Peak Car Travel : An Analysis of Trends in the National Capital Region

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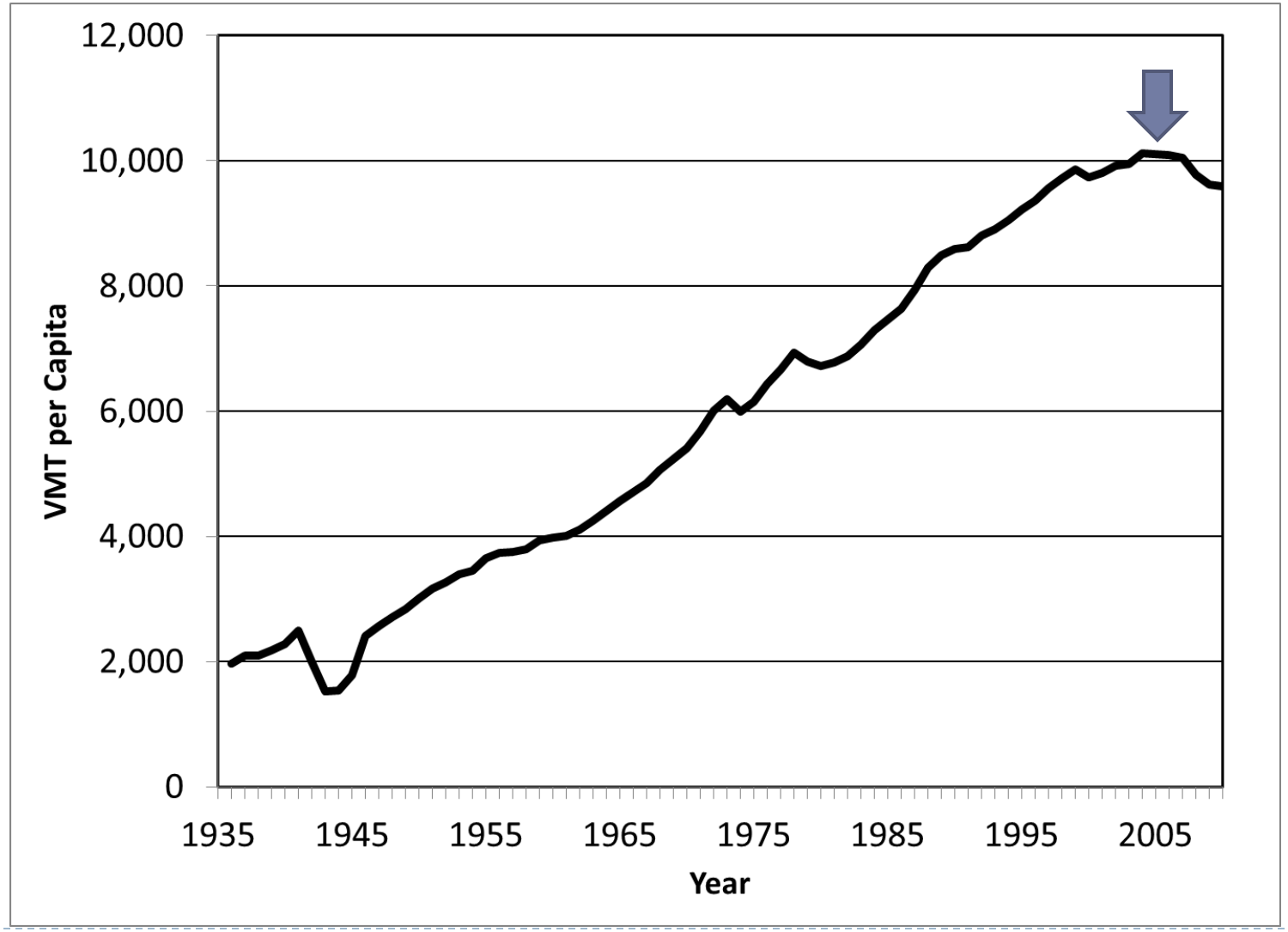
Presented to MWCOG TPB TFS on Friday, March 20, 2015

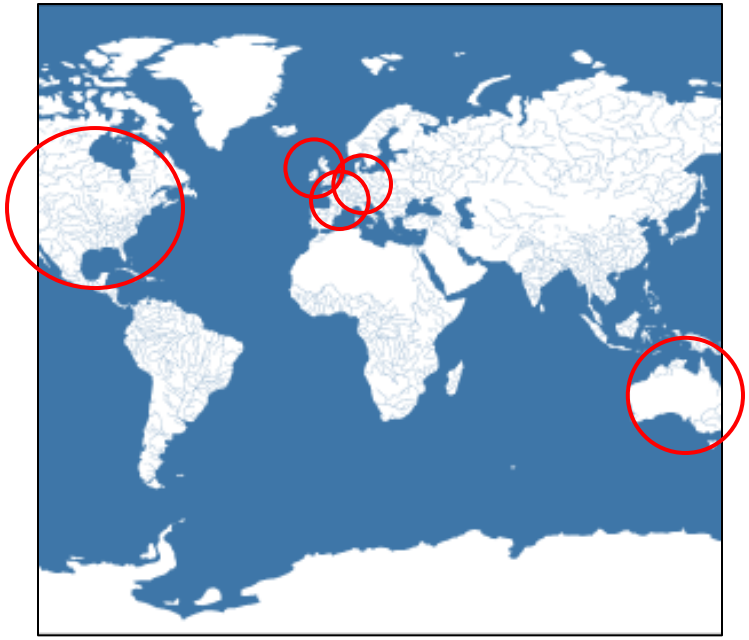
What is Peak Car Travel?



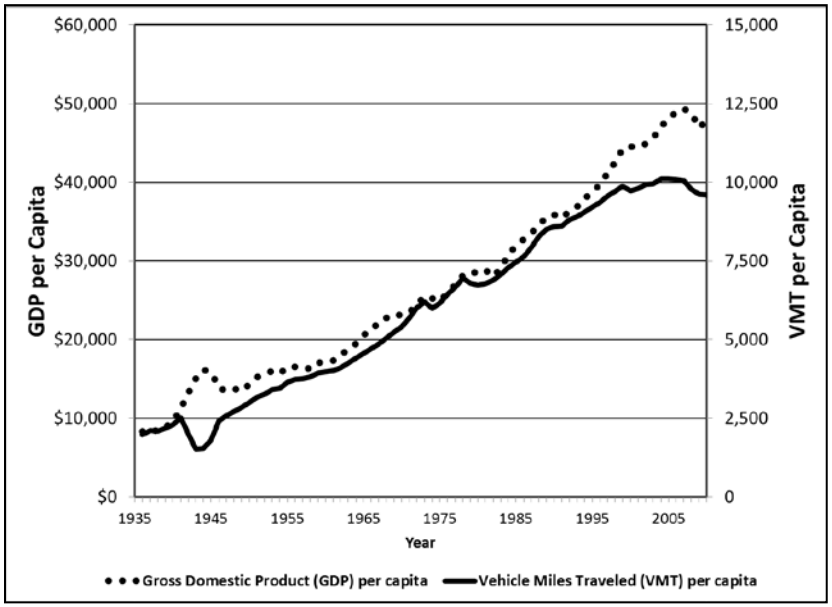
Nationally

Sources: FHWA: 2011, 2013; U.S. Census: 2012

Existing Research



Peaks identified nationally & internationally



Decoupling from GDP

Sources: FHWA: 2011, 2013; U.S. Census: 2012; U.S. Department of Commerce: 2012

Unknowns

Causes of Peak Car Travel:

- Great Recession of 2008?
- Back-to-City Movement?
- Information Communication Technologies?

Nature of Phenomenon:

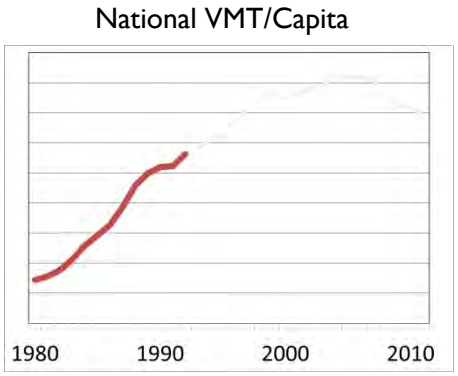
- Temporary or Permanent?

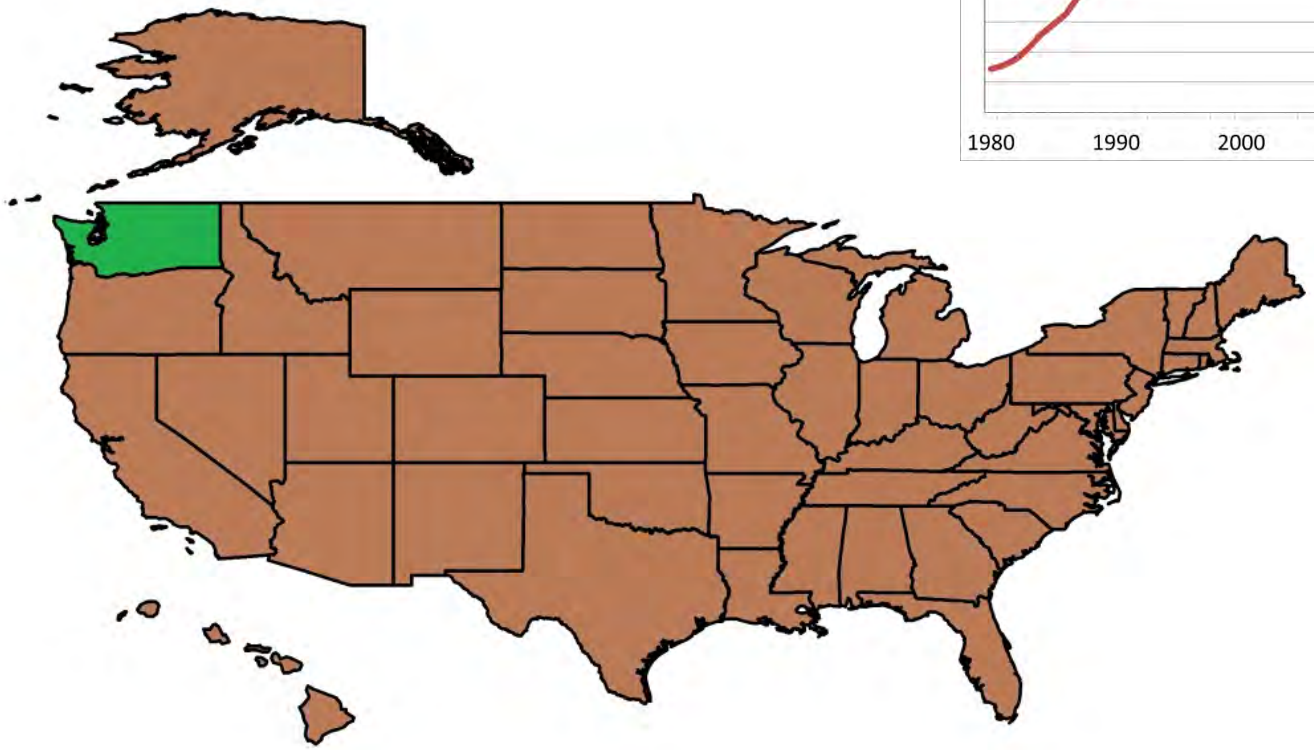
ITE President's Message, 2012

"So will VMT continue its slight downward trend, or will it turn upwards and rejoin the economic activity trends? All of these factors will need to be weighed to make proper recommendations for future decisions."

-Rock Miller, Former President, Institute for Transportation Engineers

State-Level Patterns: 1992

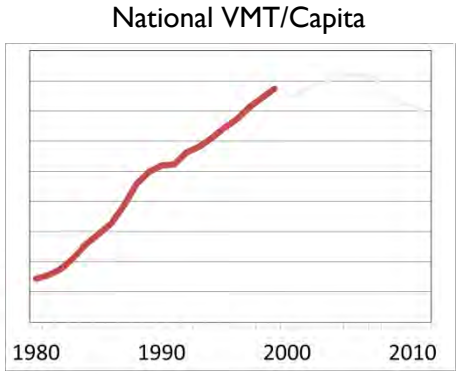


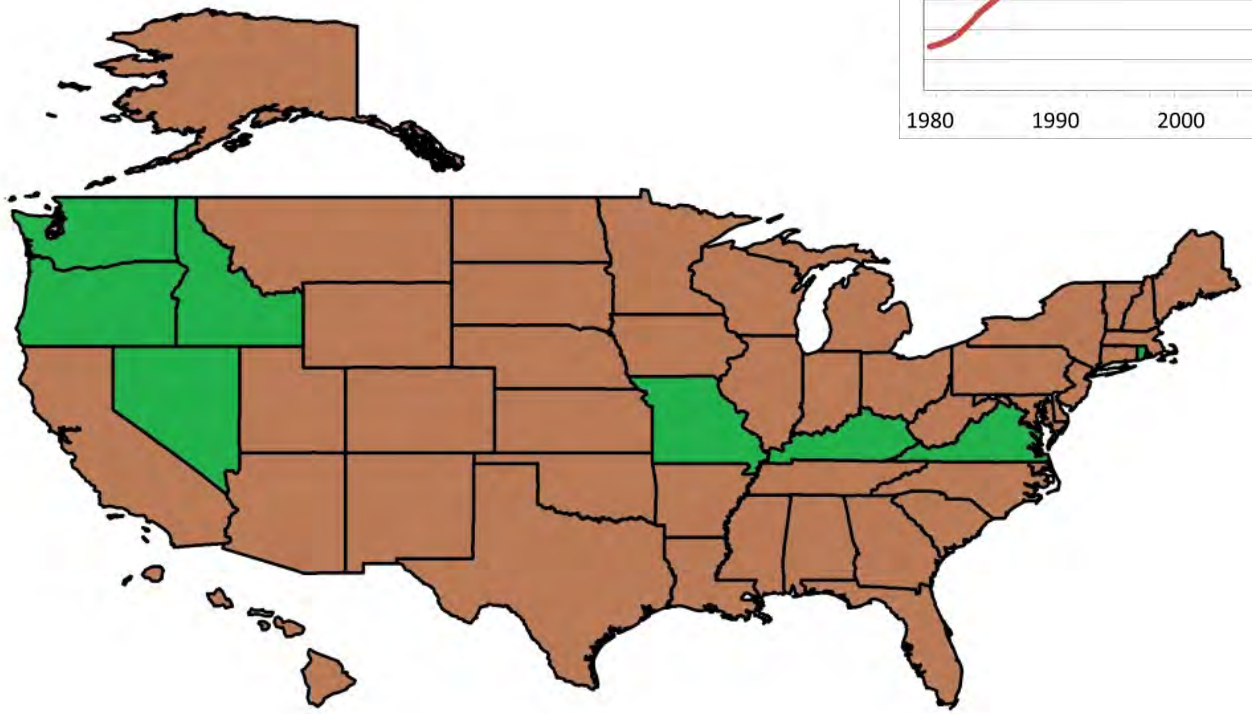


Increasing / Has Not Peaked

Peaking / Below Peak Level

State-Level Patterns: 1999

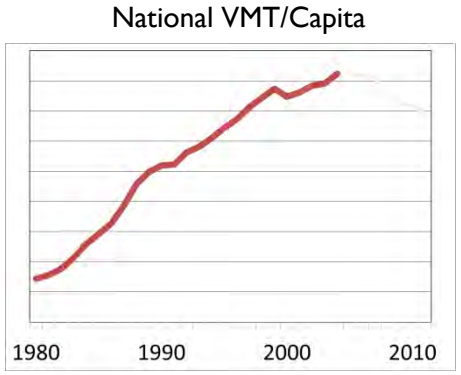


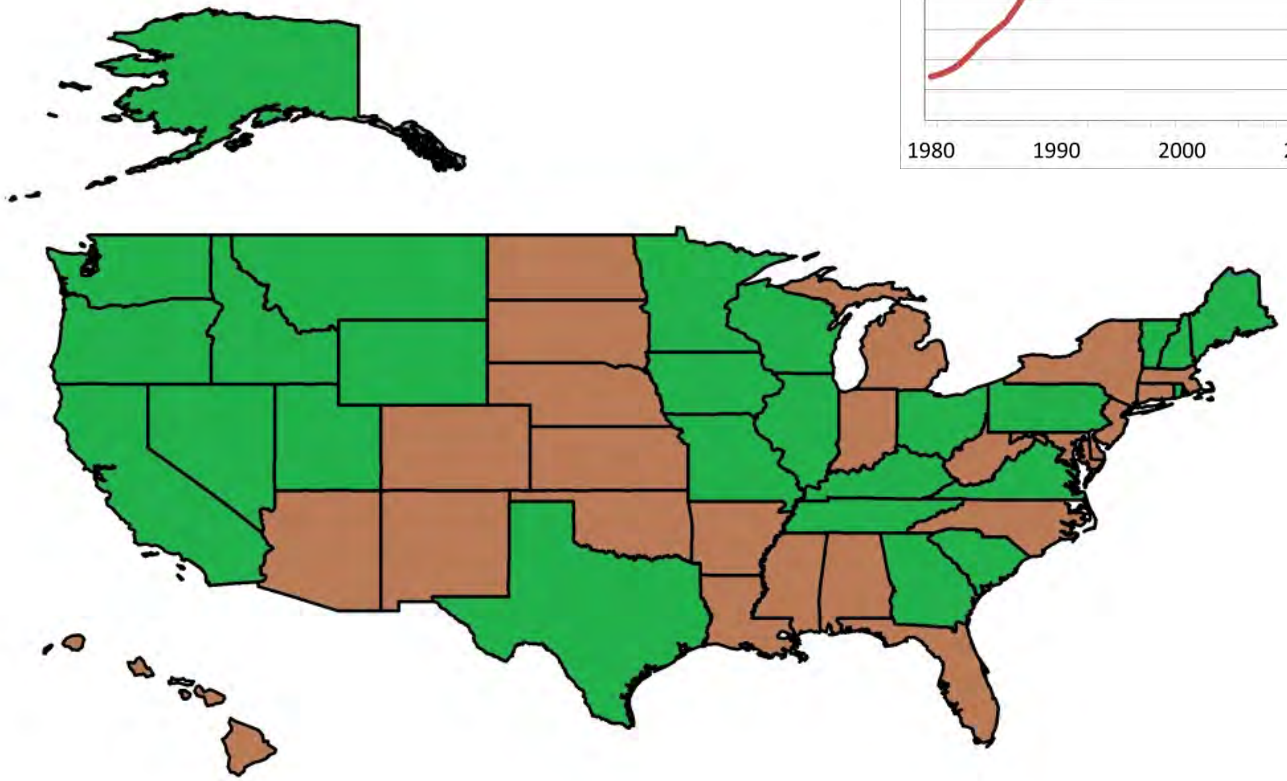


Increasing / Has Not Peaked

Peaking / Below Peak Level

State-Level Patterns: 2004

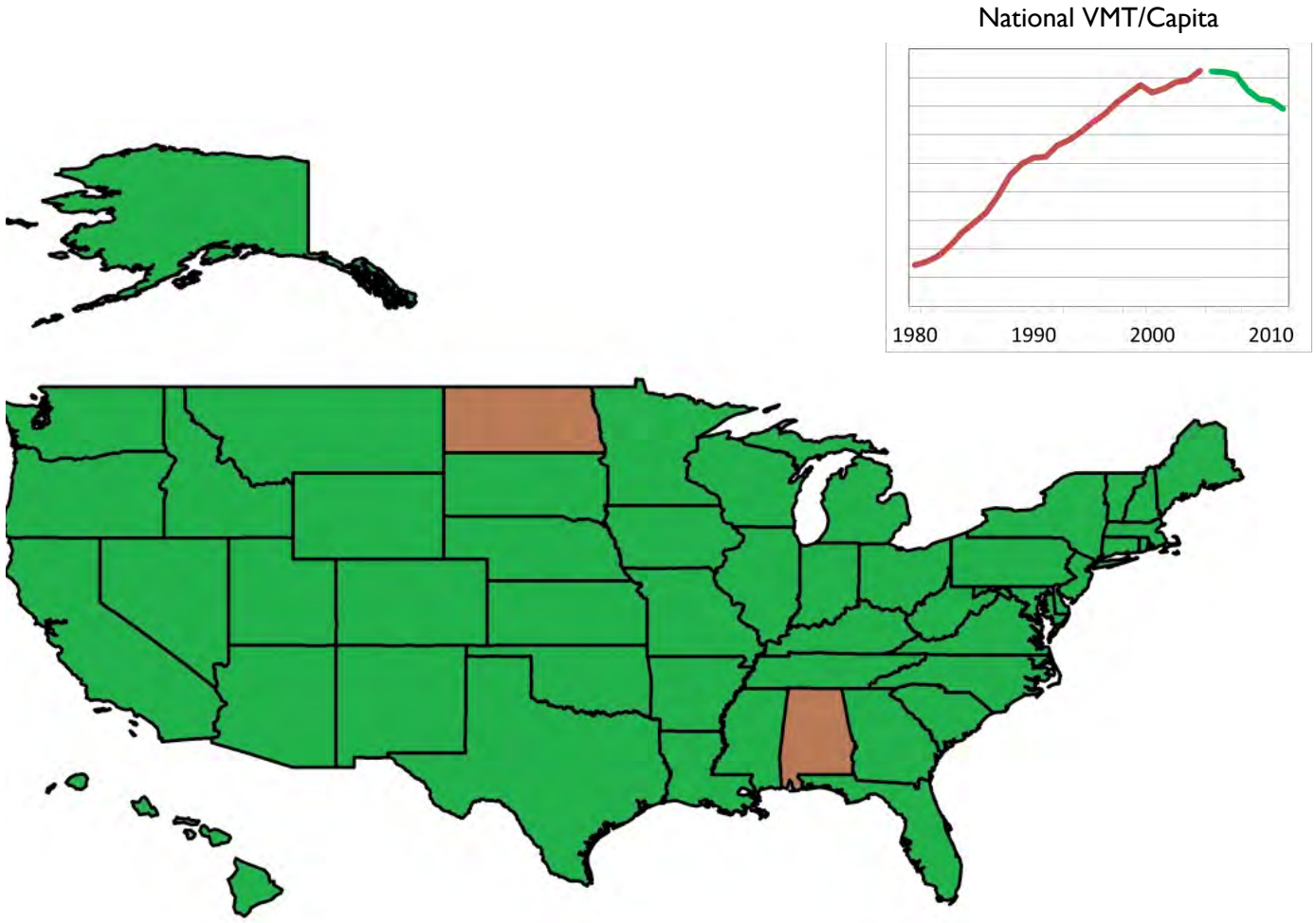




Increasing / Has Not Peaked

Peaking / Below Peak Level

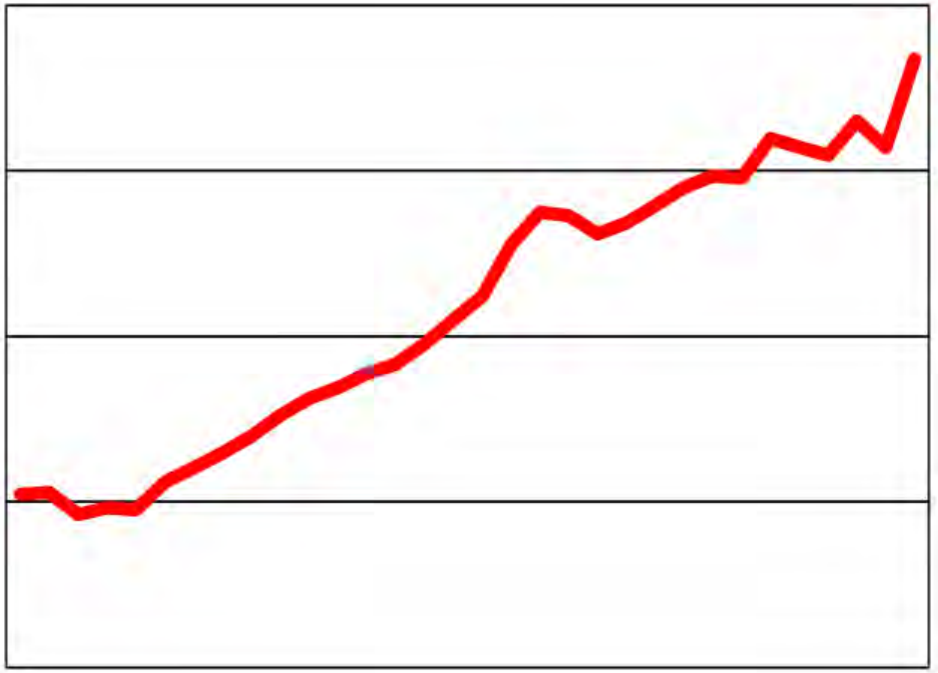
State-Level Patterns: 2011



Non-Peaking States

2
states

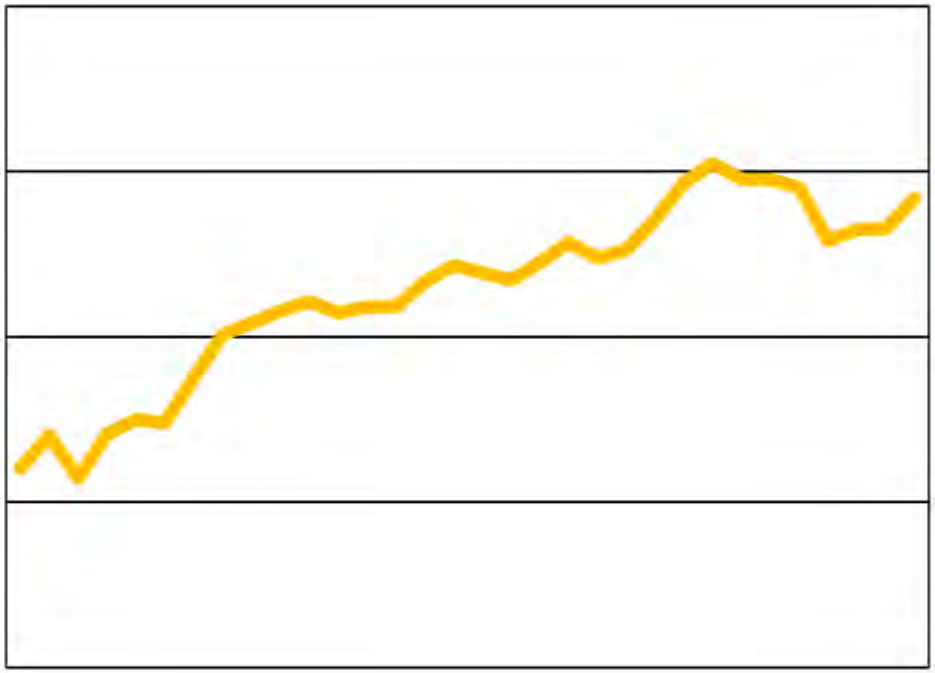
- Continued overall increases
- Alabama & North Dakota



Peak, Dip & Rise

8
states

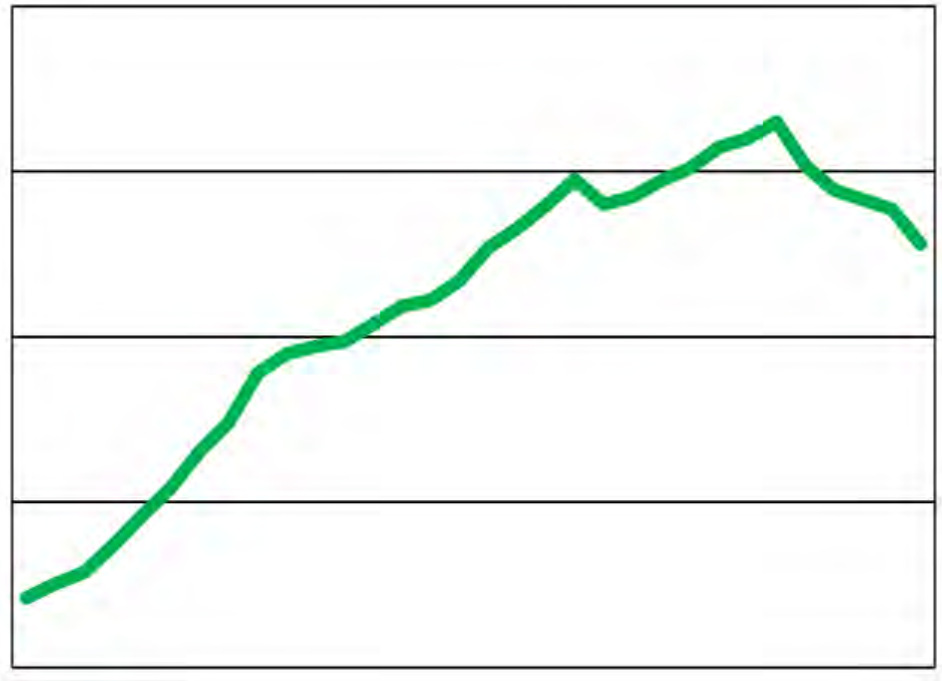
- Peak & Decline
- Now increasing, still below record-high peak



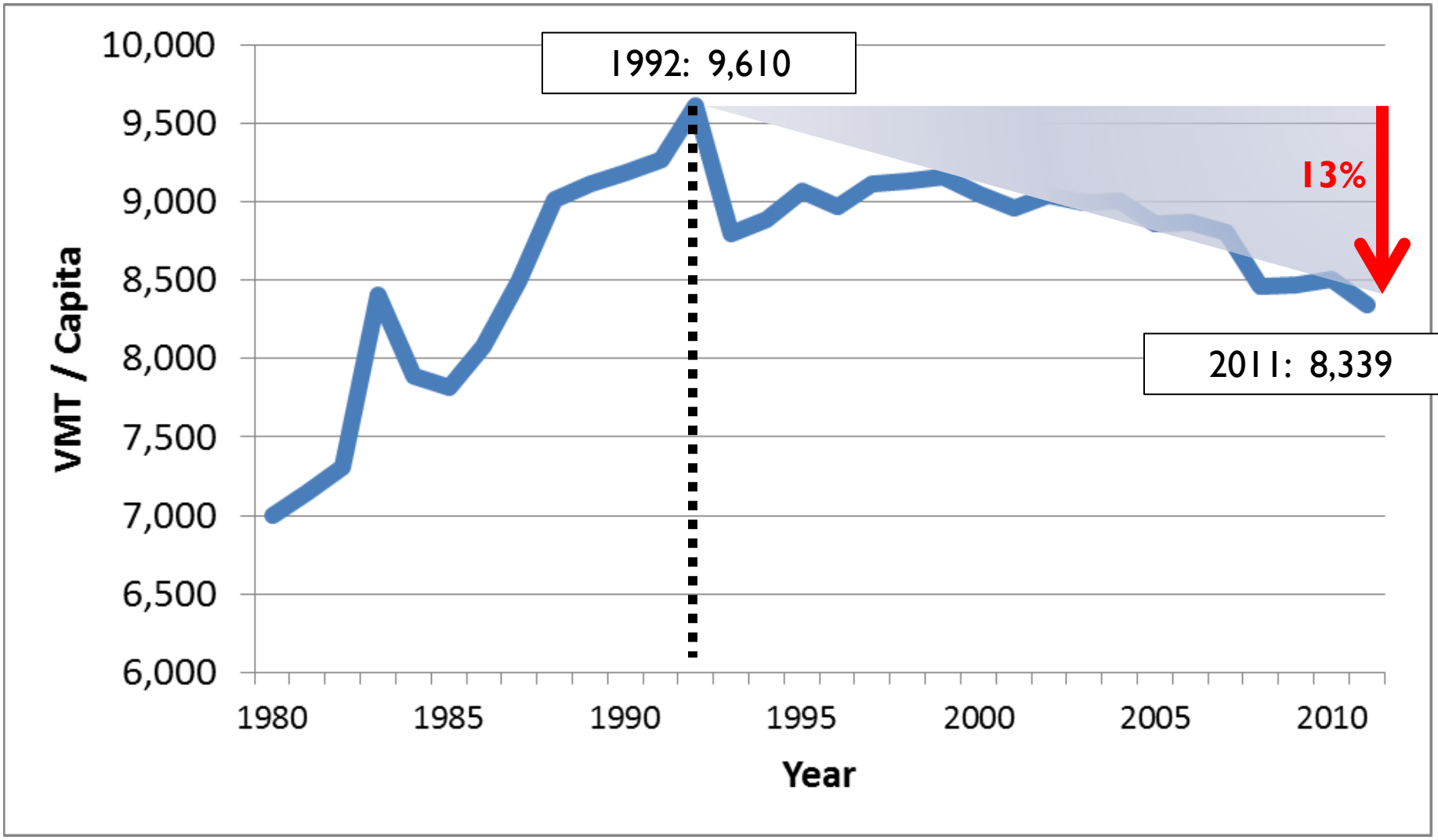
Peak & Decline

41
states

- Record-high peak
- Continued overall decline

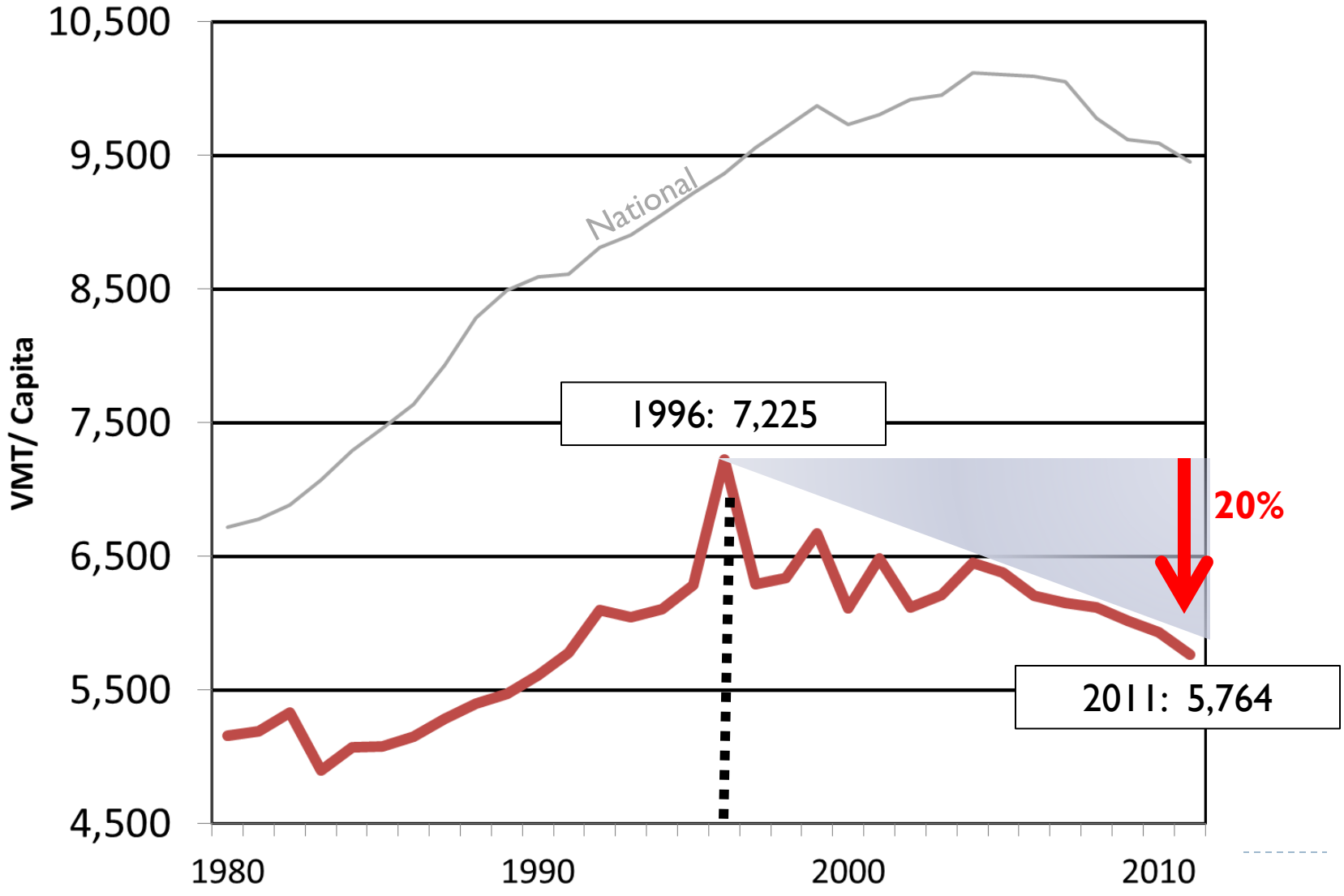


First Peak: Washington State

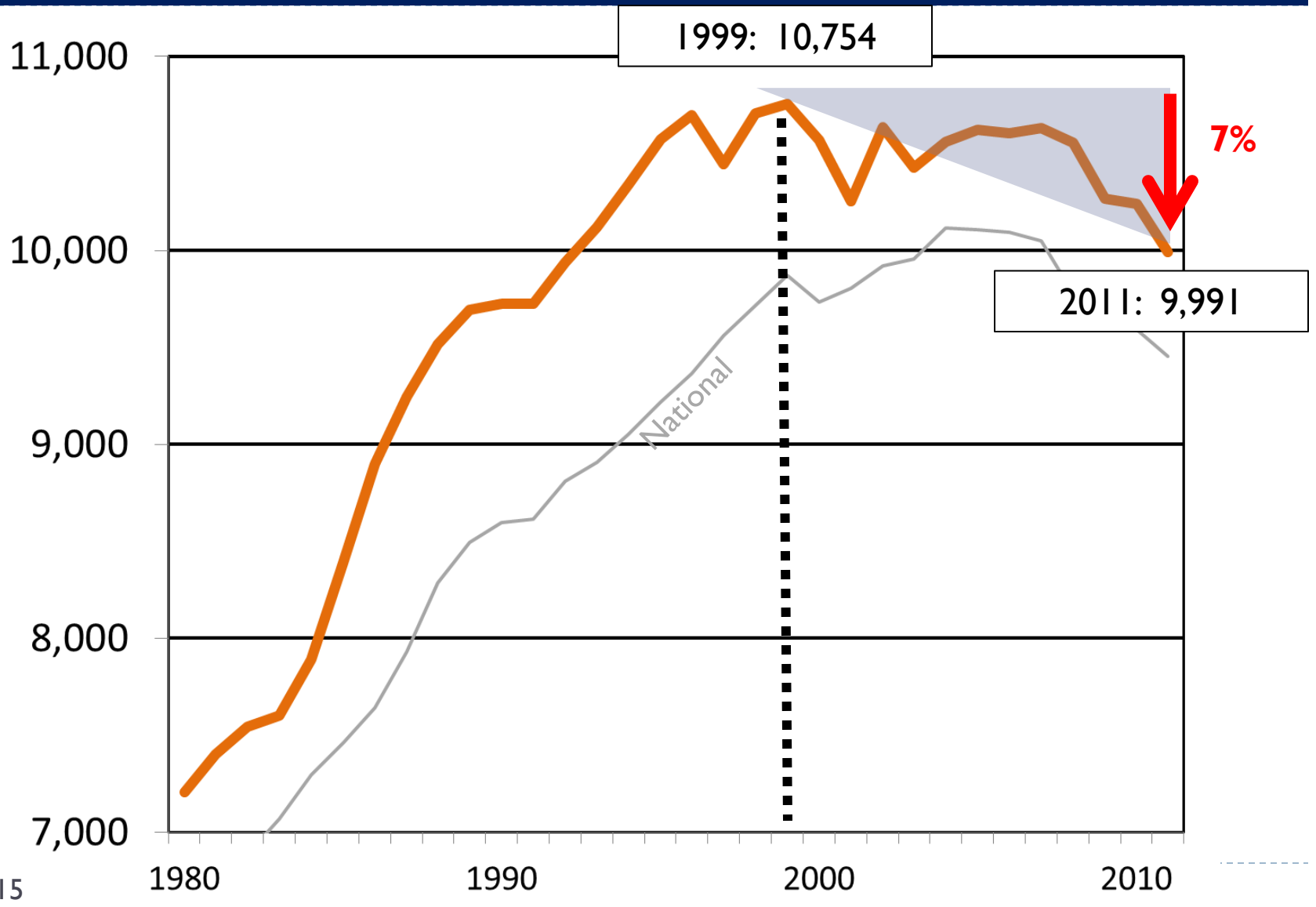


Washington, D.C.: 1996

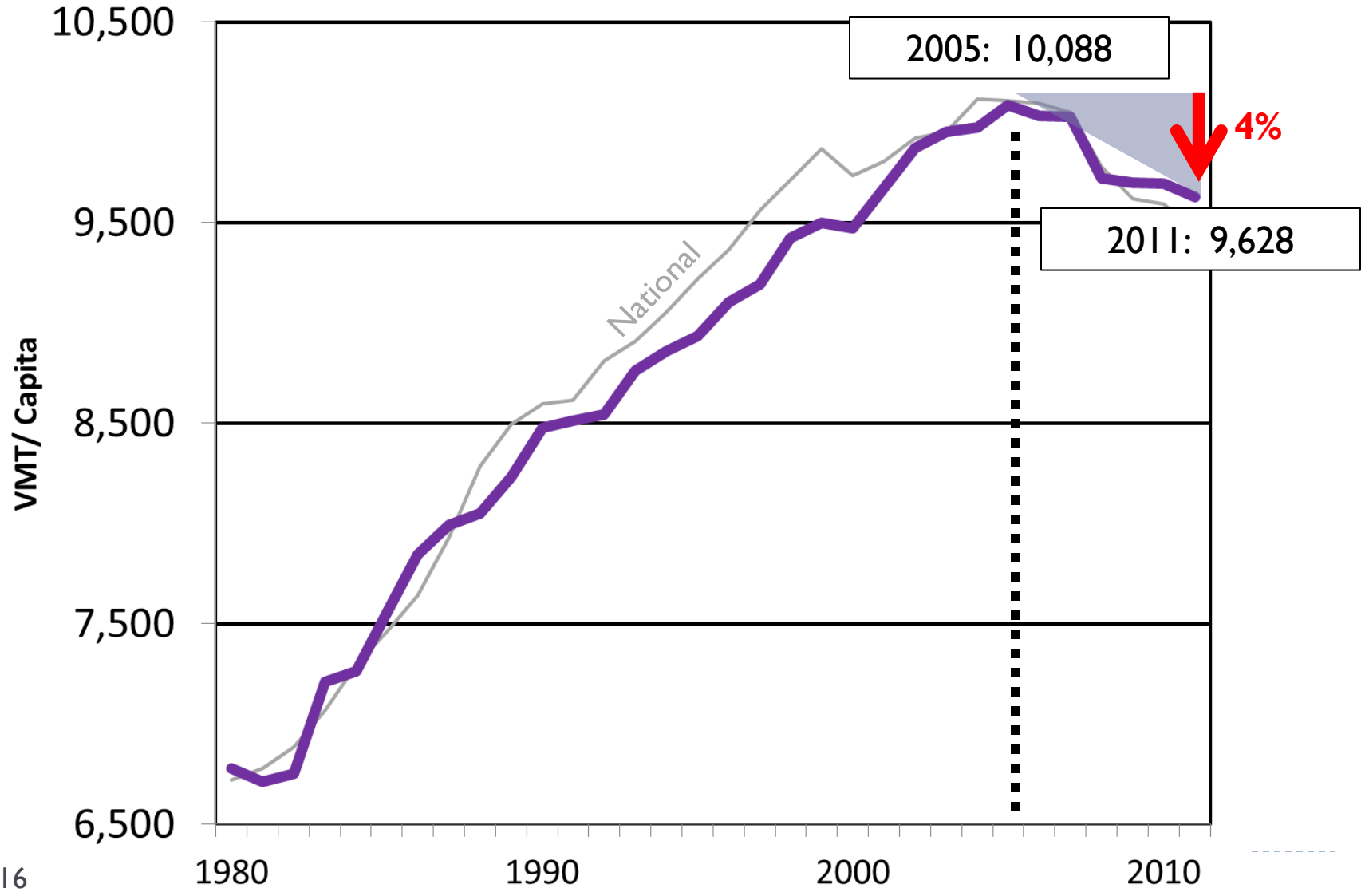
(Tied with Nevada for 2nd peak)



Virginia: 1999



Maryland: 2005

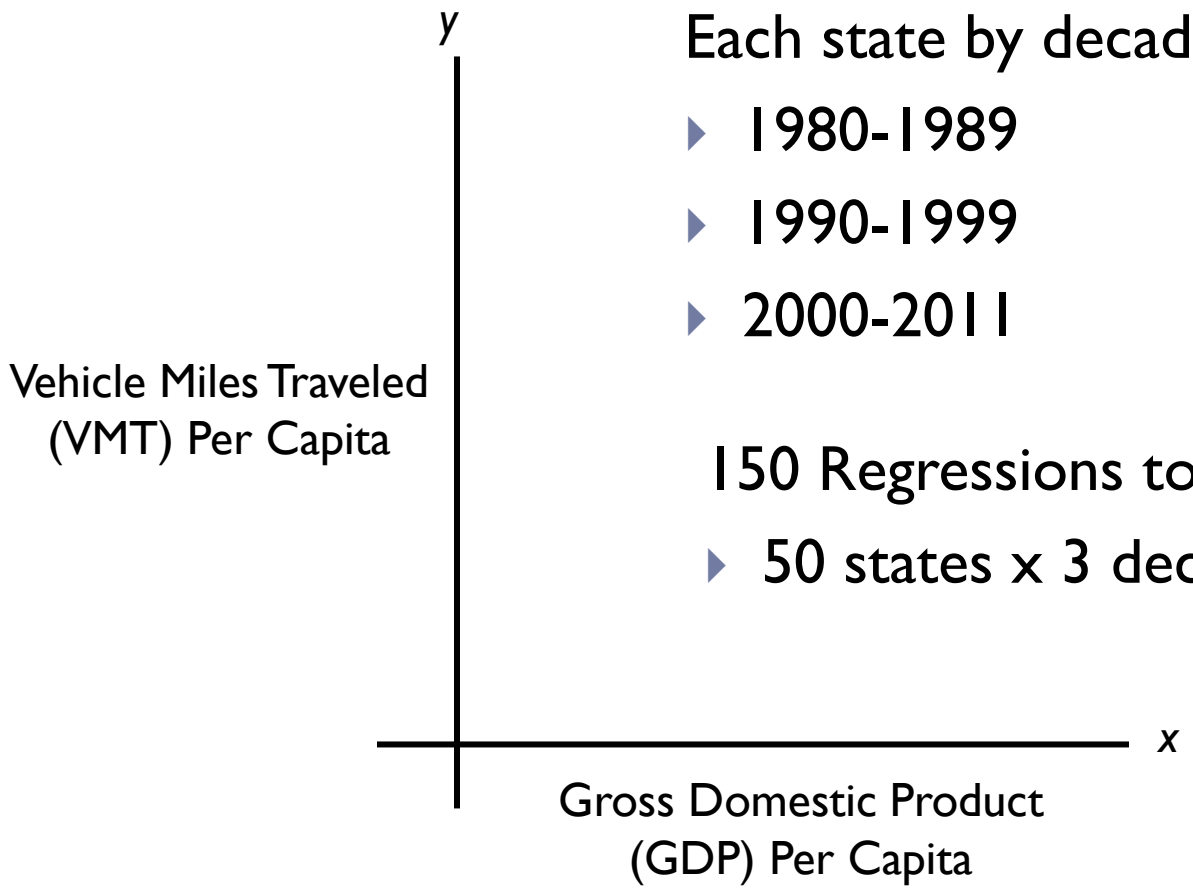


Peak Car Travel: Early & Widespread

Era	States	Total Peaking / Past Peak	Time
Rapid VMT Growth Era		0	23-80 years ago
	Washington State	1	23 years ago
	Washington, D.C. & Nevada	3	19 years ago
Slowing Growth	Virginia + 5 other states	9	16 years ago
Peaking	Maryland + 5 other states	33	10 years ago
Post-Peak	Indiana	49	6 years ago

Longevity of phenomenon suggests it may be permanent in nature

Driving & The Economy



Simple Linear Regressions:

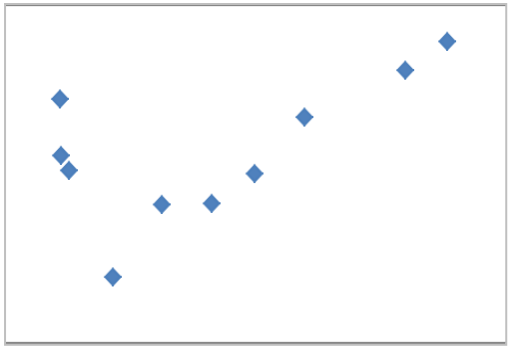
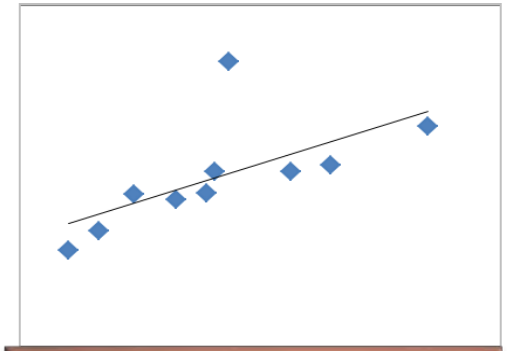
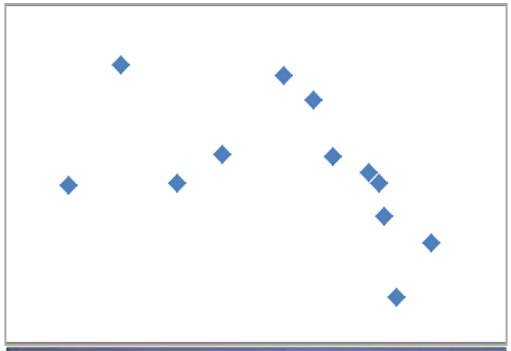
Each state by decade

- 1980-1989
- 1990-1999
- 2000-2011

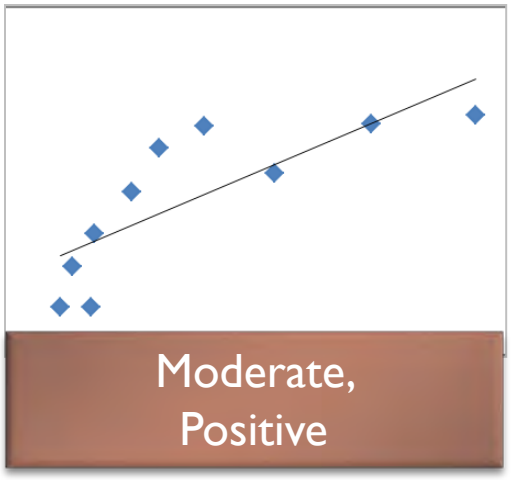
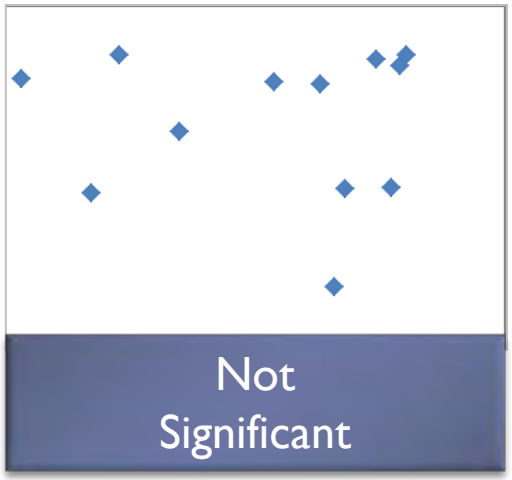
150 Regressions total

- 50 states x 3 decade per state

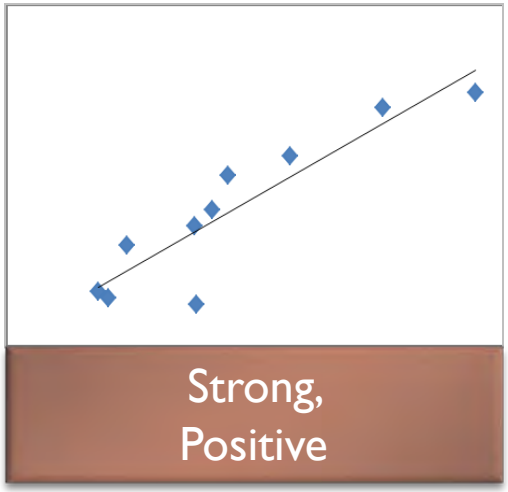
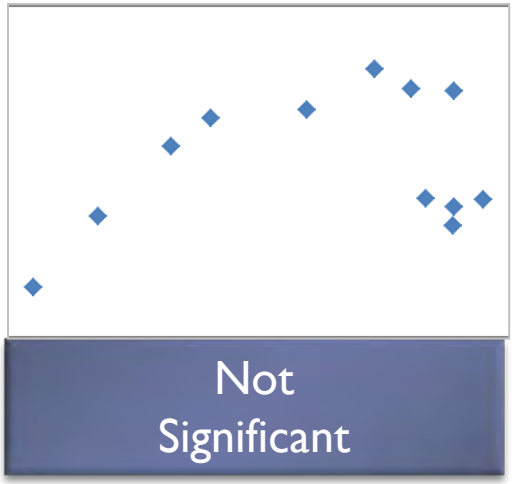
Model Results: Washington, D.C.

1980-1989	1990-1999	2000-2011
		
Low Moderate	Moderate Slightly Positive	Not Significant
P-value: 0.06	0.05	0.11
R-Square: 0.36	0.41	N/A
Slope: 0.01	0.03	N/A

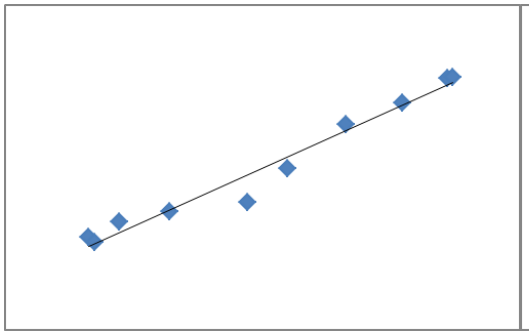
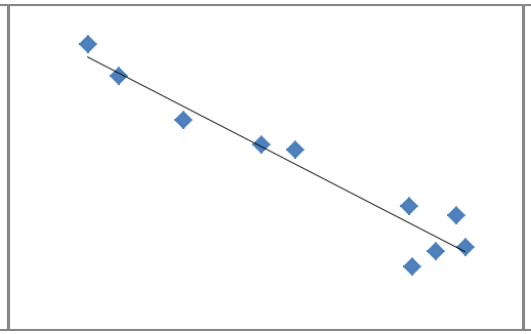
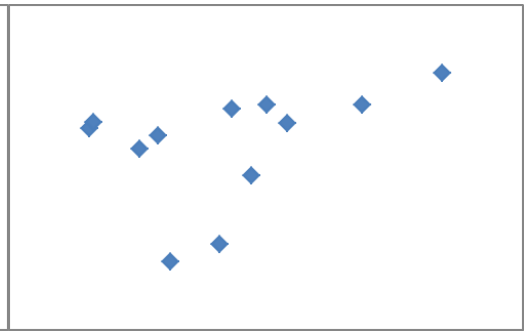
Model Results: Virginia

	1980-1989	1990-1999	2000-2011
			
	Strong, Positive	Moderate, Positive	Not Significant
P-value:	0.01	0.01	0.88
R-Square:	0.97	0.63	N/A
Slope:	0.21	0.12	N/A

Model Results: Maryland

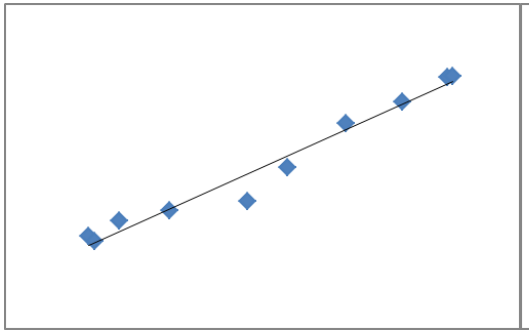
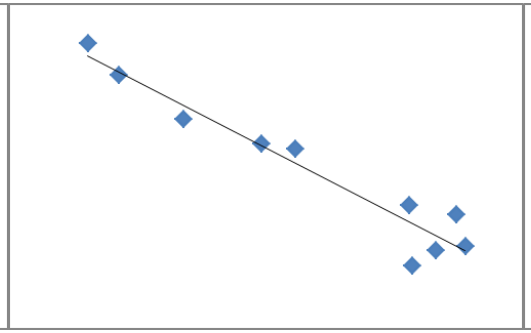
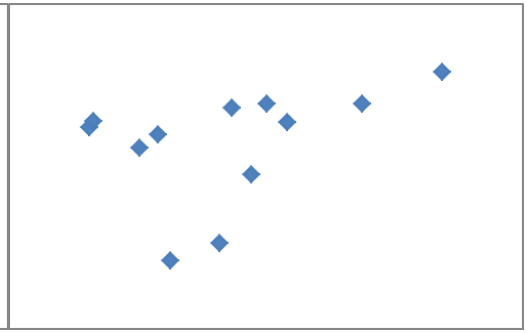
	1980-1989	1990-1999	2000-2011
			
	Strong, Positive	Strong, Positive	Not Significant
P-value:	0.01	0.01	0.31
R-Square:	0.98	0.83	N/A
Slope:	0.13	0.17	N/A

Driving & The Economy

40 states	5 states	6 states
		
Positively-Correlated	Negatively-Correlated	Not Significant

1980 - 1989

Driving & The Economy

47 states	1 state	3 states
		
Positively-Correlated	Negatively-Correlated	Not Significant

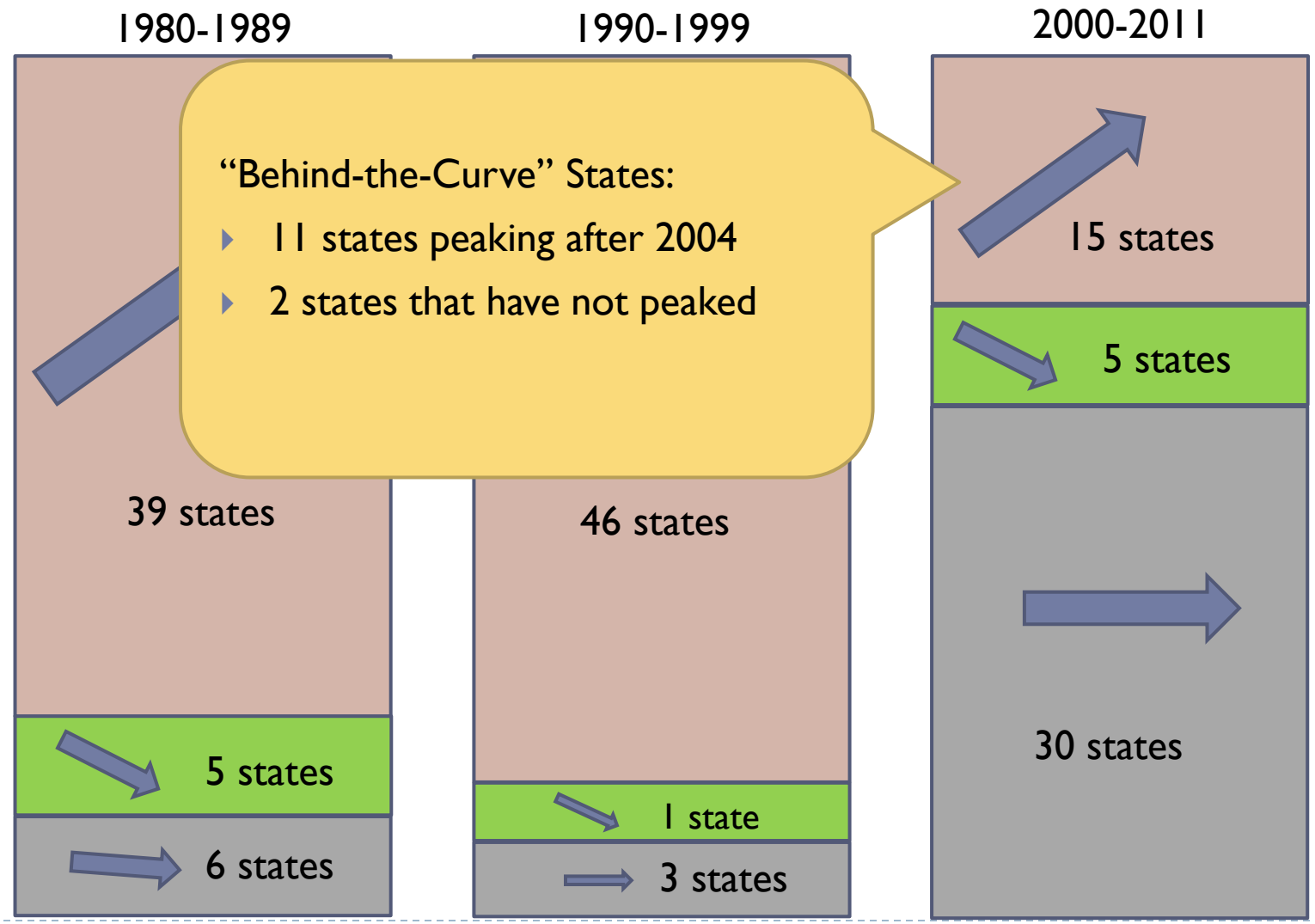
1990 - 1999

Driving & The Economy: 2000-2011

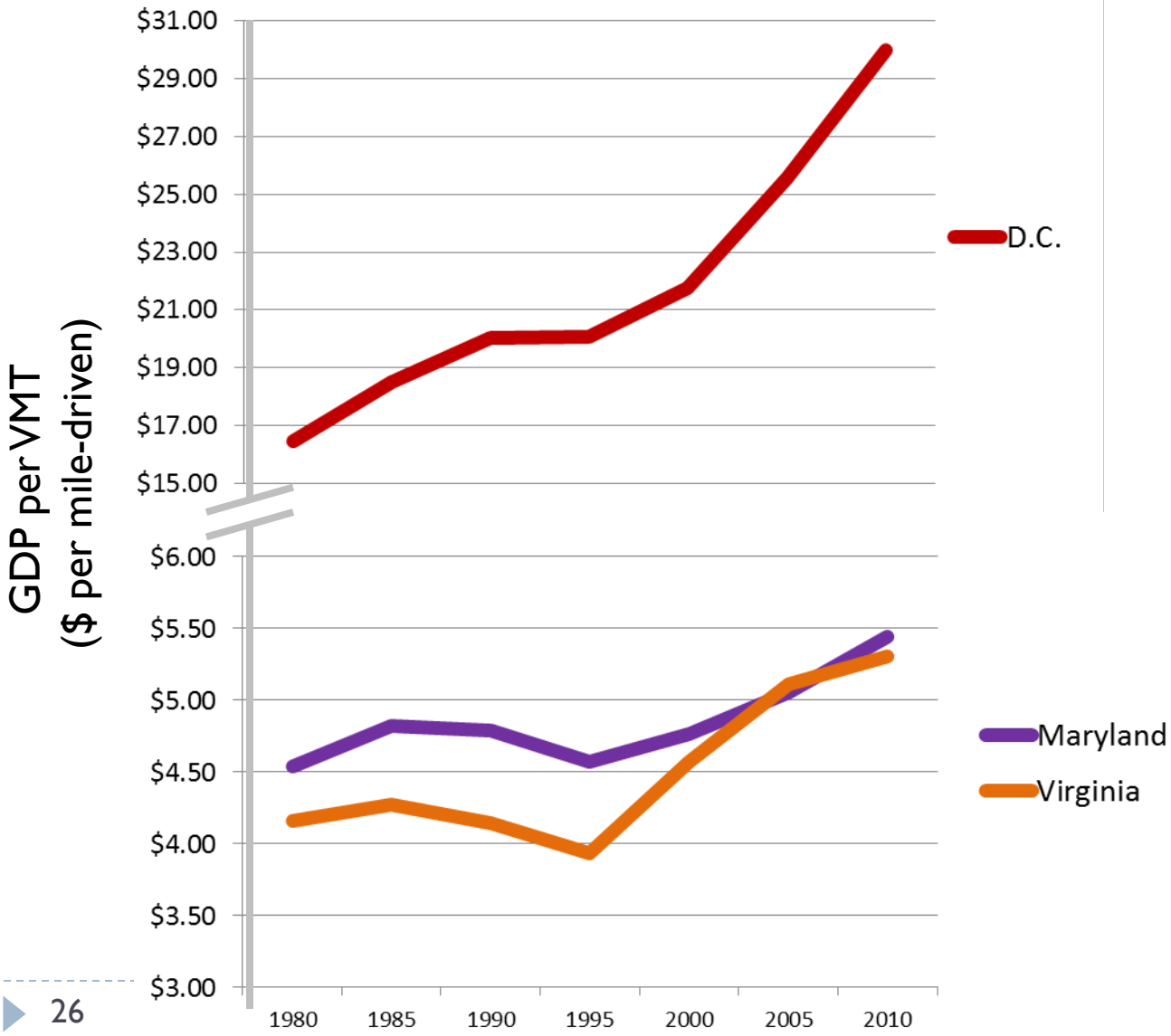
2000 - 2011

Washington (1992)
Oregon (1999)
Kentucky (1999)
Utah (2002)
Alaska (2002)

VMT v. GDP: Three Decades

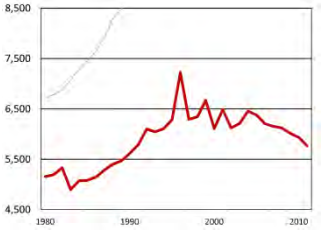


Economic-Efficiency-Per-Mile-Driven

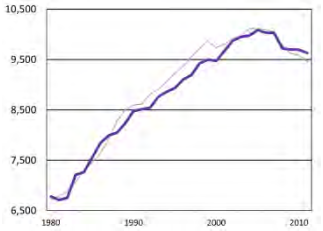


VMT per Capita

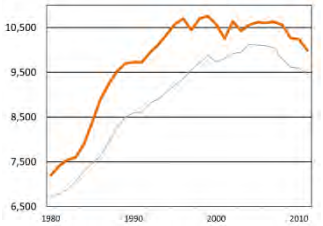
Washington, D.C.



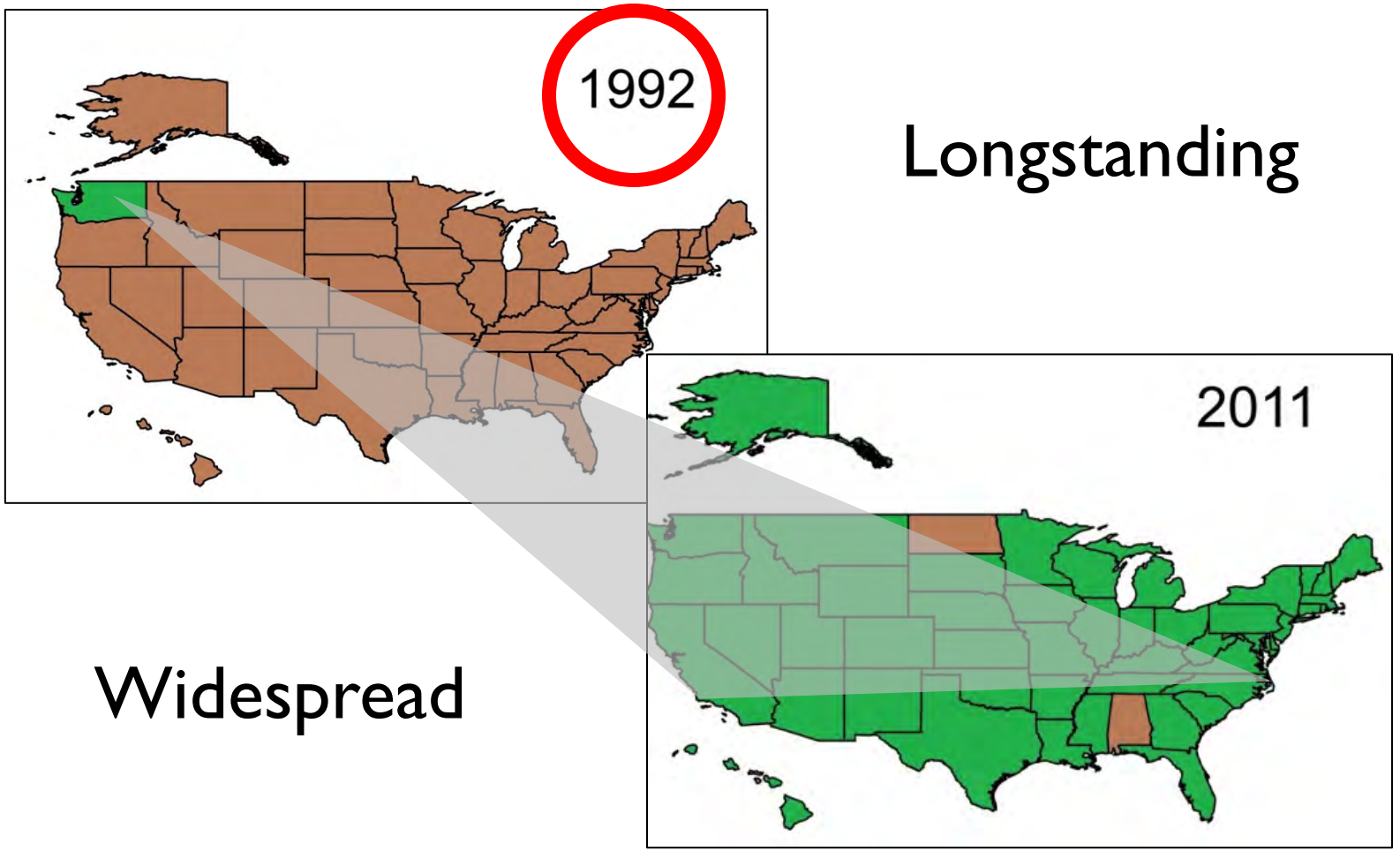
Maryland



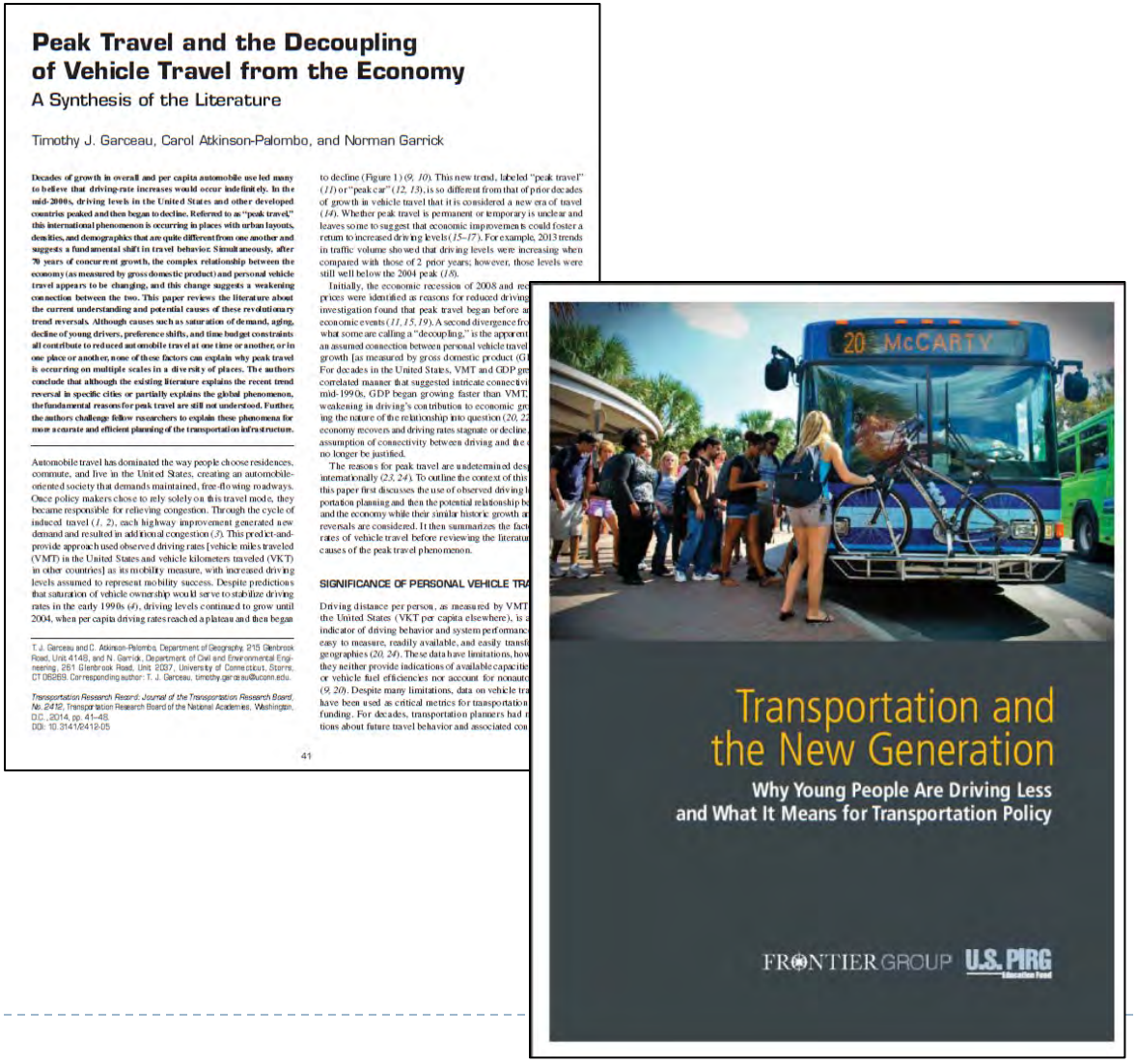
Virginia



Evidence for a New Era of Travel



Causes of Peak Remain Unknown



Peak Travel and the Decoupling of Vehicle Travel from the Economy

A Synthesis of the Literature

Timothy J. Garceau, Carol Atkinson-Palombo, and Norman Garrick

Decades of growth in overall and per capita automobile use led many to believe that driving-rate increases would occur indefinitely. In the mid-2000s, driving levels in the United States and other developed countries peaked and then began to decline. Referred to as "peak travel," this international phenomenon is occurring in places with urban layouts, densities, and demographics that are quite different from one another and suggests a fundamental shift in travel behavior. Simultaneously, after 70 years of concurrent growth, the complex relationship between the economy (as measured by gross domestic product) and personal vehicle travel appears to be changing, and this change suggests a weakening connection between the two. This paper reviews the literature about the current understanding and potential causes of these revolutionary trend reversals. Although causes such as saturation of demand, aging, decline of young drivers, preference shifts, and time budget constraints all contribute to reduced automobile travel at one time or another, or in one place or another, none of these factors can explain why peak travel is occurring on multiple scales in a diversity of places. The authors conclude that although the existing literature explains the recent trend reversal in specific cities or partially explains the global phenomenon, the fundamental reasons for peak travel are still not understood. Further, the authors challenge fellow researchers to explain these phenomena for more accurate and efficient planning of the transportation infrastructure.

Automobile travel has dominated the way people choose residences, commute, and live in the United States, creating an automobile-oriented society that demands maintained, free-flowing roadways. Once policy makers chose to rely solely on this travel mode, they became responsible for relieving congestion. Through the cycle of induced travel (*1*, *2*), each highway improvement generated new demand and resulted in additional congestion (*3*). This predict-and-provide approach used observed driving rates [vehicle miles traveled (VMT) in the United States and vehicle kilometers traveled (VKT) in other countries] as its mobility measure, with increased driving levels assumed to represent mobility success. Despite predictions that saturation of vehicle ownership would serve to stabilize driving rates in the early 1990s (*4*), driving levels continued to grow until 2004, when per capita driving rates reached a plateau and then began to decline (Figure 1) (*9*, *10*). This new trend, labeled "peak travel" (*11*) or "peak car" (*12*, *13*), is so different from that of prior decades of growth in vehicle travel that it is considered a new era of travel (*14*). Whether peak travel is permanent or temporary is unclear and leaves some to suggest that economic improvements could foster a return to increased driving levels (*15–17*). For example, 2013 trends in traffic volume showed that driving levels were increasing when compared with those of 2 prior years; however, those levels were still well below the 2004 peak (*18*).

Initially, the economic recession of 2008 and rec
prices were identified as reasons for reduced driving
investigation found that peak travel began before a
economic events (*11*, *15*, *19*). A second divergence fro
what some are calling a "decoupling," is the apparen
an assumed connection between personal vehicle travel
growth [as measured by gross domestic product (G
For decades in the United States, VMT and GDP gre
correlated manner that suggested intricate connectivi
mid-1990s, GDP began growing faster than VMT,
weakening in driving's contribution to economic gr
ing the nature of the relationship into question (*20*, *2*
economy recovers and driving rates stagnate or decline
assumption of connectivity between driving and the
no longer be justified.

The reasons for peak travel are undetermined des
internationally (*23*, *24*). To outline the context of this
this paper first discusses the use of observed driving
portation planning and then the potential relationship b
and the economy while their similar historic growth a
reversals are considered. It then summarizes the fact
rates of vehicle travel before reviewing the literatu
causes of the peak travel phenomenon.

SIGNIFICANCE OF PERSONAL VEHICLE TRA

Driving distance per person, as measured by VMT
the United States (VKT per capita elsewhere), is a
indicator of driving behavior and system performanc
easy to measure, readily available, and easily transf
geographies (*20*, *24*). These data have limitations, how
they neither provide indications of available capacitie
or vehicle fuel efficiencies nor account for nonauto
(*9*, *20*). Despite many limitations, data on vehicle tra
have been used as critical metrics for transportation
funding. For decades, transportation planners had
tions about future travel behavior and associated co

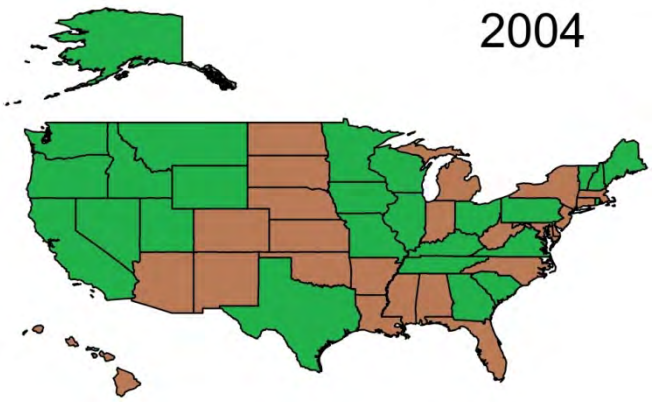
T. J. Garceau and C. Atkinson-Palombo, Department of Geography, 215 Glenbrook Road, Unit 4148, and N. Garrick, Department of Civil and Environmental Engineering, 261 Glenbrook Road, Unit 2037, University of Connecticut, Storrs, CT 06269. Corresponding author: T. J. Garceau, timothy.garceau@uconn.edu.

Transportation Research Record: Journal of the Transportation Research Board, No. 2412, Transportation Research Board of the National Academies, Washington, D.C., 2014, pp. 41–48.
DOI: 10.3141/2412-05

41

Causes of Peak Remain Unknown

1992: WA State peaked
1996: D.C. & Nevada peaked
1999: 6 states peaked
2000: 2 states peaked



Predates

Expansion of Information Communication Technologies (ICT)

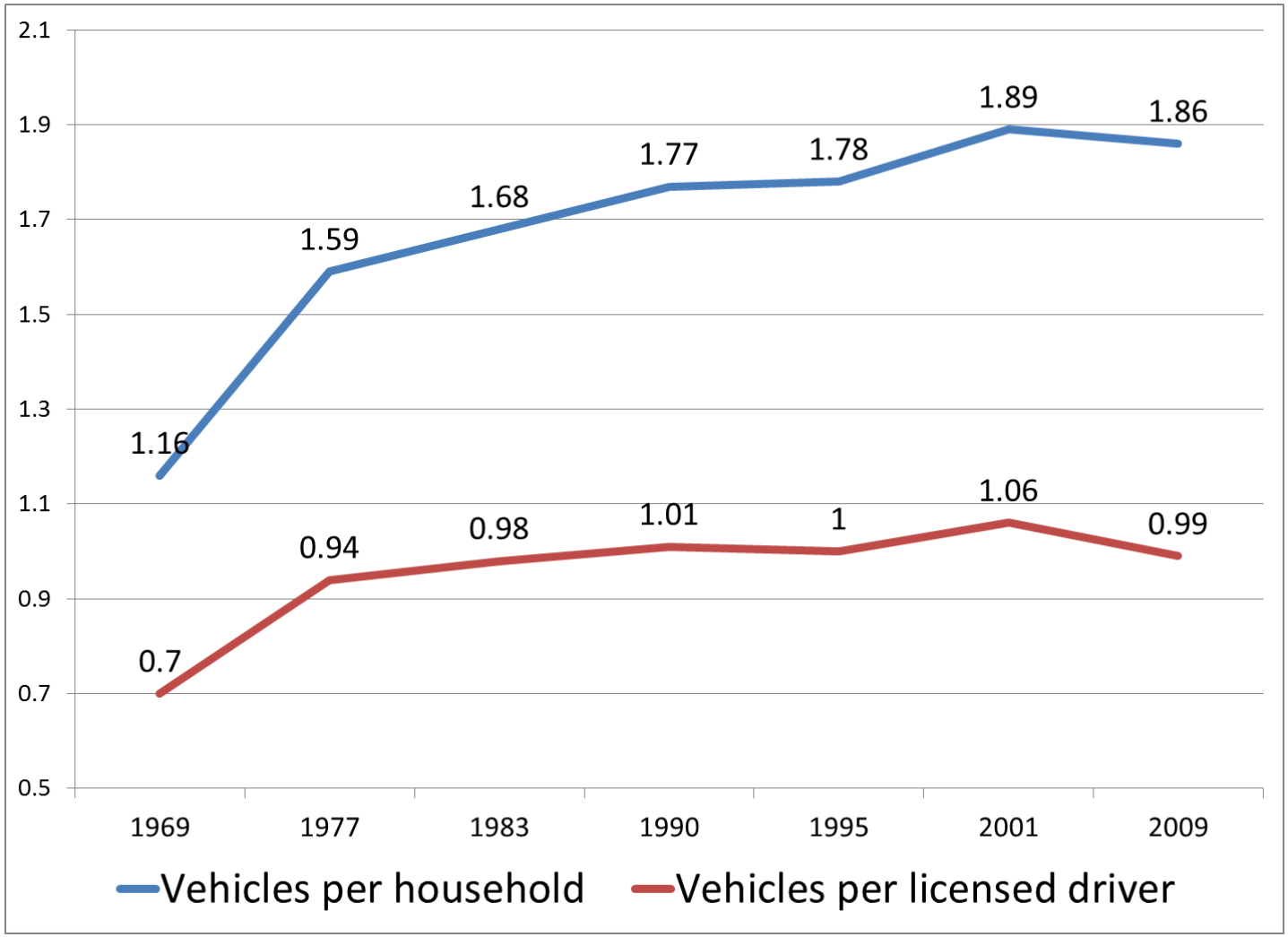
The Great Recession of 2008

Exploring Potential Causes

Back-to-City Movement:

- Young & Old
- Reversal of flight to suburbs?
  - Residential
  - Employment centers
- Transit-Oriented & Mixed Use Development

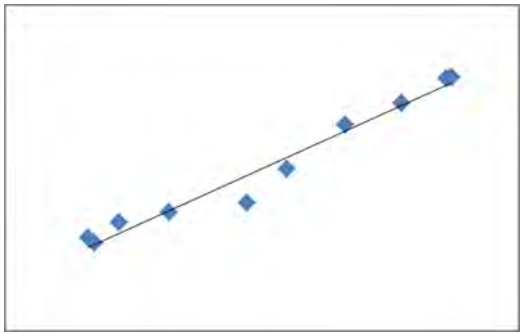
Changing Car Ownership



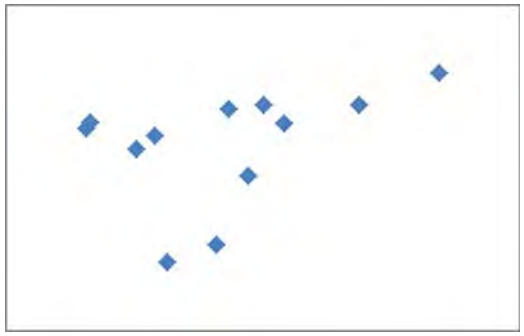
Source: Santos et al. 2011

Increased Wealth No Longer Equates to Increased Driving

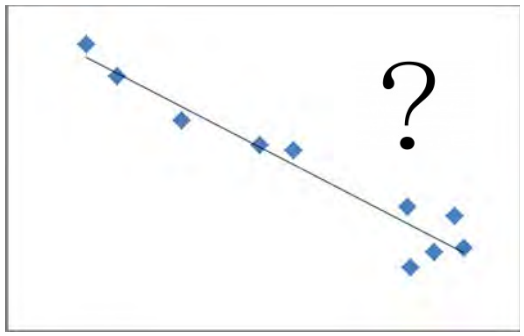
Positive relationship strengthened from 1980's to 1990's

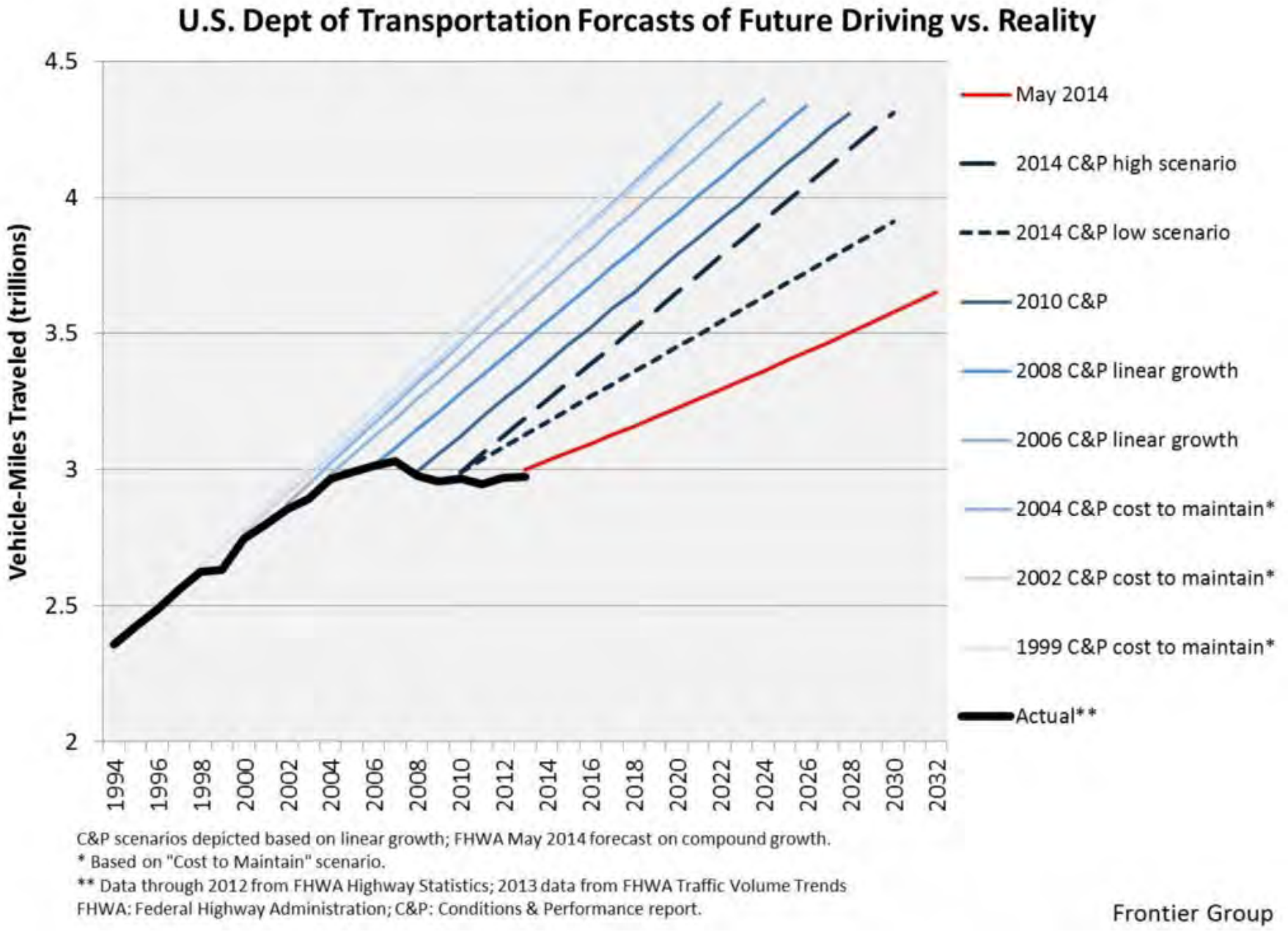


Relationship severed in New Era of Travel



Relationship may be reversing





Source: U.S. PIRG 2015

Planning for a New Era

2012 ITE President's Message:

"So will VMT continue its slight downward trend, or will it turn upwards and rejoin the economic activity trends?

All of these factors will need to be weighed to make proper recommendations for future decisions."

VMT decrease will most likely continue

We see positive economic growth in the face of decreasing VMT

States need to reconsider transportation planning approaches to focus on increasing access rather than congestion reduction

Can D.C. and the MWCOG be a leader and model for other agencies?

Acknowledgements

Dwight David Eisenhower Transportation Fellowship

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Sources

- USDOT, FHWA. Annual vehicle-miles of travel, by vehicle type and highway category, 1936-1995, Table VM-201. 2011. http://www.fhwa.dot.gov/ohim/summary95/section5.html. Accessed November 7, 2013.
- USDOT, FHWA. Annual vehicle distance traveled in miles and related data, by highway category and vehicle type, Tables VM-1, 1996-2011. 2013. http://www.fhwa.dot.gov/policyinformation/statistics.cfm. Accessed November 7, 2013.
- U.S. Census Bureau. *Population Estimates: Historical Data: 1900-1999, 2000-2010, 2011*. 2012. http://www.census.gov/popest/data/historical/. Accessed November 7, 2013.
- U.S. Department of Commerce, Bureau of Economic Analysis. Current-dollar and "real" GDP." 2012. http://www.bea.gov/national/index.htm#gdp. Accessed November 7, 2013.
- Santos, A., McGuckin, N., Nakamoto, H.Y., Gray, D., & Liss, S. Summary of Travel Trends: 2009 National Household Travel Survey, Report No.: FHWA-PL-II-022. 2011. http://nhts.ornl.gov/2009/pub/stt.pdf . Accessed February 6, 2012.
- U.S. PIRG. U.S Department of Transportation Forecasts of Future Driving Vs. Reality. 2015. http://uspirg.org/resources/usp/us-dept-transportation-forecasts-future-driving-vs-reality. Accessed March 16, 2015.