

Examining the Effect of Deregulation on Retail Electricity Prices

John Taber, Duane Chapman, and Tim Mount
Applied Economics & Management
Cornell University

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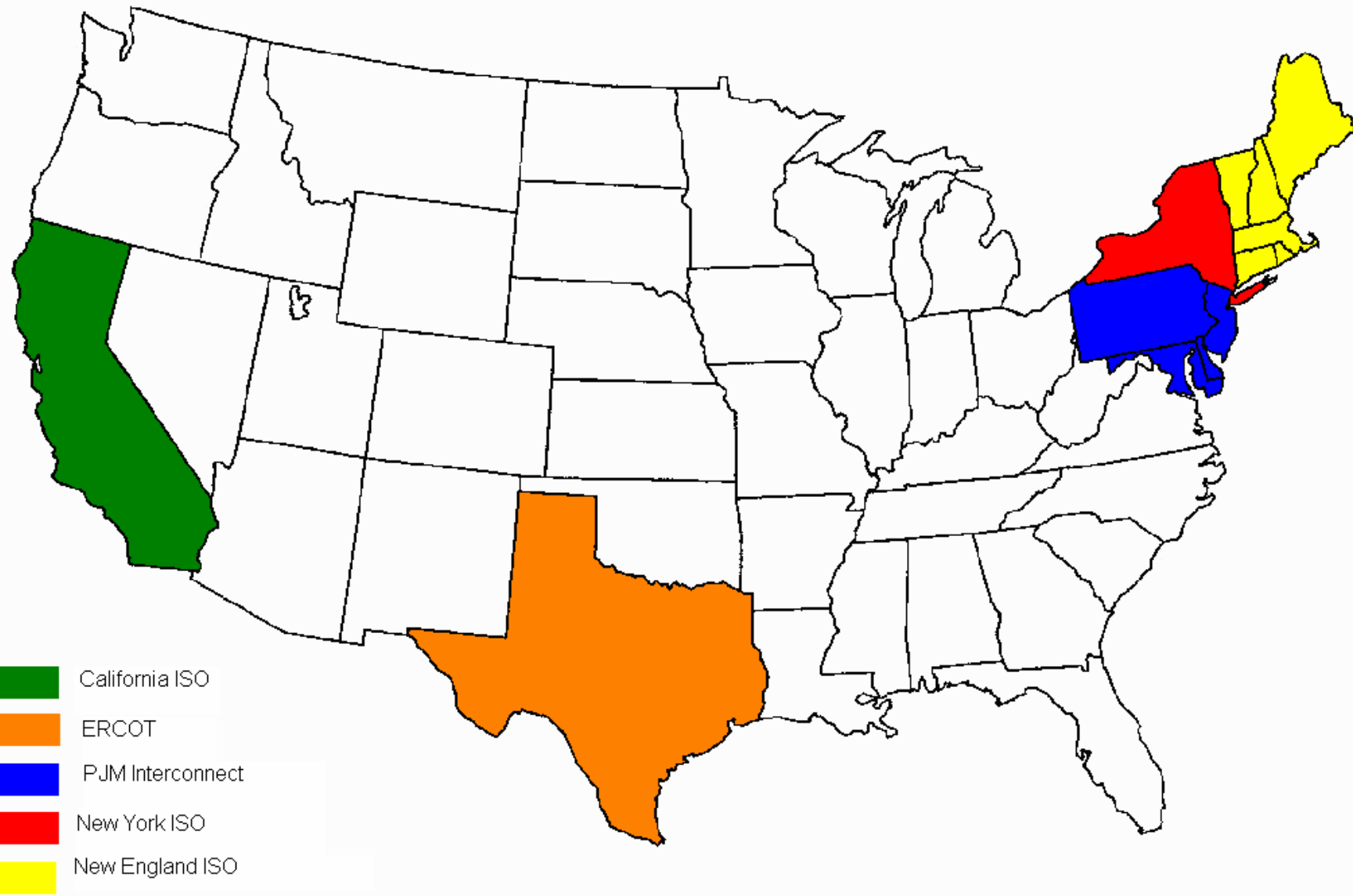
Overview

- Definitions and Deregulation Overview
- Trends in Retail Electricity Prices
- Trends in Explanatory Variables
- Econometric Model
- Conclusions
- Questions to be Addressed

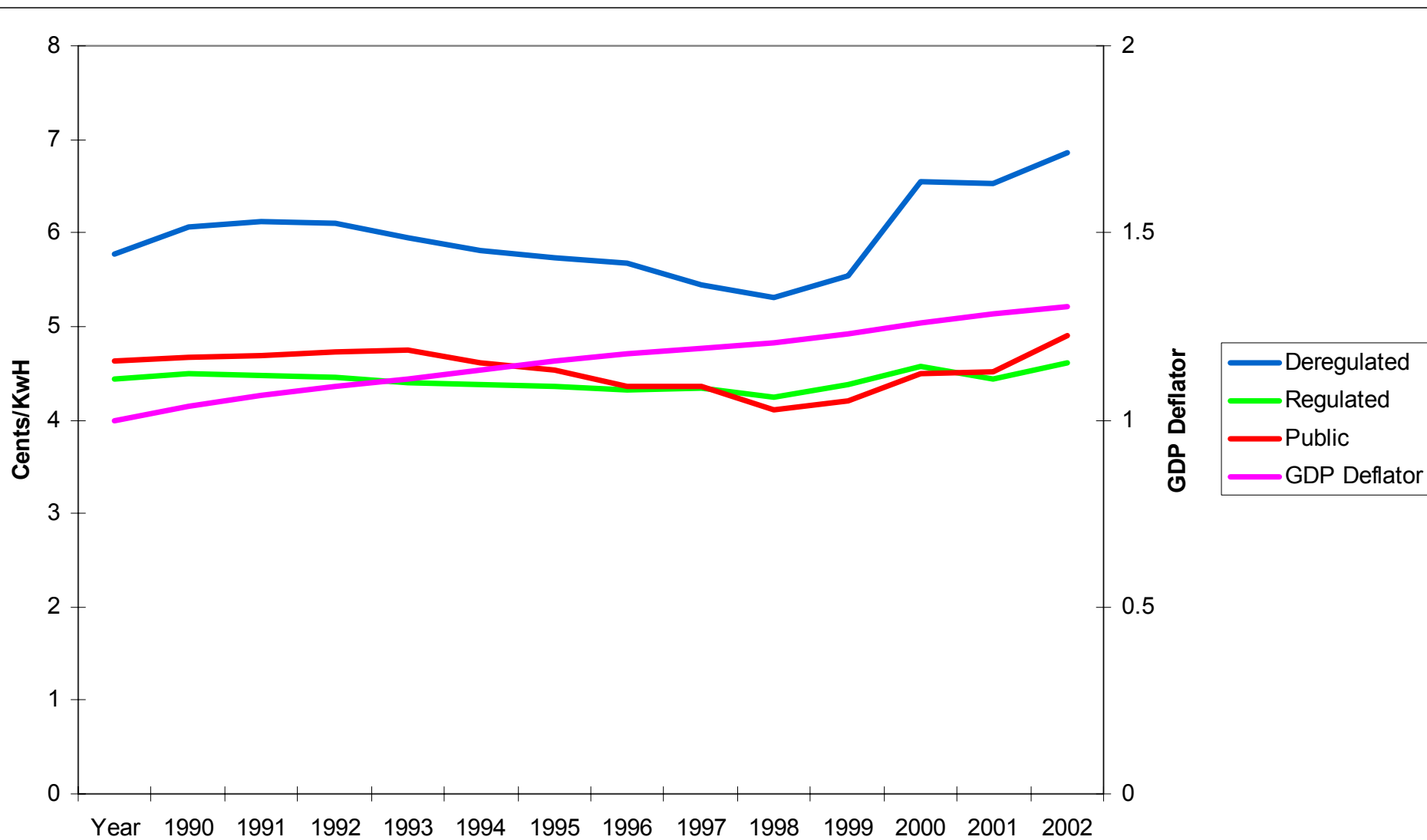
Definitions

- A deregulated state is one contained within an ISO with an auction-based wholesale market by 2002
- Price Gap:
$$\frac{(\text{Deregulated Prices} - \text{Regulated Prices}) \times 100}{\text{Deregulated Prices}}$$

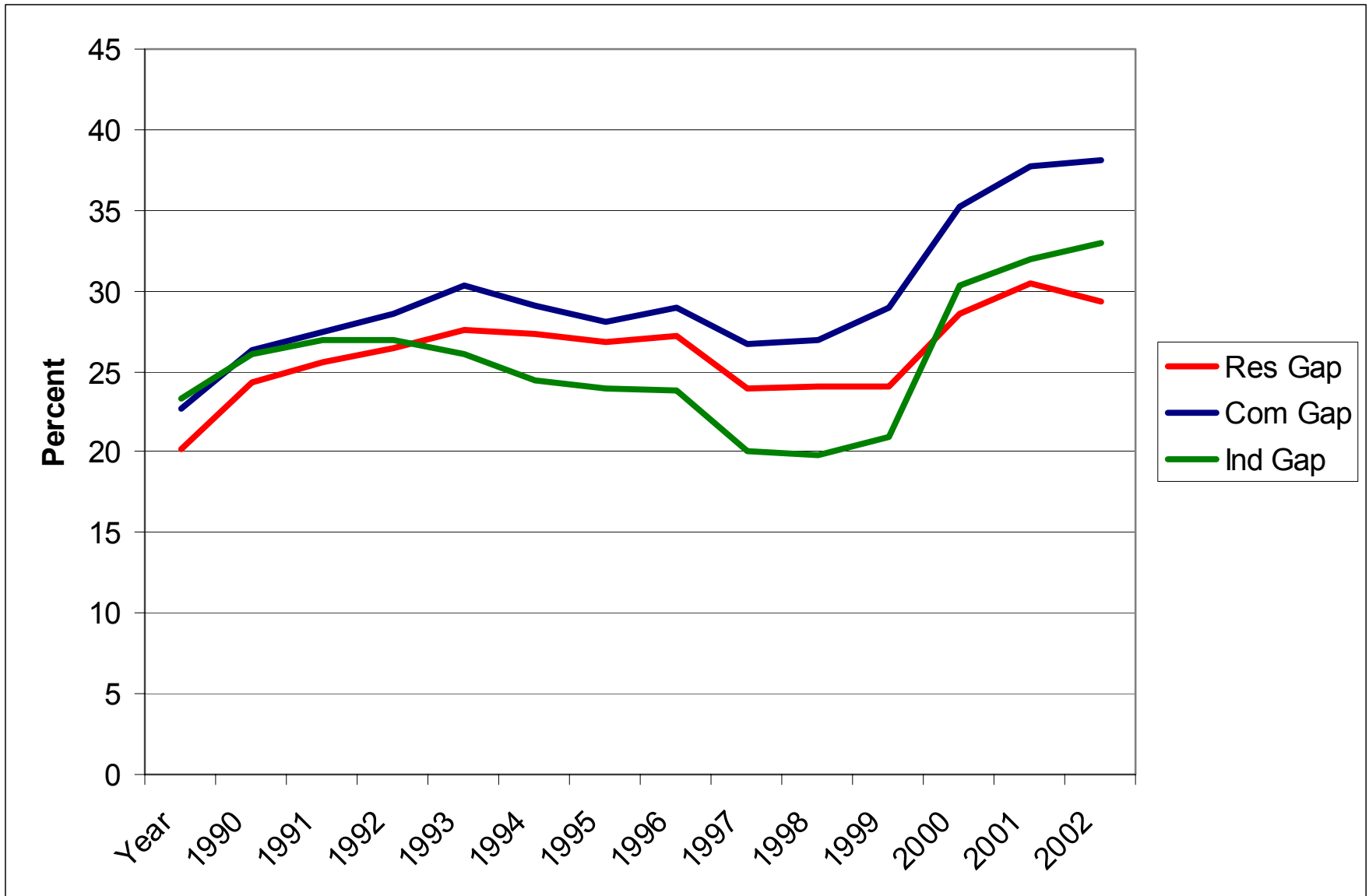
Deregulated States as of 2002



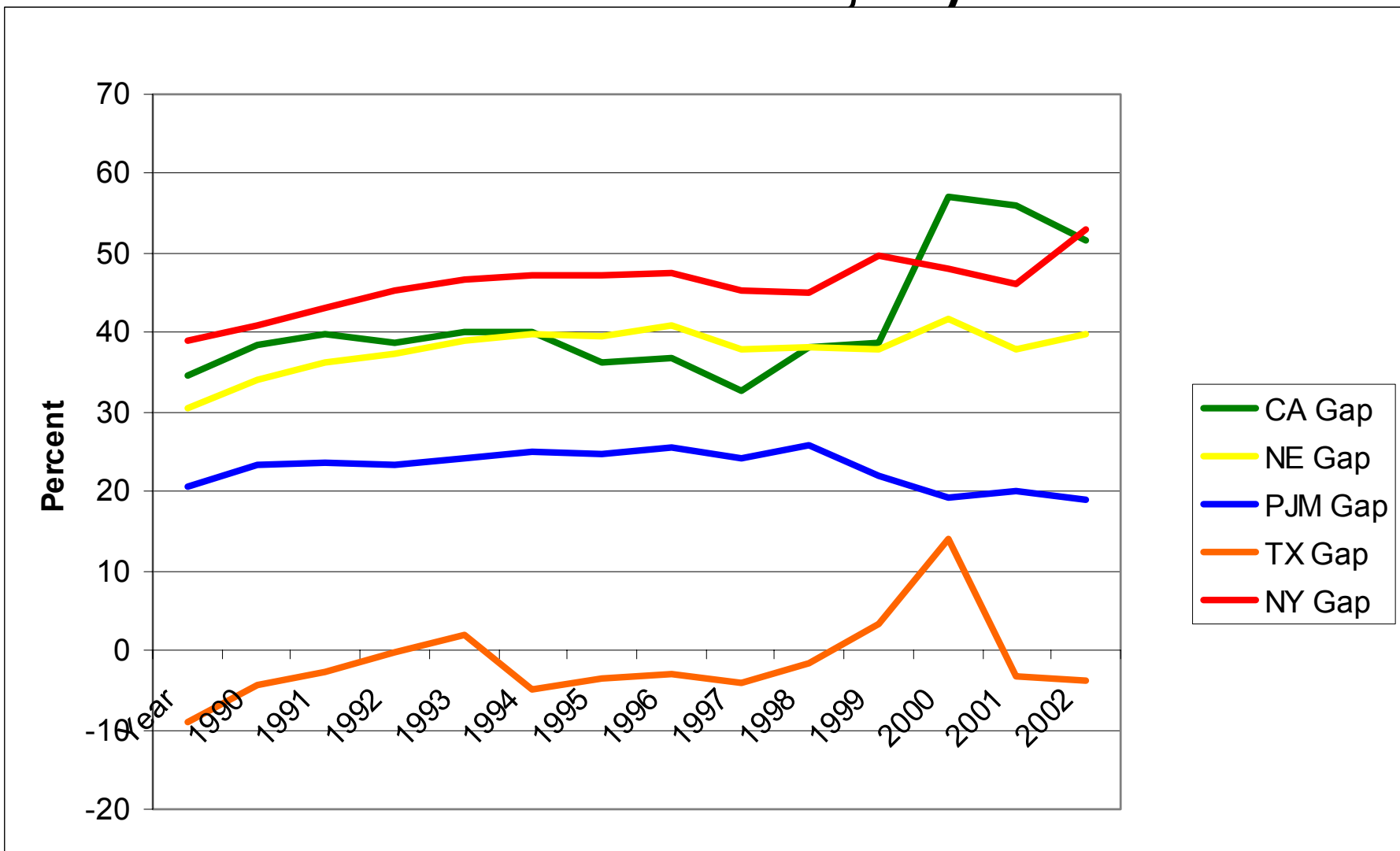
Nominal Industry Electricity Prices and GDP Deflator



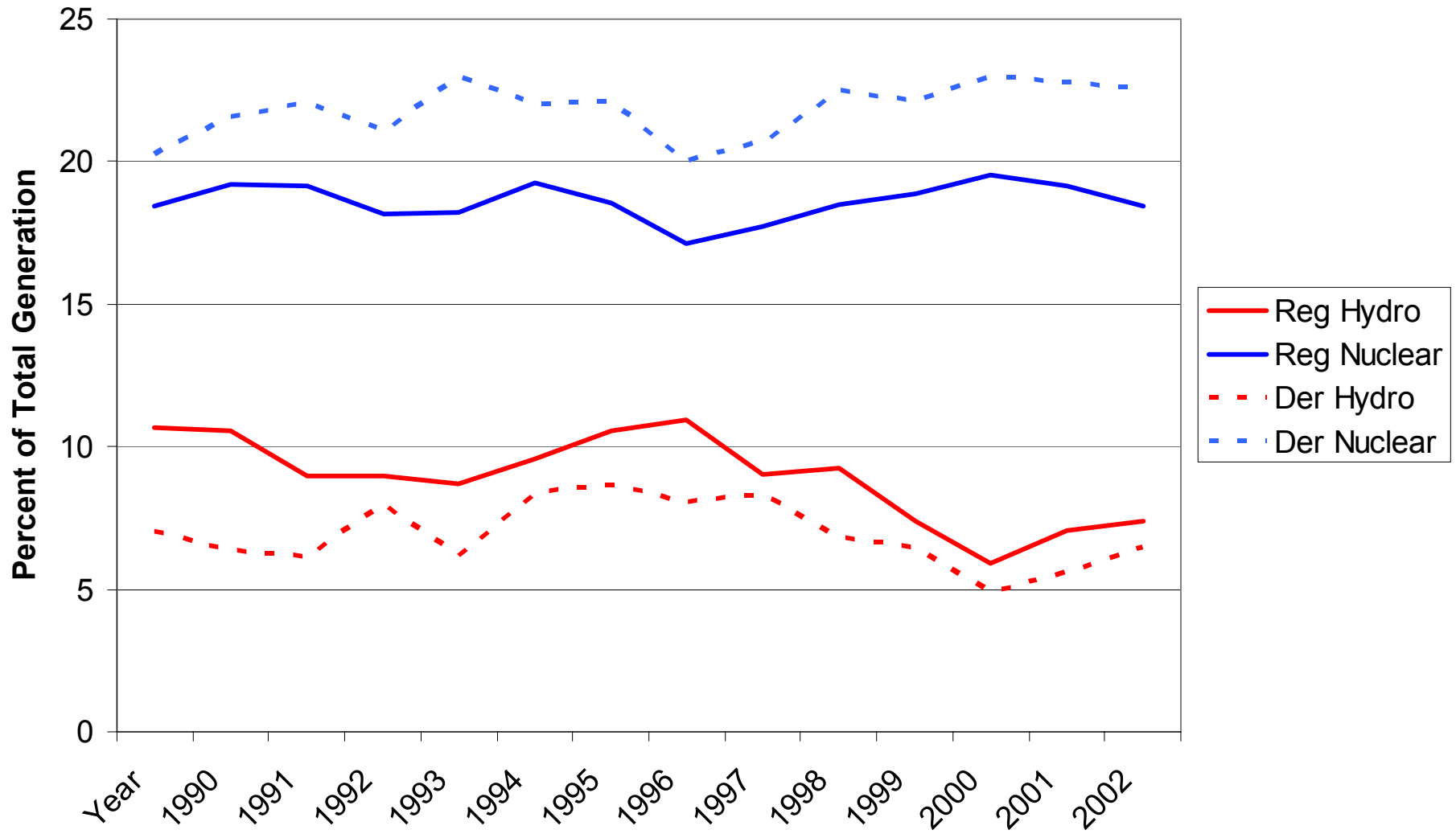
Price Gap for Privately-Owned Regulated and Deregulated Utilities



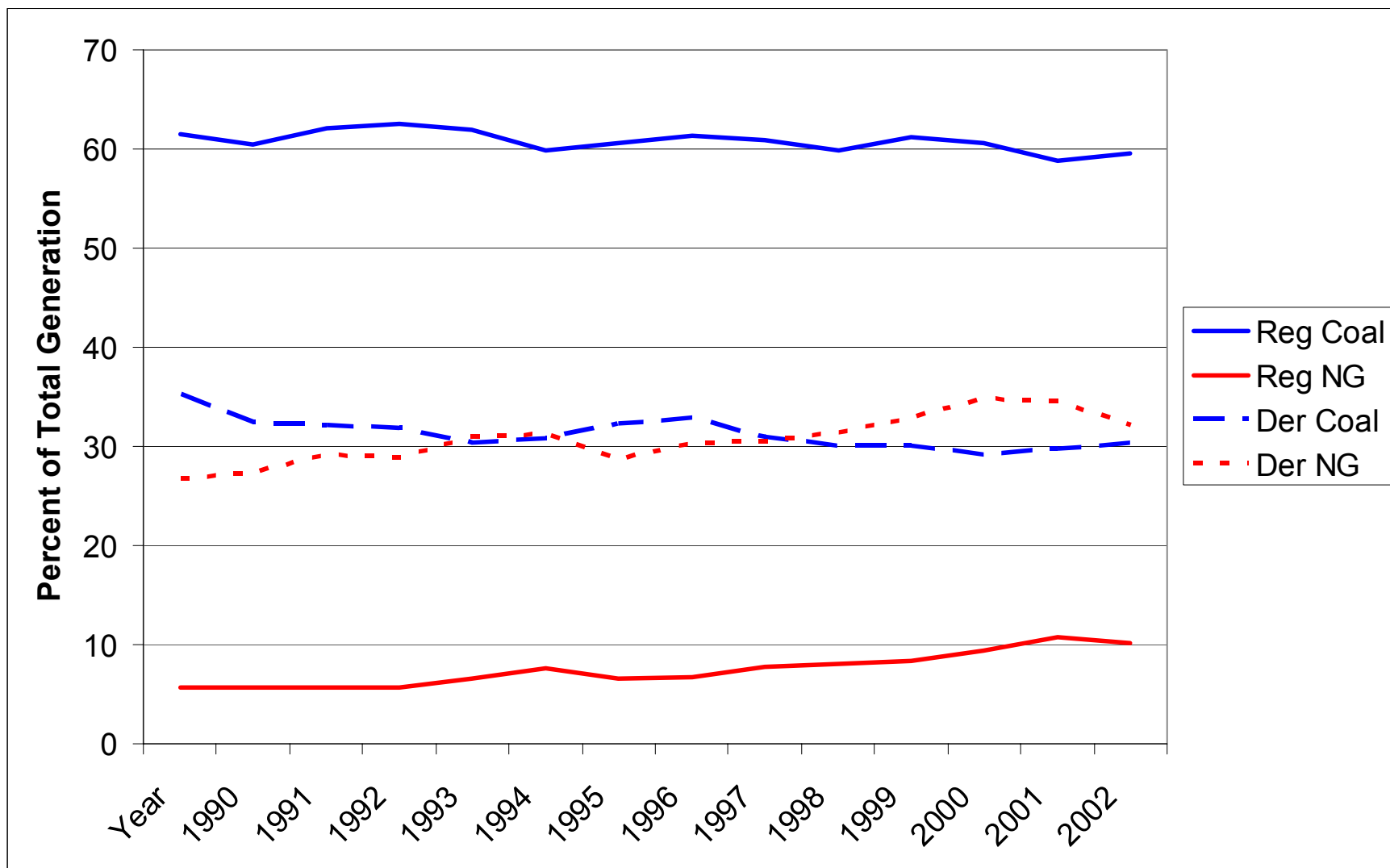
Price Gaps for Total Electricity Prices in Regulated and Deregulated Privately-Owned Utilities, by ISO



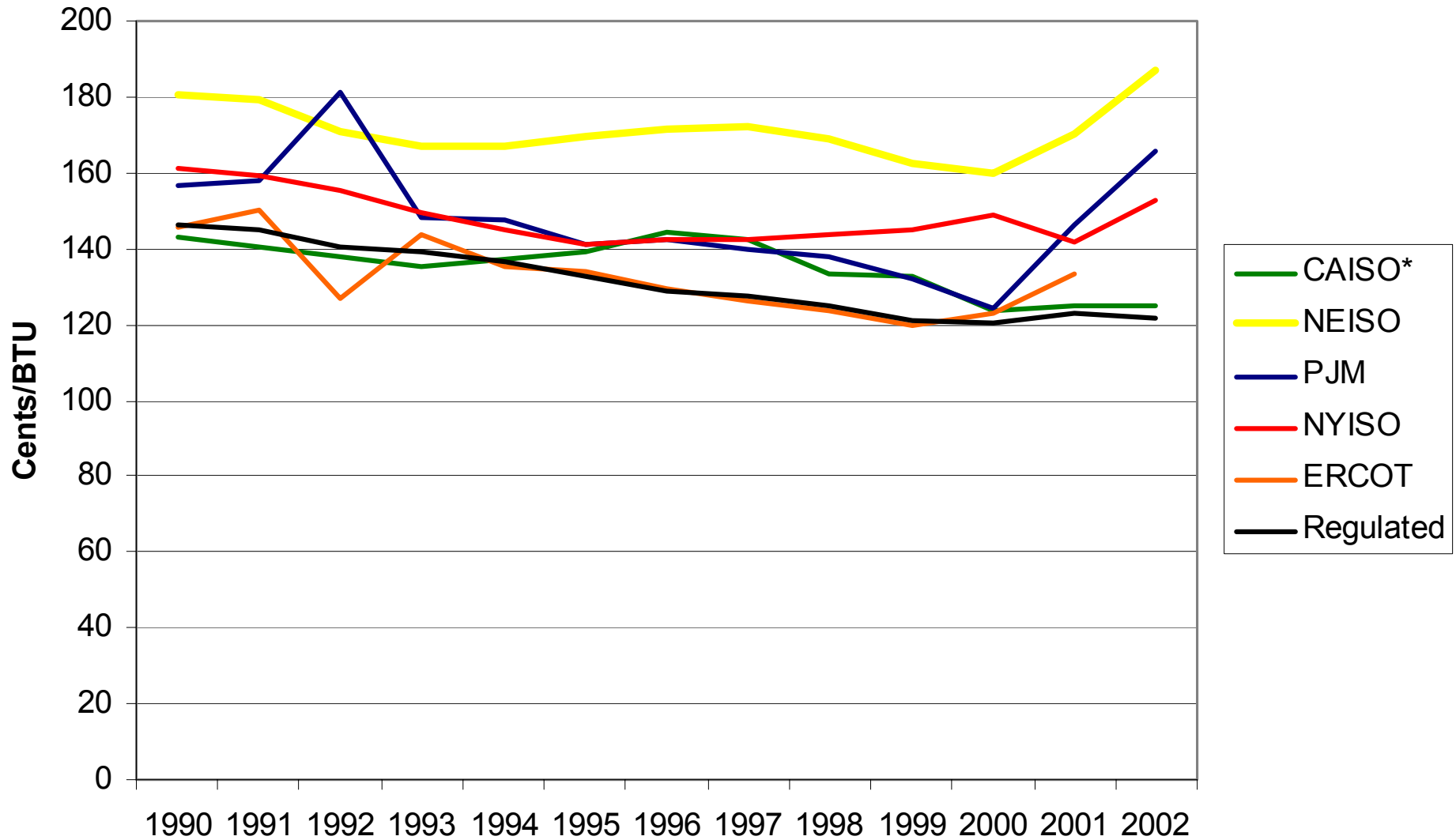
Hydropower and Nuclear Generation in Regulated and Deregulated States



Coal and Natural Gas Generation in Regulated and Deregulated States



Comparison of Coal Costs for ISO's and Regulated States



An Econometric Model

- $P_e = HDD + CDD + GEN_{TOT} + DER + \sum w_i [P_{fi} + 1]$
- Dependant Variable: Retail Electricity Prices
- Explanatory Variables:
 - Heating and Cooling Degree Days
 - Total Generation
 - Constant Terms for Deregulation, by ISO
 - Proportionality-weighted fuel prices for Coal, Natural Gas and Oil
 - Generation Ratios for Coal, Natural Gas, Oil, Nuclear, Hydropower, and Other Renewable

Typical Regression Results: Nominal Industrial Electricity Prices

Adjusted R²: 0.9568

Observations: 1177

HDD	8.45E-05	2.35
CDD	-4.56E-04	-5.27
Coal Cost Ratio	3.08E-03	1.72
NG Cost Ratio	1.23E-03	1.27
Oil Cost Ratio	4.46E-03	1.56
Coal Ratio	3.51	8.53
Hydropower Ratio	2.87	9.68
NG Ratio	8.20	20.03
Nuclear Ratio	7.57	22.77
Other Renewables Ratio	6.06	6.38
Oil Ratio	6.75	5.59
Private Regulated	-0.22	-2.88
CAISO	1.40	3.99
ERCOT	-0.81	-2.23
NEISO	0.66	3.95
NYISO	0.25	0.76
PJM	-0.21	-1.23
Total Generation	-1.41E-09	-2.00

A Summary of 24 Regressions

Variable	Average Coefficient	Number of Regressions with Significant Coefficient at 5%
HDD	1.74E-04	24
CDD	-1.88E-04	10
Coal Cost Ratio	1.19E-02	23
NG Cost Ratio	8.59E-04	0
Oil Cost Ratio	4.83E-03	3
Coal Ratio	2.6	21
Hydropower Ratio	4.79	24
NG Ratio	7.9	24
Nuclear Ratio	7.82	24
Other Renewables Ratio	9	24
Oil Ratio	6.97	22
Private Regulated	0.33	16
CAISO	2.5	23
ERCOT	0.11	1
NEISO	0.78	15
NYISO	2.56	19
PJM	0.23	6
Total Generation	-1.33E-09	7

Conclusions

- No evidence to support the general expectation that deregulation would result in reduced electricity prices.
- California, New York and the New England ISO more expensive than Private Regulated Utilities. ERCOT and PJM less expensive.

Issues to be Addressed

- Taxes
 - Might be lower in deregulated states
- Extent of Divestiture
 - More utilities in PJM retain generating assets