Environmental Regulation and the Market for Motor Fuels: Unintended Consequences

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Note: Views expressed are solely those of the authors and do not represent the views of their respective employers.

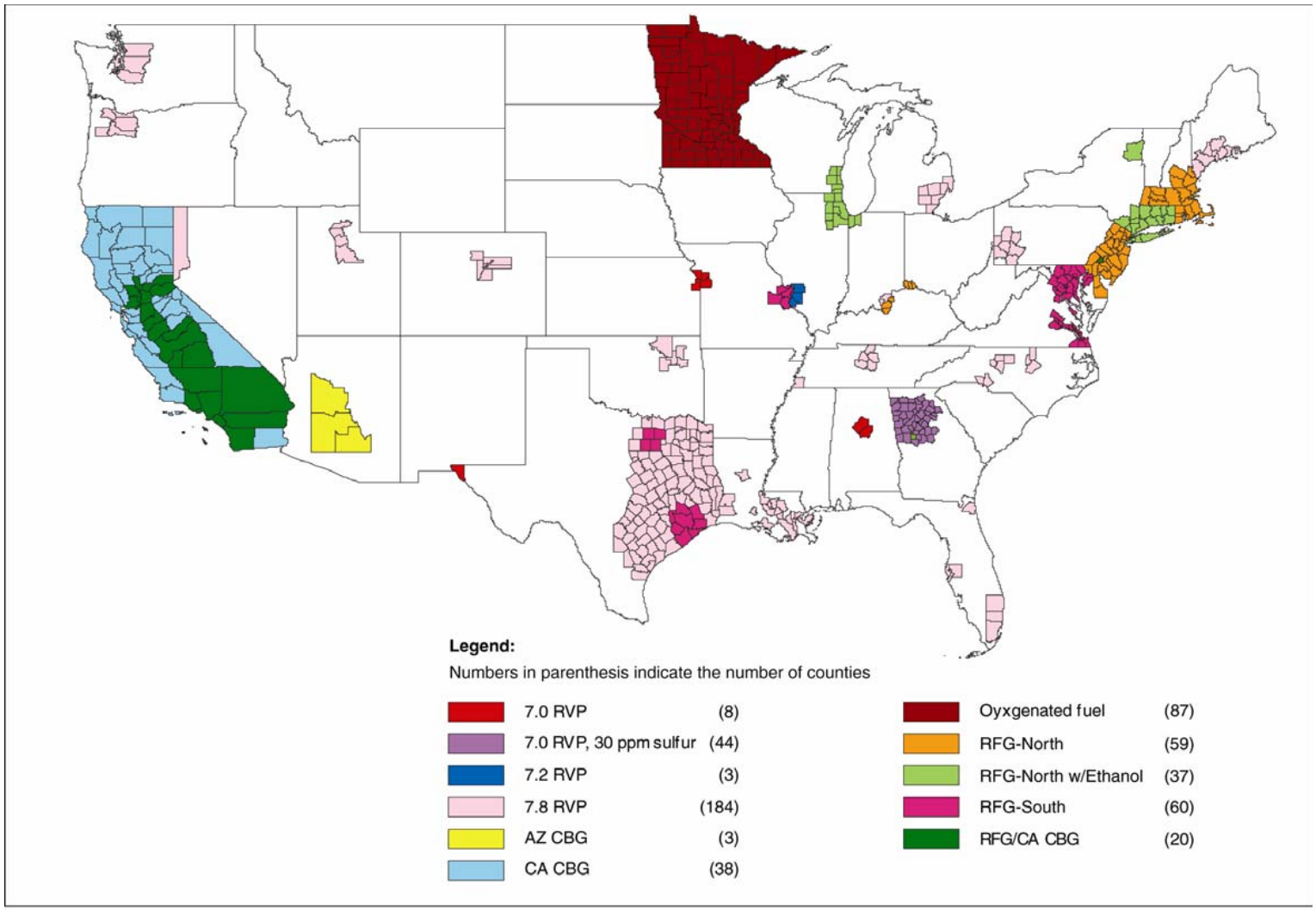
Environmental Regulation Changes Focus to Motor Fuels

- 1990 Clean Air Act and amendments heralded a new focus on regulating fuel content – previous focus had been engine design and efficiency standards
- Division of jurisdiction between federal and states led to proliferation of fuel types
- Unintended consequences including higher and more volatile prices are the result

What is a Special Blend of Gasoline?

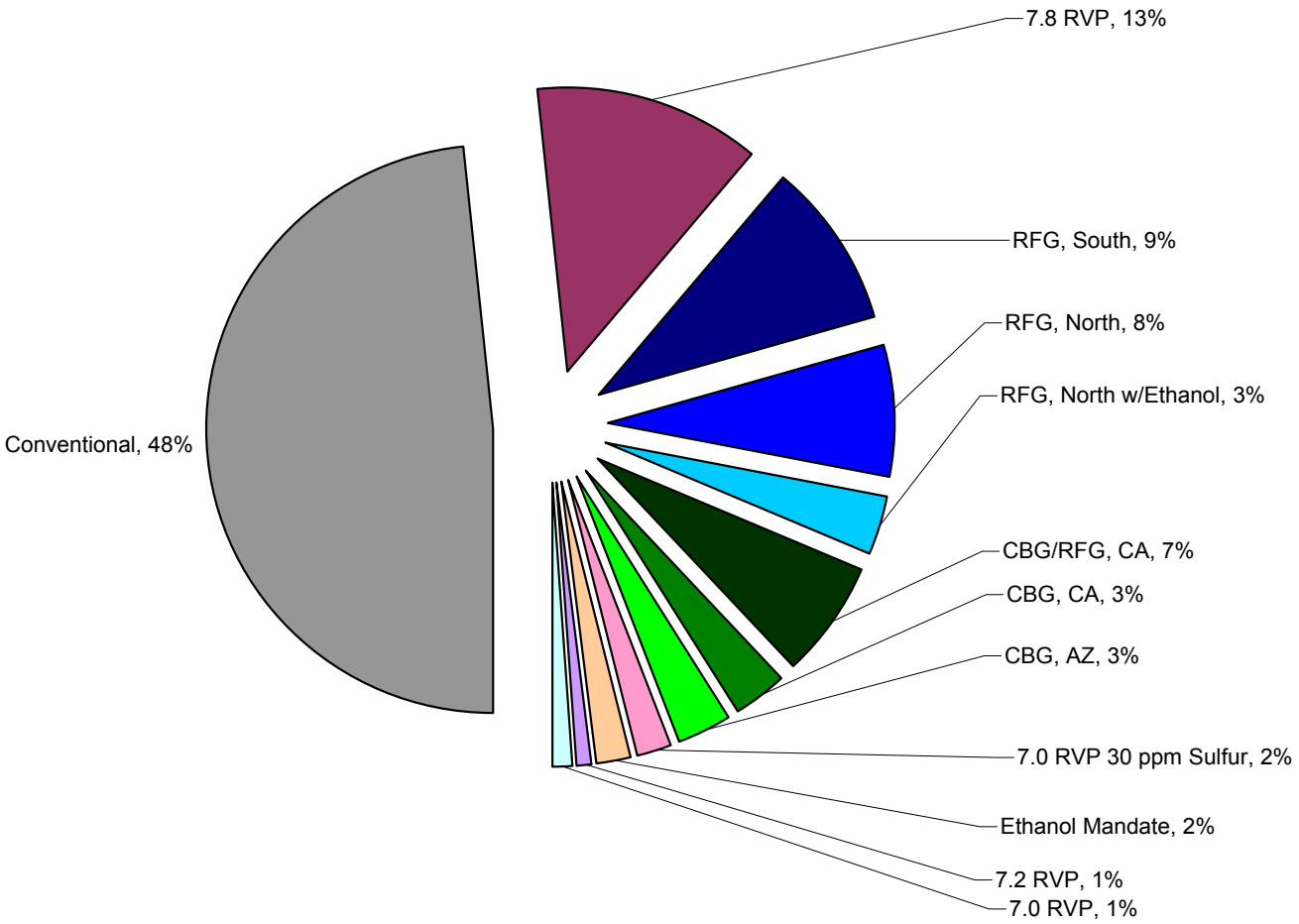
- Ways in which motor fuels have been differentiated as a result of content regulation include
  - Addition of oxygenates – reduces CO emissions
    - MTBE, Ethanol
  - Reducing Reid Vapor Pressure – reduces VOCs and has implications for engine performance
  - Removal of toxics – sulfur, benzene, etc.

Special Gasoline Blends—Summer 2004



Source: GAO analysis of data provided by EPA, ExxonMobil, the Oil Price information Service, and state environmental agencies.

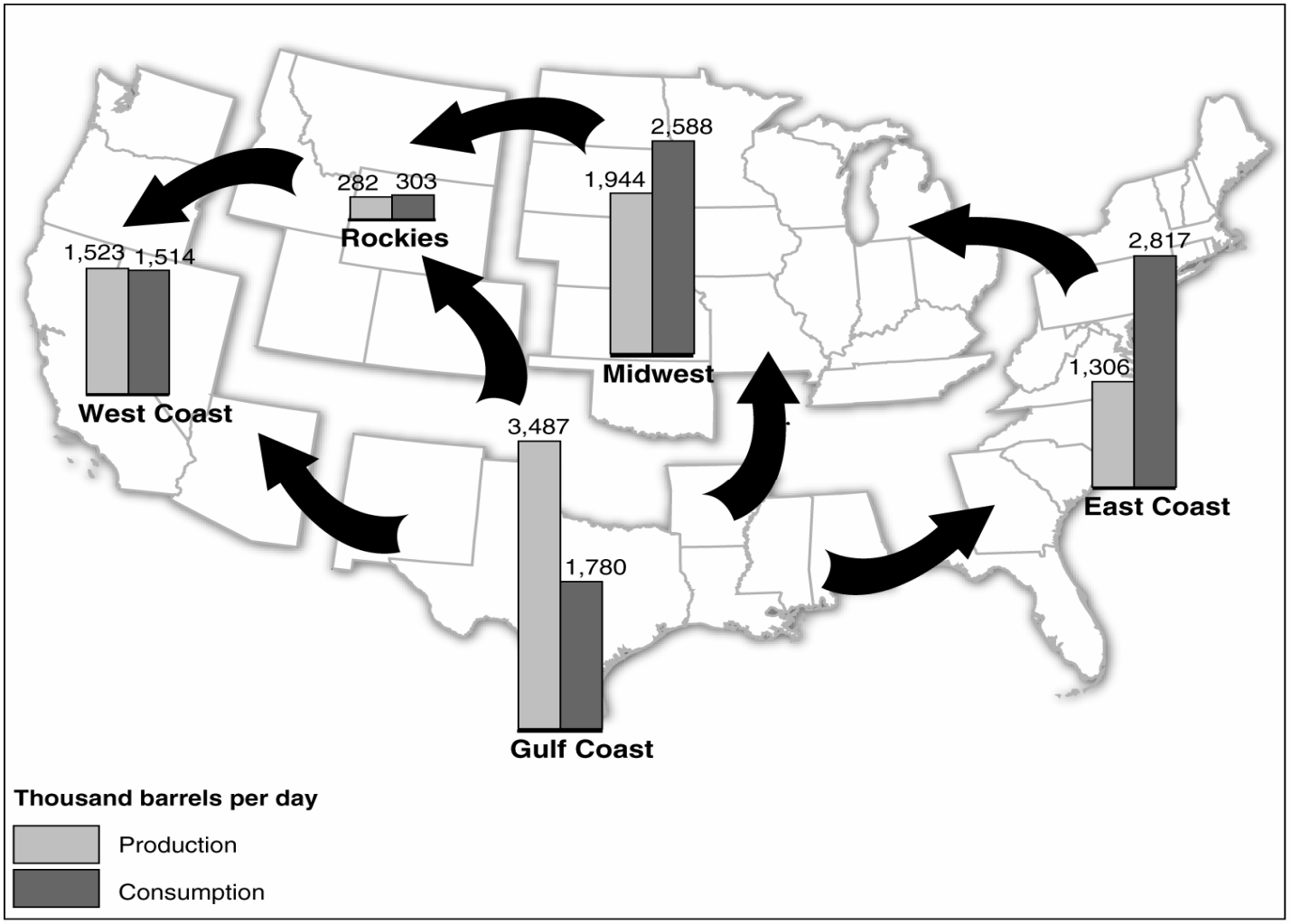
Market Shares for the Various Gasoline Blends Used in 2001



Effects on the Supply Chain

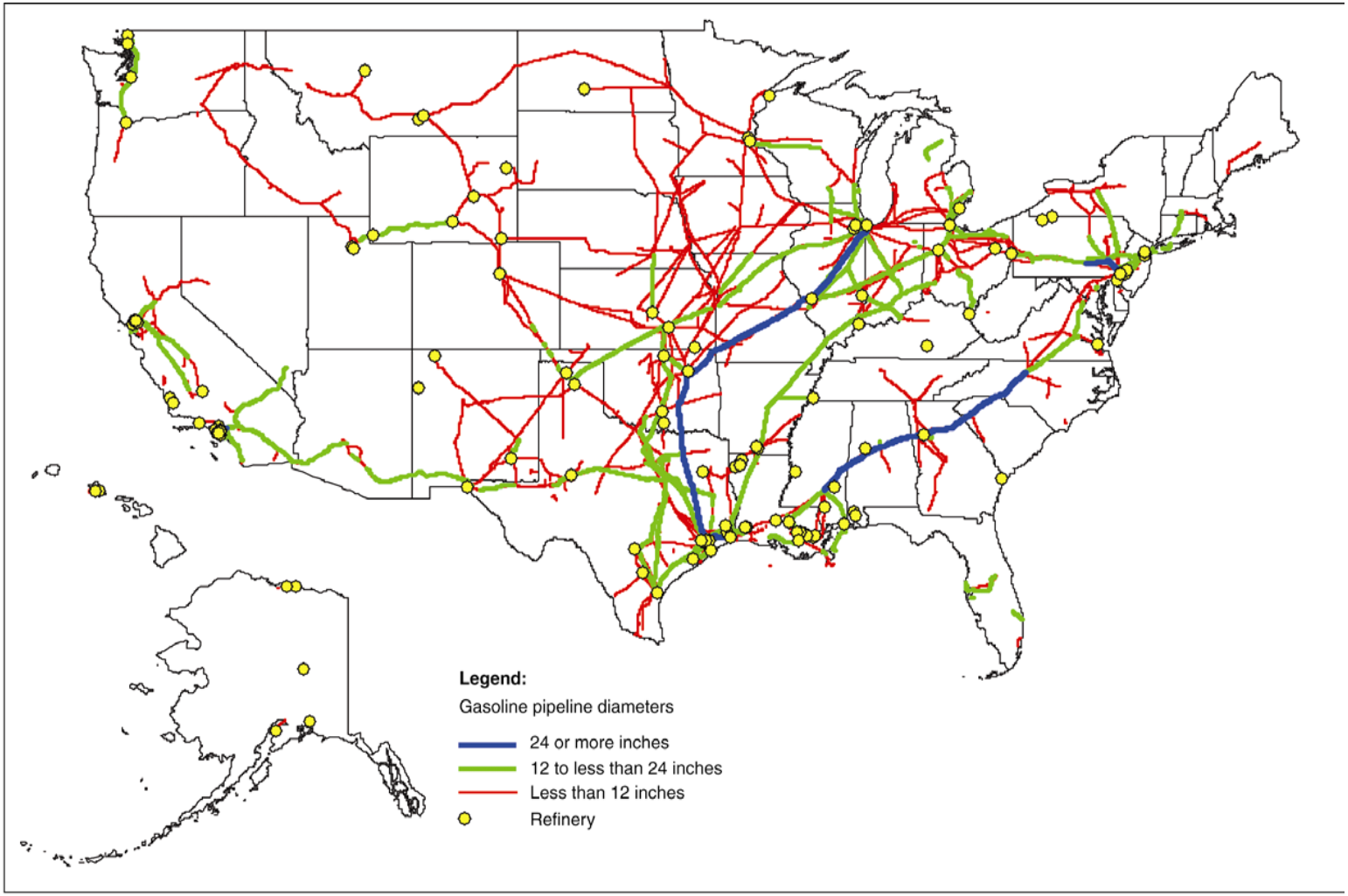
- Changes to supply chain to accommodate new fuels include
  - Billions of dollars of refining upgrades
  - Changes in markets for gasoline components—seasonally and geographically
  - Reduction of pipeline and terminal storage capacity
  - Shrinking of the size of wholesale/retail markets

Gasoline Supply and Demand, September 2004



Source: Energy Information Administration, U.S. Department of Energy.

Map of Key Pipelines and Refineries, 2004



Source: GAO analysis based on data from the Department of Transportation and the Energy Information Administration.

Regression Model

- Panel data model of weekly gasoline prices across 99 cities (OPIS data)
  - Sample: 12/07/2000-10/28/2004; 204 weeks
  - 99 cross sections used
  - Total panel (balanced) size: 20196
- Dependent variable is gasoline price
- RHS variables include fuel specific attributes and city market attributes

Regression Results

Variable	Coefficient	Std. Error	t - Statistic
WTI (¢ per gallon)	1.169201	0.004212	277.5680
Dist. To Sub. Fuel	0.003912	0.000959	4.077237
Low sulfur	5.071134	1.377933	3.680248
RVP 9.0	5.841131	0.195009	29.95315
RVP 7.8	4.470009	0.365786	12.22028
RVP 7.2	9.674229	1.400786	6.906285
Ethanol 5-5.7%	1.034584	1.354990	0.763536
Ethanol 10%	3.622967	0.635272	5.703013
RFG MTBE RVP 8.2	6.862264	0.799897	8.578940
RFG MTBE RVP 7.2	8.534264	0.917066	9.306055
RFG Ethanol RVP 8.2	16.16030	1.303870	12.39411
RFG Ethanol RVP 7.2	6.016466	1.045394	5.755212

Regression Results Continued

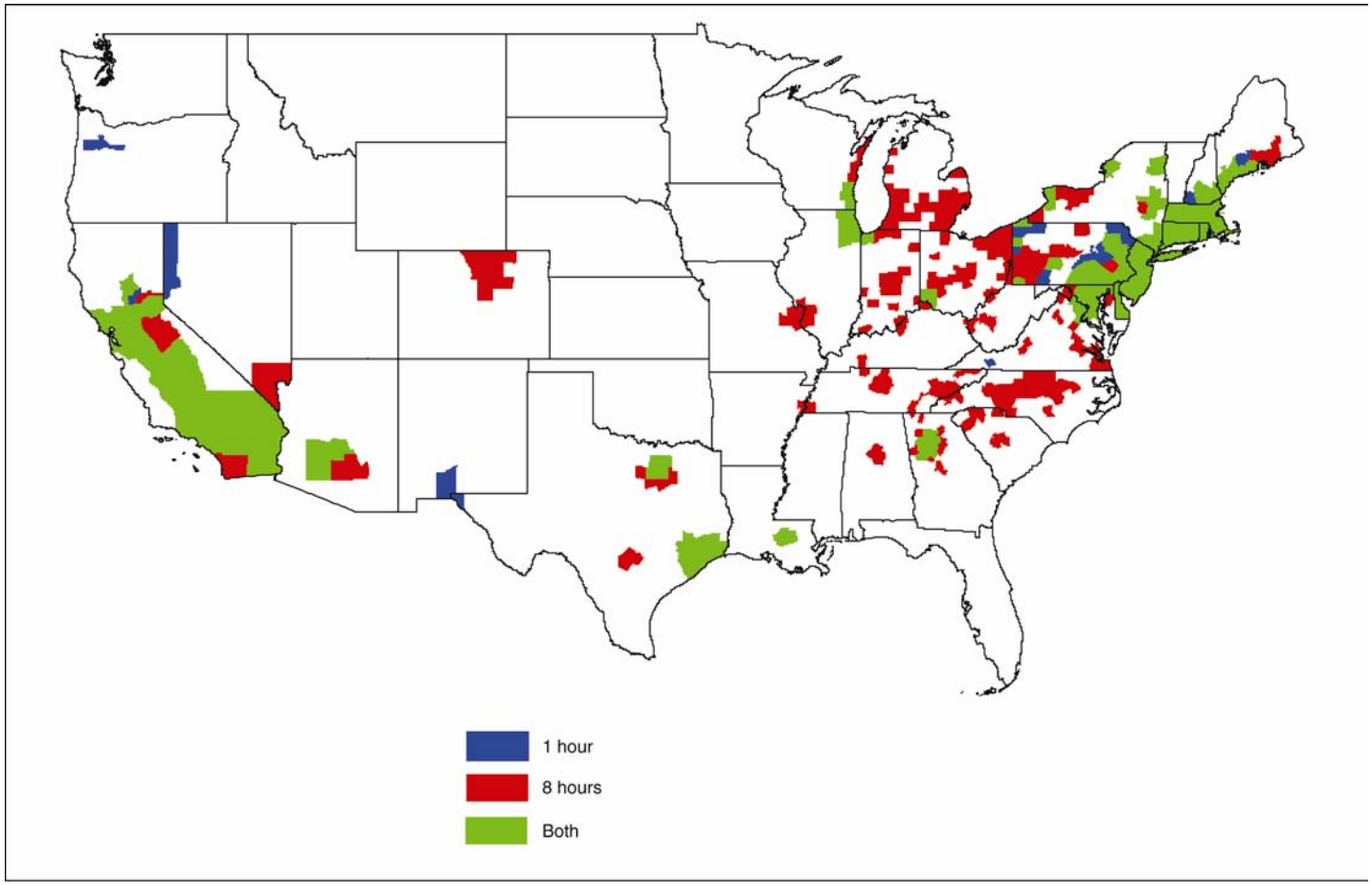
Variable	Coefficient	Std. Error	t - Statistic
Akron/Canton, OH	8.707963	0.739922	11.76876
Albuquerque, NM	11.26660	0.757700	14.86946
Anacortes, WA	13.79322	0.742042	18.58820
Anchorage, AK	38.49257	1.532351	25.11993
: :			
Tucson, AR	19.29393	1.042146	18.51365
Tulsa, OK	7.298799	0.752439	9.700188
Wichita, KS	7.817934	0.750177	10.42145
Wilmington, DE	8.853039	0.743329	11.90999
Wood River, IL	6.712616	0.889631	7.545390

R-squared=0.821904; Log likelihood= -74256.72;
F-statistic=842.6497

Conclusions

- Lack of coherent jurisdictional boundaries for regulation lead to chaotic environment
- Proliferation of motor fuels has led to higher and more volatile prices
- Lack of regulatory certainty makes investment in infrastructure suboptimal
- Problem will get worse before it gets better
  - ULSD and new gasoline stds will further stress the infrastructure
  - 8-hour ozone rule will further spread of fuels

Map of Areas Not Meeting New 8-Hour and Former 1-Hour Ozone Standard, 2004



Source: GAO analysis based on data from EPA.

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