Technische Universität München

Assessing Models for Demand Estimation

Evidence from Power Markets

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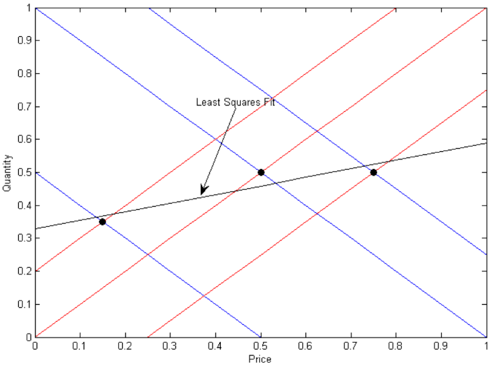

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$\rightarrow$ Relevant for both: general IO and Energy research

Contents

Framework for model assessment

Use perfect information to calculate true elasticities: EPEX day-ahead hourly bid curves, 2014–2015

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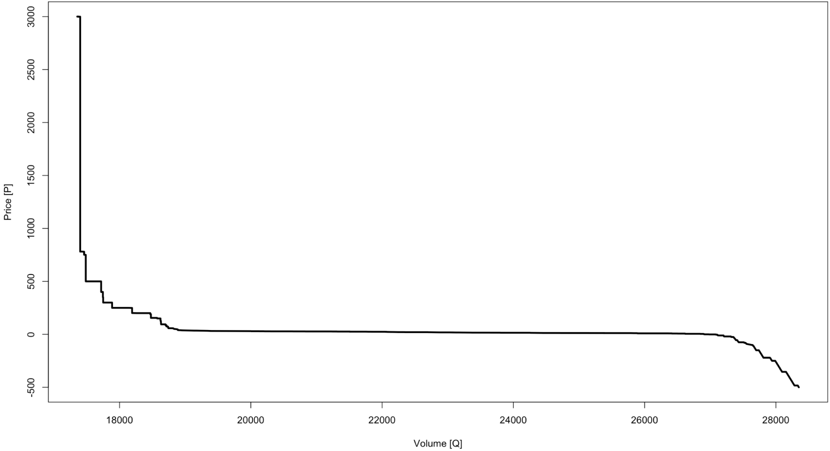

Figure: Demand bid curve for 01.05.2014, Hour 1

Use perfect information to calculate true elasticities: EPEX day-ahead hourly bid curves, 2014–2015

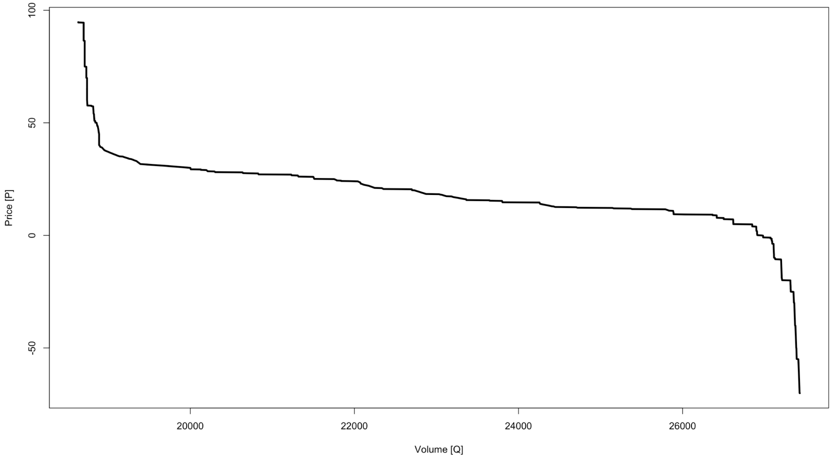

Figure: Demand bid curve for 01.05.2014, Hour 1, around equilibrium

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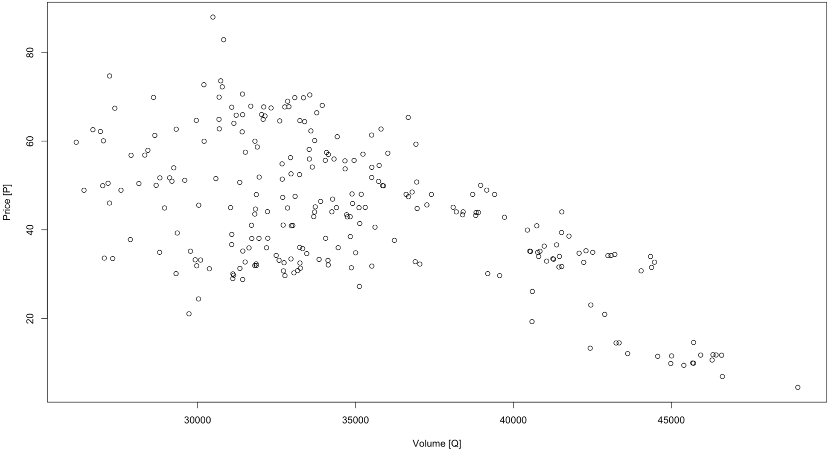

Figure: Equilibrium prices/quantities, May 2014, identification problem

Empirical setup: Instrument variable

Suitable instrument fulfils:

1. instrument relevance
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3. Lasso regression combined with IV (*similar to Belloni et al. [2011]*)

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$$\hat{\beta}_1 = \frac{1}{N} \sum_{i=1}^{N} \beta_{1,i}$$

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$\rightarrow$ β_1 from 2nd stage represents demand elasticity

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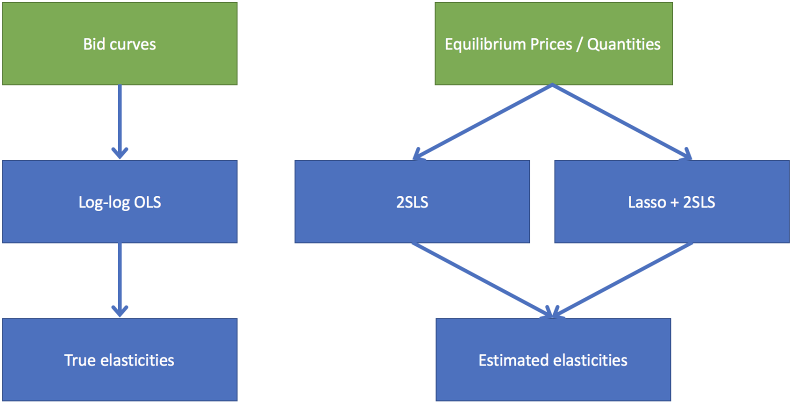
Note: Computing standard errors of the estimation in this setting is non-trivial and requires the use of Bayesian Lasso. (*Park and Casella [2008]*).

Overview of empirical methods



Yearly results (Peak hours)

Model	Estimate	Std. Error	p-value
True estimate	–0.38	—	—
OLS	–0.23	0.024	<0.01
OLS, control load	–0.37	0.048	<0.01
2SLS, RES	–0.45	0.011	<0.01
2SLS, RES, hours	–0.37	0.012	<0.01
2SLS, Lasso	–0.36	0.003	<0.01
Observations	2*8760		
1st stage F-tests	1066*** / 1143***		

Yearly results (Off-Peak hours)

Model	Estimate	Std. Error	p-value
True estimate	–0.39	—	—
OLS	–0.07	0.16	<0.01
OLS, control load	–0.13	0.031	<0.01
2SLS, RES	–0.43	0.026	<0.01
2SLS, RES, hours	–0.39	0.038	<0.01
2SLS, Lasso	–0.39	0.0042	<0.01
Observations	2*8760		
1st stage F-tests	1120*** / 1371***		

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- **Locality of Instrumental Variable can yield biased results**tt

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- Possibly other demand and supply shifters or a combination thereof?

Thanks for your attention!

Literature

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Market description

EPEX day-ahead auction market in Germany

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