

Addressing Retail Problems with Wholesale Products

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What is the right price?

- Economists argue that the marginal price (price of 1 more kWh) would ideally be set at the societal cost of supplying that kWh
 - Incremental generation (fuel, O&M) costs
 - Network congestion and contingency costs
 - Scarcity
 - Environmental externalities (e.g. cost of carbon)
- Ideally would *not* include
 - Recovery of sunk costs, market power
- Goal is to align the *marginal cost* of supply with the *marginal benefit* of consumption
 - Mis-alignment creates deadweight loss from too much or too little consumption

Locational Marginal Prices

- Wholesale LMPs represent the gold standard in marginal pricing for wholesale supply/demand.
 - In CA LMP even include (some) externality costs
- A negative LMP does indeed imply that social costs of serving customers would decrease if load increased at a negative LMP node.
- Wholesale LMPs do not account for distribution level marginal costs such as losses, contingencies, voltage support
 - Also only zonal congestion for non PDR load

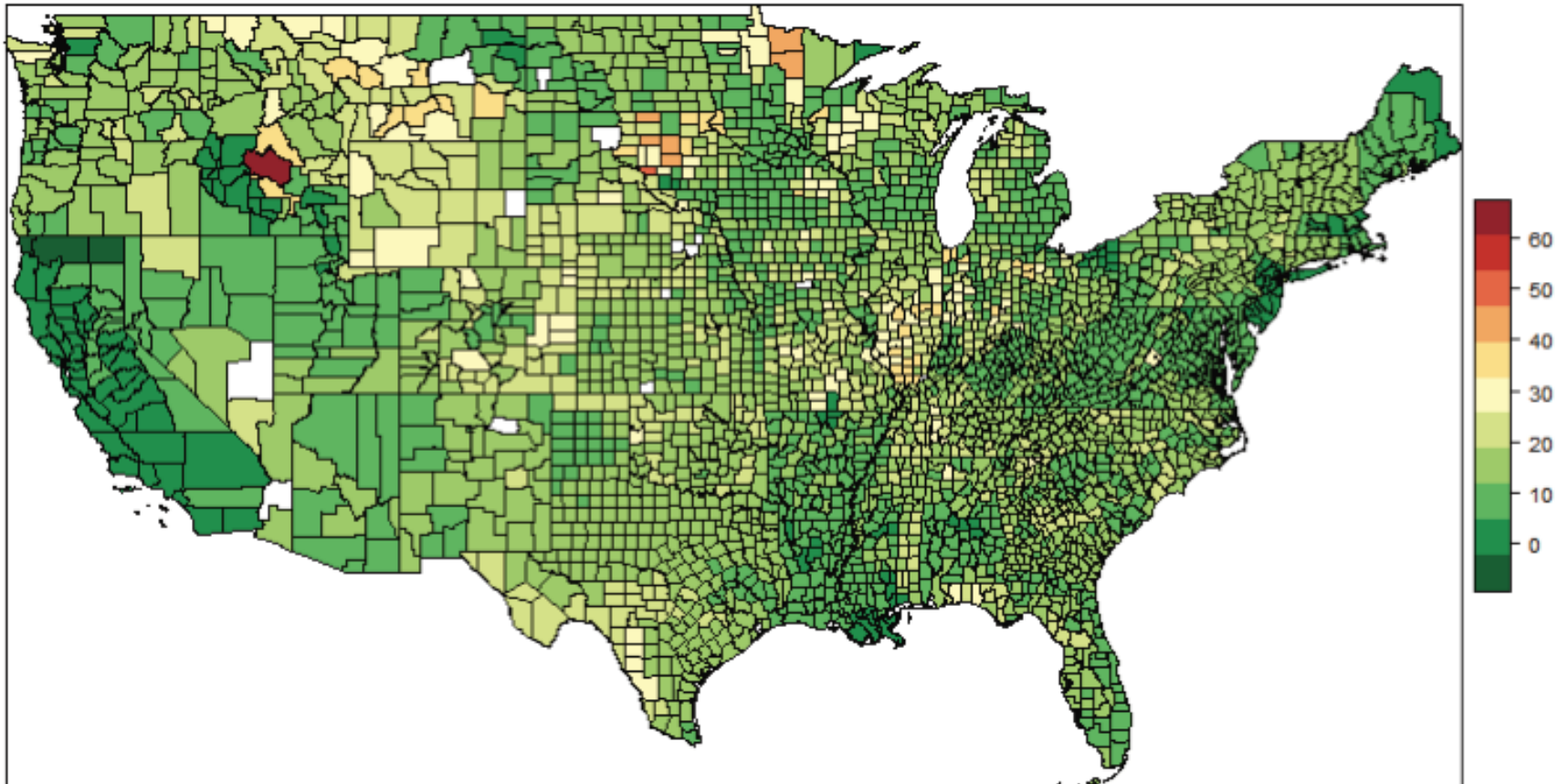
Retail vs. Wholesale Pricing

- Wholesale LMPs are applied to (non-DG) supply and a limited amount of PDR
- Retail prices, paid by most customers, deviate from the gold standard in several ways
 - Do not vary much by time (not RTP)
 - Include charges for recovery of sunk (T&D) costs
 - Do not reflect distribution level marginal costs
- Many LSEs recover some sunk cost through fixed and demand charges
 - Large LSEs in CA do not

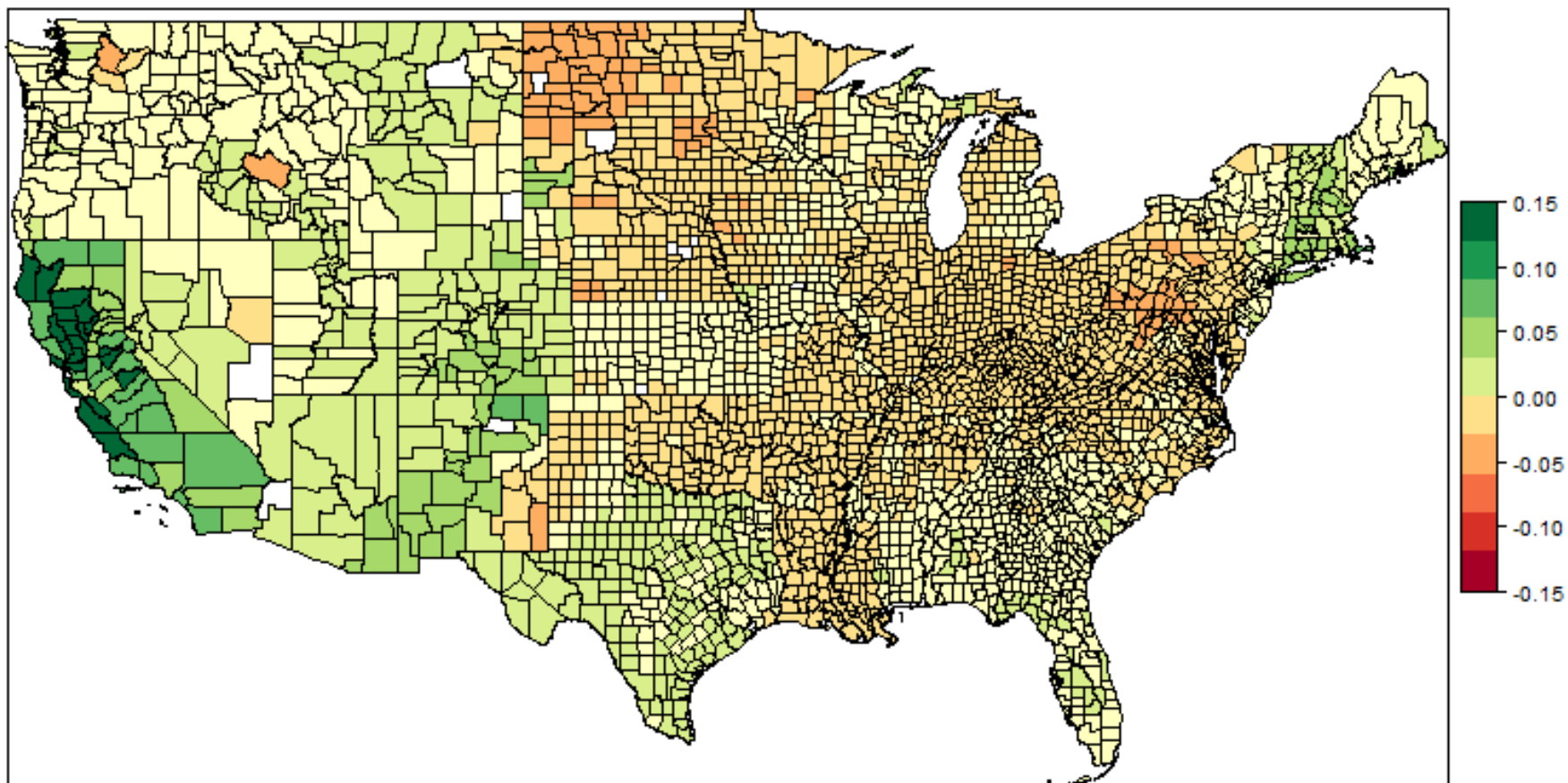
Some Examples

- Drawn from ongoing work (Borenstein and Bushnell) looking at pricing in 2015
 - Incorporates the “standard” residential retail rate
 - EIA 861 sales and revenue data
 - Wholesale (realtime) LMP
 - Environmental externality costs (from Holland, et al 2017)

Monthly Fixed Charges on Residential Rates

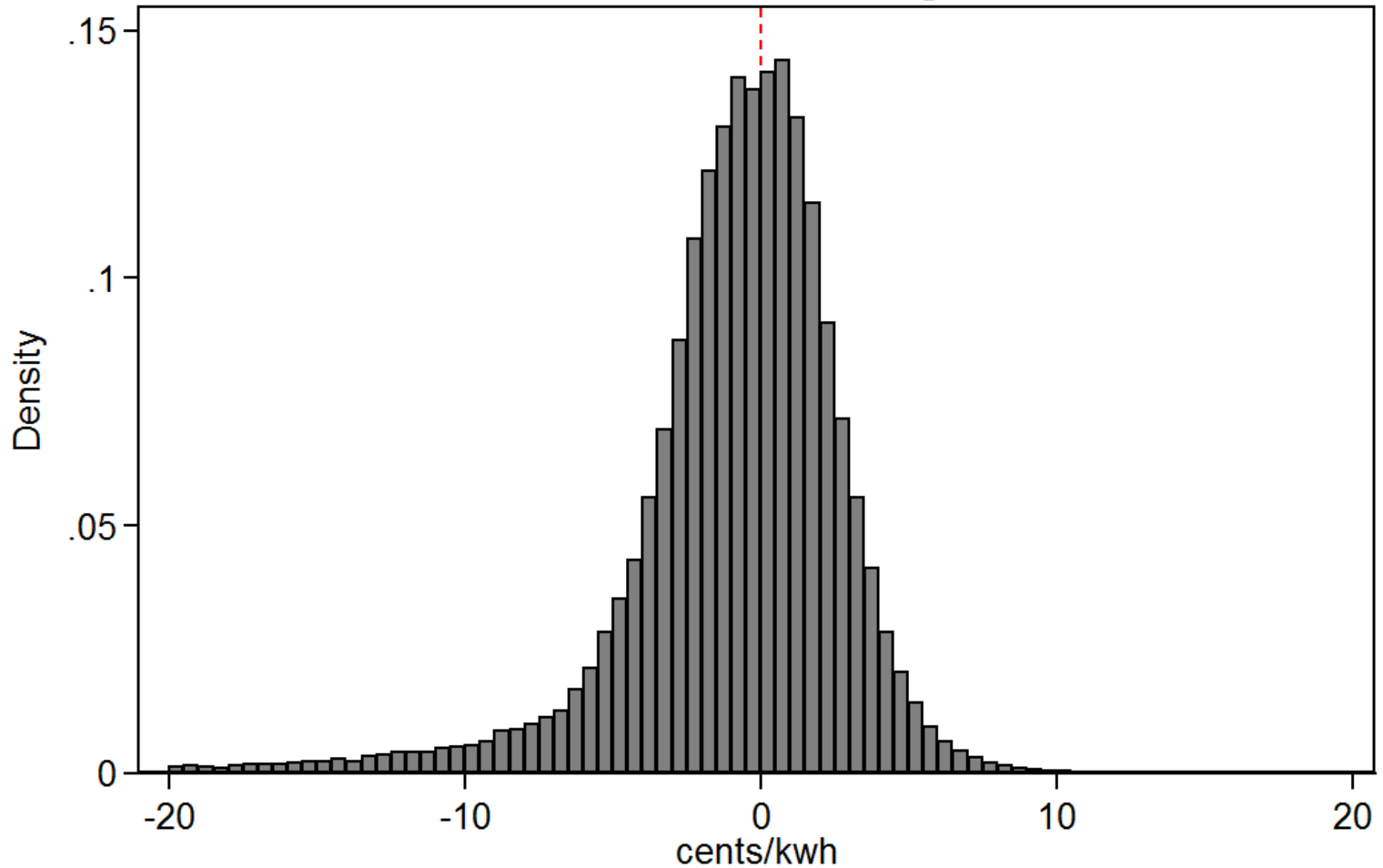


Comparison of Fixed Retail Price to Average Annual Soc. Marg. Cost



Fixed Retail Price vs. SMC in PA

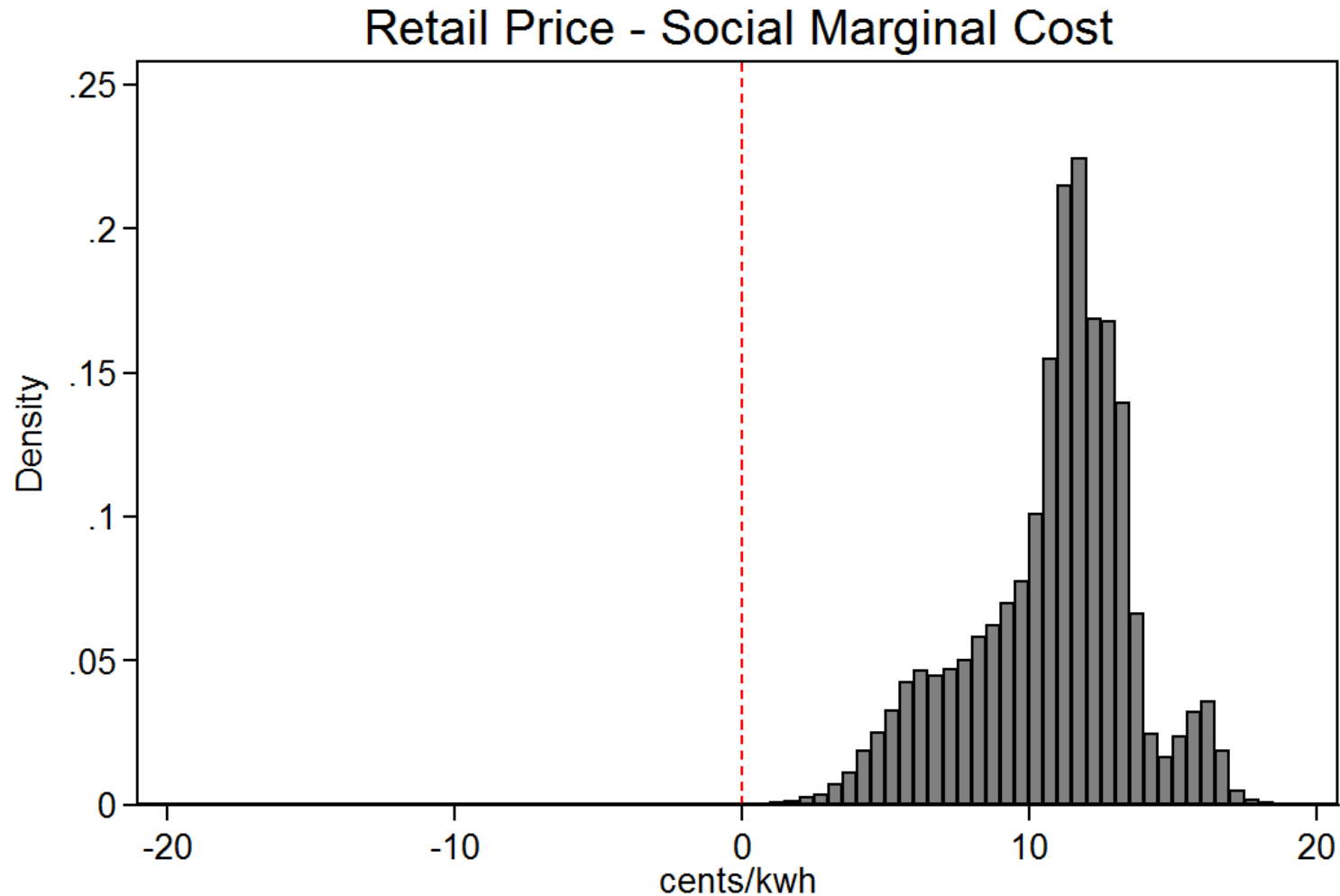
Retail Price - Social Marginal Cost



Timing: hourly

Note: outliers above +20c/kwh and below -20c/kwh dropped

Fixed Retail Price vs. SMC in California



Timing: hourly

Note: outliers above +20c/kwh and below -20c/kwh dropped

Should wholesale products be used to fix problems in retail pricing?

- Could counteract retail pricing imperfections
 - Better case for mitigating periodic “spikes” rather than chronic mismatches
 - baseline measurement issues
 - “double payment” issues
 - Argument for not copying current PDR paradigm
 - Does the existing upward bias in retail prices make this less of a risk for consumption products? (or is it irrelevant?)
- Could promote storage (or other) technologies
 - But risk of bias for behind the meter tech
 - Tech can be used to shift costs as well as reduce them
- Trying to make distinctions between consumption for storage and consumption for other purposes can be seen as making judgements about the “appropriate” use of electricity
 - But could paying both consumption and supply under the same PDR paradigm risk additional gaming?