



Capacity “markets” - substitutes for a good price?

NARUC

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Study of Prices in Constrained Areas

- Two markets were studied
 - PJM
 - ISO-NE
- Prices from both Day-Ahead and Real-Time Markets were analyzed for both peak and off-peak hours of the day.
- Prices were analyzed three different ways:
 - Nominal
 - Real Term
 - Fuel Adjusted

PJM Market

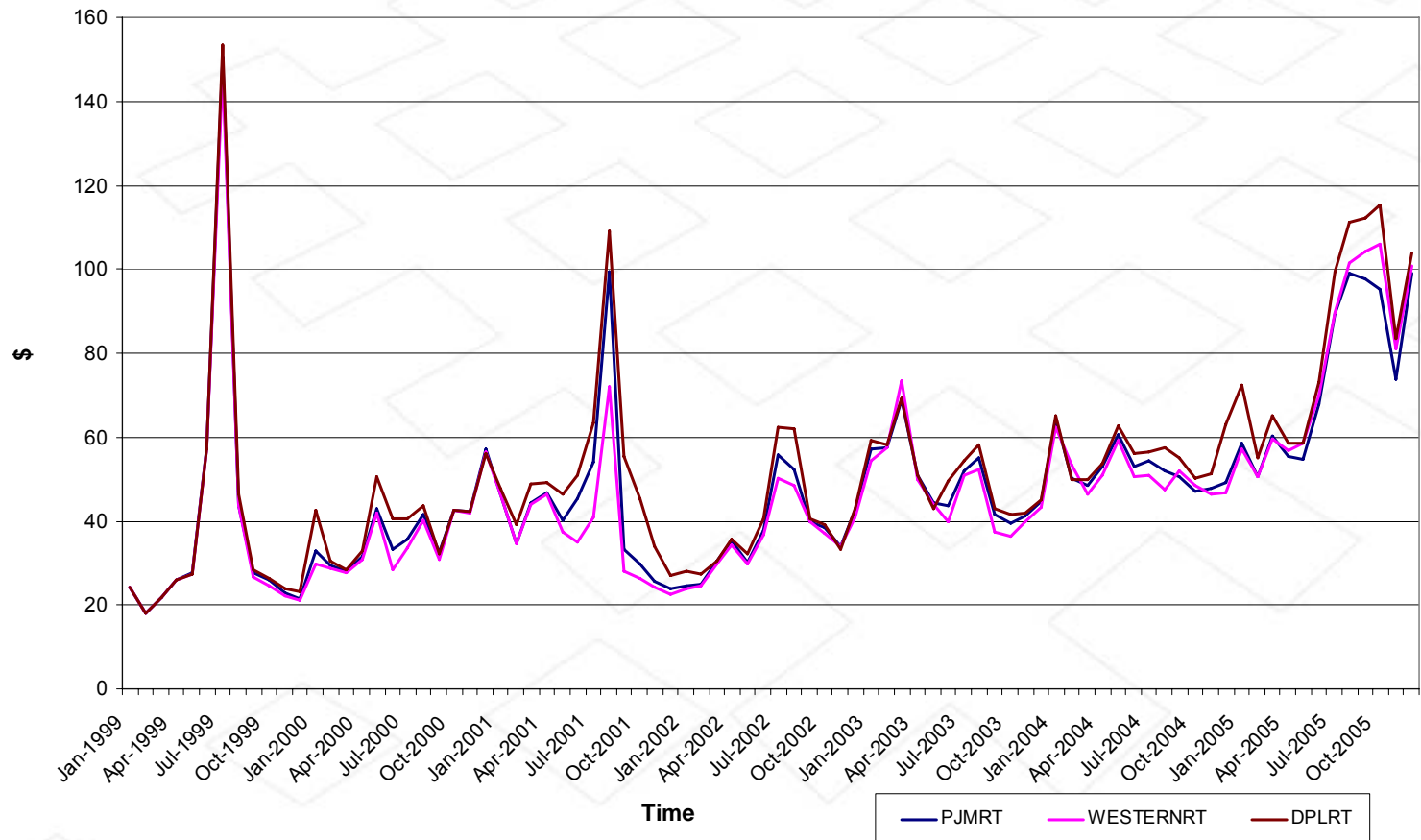
- Delmarva Peninsula is an area in PJM that often suffers import limits
 - Delmarva Power (DPL) was used as a surrogate for analyzing the Delmarva Peninsula constrained market.
- Prices in Delmarva were compared with PJM system wide prices.
 - In addition Delmarva prices were compared to prices at the Western Hub.
 - Western Hub was used since much of the transmission congestion that affect DPL prices would not affect Western Hub prices.

○ PJM Market

- In nominal terms, DPL prices are somewhat higher than the PJM system or Western Hub of PJM prices given the congestion into DPL.
 - The relative price analysis shows the same effects.
 - Both the Day-Ahead and Real-Time market display the same price dispersion between the constrained and unconstrained regions of PJM for most of the hours of the day.
- While the DPL prices spike higher than PJM and Western Hub prices, the average effect of these spikes may not be large enough to drive needed investment in Delmarva infrastructure.

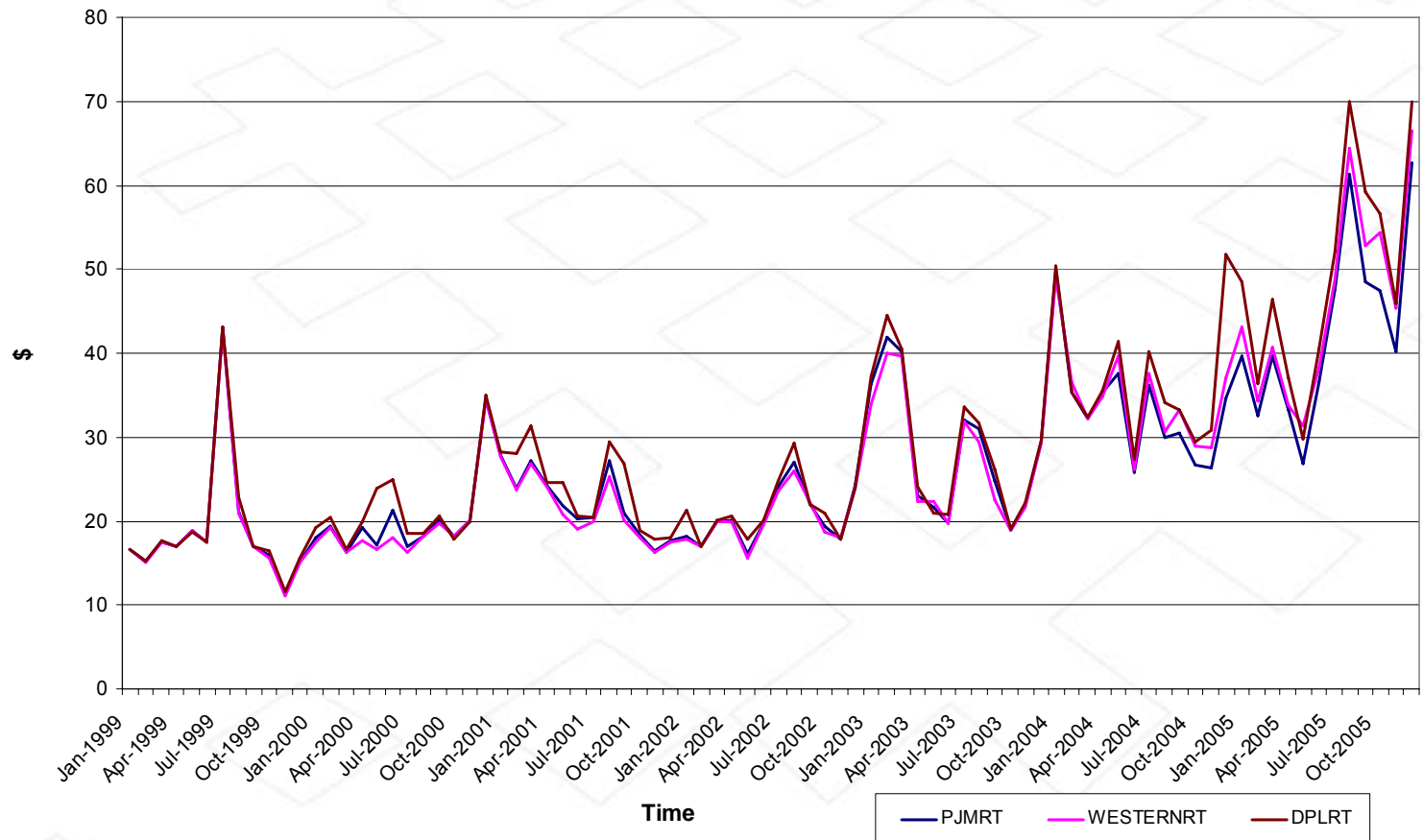
Nominal Price

**PJM Monthly Averaged RealTime LMP for Peak Period
(from Jan 1999 - Dec 2005)**



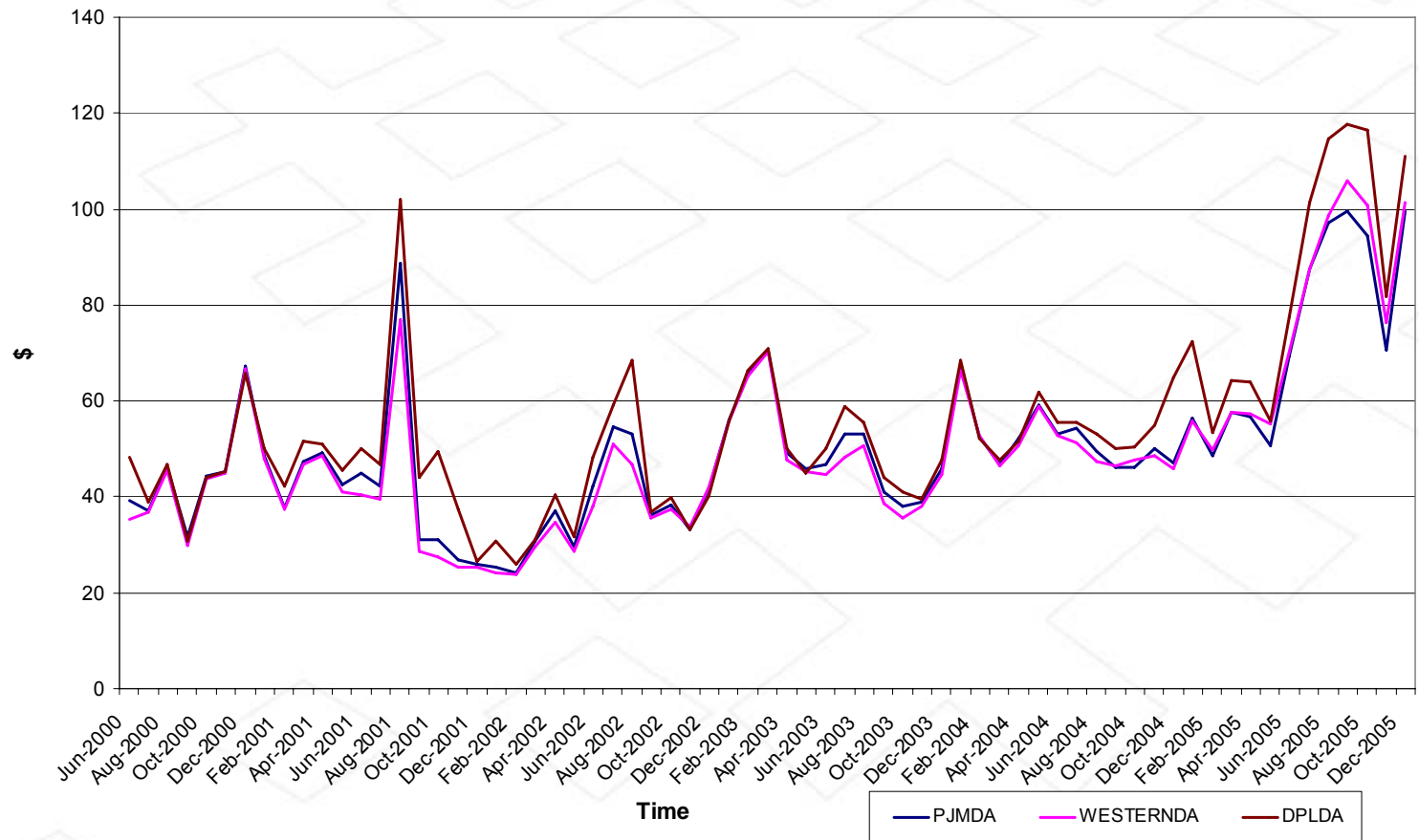
Nominal Price

**PJM Monthly Averaged RealTime LMP for OffPeak Period
(from Jan 1999 - Dec 2005)**



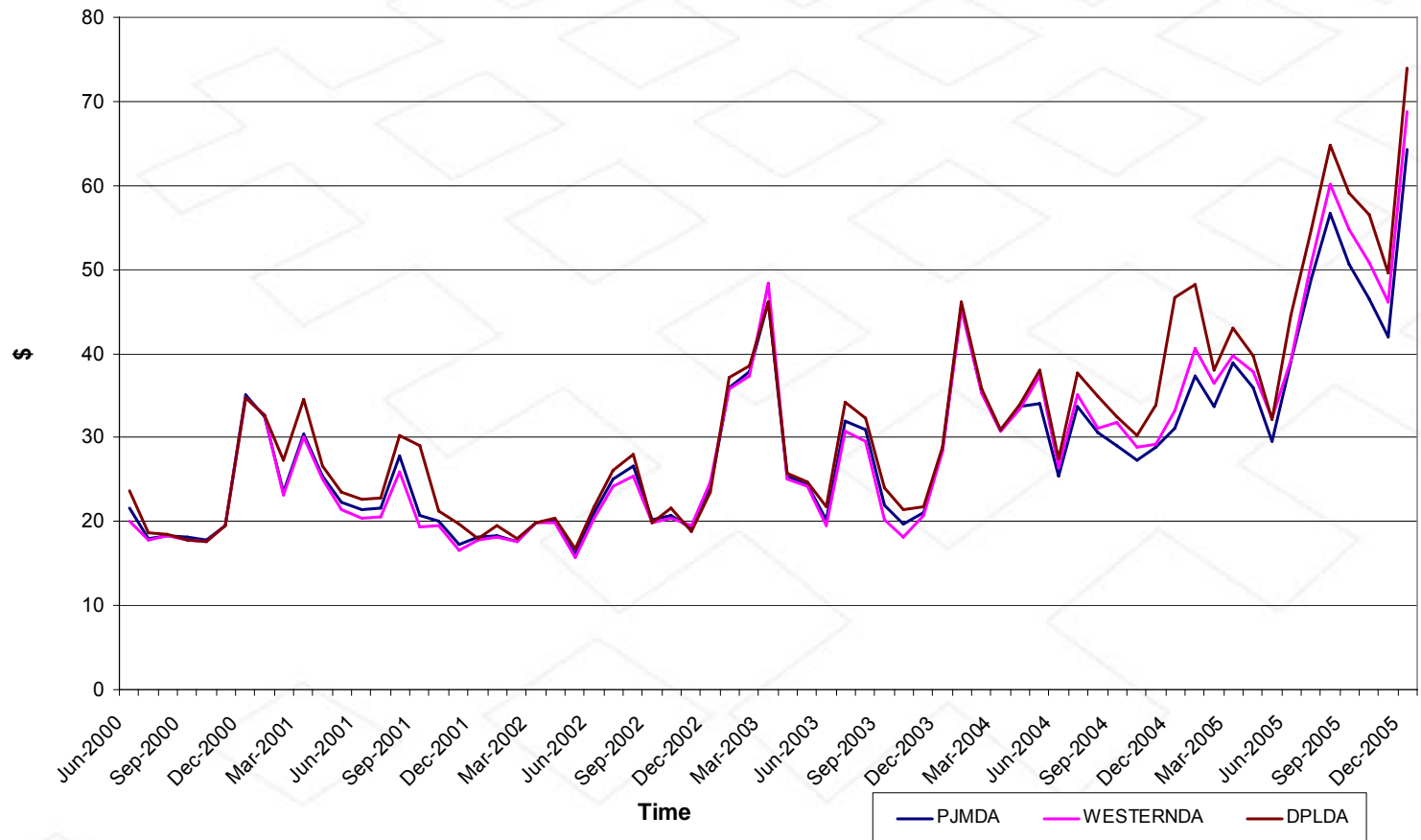
Nominal Price

**PJM Monthly Averaged DayAhead LMP for Peak Period
(from June 2000 - Dec 2005)**



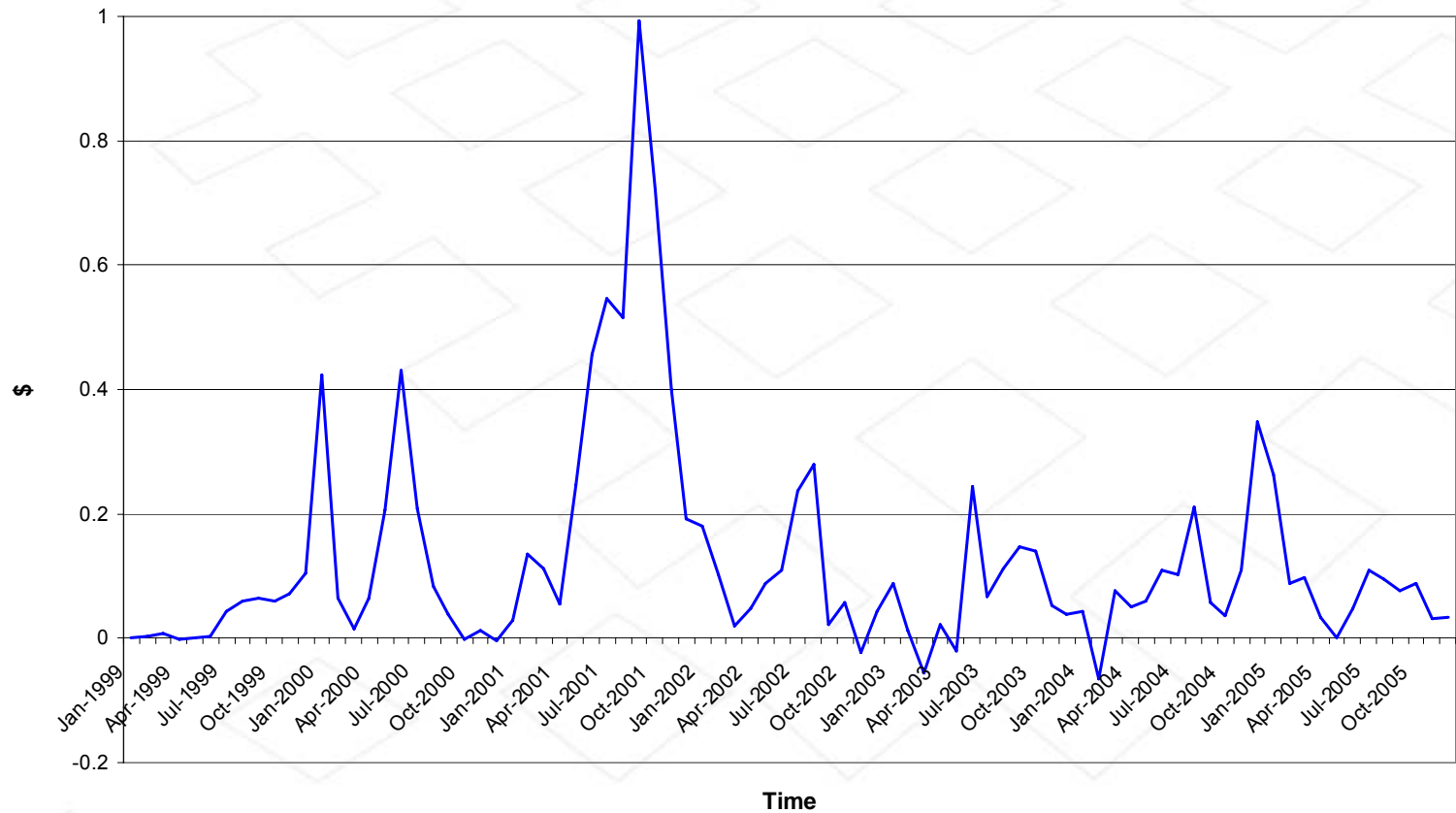
Nominal Price

**PJM Monthly Averaged DayAhead LMP for OffPeak Period
(from June 2000 - Dec 2005)**



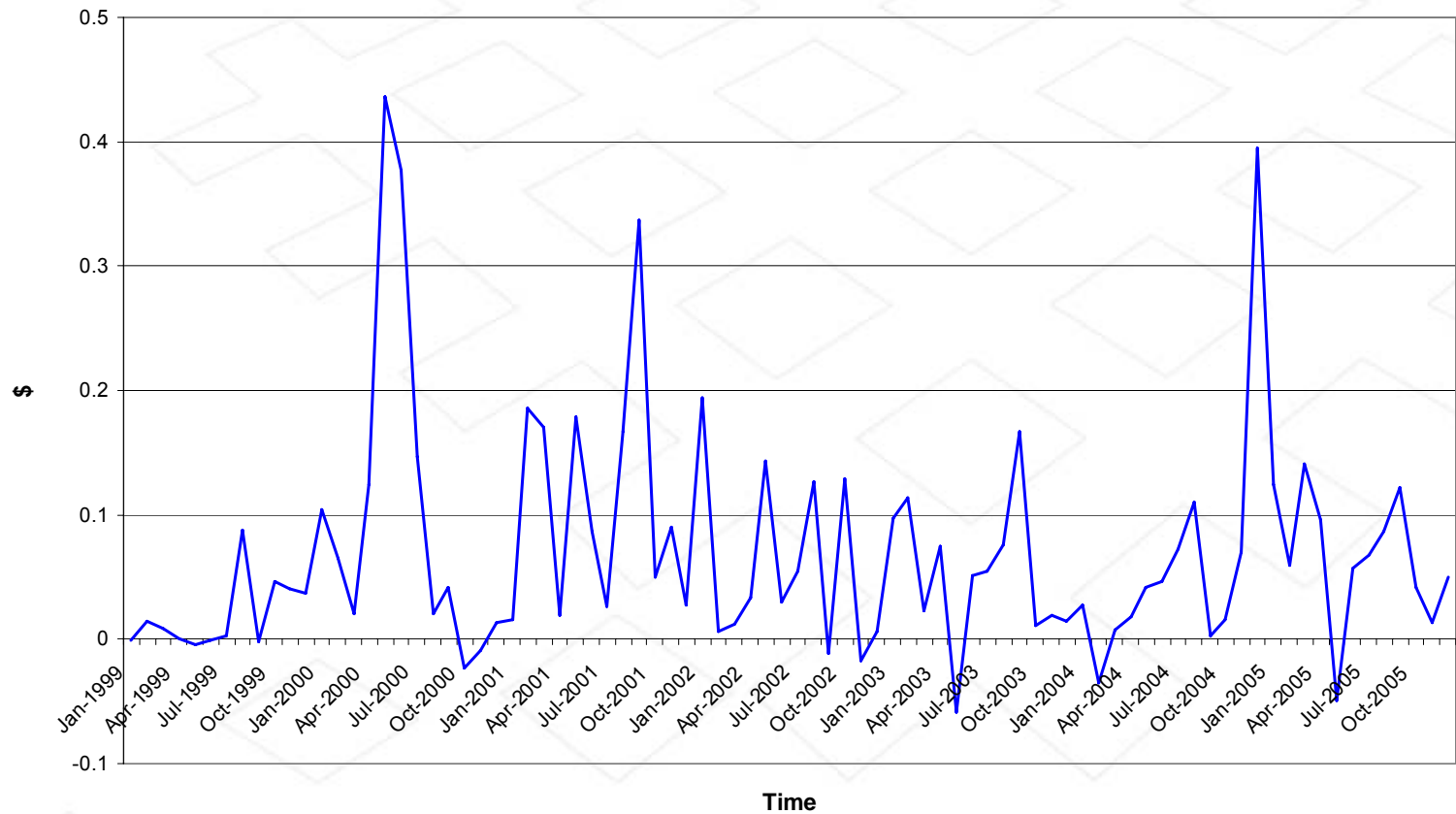
Nominal Price

Ratio (DPL - WESTERN)/WESTERN of RealTime Monthly Averaged LMP for Peak Period
(from Jan 1999 - Dec 2005)



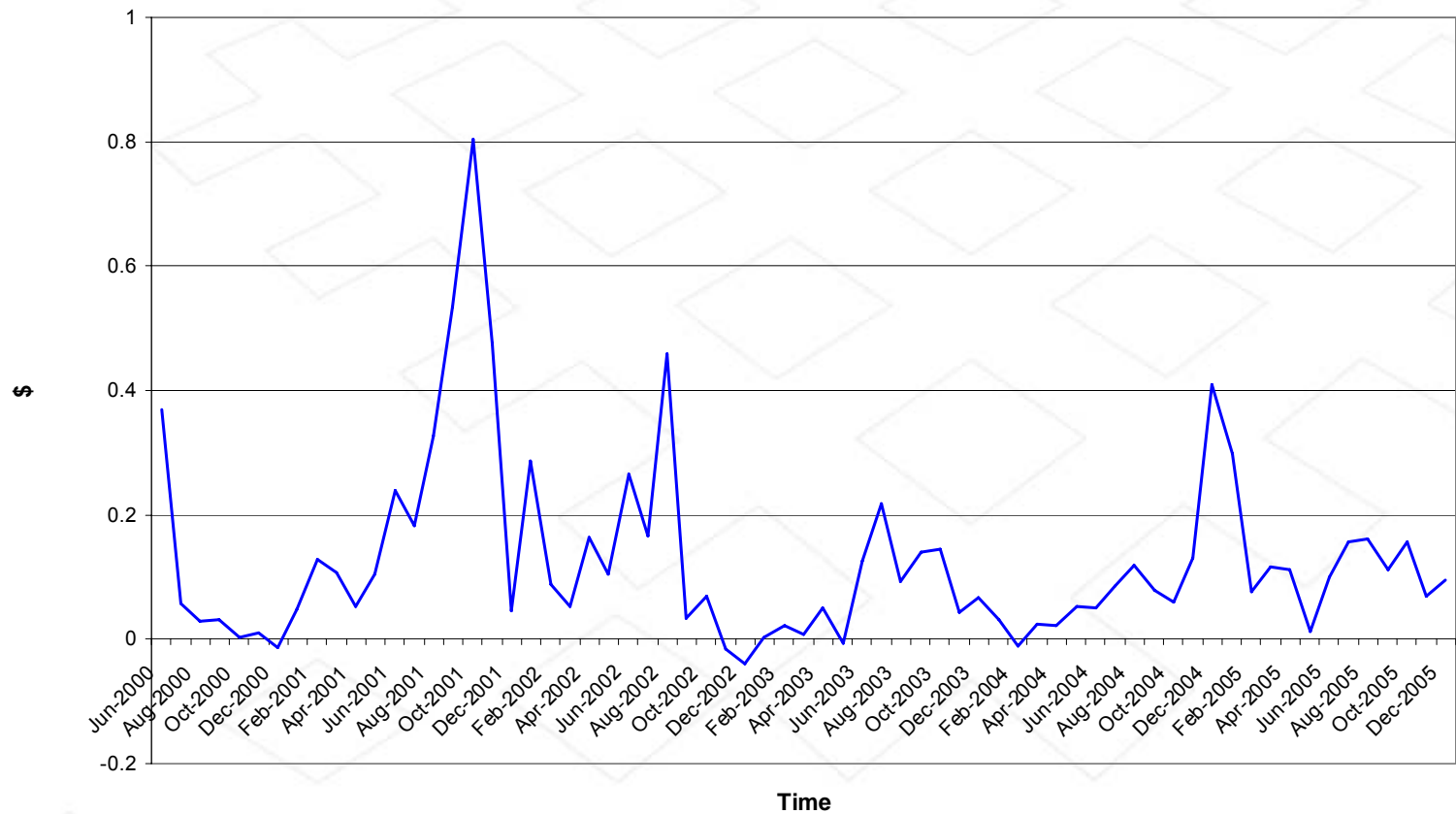
Nominal Price

Ratio (DPL - WESTERN)/WESTERN of RealTime Monthly Averaged LMP for OffPeak Period
(from Jan 1999 - Dec 2005)



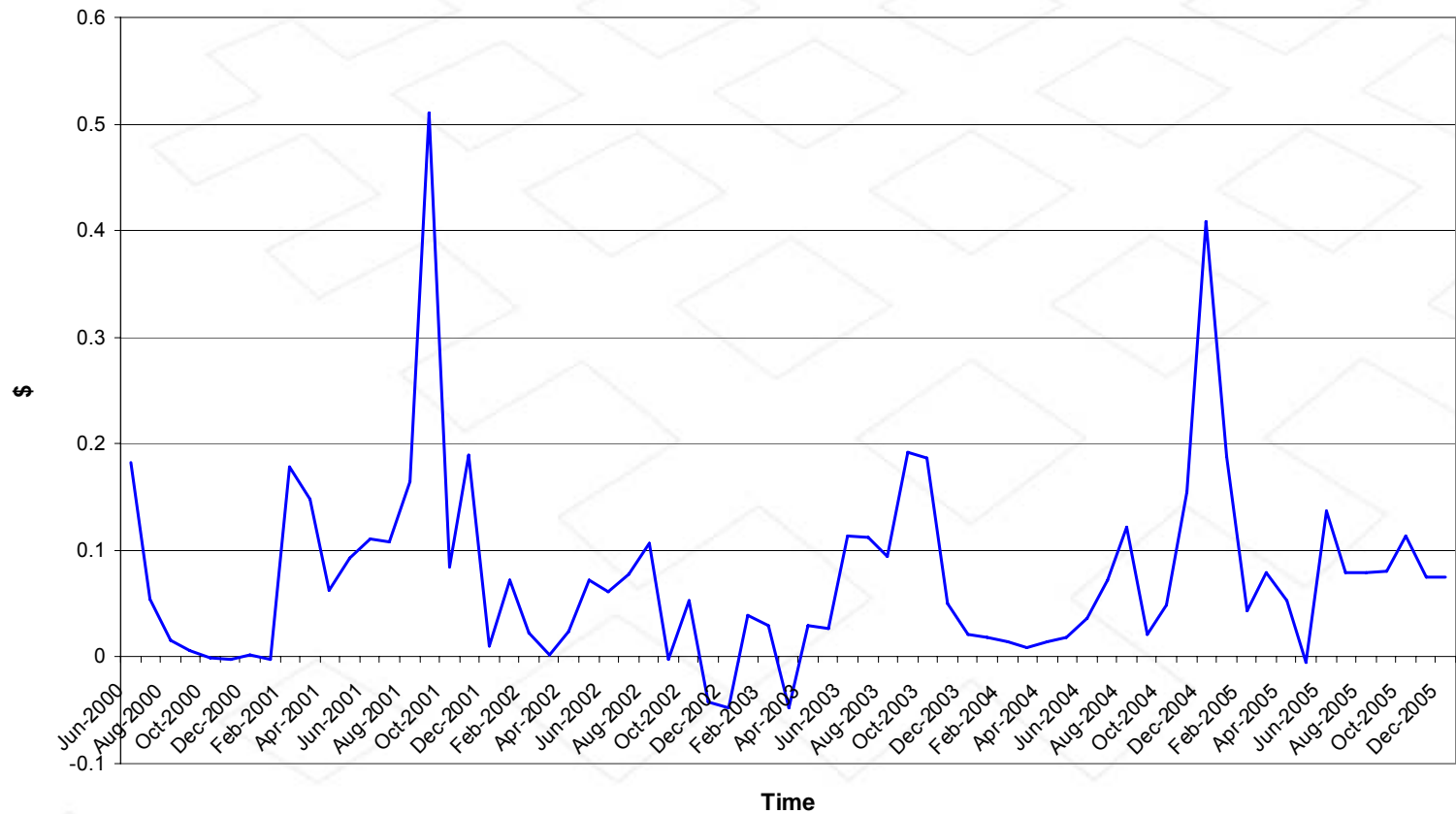
Nominal Price

Ratio (DPL - WESTERN)/WESTERN of DayAhead Monthly Averaged LMP for Peak Period
(from June 2000 - Dec 2005)



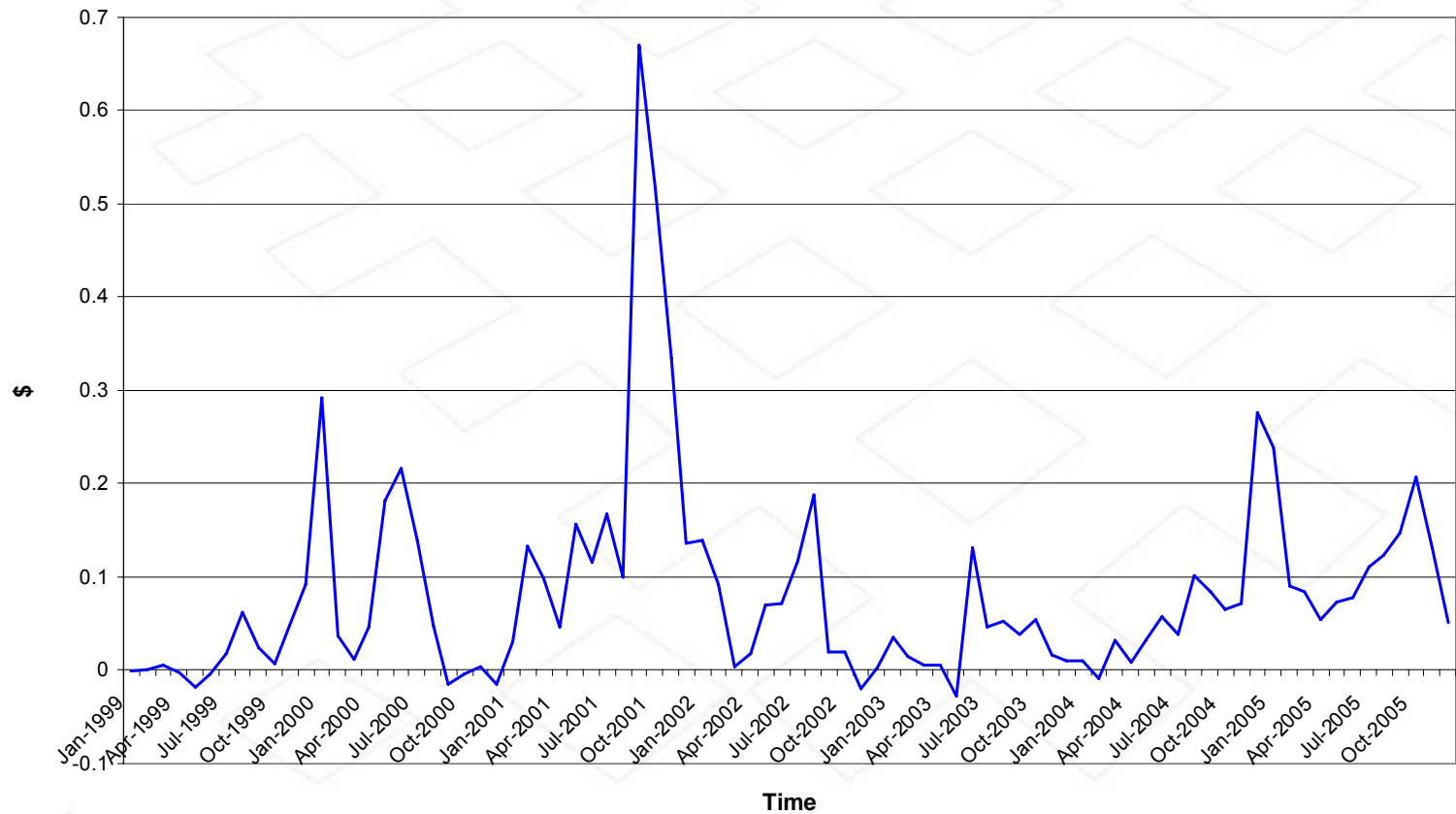
Nominal Price

Ratio (DPL - WESTERN)/WESTERN of DayAhead Monthly Averaged LMP for OffPeak Period
(from June 2000 - Dec 2005)



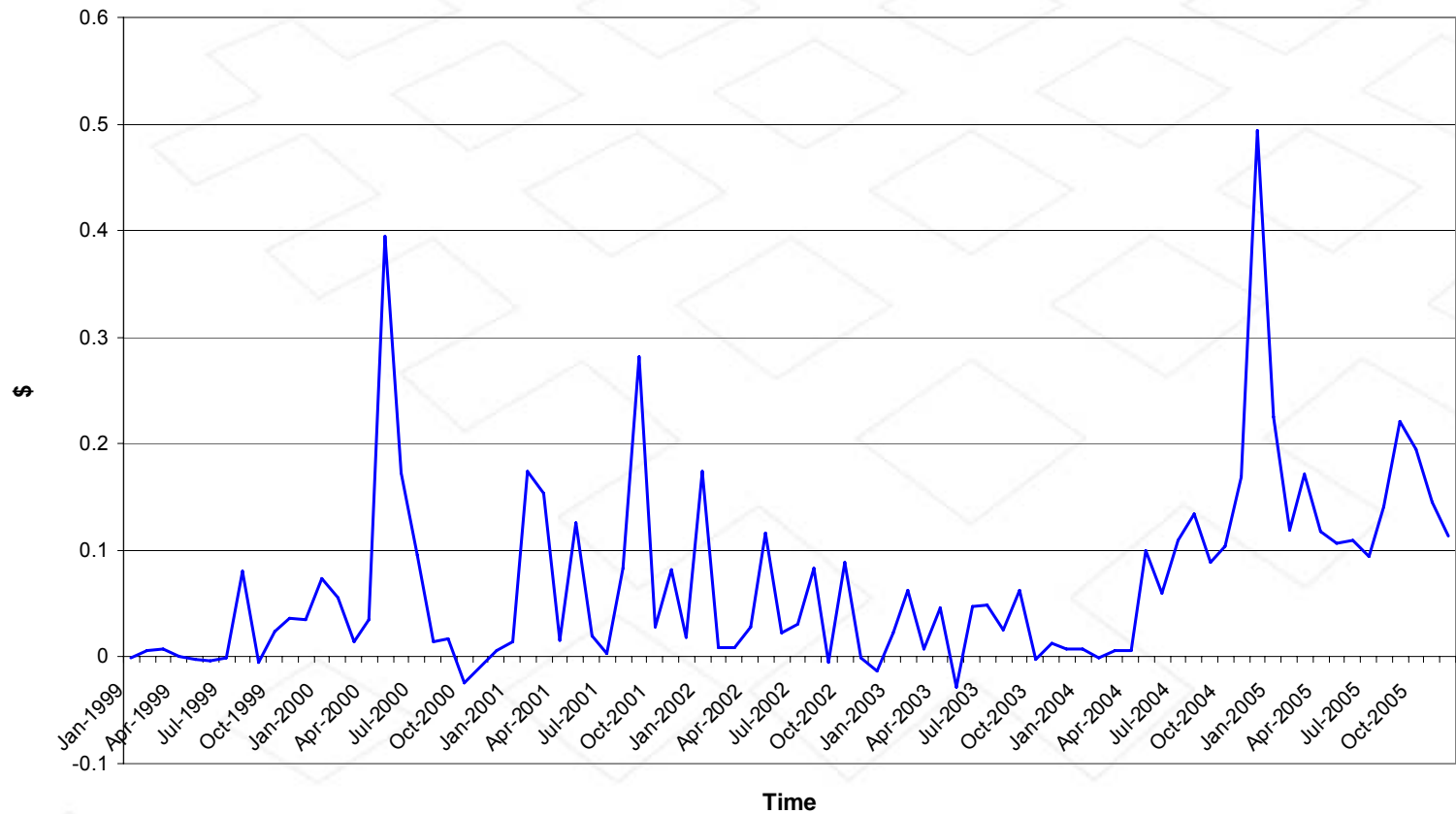
Nominal Price

Ratio (DPL - PJM)/PJM of RealTime Monthly Averaged LMP for Peak Period
(from Jan 1999 - Dec 2005)



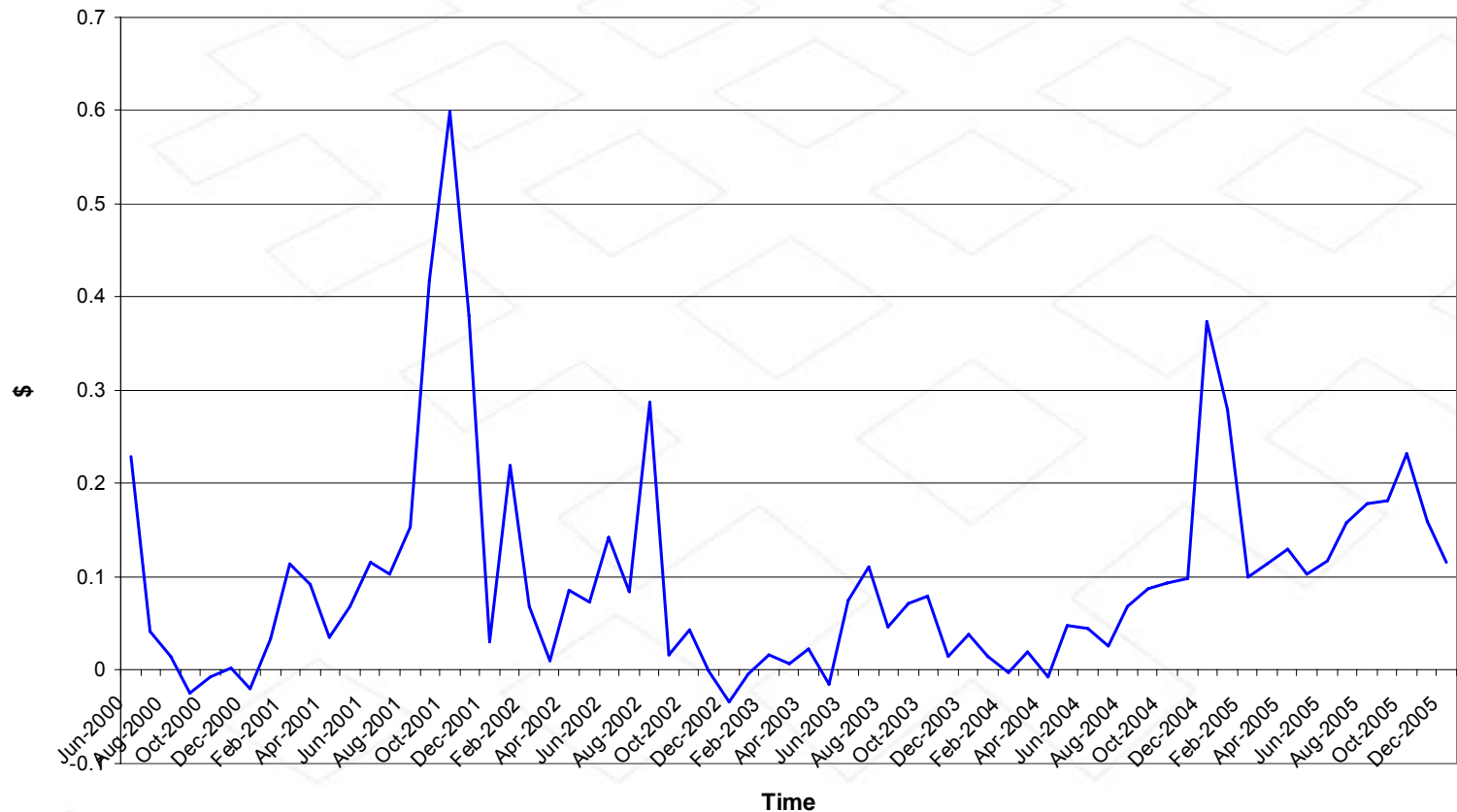
Nominal Price

Ratio (DPL - PJM)/PJM of RealTime Monthly Averaged LMP for OffPeak Period
(from Jan 1999 - Dec 2005)



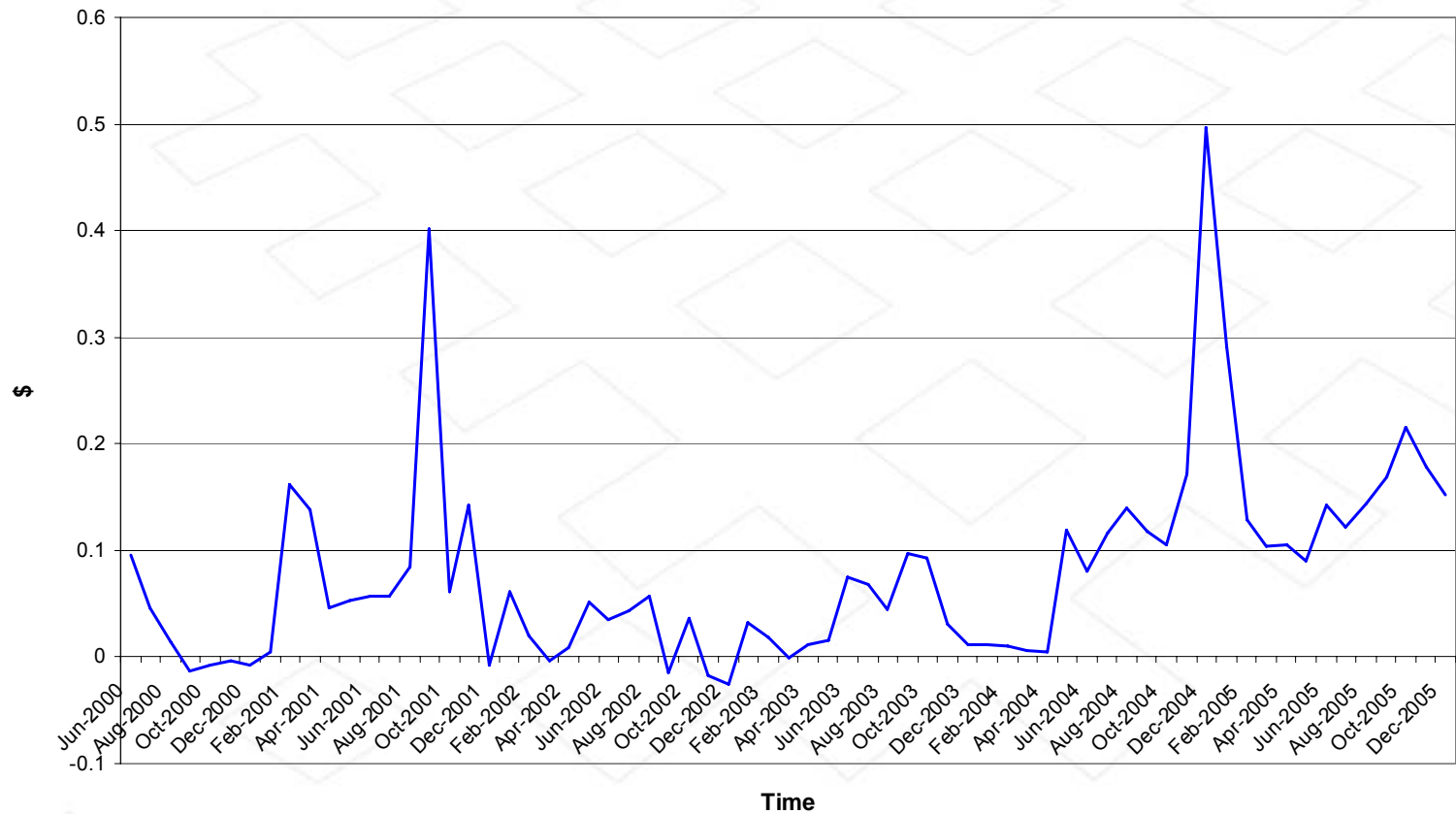
Nominal Price

Ratio (DPL - PJM)/PJM of DayAhead Monthly Averaged LMP for Peak Period
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Nominal Price

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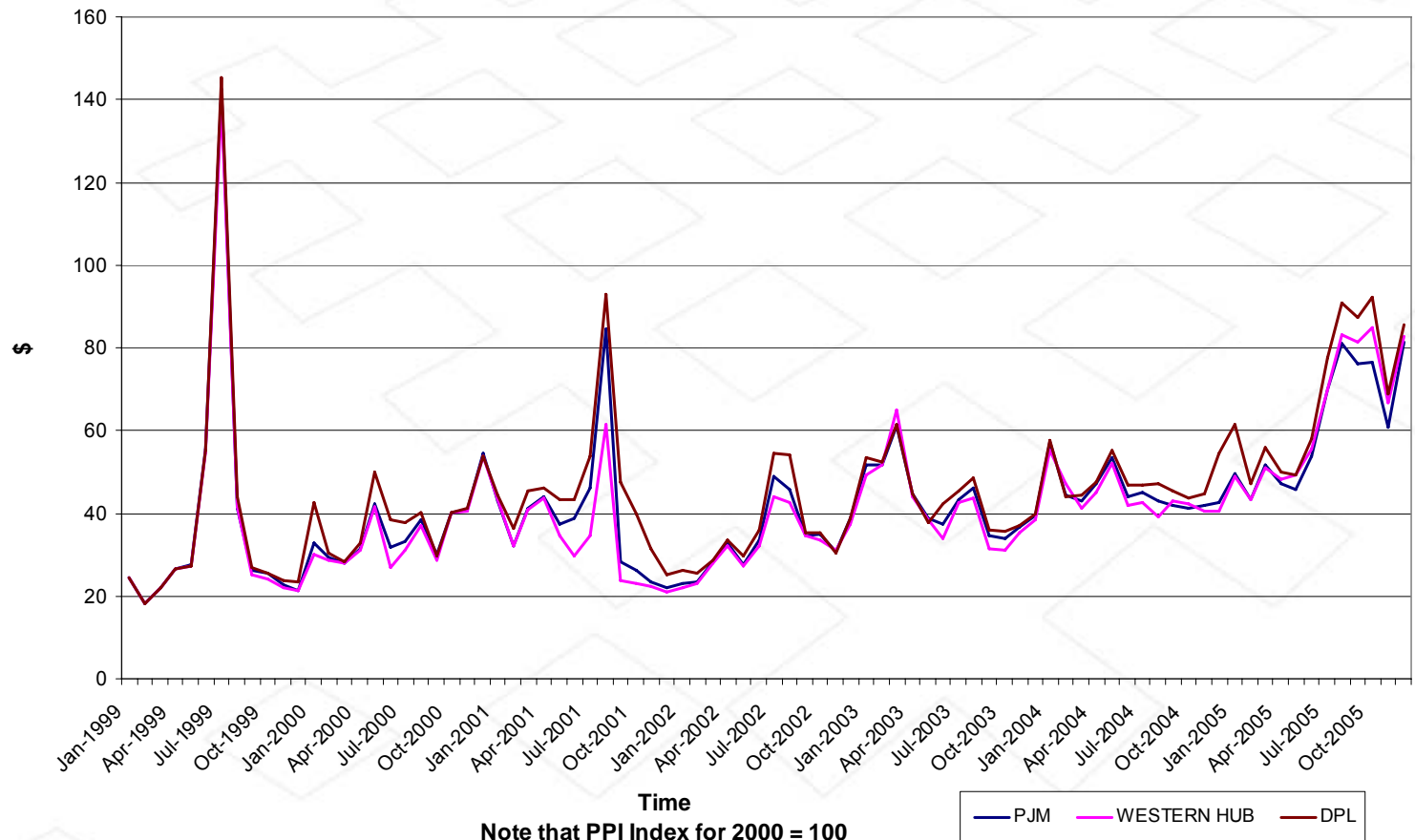
Real Price

(PPI Base = 2000)

- DPL Western Hub and PJM System wide prices were adjusted for inflation (PPI).
- In real terms, the price spread between the constrained market price of DPL and PJM price is very narrow at best.
- Western Hub real price series is the lowest since 1999, except around July 2005 when it started to rise above PJM price.
- Price divergence between constrained and unconstrained markets is not clearly discernable most of the period.

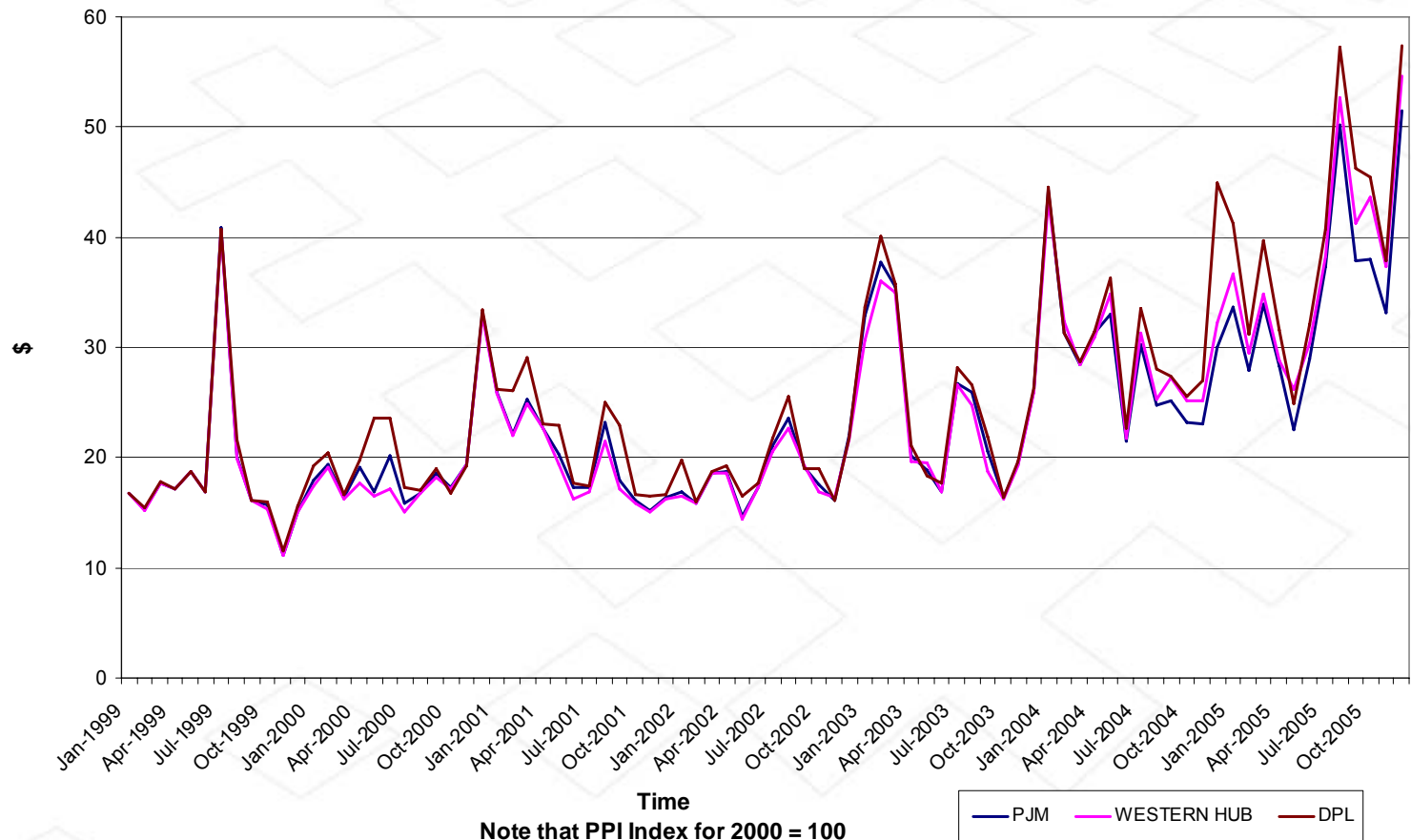
○ Real Price

**PPI Adjusted PJM Monthly Averaged RealTime LMP for Peak Period
(from Jan 1999 - Dec 2005)**



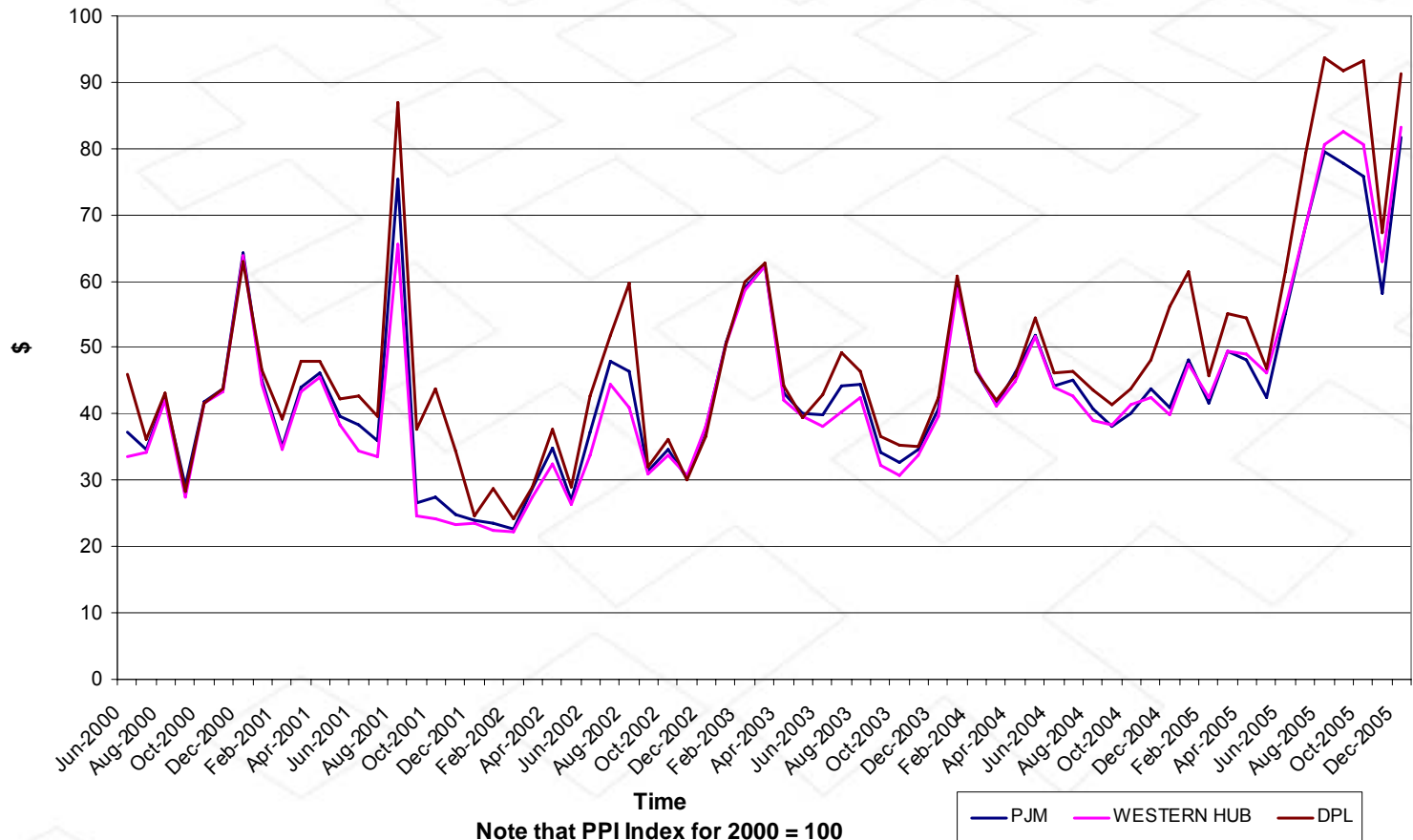
○ Real Price

**PPI Adjusted PJM Monthly Averaged RealTime LMP for OffPeak Period
(from Jan 1999 - Dec 2005)**



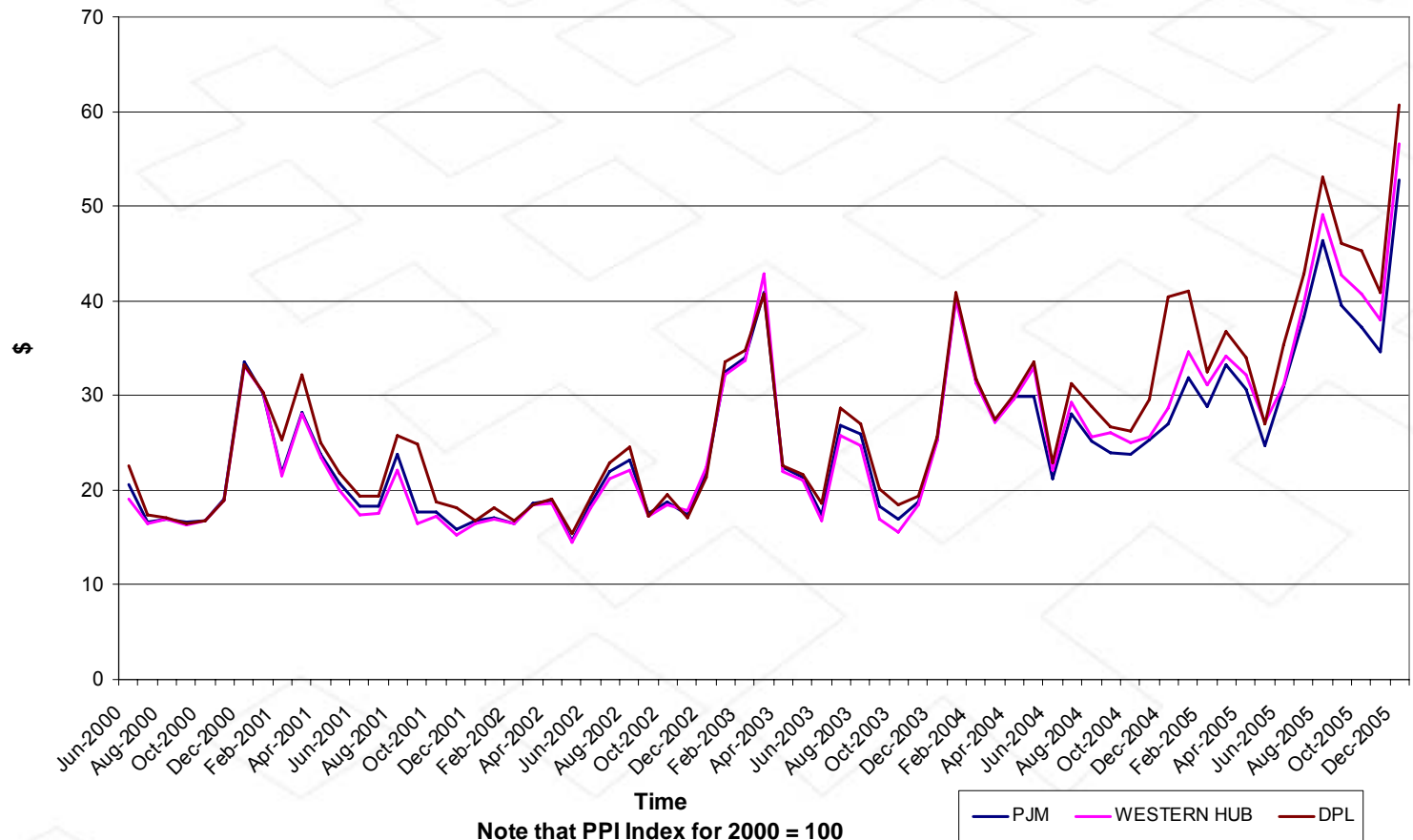
○ Real Price

**PPI Adjusted PJM Monthly Averaged DayAhead LMP for Peak Period
(from June 2000 - Dec 2005)**



○ Real Price

**PPI Adjusted PJM Monthly Averaged DayAhead LMP for OffPeak Period
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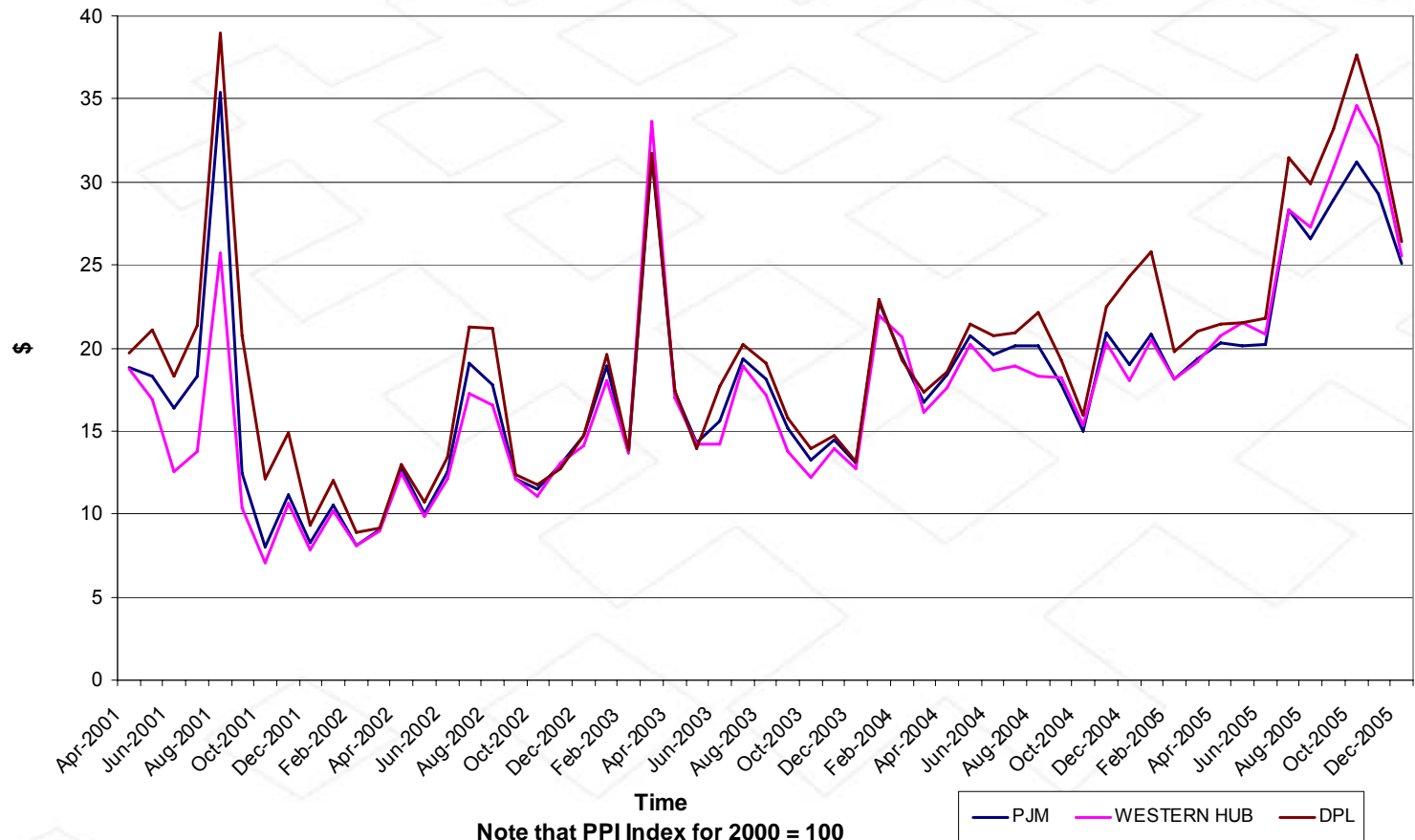


Fuel Adjusted Price

- Natural Gas price was used for the fuel adjustment.
- Fuel Adjusted Price of DPL is marginally higher than Western Hub and PJM system wide average price for most hours of the day.
- Fuel adjusted prices display similar characteristics as real time price movements in both constrained and unconstrained markets.
- The price spread between DPL and Western Hub and PJM are very narrow most of the period studied, with a few exceptions when price spikes were noticeable.

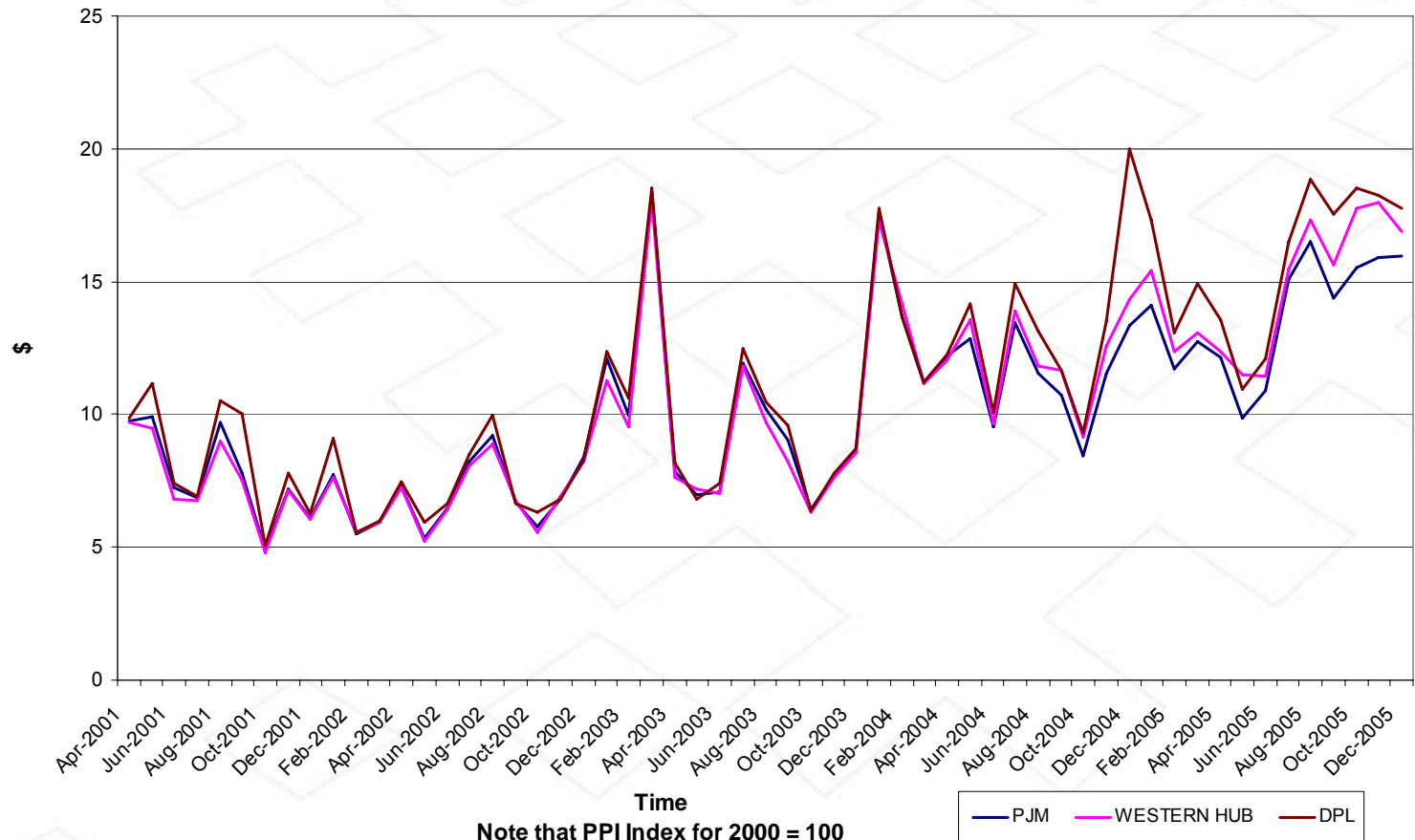
Fuel Adjusted

Fuel Adjusted PJM Monthly Averaged RealTime LMP for Peak Period
(from April 2001 - Dec 2005)



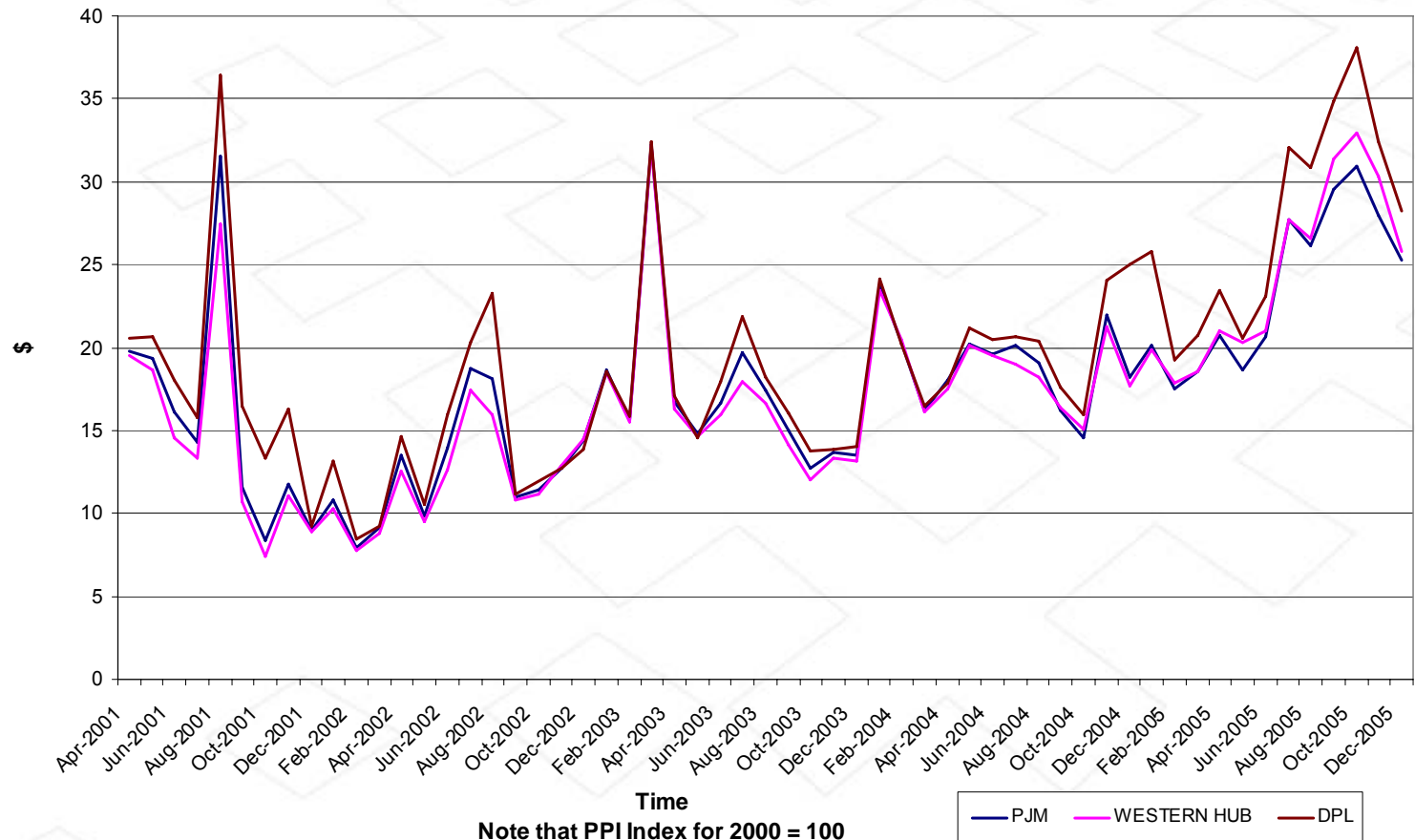
Fuel Adjusted

**Fuel Adjusted PJM Monthly Averaged RealTime LMP for OffPeak Period
(from April 2001 - Dec 2005)**



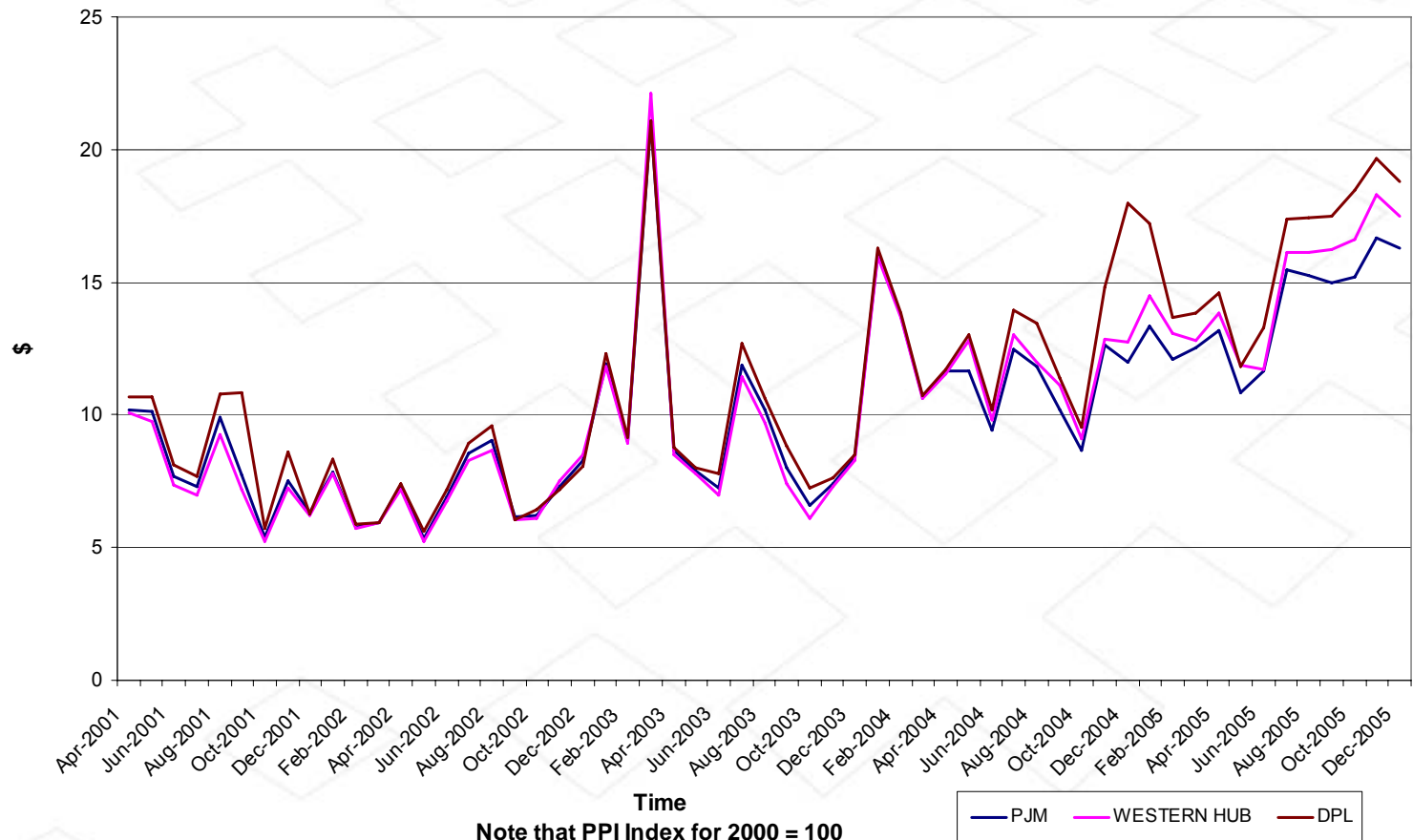
Fuel Adjusted

**Fuel Adjusted PJM Monthly Averaged DayAhead LMP for Peak Period
(from April 2001 - Dec 2005)**



Fuel Adjusted

Fuel Adjusted PJM Monthly Averaged DayAhead LMP for OffPeak Period
(from April 2001 - Dec 2005)



ISO-NE

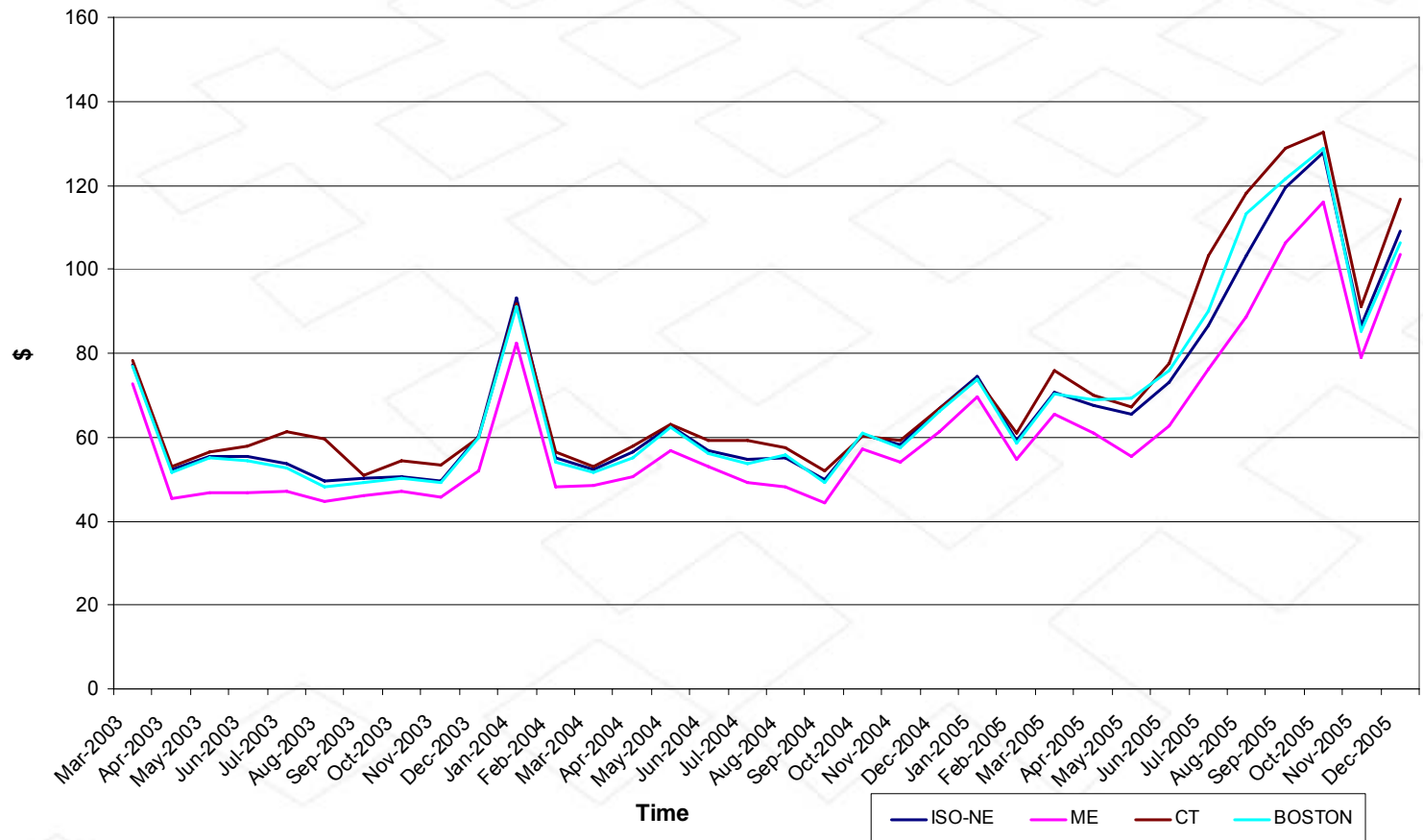
- Prices from three ISO-NE regions were analyzed.
 - Boston and Connecticut were selected as regions where transmission into the regions would be often congested.
 - Maine was chosen as a region whose prices are most likely to be unaffected by constraints affecting Connecticut and Boston.
 - ISO-NE is a system wide average price.

○ Nominal Price

- In nominal terms, prices in Boston and CT are tend to be the highest.
 - In the Real-Time market, the price trends for the peak and off-peak periods of ISO-NE and CT and Boston prices are very close to one another.
 - The prices in Maine produce the lowest price series.
 - The CT prices in the Day-Ahead market are slightly higher than both the ISO-NE system average and Maine prices.
 - Until June 2005, the peak prices of the constrained Boston and CT areas were virtually converged with ISO-NE average price. CT Real-Time peak prices started to diverge slightly from the ISO-NE averages following June 2005.

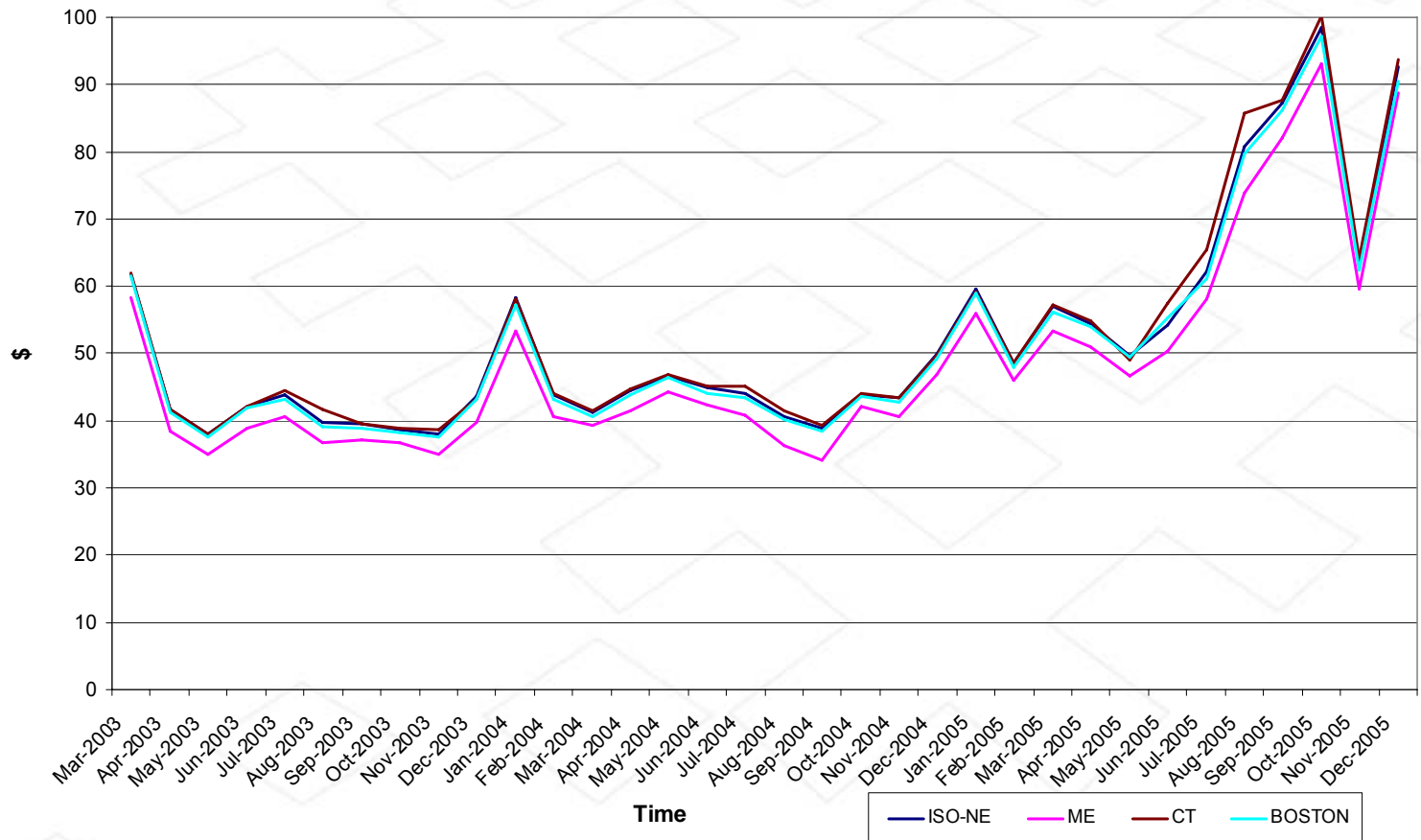
Nominal Price

**ISONE Monthly Averaged RealTime LMP for Peak Period
(from March 2003 - Dec 2005)**



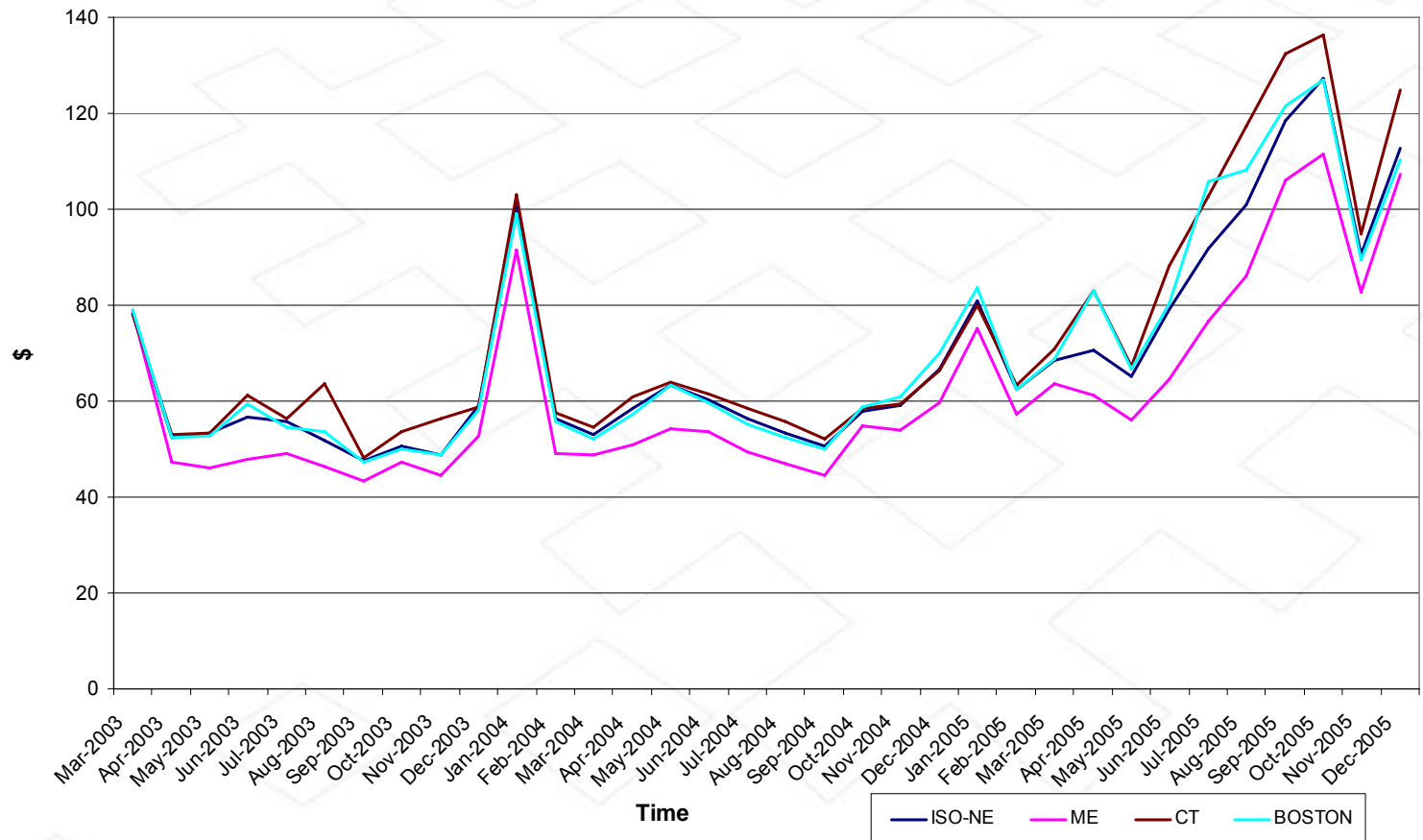
Nominal Price

**ISONE Monthly Averaged RealTime LMP for OffPeak Period
(from March 2003 - Dec 2005)**



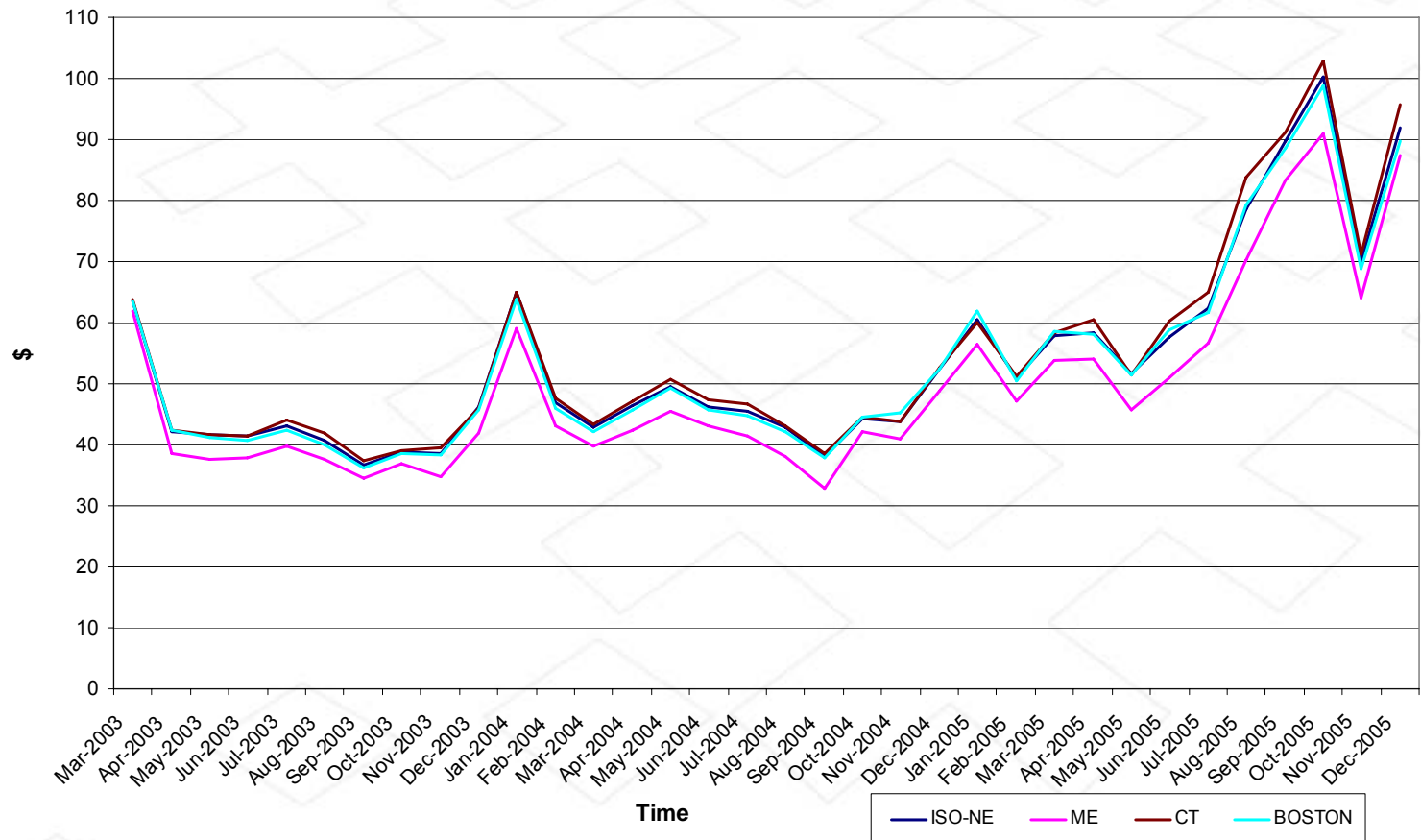
Nominal Price

**ISONE Monthly Averaged DayAhead LMP for Peak Period
(from March 2003 - Dec 2005)**



Nominal Price

**ISONE Monthly Averaged DayAhead LMP for OffPeak Period
(from March 2003 - Dec 2005)**

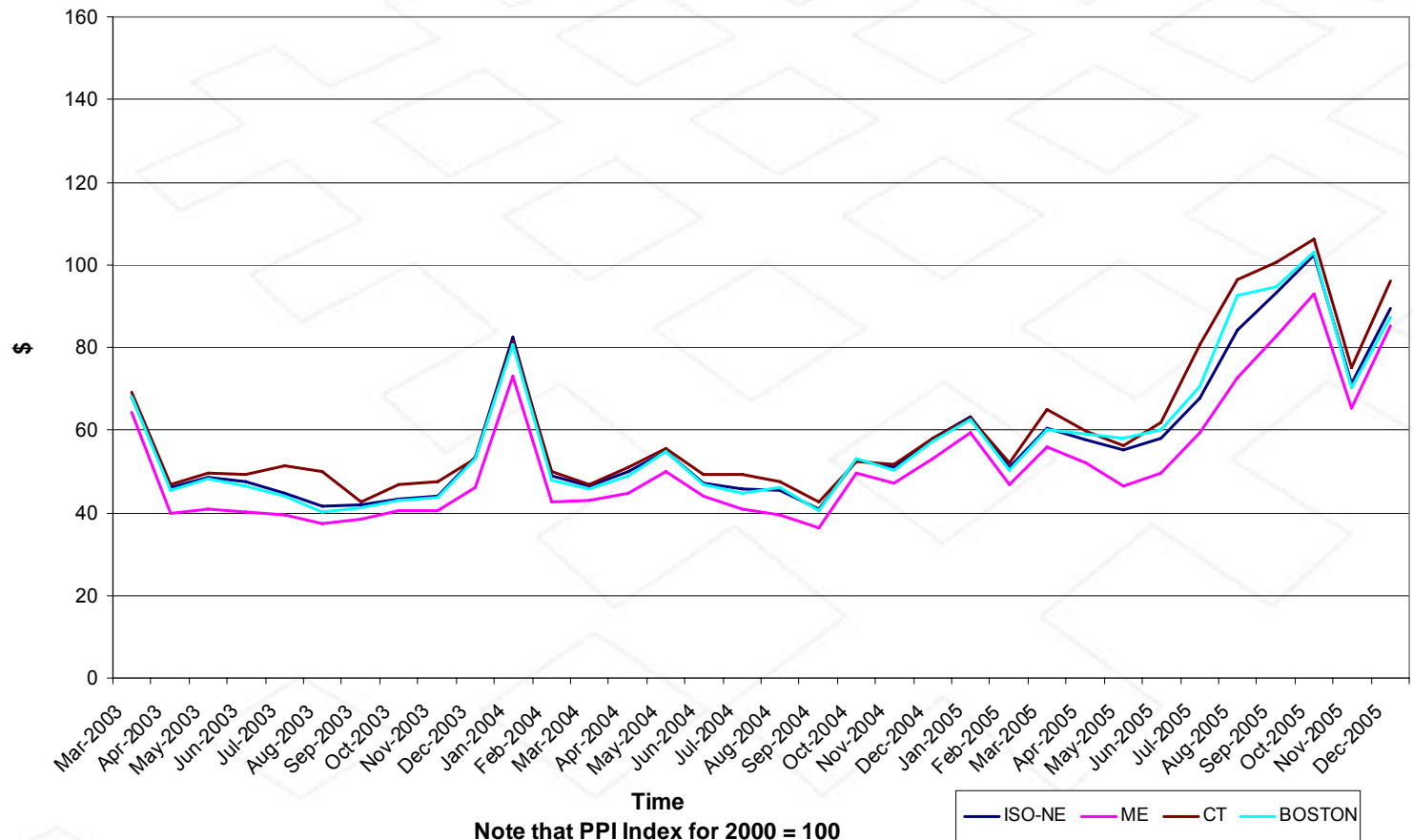


○ Real Prices

- In real terms, the Boston and CT tend to be the highest.
 - There is very little divergence of prices among the CT and Boston areas and ISO-NE system average.
 - This characteristic is more clearly depicted both in the RT and DA off-peak markets.
 - The prices in Maine produce the lowest price series.
 - In November 2005, the constrained real price in Boston area is virtually on top of ISO-NE average real price.

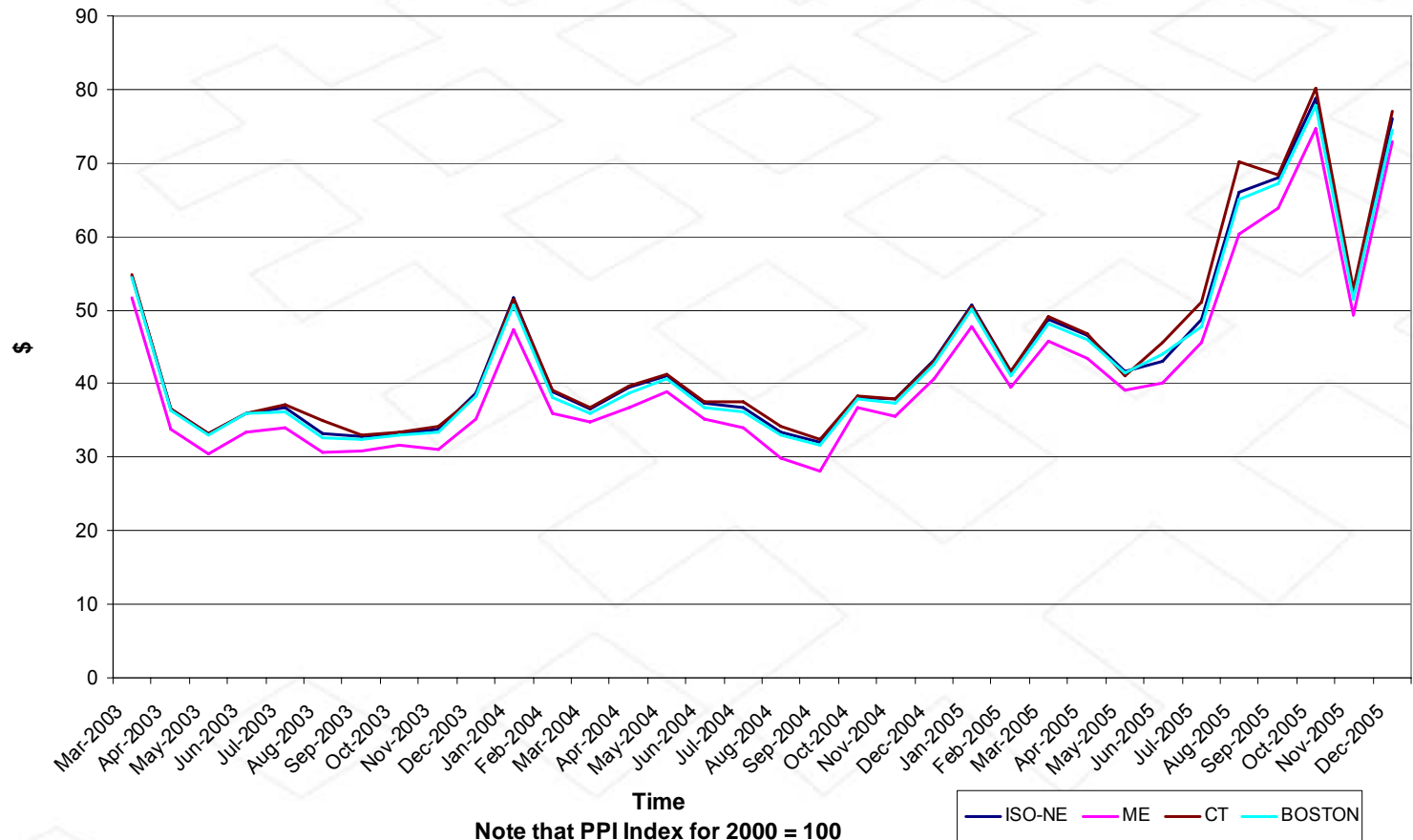
○ Real Price

**PPI Adjusted ISONE Monthly Averaged RealTime LMP for Peak Period
(from March 2003 - Dec 2005)**



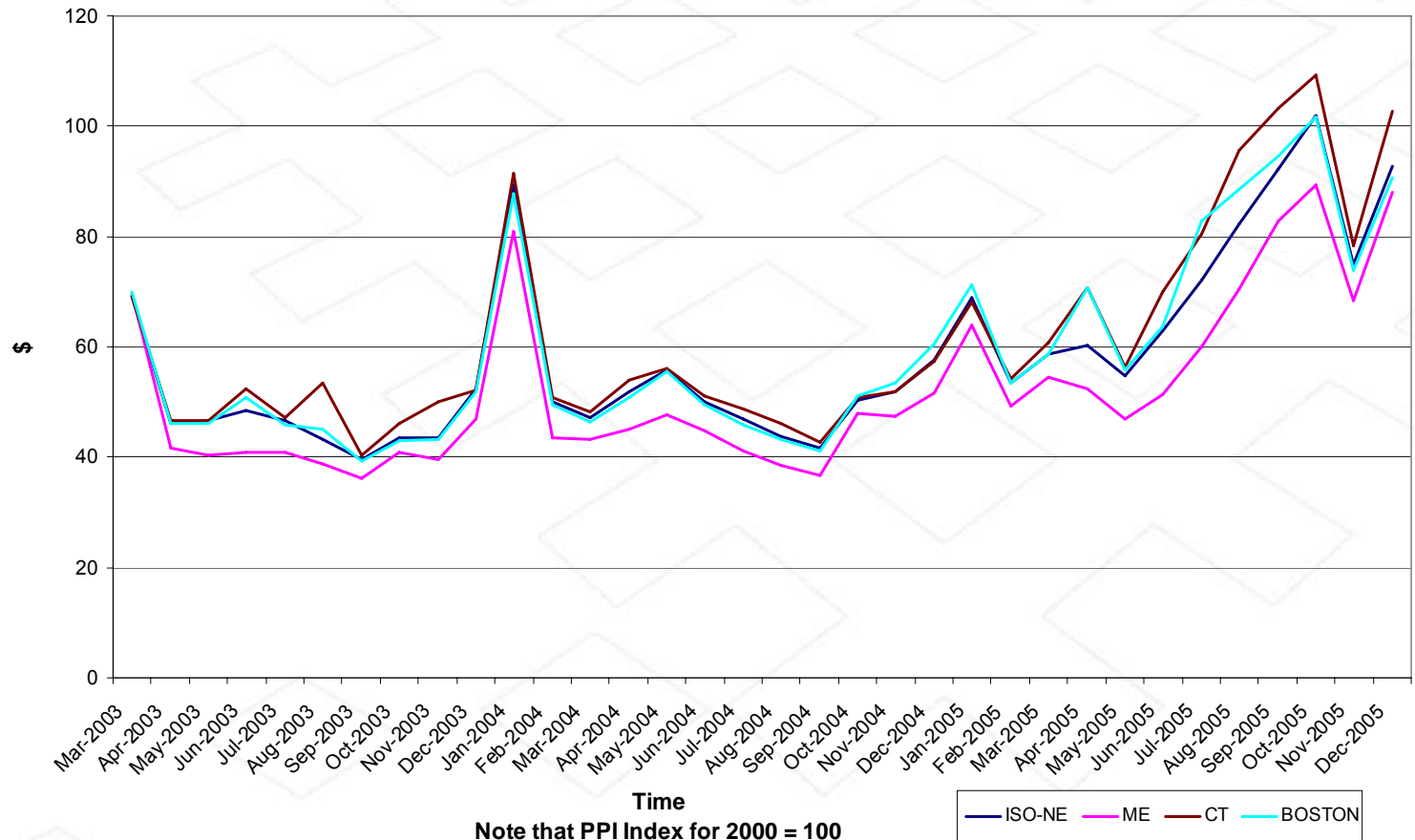
○ Real Price

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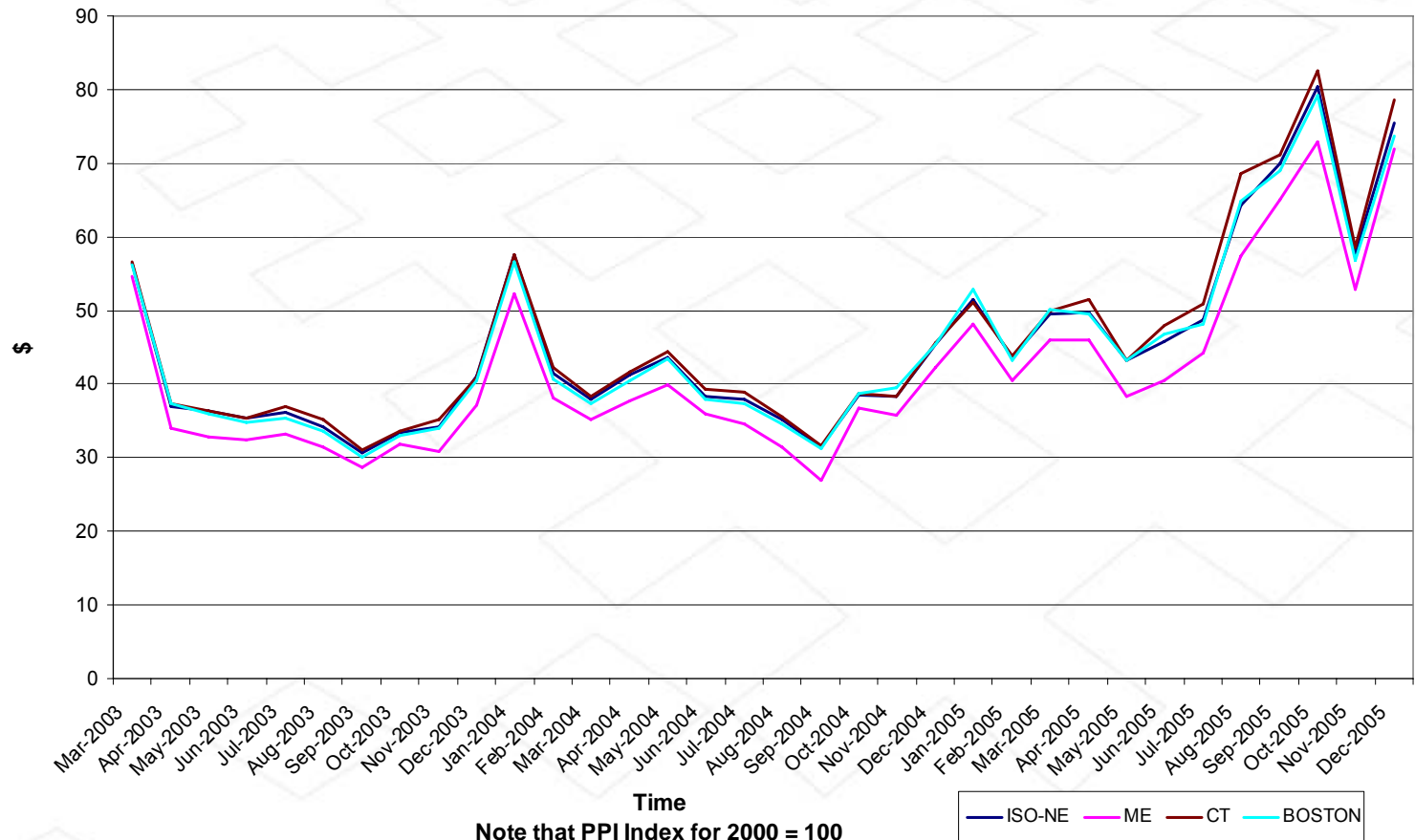
○ Real Price

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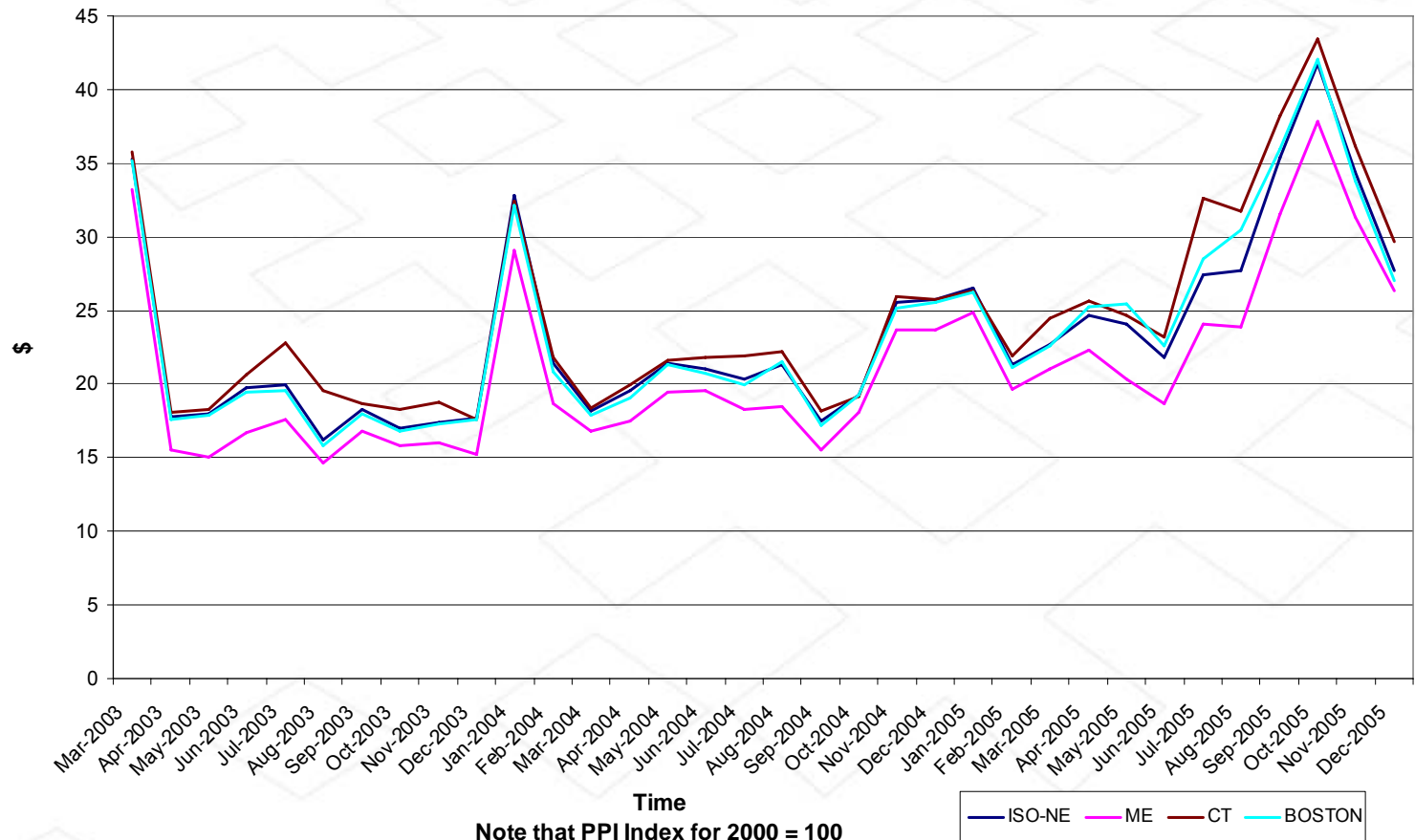


○ Fuel Adjusted Price

- For most of the period since April 2003, the fuel adjusted price trend analysis, in both the constrained and unconstrained regions for the ISO-NE real-time off peak market indicates that Boston and CT and ISO-NE average are very close whereas Maine is always lower than the other three prices studied.
- In most of the period, fuel adjusted prices were virtually on top of one another, except Maine, which is always lower. Price spreads among constrained and unconstrained markets were marginally measurable at best.
- In early 2005, CT Day-Ahead constrained market prices started to marginally deviate from the ISO-NE average price, whereas Boston was very close to the ISO-NE average price.

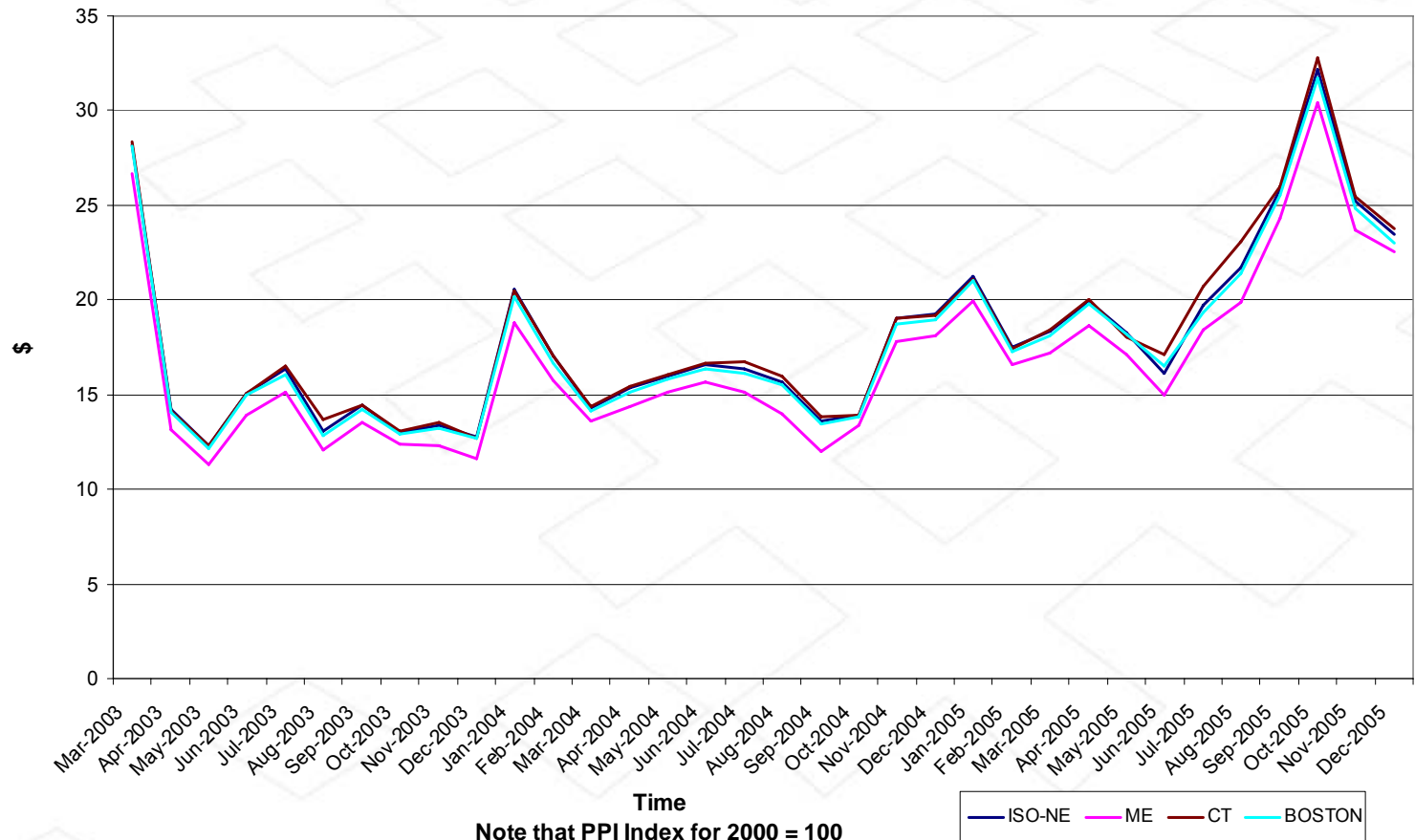
Fuel Adjusted Price

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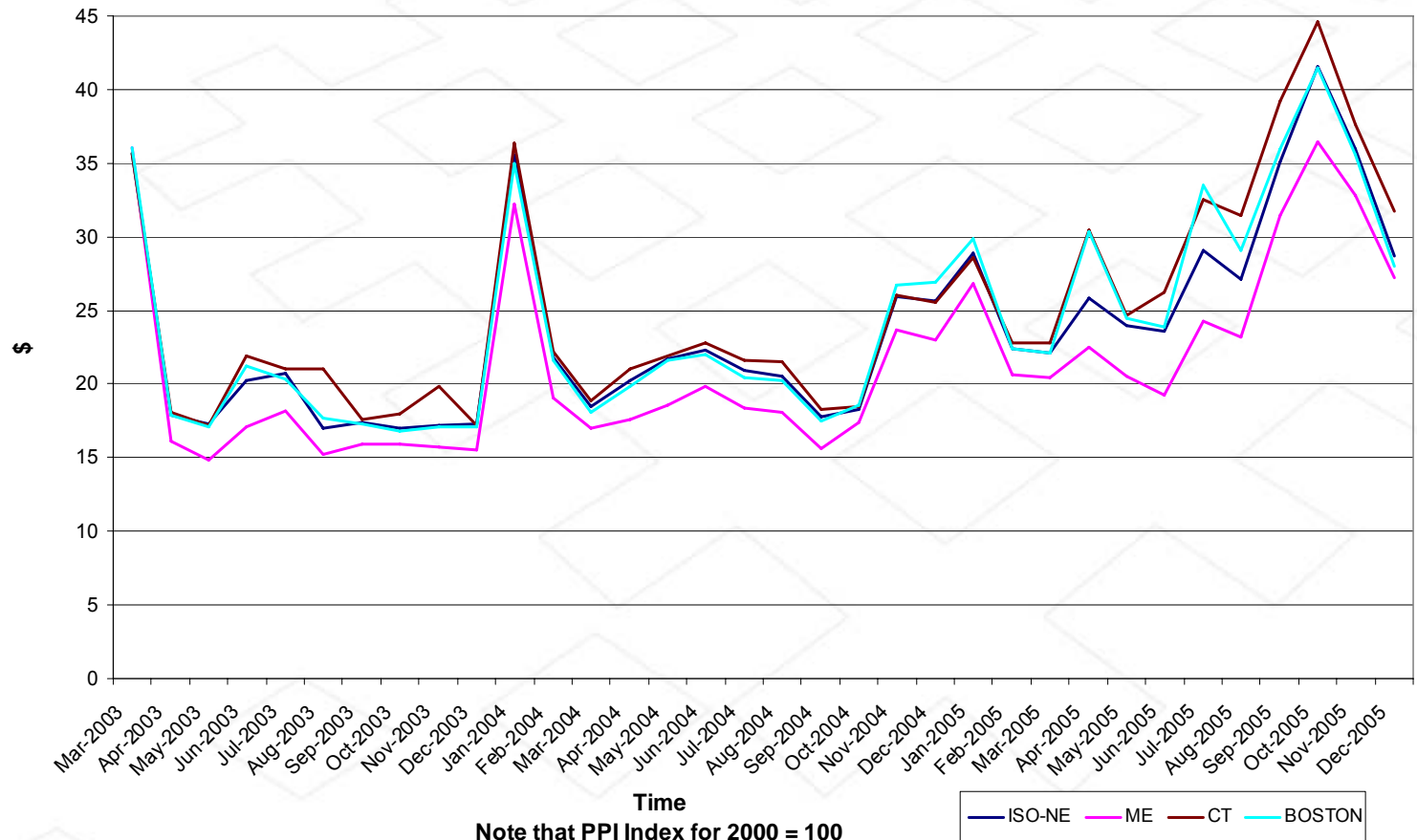
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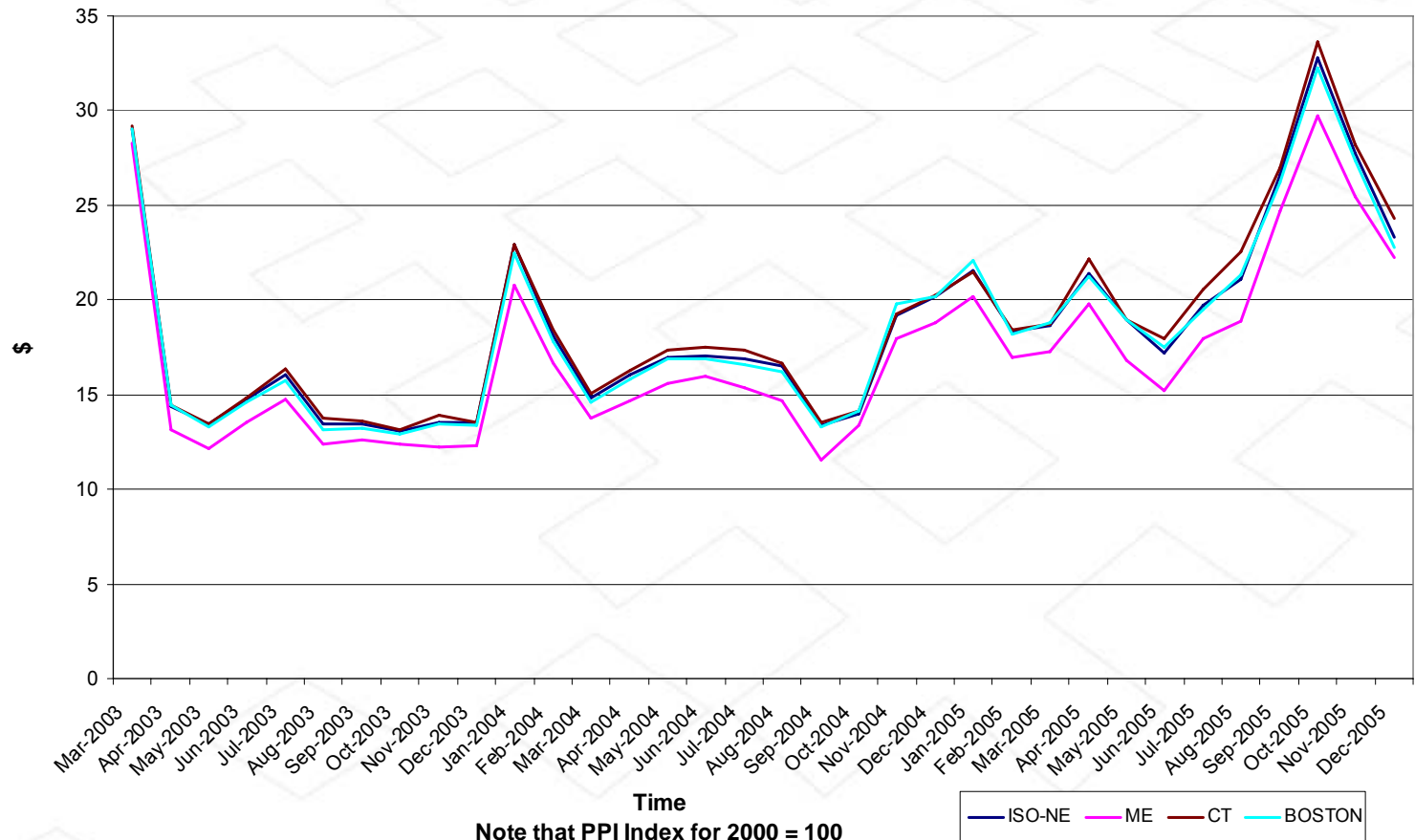
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Fuel Adjusted Price

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○ Questions?

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