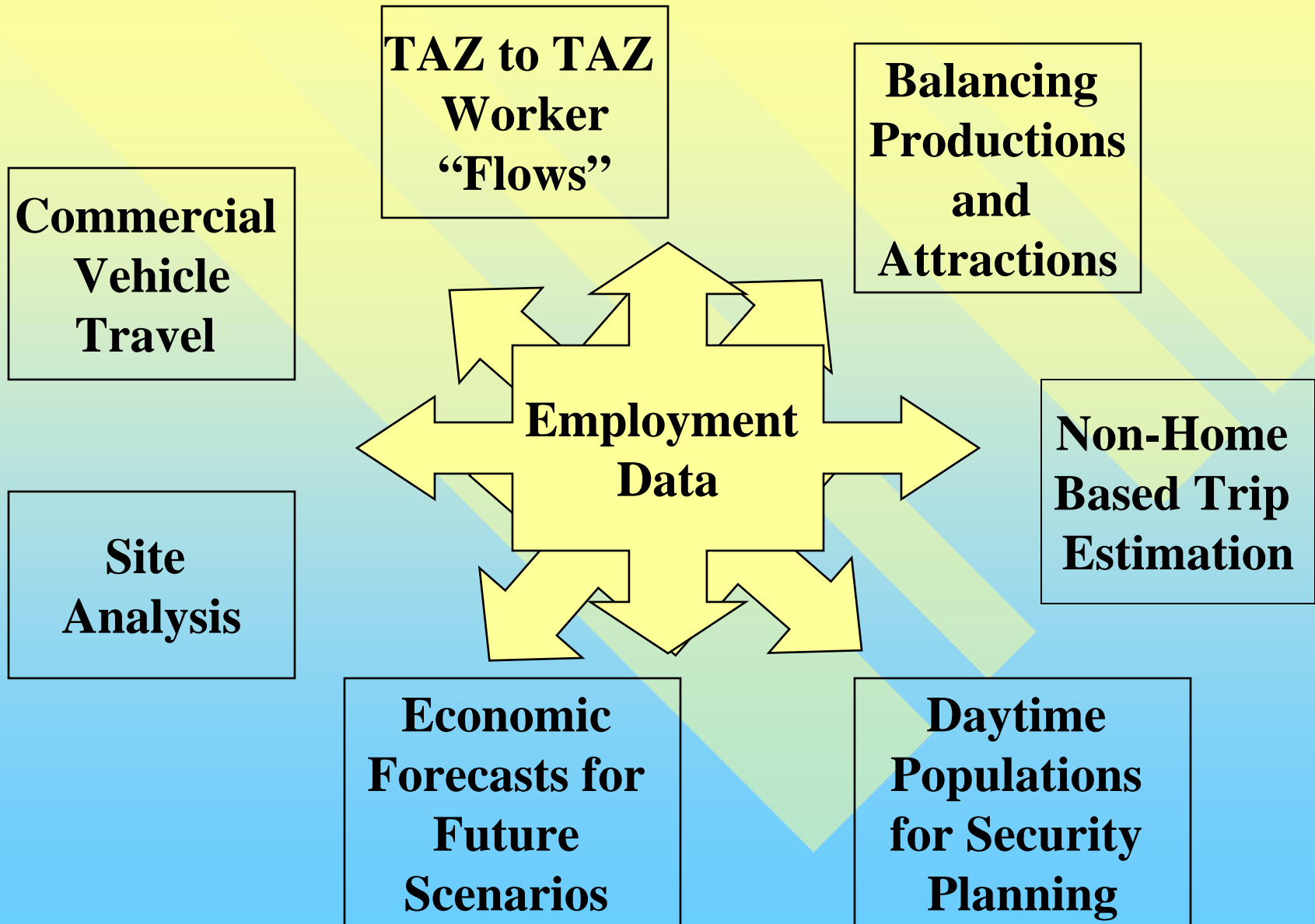
VMT from "Other 2-Axle/4-Tire Vehicle"



Source: Historic HPMS



# How do we use Employment Data?



# Commercial Vehicle Activity

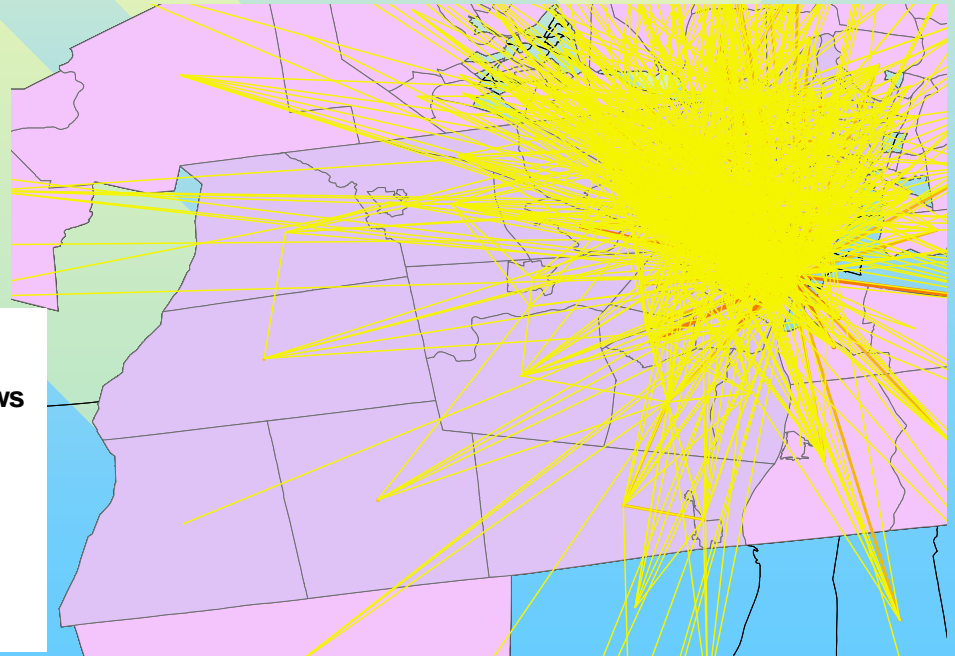
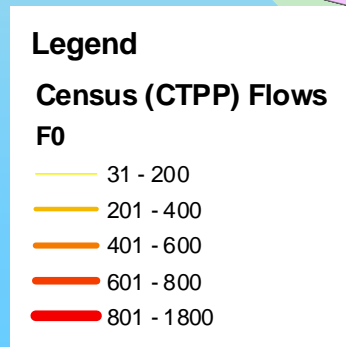
- Background data: Commercial business lists
- Economic activity location and clustering
- Commercial vehicle activity visualized as part of the vehicle mix on the roadway (Nathan)
- Potential to understand the effect of vehicle mixing: system use, safety, congestion, design implications, etc.



# Worker “Flows”

- Background data: Census JTW workplace location
- Potential ‘flows’ between home and work (HBW)
- Trip length frequency distribution
- Time of day, usual mode, etc.

Major CTPP Tract  
Journey to Work Flows



**Source: JTW in the  
Context of Daily  
Travel, McGuckin and  
Srinivasan**

# Site Analysis

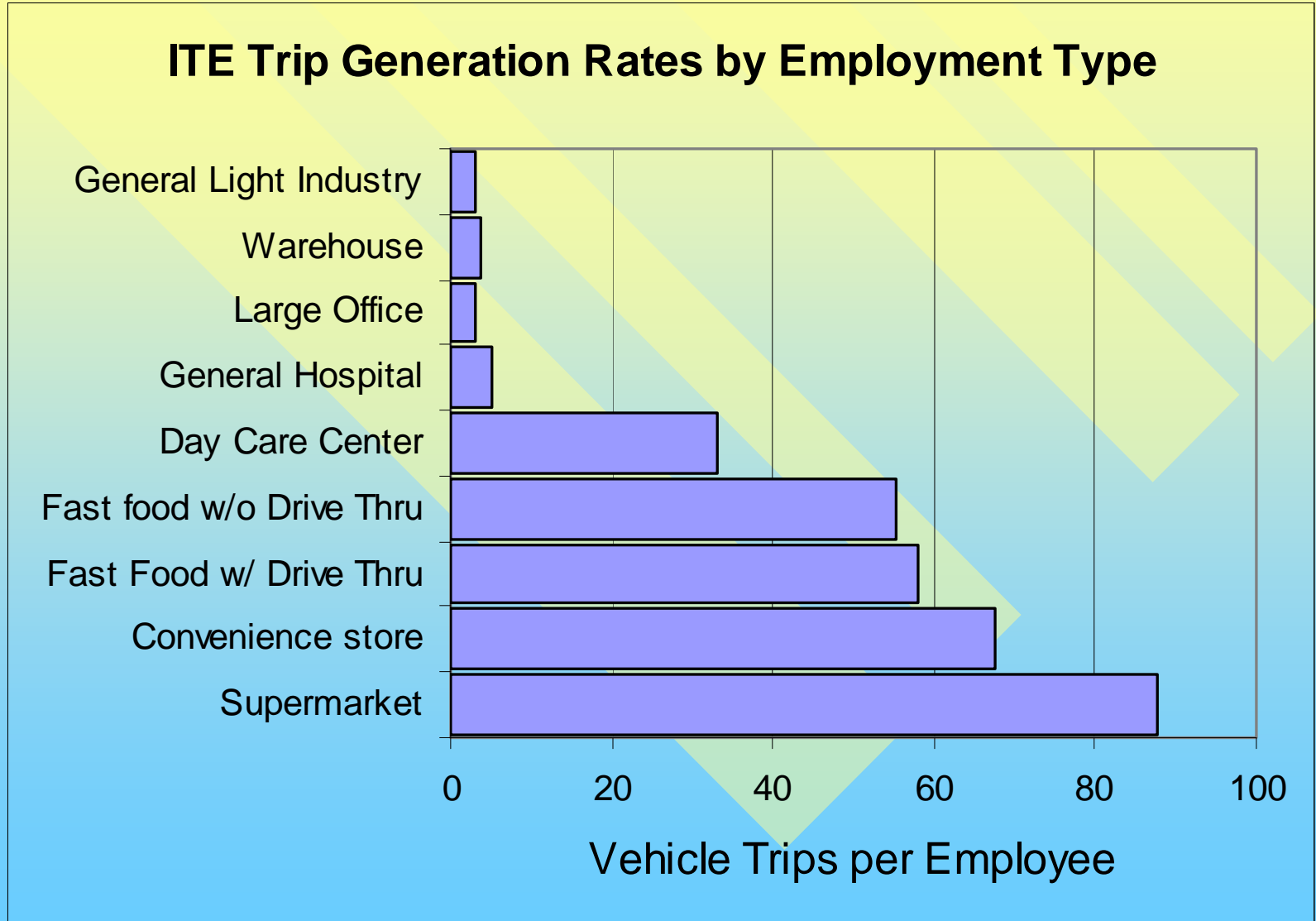
## Traffic Impact Studies

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- Background data: ITE Trip Generation Rates
- How many vehicles/trips will be added to the mix when a new development is built?
- How many parking spaces will be required for employees and visitors
- Will special traffic facilities (right turn lanes, signalized intersections) be required to help the flow of traffic around the site?

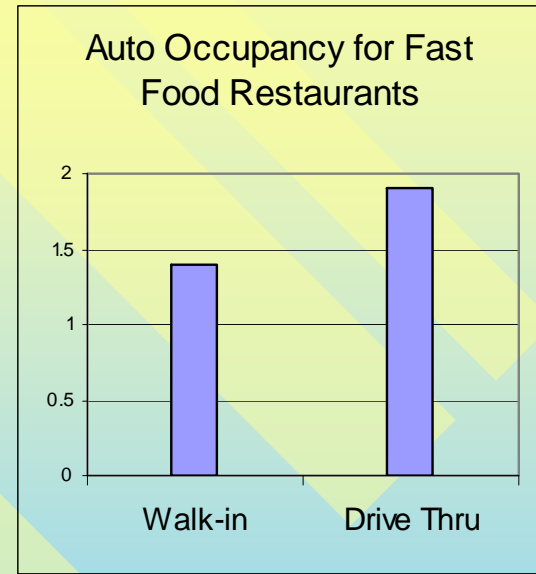


# Vehicle Trips Attracted by Land-use



# Non-Home Based (NHB) Trips

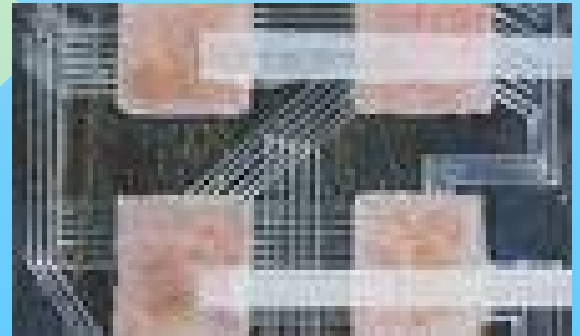
- Background data: Attraction survey (sample from commercial business list)
- Employee, visitor, and commercial trips by purpose, time of day, mode, auto occupancy
- Employer TDM measures
- Parking usage and cost
- Transit accessibility
- Special generators



# Balancing Productions and Attractions

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- Trips are 'produced' at residences and 'attracted' to commercial sites
- Travel demand is a function of the amount, location, and intensity of activity (commercial/gov't/recreation) in a region
- Measured as land-use by type (including sales, employment, square foot of development, and other measures of amount)
- Ideally, trips generated on the network are balanced against attractions

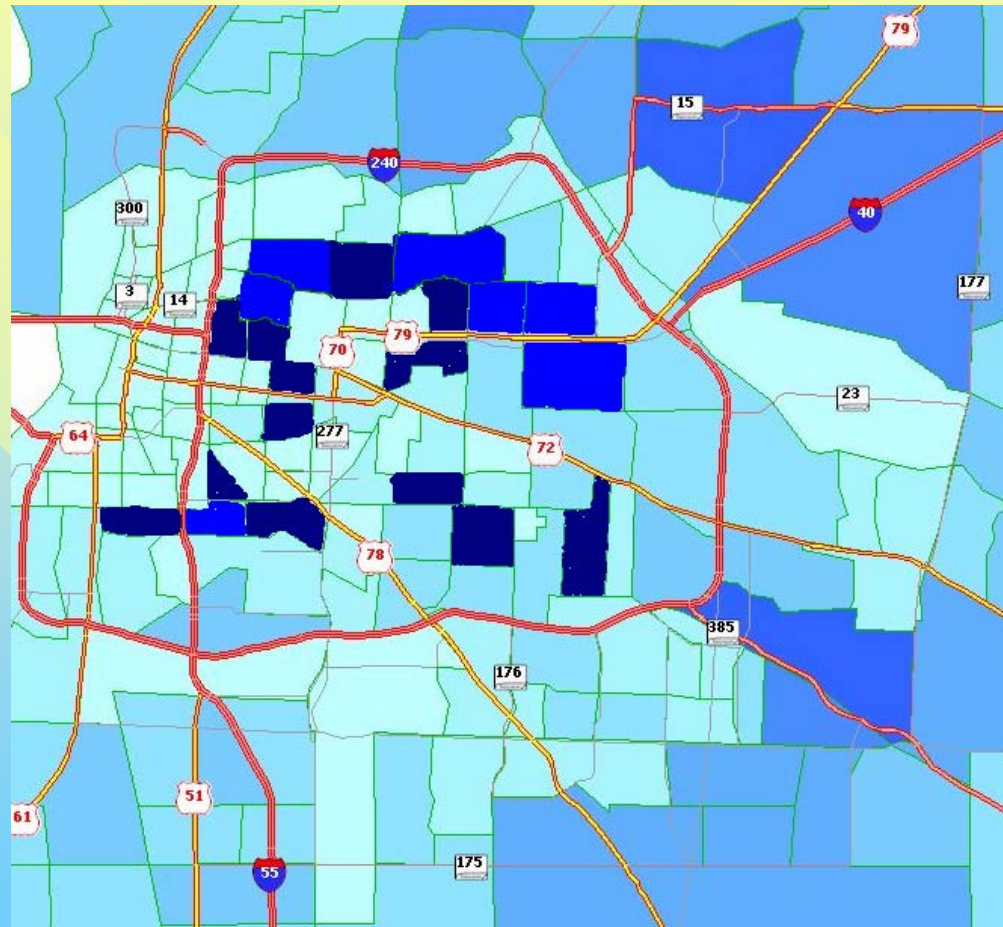


# Estimating Daytime Populations

Number of  
workers at  
work, visitors,  
people in  
motion and  
people at home

2:00 pm  
Tuesday

Memphis, TN





# Socio-economic forecasts: Where will people live and work in the future? (for future scenario planning)

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- Background data: Number of workers by industry type by State/region
- Assigned to land-use inventory locally based on land requirements
- Combined with pipeline development and developable land in local areas
- Most MPOs are responsible for assigning SE data to TAZ (Spielberg's work)

# Which features are most in need of improvement?

27% of all MPOs stated that land use forecasting was the feature of their model that was most in need of improvement

Response	All	MPO Size		
		Large	Medium	Small
1. LU Forecasting	38	4	12	22
2. Lack of Detail/Quality in Mode Choice Model	30	5	16	9
3. Trip Generation	24	3	10	11
4. Lack of Time of Day	15	4	5	6
5. Lack of Travel Survey Data	14	4	3	7
6. Lack of Recent Quality Calibration	12	5	2	5
7. Lack of Toll/HOT Lane Modeling	11	3	4	4
8. Lack of Commercial/Truck Vehicle/Freight Modeling	9	3	4	2
9. No Mode Choice Model	9	2	3	4
10. Lack of Tour Based/Activity Based Model	8	5	2	1
Other	66	21	22	23

# Forecast Requirements

## FHWA Certification Checklist for Travel Demand Forecasting Models

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**Population change** - Population assumptions should be compared to past trends, and to statewide demographic control totals.

**Employment change** - expected change in regional employment over the duration of the Transportation Plan. Employment assumptions should be compared to past trends, and to statewide economic growth control totals.

**Regional distribution** of future population, employment and land use - Are the land use forecasts consistent with local jurisdictions' Master Plans? If land use models were employed, these should also be documented under forecasting methods.

**Demographic changes** - Demographic changes might include, auto ownership, household income, household size, multi-worker households, minority households, etc.

**Travel behavior changes** - Travel behavior changes might include telecommuting, Internet shopping, trip chaining, etc.



# **Some Challenges**

# Which source is the “best” estimate?

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<b>Data Source</b>	<b>Employment in thousands</b>
CPS - April 2000	137,264
CES - April 2000	131,677
Census 2000 (April 2000)	129,722
CTPP 2000	128,279

**CAVEATS: CTPP Workers are different from C2000 Employment**

<http://www.fhwa.dot.gov/ctpp/pt2compare.htm>

**C2000 Employment is different from CPS data**

[http://www.census.gov/hhes/www/laborfor/final2\\_b8\\_nov6.pdf](http://www.census.gov/hhes/www/laborfor/final2_b8_nov6.pdf)

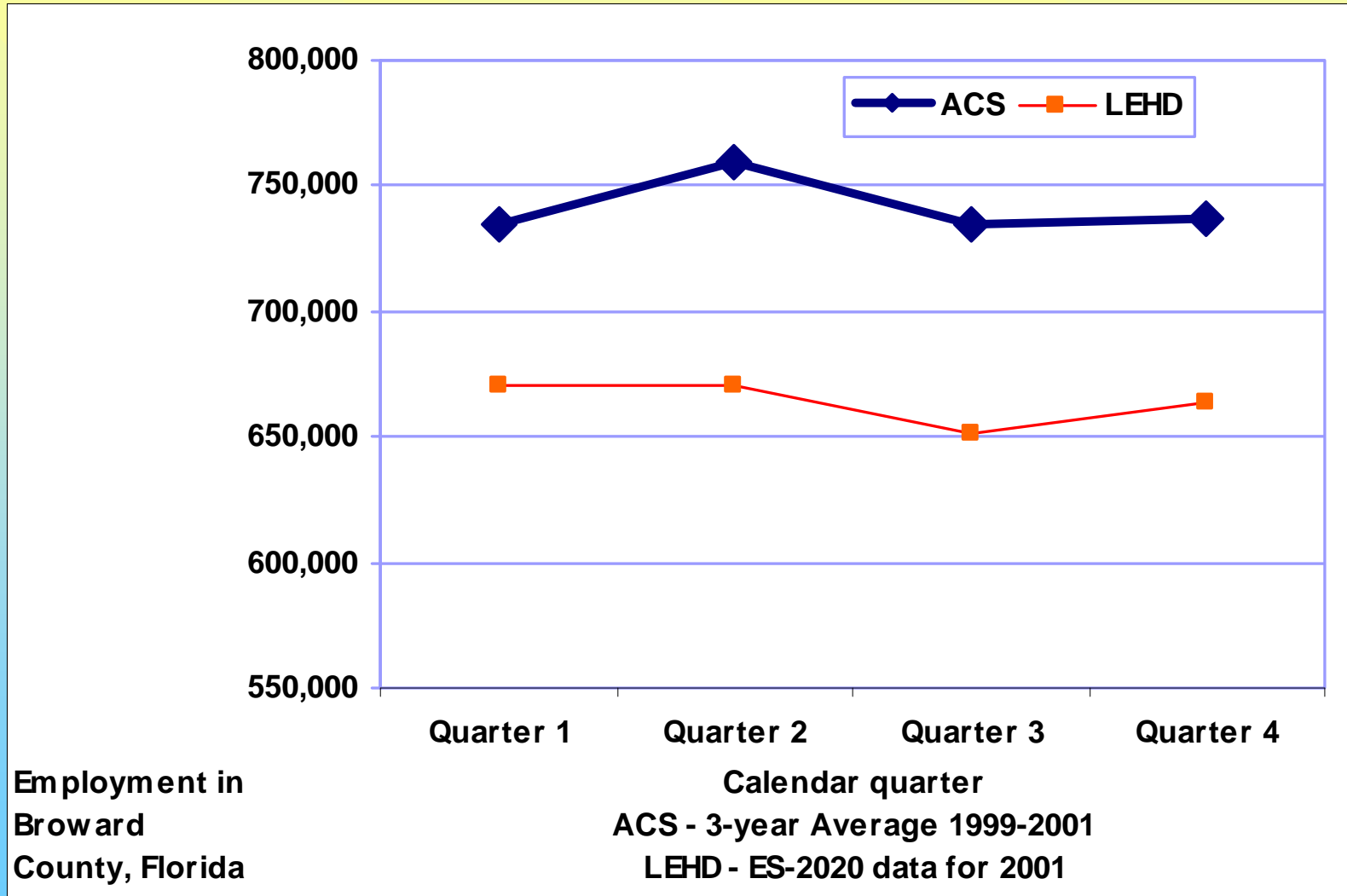
# What differences appear between NAICS and SIC?

<b>Montgomery County, MD</b>	<b>Retail Trade</b>	
	<b>NAICS</b>	<b>SIC</b>
Total Employment	49,723	73,854
Net Job Flows	426	2,850
Job Creation	3,106	8,006
New Hires	10,839	20,740
Separations	12,574	23,432
Turnover	12.70%	14.80%
Avg Monthly Earnings	\$2,575.00	\$2,189.00
Avg New Hire Earnings	\$1,612.00	\$1,372.00

For correspondence between NAICS and SIC, please visit:

<http://www.census.gov/epcd/www/naicstab.htm>

# How does seasonality effect employment estimates?



Source: Nanda Srinivasan, CS

# Land-use/Employment is important

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- Understanding the economics of the area
- Tracking commercial vehicle travel
- Tracking changes in non-work travel
- Site analysis
- Worker 'flows'
- Non-home-based trips
- Balancing productions and attraction
- Estimating daytime populations
- Forecasting future travel



# Thank You!

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