Welfare Effects of Buyer and Seller Power

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Workshop on Market Power in Supply Chains

Competition and Markets Authority

February 14, 2025

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Increasing evidence for **buyer power** across industries & factor markets

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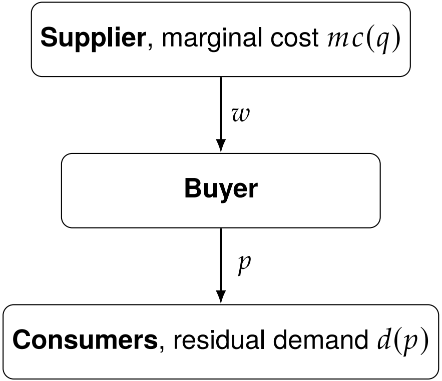
When are buyer & seller power anti-competitive or pro-competitive?

Stylized Framework: Classical Monopsony



- $mc'(q) > 0$
- $d'(p) = 0$
- Seller chooses supply $q(w)$
- Buyer chooses w
- Inefficiency: buyer exercises monopsony power when setting w

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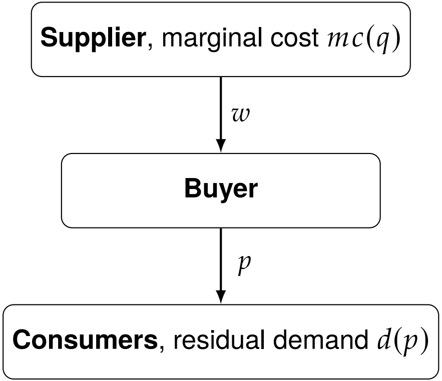

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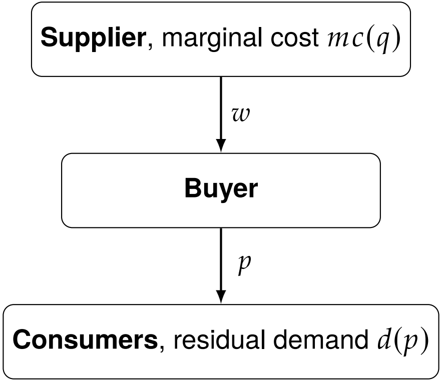
Examples:

- Robinson (1969); Card, Cardoso, Heining, Kline (2018); Berger, Herkenhoff, Mongey (2022)

Stylized Framework: Sequential Monopoly



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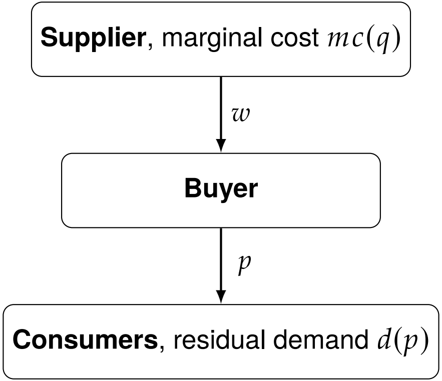

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Examples:

- Grennan (2013), Ho and Lee (2017); Crawford, Lee, Whinston, Yurukoglu (2018); Hosken, Larson-Koester, Tarragin (2023)

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- Increasing marginal cost of seller $mc'(q) \geq 0$, decreasing demand curve of buyer $d'(p) \leq 0$
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- Conduct (monopsony or monopoly) is endogenously determined
- Nests most commonly used vertical models in the literature

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Application to coal procurement of power plants from coal mines

- ERCOT ISO (Texas) market, 2005-2015
- Decompose total welfare loss from market power into monopsony vs. monopoly distortion

Prior Literature

1. **Vertical models with double marginalization:**
   - Ho, Lee (2017); Crawford, Lee, Whinston, Yurukoglu (2018); Collard-Wexler, Gowrisankaran, Lee (2019); Alviarez, Fioretti, Kikkawa, Morlacco (2022), Hosken, Larson-Koester, Tarragin (2023) ;

→ These assume downstream picks q (or p)

Prior Literature

1. **Vertical models with double marginalization:**

2. **Vertical models with monopsony power:**
   - Prager & Schmitt (2021); Arnold (2019); Berger, Hasenzagl, Herkenhoff, Mongey, & Posner, (2023)

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Prior Literature

1. **Vertical models with double marginalization:**

2. **Vertical models with monopsony power:**

3. **Countervailing power**

   - Galbraith (1954), Hemphill & Rose (2018); Barrette, Gowrisankaran, Town (2022), Loertscher & Marx (2022), Avignon, Chambolle, Guigue, Molina (2024)

   → We endogeneize vertical conduct in complete-information setup

Prior Literature

1. **Vertical models with double marginalization:**

2. **Vertical models with monopsony power:**

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4. **Vertical conduct inference**
   - Bonnet & Dubois (2010), De Loecker & Scott (2015), Atkin, Blaum, Fajgelbaum, Ospital, 2024

   $\longrightarrow$ Rather than testing for conduct, we endogeneize conduct

Model Primitives

Seller u and buyer d negotiate over **linear contract** w.

- Profits: $\pi_d = [p(q) - w]q$, $\pi_u = [w - c(q)]q$. Zero disagreement payoff.

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Notation:

- $mc(q) \equiv \frac{\partial(c(q)q)}{q}$, $mr(q) \equiv \frac{\partial(p(q)q)}{q}$
- $0 \leq \beta \leq 1$: bargaining power of buyer, ‘buyer power’

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Assumptions:

- $p'(q) \leq 0, c'(q) \geq 0$
- $d\big(mc(q) - c(q)\big)/dq > 0$
- $d\big(mr(q) - p(q)\big)/dq < 0$

Vertical Conduct: Monopolistic vs. Monopsonistic

'Monopolistic bargaining' ('mp'):

$$\begin{cases} \max\limits_{w} (\pi_u)^{(1-\beta)} (\pi_d)^{\beta} \\ \max\limits_{q} \pi_d \end{cases} \longrightarrow (q^{mp}, w^{mp})$$

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'Monopsonistic bargaining' ('ms'): $\begin{cases} \max\limits_{w} (\pi_u)^{(1-\beta)} (\pi_d)^{\beta} \\ \max\limits_{q} \pi_u \end{cases} \longrightarrow (q^{ms}, w^{ms})$

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'Monopsonistic bargaining' ('ms'): $\begin{cases} \max_w (\pi_u)^{(1-\beta)}(\pi_d)^{\beta} \\ \max_q \pi_u \end{cases} \longrightarrow (q^{ms}, w^{ms})$

We will compare to, but do not allow for, **joint profit maximization:** ('efficient bargaining')

$$q^* = \arg\max_{w,q} (\pi_u)^{(1-\beta)}(\pi_d)^{\beta} \qquad \longrightarrow (q^*, w^*)$$

Timing of Decisions

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1. Upstream and downstream observe $c(.), p(.), \beta$
2. U and D bargain over w.
3. Upstream **or** downstream choose q

We prove results both when 2. and 3. happen **simultaneously** and when **sequentially**

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This nests often-used models:

	Monopolistic	**Monopsonistic**
$\beta = 0$	Sequential monopoly	Seller makes TIOLI offer (w, q)
$\beta = 1$	Buyer makes TIOLI offer (w, q)	Classical monopsony

Result 1: Existence of Equilibrium

Result

- $mc'(q) = 0$: interior solution exists only under **monopolistic conduct**
- $mr'(q) = 0$: interior solution exists only under **monopsonistic conduct**
- $c'(q) > 0$, $d'(p) < 0$: Both monopolistic and monopsonistic conduct have an interior solution

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Denote $q^{ms}(\beta)$, $q^{mp}(\beta)$ as equilibrium output under each conduct

Result 2: How Does Equilibrium Quantity Change with Buyer Power

Result: $q'(\beta)$ depends on conduct: $\frac{\partial q^{mp}(\beta)}{\partial \beta} \geq 0, \frac{\partial q^{ms}(\beta)}{\partial \beta} \leq 0$

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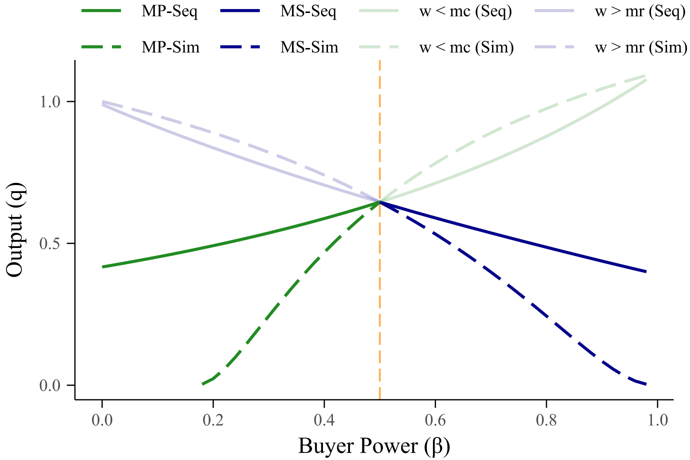
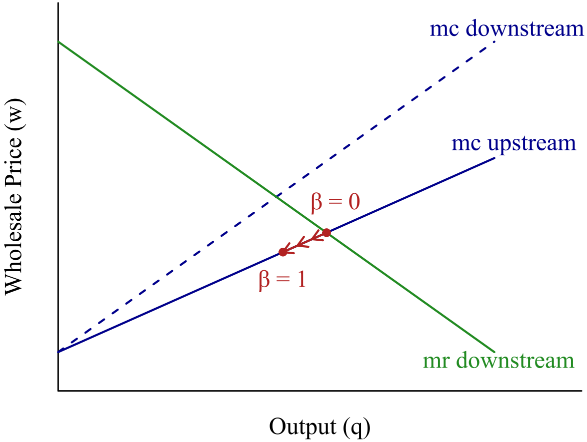


Intuition: Monopsony



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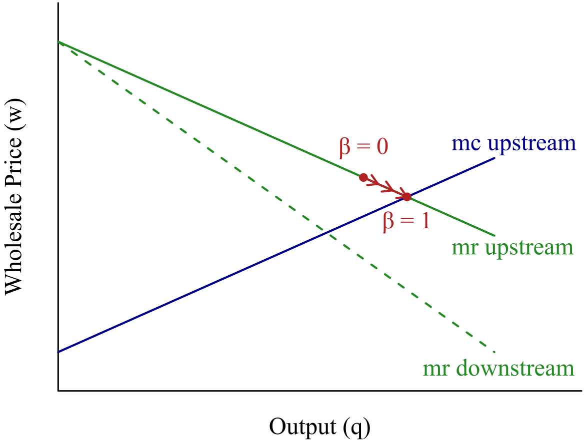

Result 3: Efficient Level of Buyer Power

Result: There exists $\beta^* \in [0, 1]$ such that $q^{mps}(\beta^*) = q^{mp}(\beta^*) = q^{jpm}$.

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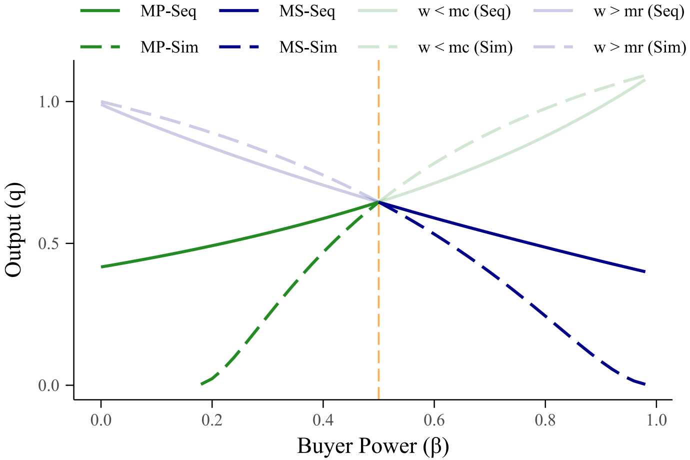

Conduct Selection

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Instead, we impose a participation constraint:

Participation Constraint 1:

- $w \geq mc(q)$ (nonnegative markup) (A1)
- $w \leq mr(q)$ (nonnegative markdown) (A2)

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- $w \geq mc(q)$ (nonnegative markup) (A1)
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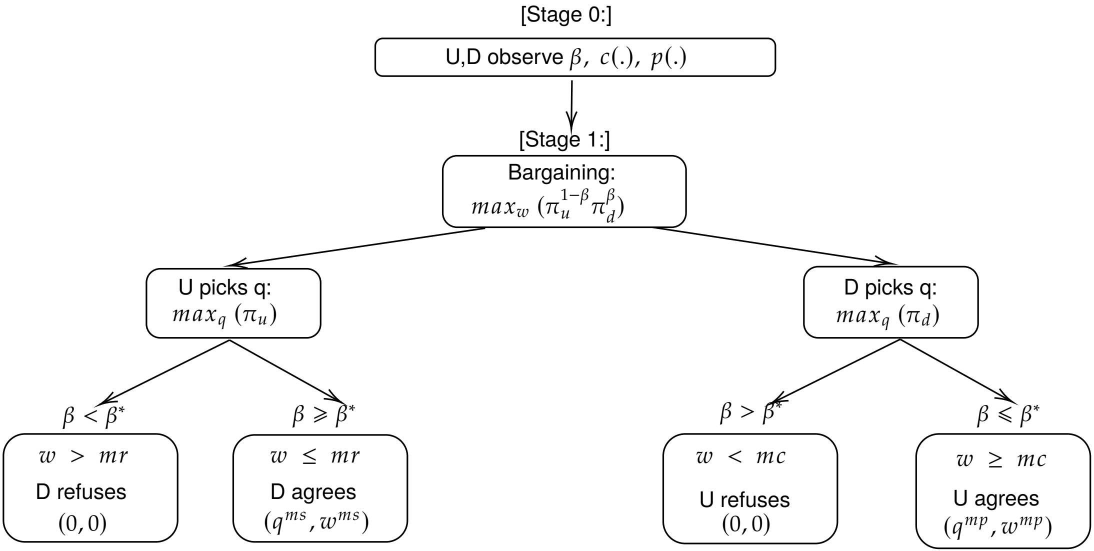
- Satisfied if transfers between units are impossible
- Testable implication: Output bounded by q^{jpm}

Conduct Selection: Participation Constraint 1



Result 4: Unique Vertical Conduct

Theorem Under Participation Constraint 1, for any bargaining parameter β, either the monopsonistic or the monopolistic bargaining equilibrium exists, but not both. Specifically, the monopsonistic equilibrium exists if $\beta > \beta^*$, while the monopolistic equilibrium exists if $\beta < \beta^*$.

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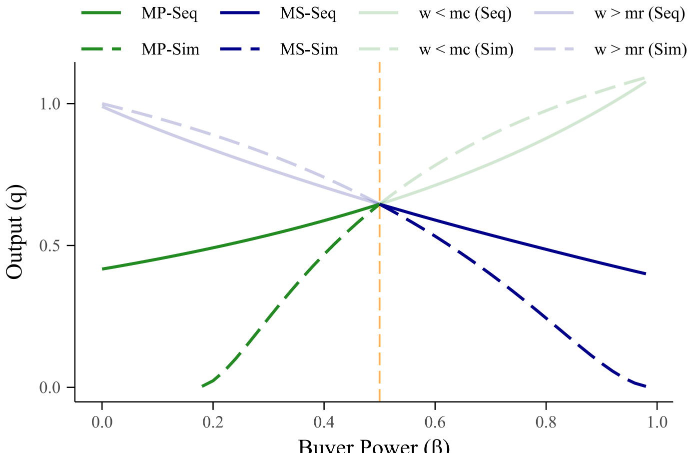
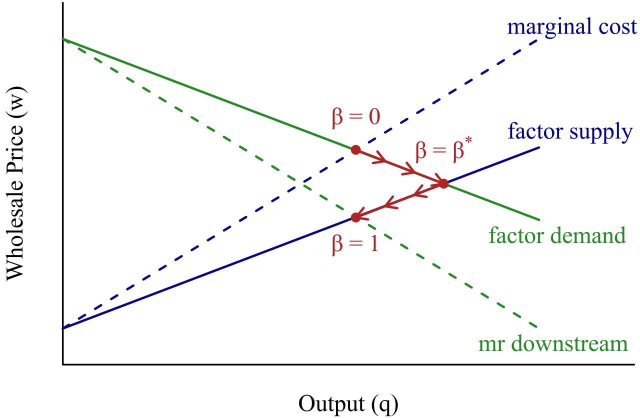


Intuition: Buyer *and* Seller Power



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In sequential model, have alternative microfoundation:

Participation Constraint 2:

D and U choose q unilaterally only if they cannot earn higher profits by bargaining over (q, w) instead:

$$\begin{cases} \pi_u(q^{ms}, w^{ms}) & \geq \pi_u(q^*, w^*) \\ \pi_d(q^{mp}, w^{mp}) & \geq \pi_d(q^*, w^*) \end{cases}$$

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This leads to the same equilibrium selection rule:

- Monopsonistic if $\beta > \beta^*$
- Monopolistic if $\beta < \beta^*$

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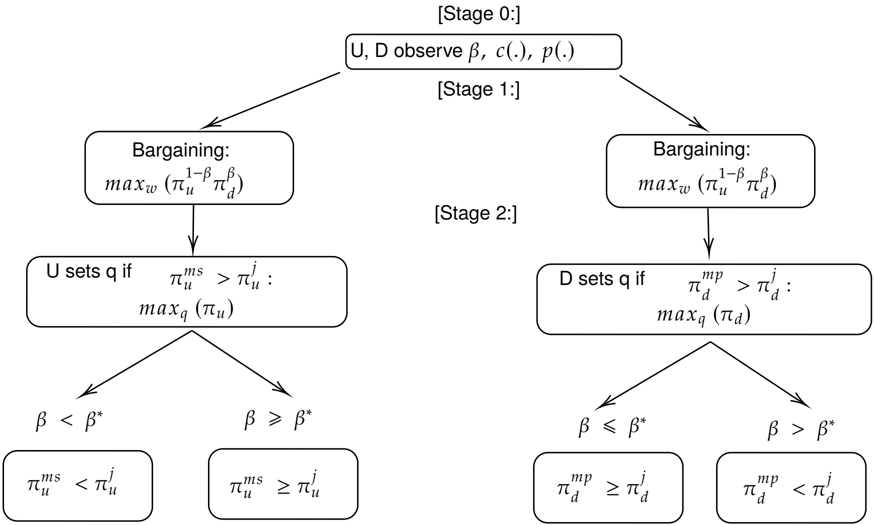

Vertical Conduct: Determinants

- Vertical conduct depends on how β relates to β^*
- β^* is a function of cost and demand curvature:

$$\beta^* = \frac{-p'(q^*)}{c'(q^*) - p'(q^*)}$$

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- More inelastic demand ($-p'(q^*) \uparrow$) $\longrightarrow \beta^* \uparrow$
- Steeper marginal cost curve $(c'(q^*) \uparrow) \longrightarrow \beta^* \downarrow$
- $\beta^* = 0$ if fully elastic residual demand, $\beta^* = 1$ if constant marginal cost

Welfare and Policy Implications

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  - Increase CS if $\beta < \beta^*$
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  - Opposite holds for mergers between upstream entities
- **Vertical mergers:** double marginalization reduction increases with $|\beta - \beta^*|$

Extensions

- **Non-zero disagreement payoffs**
  - Baseline: fix disagreement payoffs, vary β
  - Alternative: fix β, vary disagreement payoff of buyer ('z') & seller ('y')
  - Results generalize: $q(z-y)$ is inverted V-function

  Disagreement payoff results
- **Multiple buyers** that compete à la Cournot
  - # Competitors $\uparrow \Rightarrow \beta^* \downarrow$

    Cournot results
  - Increased competition makes residual demand curve more elastic
  - This increases the range of β values for which monopsonistic conduct occurs in equilibrium
- **Multiple buyers and sellers**
  - Results generalize under a passive beliefs assumption

    Results
- **Multi-input production function**
  - Results generalize under a CES production function

    Multiple inputs

Takeaways

Consumer welfare losses of buyer / seller power depend on:

- shape of the marginal cost curve (upstream)
- shape of the demand curve (downstream)
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Empirical roadmap:

- If w is observed: estimate $c(.)$ and $d(.)$, infer both β and β^*
- If w is unobserved: estimate $c(.), d(.)$, infer β^*, prior on distribution of β

Empirical Applications

Estimation of β^* when w is unobserved:

1. Effects of unionization in U.S. construction industry Application
2. Effects of farmer cooperatives in Chinese tobbaco industry Application

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Estimation of β^* when w is observed:

3. Sources of misallocation in U.S. coal procurement

   $\longrightarrow$ Focus on coal-fired power plants in the **ERCOT** ISO, 2005-2015

   - Isolated market with little external trade
   - Mostly deregulated plants
   - Rich hourly price and generation data

Data

1. **Power Plant Data**: EPA, EIA, Velocity Suite, ERCOT
   - Hourly fuel consumption and generation
   - Fuel Type, Capacity, Location, Ownership
   - Hourly nodal prices

Summary statistics   ERCOT coal capacity

Data

1. **Power Plant Data**: EPA, EIA, Velocity Suite, ERCOT

2. **Coal Mine Data**: Mine Safety and Health Administration, Coal Cost Guide, Velocity Suite
   - Quarterly production of coal mines
   - Variable and fixed cost by mine type, hourly wages at the county level
   - Ownership and mergers and acquisitions

Data

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2. **Coal Mine Data**: Mine Safety and Health Administration, Coal Cost Guide, Velocity Suite

3. **Coal Transaction Data**: Velocity Suite (based on EIA data)
   - Monthly coal shipment with prices, quantities and coal type
   - Contract duration
   - Transportation mode and transportation cost

Summary statistics ERCOT coal capacity

Empirical Model: Overview

- **Mining Firm Supply Curves**
  - Estimate marginal costs at unit level, then aggregate to firm level

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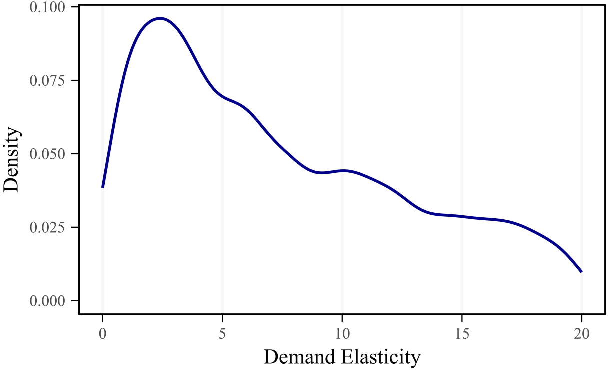
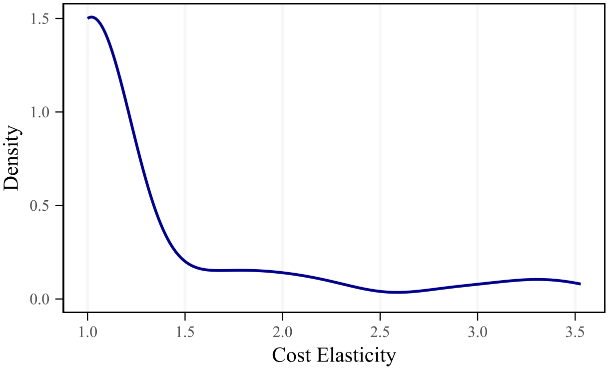
- **Welfare** Implementation
  - Compute output under observed conduct and under joint profit maximization. Decompose deviations into monopsony- and monopoly-induced.
  - Focus on output (consumer surplus) but can adjust for externalities (e.g. environmental).

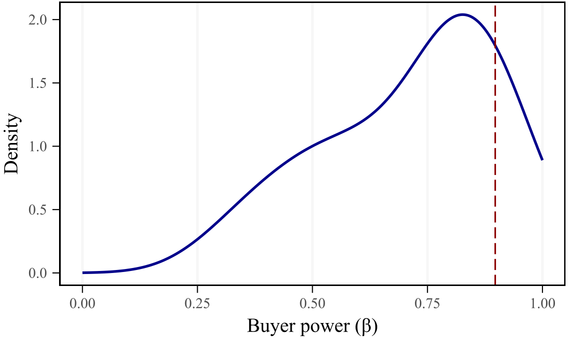
Results: Demand Estimates



Results: Cost Estimates

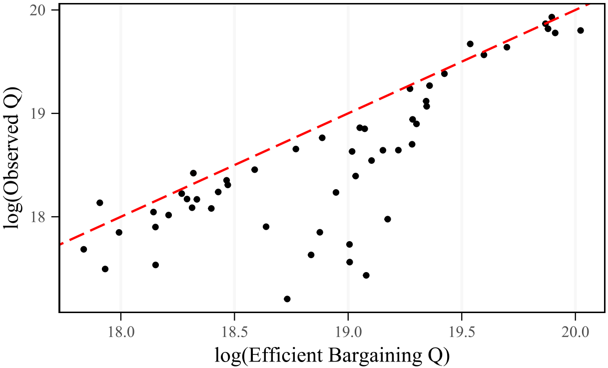


Results: Buyer Power Estimates



- Power plants relatively more bargaining power than mines
- Efficient level of buyer power around 0.9
- Mines still have too much bargaining power, deadweight loss mostly due to double marginalization

Deadweight Loss



Decomposing Welfare Losses

Misallocation	% of Coal Expenditure
Total misallocated output	5.11 %
Decomposition:	*% of Total Loss*
Due to monopsony	17.29%
Due to monopoly	82.71%

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Applying model to study coal fuel procurement in the ERCOT ISO, we find that

- A deadweight loss of 5.11% the total output.
- 83% of DWL due to seller power, 17% due to buyer power

Appendix

Parametrization

Consumer demand for q:

$$q(p) = p^{\eta}$$

Cost curve of U:

$$c(q) = q^{\psi}$$

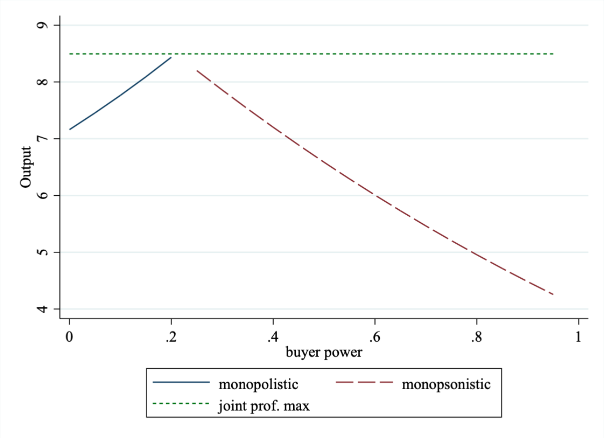
Solve for equilibrium using

- $\eta = -6$
- $\psi = 0.25$
- $\beta \sim \mathcal{U}[0, 1]$,

Back to conduct

More elastic demand

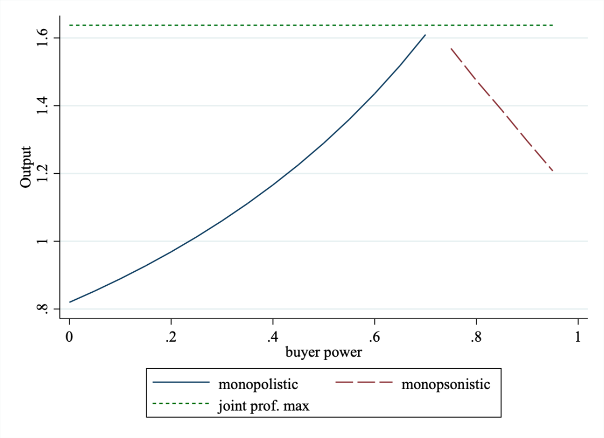
Let $\eta = -20$, rather than $\eta = -6$



back to slides
graph with inelastic demand

More inelastic demand

Let $\eta = -3$, rather than $\eta = -6$



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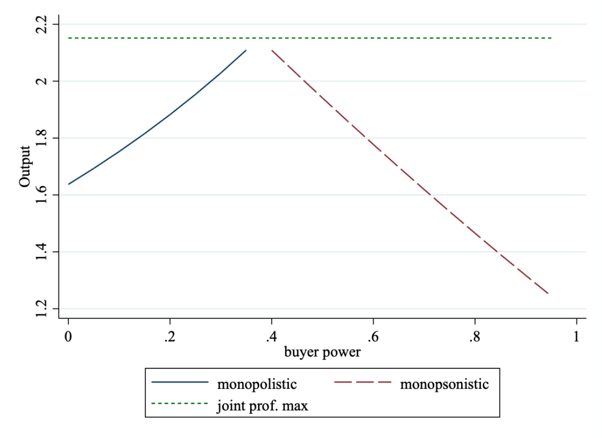
More elastic supply

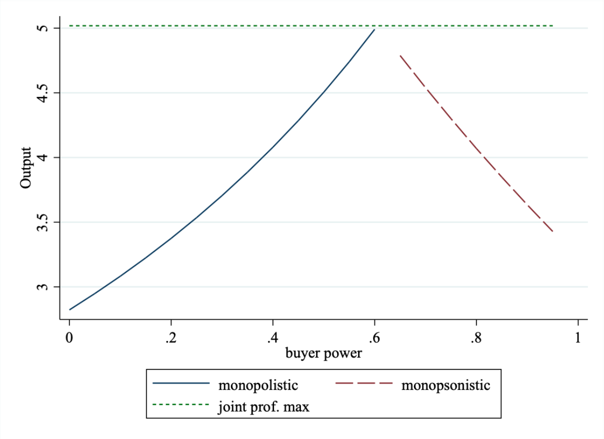
Let $\psi = 0.5$ rather than $\psi = 0.25$:



back to slides   graph with inelastic supply

More elastic marginal costs curve

Let $\psi = 0.15$ rather than $\psi = 0.25$:



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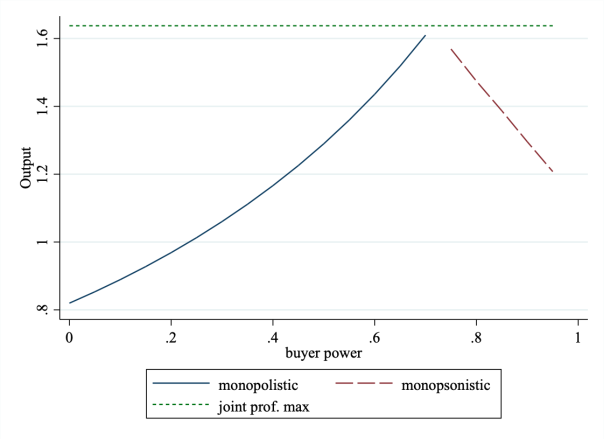
More inelastic demand

Let $\eta = -3$, rather than $\eta = -6$



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Cournot competition

$\eta = -3$, $\psi = 0.25$, 1 to 3 firms

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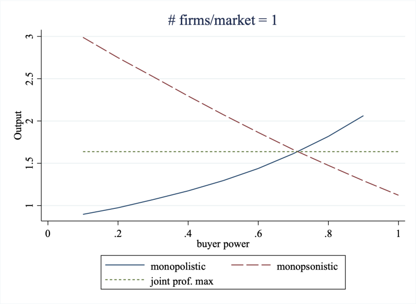

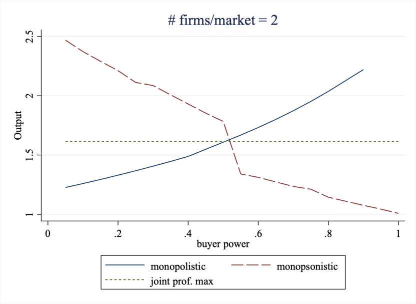

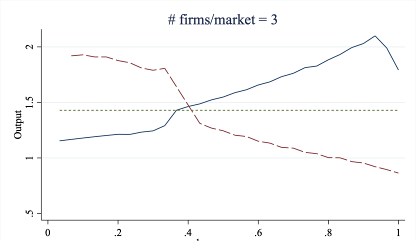

Coal Mining Production Model Estimation

- Mines m characterized by 'type' $\boldsymbol{\theta}_m$: (capacity, vein thickness, technology)

- Coal Cost Guide: $\gamma_{\boldsymbol{\theta}_m} = \frac{p^v v}{hl}$

$$\Rightarrow c_m = h_m \frac{l_m}{q_m}(1 + \gamma_{\boldsymbol{\theta}_m}) + v_m(cap_m - q_m) \text{ if } q_m \leq cap_m$$

- Estimate $c_m - v_m(cap_m - q_m)$ by cap_m, then find v_{cap_m} by linear interpolation

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Bargaining model

- **Monopolistic bargaining:**

$$\begin{cases} \max\limits_{Q_d^e} \pi_d(Q_d^e, W_d) \\ \max\limits_{W_{kl}} \left[\left(\pi_d(Q_d^e, W_d) - \pi_d(\tilde{Q}_d^e, W_{u,-d}) \right)^{\beta_{ud}} \left(\pi_u(Q_u^c, W_u) - \pi_u(\tilde{Q}_u^c, W_{u,-d}) \right)^{1-\beta_{ud}} \right] \end{cases}$$

- **Monopsonistic bargaining:**

$$\begin{cases} \max\limits_{Q_u} \pi_u(Q_u^c, W_u) \\ \max\limits_{W_{kl}} \left[\left(\pi_d(Q_d^e, W_d) - \pi_d(\tilde{Q}_d^e, W_{u,-d}) \right)^{\beta_{ud}} \left(\pi_u(Q_u^c, W_u) - \pi_u(\tilde{Q}_u^c, W_{u,-d}) \right)^{1-\beta_{ud}} \right] \end{cases}$$

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Equilibrium conditions

- Each pair ij forms a contract $\mathbb{C}_{ij} \in C_{ij}$, no agreement is $\mathbb{C}_0$
- Given all contracts $\mathbb{C} \equiv \{\mathbb{C}_{ij}\}$, downstream profit is $\Pi_j^d(\mathbb{C})$, upstream $\Pi_i^u(\mathbb{C})$
- Set of contracts with non-negative gains to trade for i and j is:

$$C_{ij}^{+}(\mathbb{C}_{-ij}) \equiv \{\mathbb{C}_{ij} \in C_{ij} : [\Pi_j^d(\mathbb{C}_{ij}, \mathbb{C}_{-ij}) - \Pi_j^d(\mathbb{C}_0, \mathbb{C}_{-ij})\}] \geq 0$$

$$\text{and } [\Pi_j^u(\mathbb{C}_{ij}, \mathbb{C}_{-ij}) - \Pi_j^u(\mathbb{C}_0, \mathbb{C}_{-ij})\}] \geq 0$$

next slide

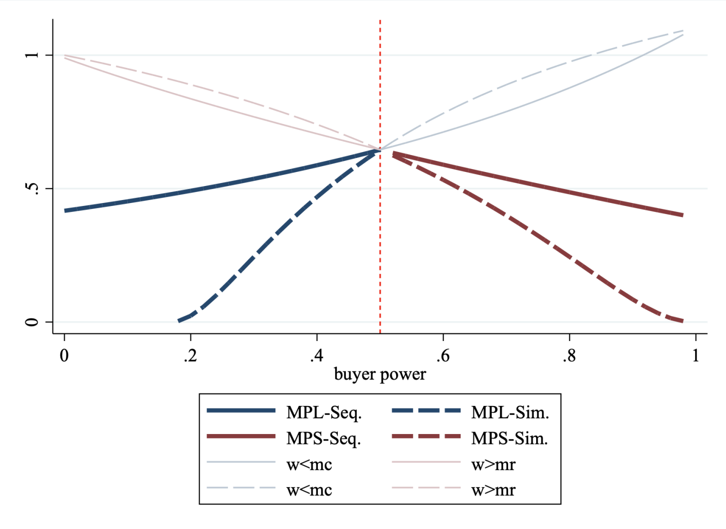
Nash-in-Nash bargaining equilibrium

$\hat{\mathbb{C}} \equiv \{\hat{\mathbb{C}}_{ij}\}$ is a **Nash-in-Nash equilibrium** if:

(i)$\forall i, j$ such that $\hat{\mathbb{C}}_{ij} \neq \mathbb{C}_0$:
$\{\hat{\mathbb{C}}_{ij}\} \in \arg\max[\Pi_j^d(\{\{\mathbb{C}_{ij}\}, \{\hat{\mathbb{C}}_{-ij}\}\}) - \Pi_j^d(\{\{\mathbb{C}_0\}, \{\hat{\mathbb{C}}_{-ij}\}\})]^{b_{ij}}$
$x[\Pi_i^u(\{\{\mathbb{C}_{ij}\}, \{\hat{\mathbb{C}}_{-ij}\}\}) - \Pi_i^u(\{\{\mathbb{C}_0\}, \{\hat{\mathbb{C}}_{-ij}\}\})]^{1-b_{ij}}$

(ii) $\forall i, j$ such that $\hat{\mathbb{C}}_{ij} = \mathbb{C}_0$, there is no contract in $C_{ij}^+(\mathbb{C}_{-ij})$ that gives strictly positive gains from trade to both i and j. back to main slide deck

Simultaneous vs. sequential model



Parametrization

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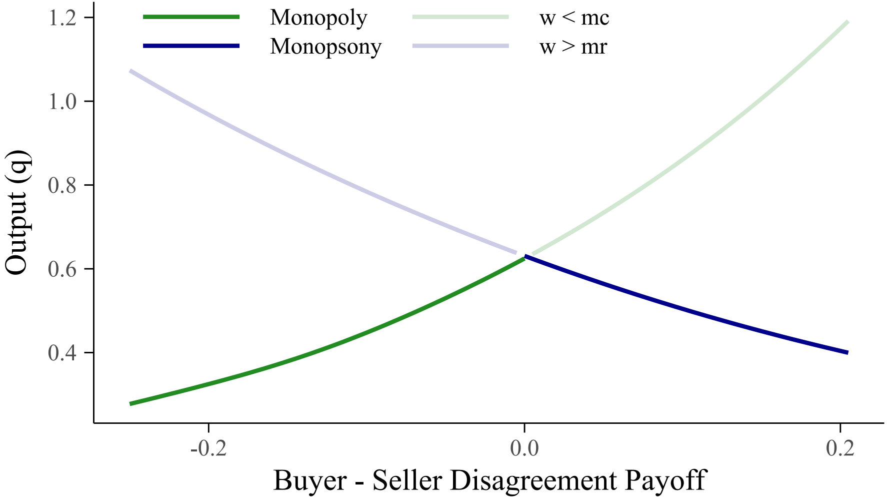
Non-zero disagreement payoffs

$$\pi^u = (w - c(q - y)q \ , \quad \pi^d = (p(q) - w - z)q$$



Summary Statistics

	Upstream	Downstream
	Unit Characteristics	
# of Units (Plant or Mine)	25	9
# of Firms	9	3
# of Units per Firm	2.51	2.88
Avg. # of Trade Partners	22.09	2.65
Avg. Share of Largest Partner	0.42	0.53
	Transaction Characteristics	
Average Fob Price (per mmtbu)	-	0.85
Contract Duration (year)	-	1.42
% Spot	-	0.04
% Railroad	-	0.77

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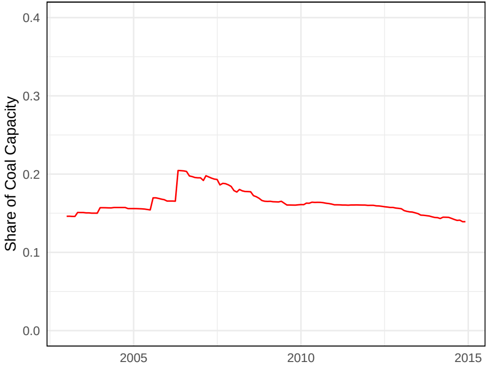
Ercot Market



- Ercot market is ideal empirical setting
  - No import and export
  - Most power plants are not regulated
  - Availability of nodal prices
- Stable coal capacity share between 2005 and 2015
- Existing evidence of market power

  (Hortacsu and Puller, 2008 ; Hortacsu et al, 2015)

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Estimating Mining Supply Function

- A mining firm u consists of a portfolio of mines $i(u)$
- Estimate Leontief production function in labor and non-labor inputs
- Mine i that produce q_i has the following marginal cost curve (quantities in terms of heat input)

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$$\underbrace{c_i}_{\text{marginal cost}} = \frac{\overbrace{h_i l_i}^{\text{Labor cost}} + \overbrace{p^v v_i}^{\text{Non-labor variable costs}}}{\underbrace{q_i}_{\text{production}}} \text{ if } q_i < cap_i$$

- **Supply curve of mining firm**: rank mines by increasing c_i, add start-up costs of idle mines $c_u = \{c_1, c_2 + I_2, c_3 + I_3 ...\}$

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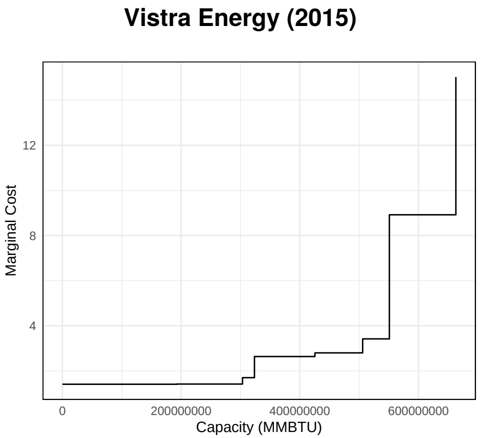
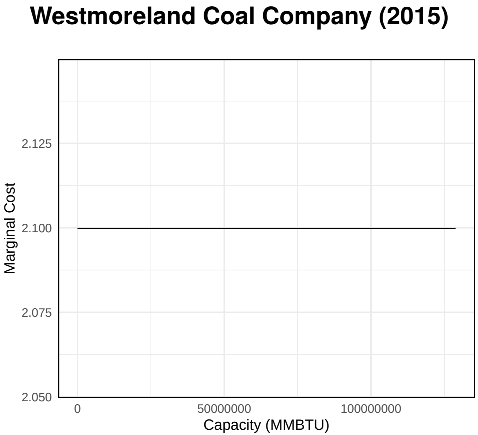
Mining Supply Curves: Examples





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Power Plant Cost Curve

- Each power company d consists of a portfolio of power plants
  - Potentially different fuels (nuclear, gas, coal renewable)
  - Each power plant j has a technology characterized by heat rate

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Production technology for power plant j:

$$\underbrace{q_j^e}_{\text{electricity output}} = \underbrace{q_j^c}_{\text{heat input}} / \underbrace{\lambda_j}_{\text{heat rate}}$$

Marginal cost of each power plant:

$$c_j(q_j^e) = q^c \lambda_j \underbrace{w}_{\text{coal price per mmbtu}}$$

- w^c = fob price + transportation cost

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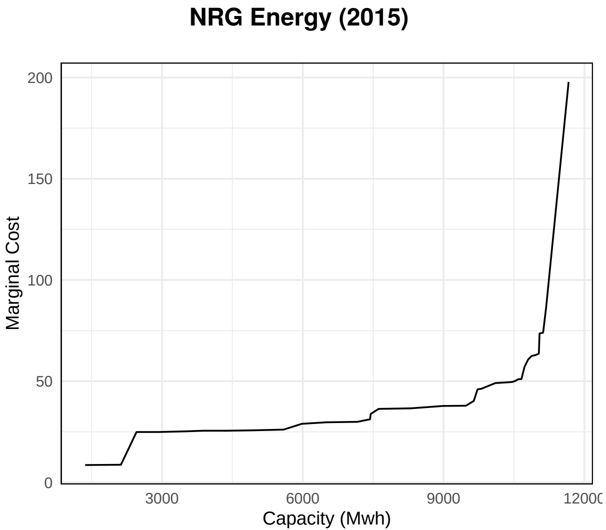
- Cost curve of power firm is the aggregation of individual marginal cost from lowest to highest

Power Plant Cost Curve: Example



Modeling Electricity Market: Cournot Competition

- We impose **Cournot competition** to model electricity market
  - (Borenstein et al., 1995; Borenstein and Bushnell, 1999 ; Puller, 2007)
- Market includes **fringe and strategic firms**
  - Fringe (competitive) firms: Small market share firms (less than 5% capacity) and regulated firms.
  - Strategic (Cournot) firms: Large firms compete à la Cournot
  - The market definition is an ISO (ERCOT)

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  - Strategic (Cournot) firms: Large firms compete à la Cournot
  - The market definition is an ISO (ERCOT)
- Strategic firms face the following demand curve every hour t

$$\underbrace{Q^D_{\text{strat}}(P_t)}_{\text{Strategic demand at price } P_t} = \underbrace{Q^D_{\text{total}_t}}_{\text{Inelastic demand at hour t}} - \underbrace{Q^S_{\text{fringe}}(P_t)}_{\text{Supply from fringe firms at price } P_t}$$

- Supply elasticity of fringe firm determines the residual demand curve for strategic firms

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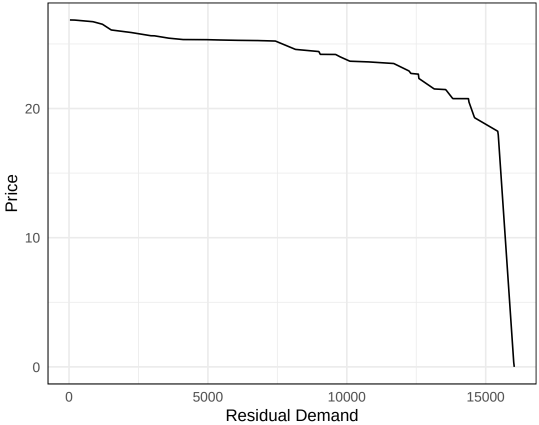
Electricity Demand: Example

NRG Energy (January, Weekday 2pm)



- Estimate residual demand for every month-hour-(weekend/weekday) combination
- Use average fringe supply and demand to estimate firm's expected residual demand curve
- Aggregate hourly residual demand curves to yearly level

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Modeling Electricity Market: Cournot Competition

- Strategic firm d chooses quantity in period t to maximize profit subject to a capacity constraint:

$$\max_{q_{dt}} \left(P(q_{dt} + q_{-dt}) \cdot q_{dt} - C_{dt}(q_{dt})\right) \quad \text{s.t.} \quad q_{dt} \leq k_{dt}$$

- The annual profit of the power company is

$$\Pi_d = \sum_t \pi_{dt}(q_{dt}, q_{-dt})$$

Bargaining Weight Estimation

We solve the model for every contracting pair-year using the estimated primitives

- (i) electricity demand curve at downstream firm
- (ii) coal mining marginal cost curve of upstream firm

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Estimation Procedure

1. Solve equilibrium (q, p, w) under monopsonistic and monopolistic conduct to form payoff functions
2. For each $\beta \in (0, 1)$, form $q(\beta)$ and $w(\beta)$ under monopolistic and monopsonistic bargaining. Solve β as intersection of $w(\beta)$ and w. equilibrium conditions
3. Compare β to β^*, $q(\beta)$ to $q(\beta^*)$ to pick vertical conduct, applying theorem 1.

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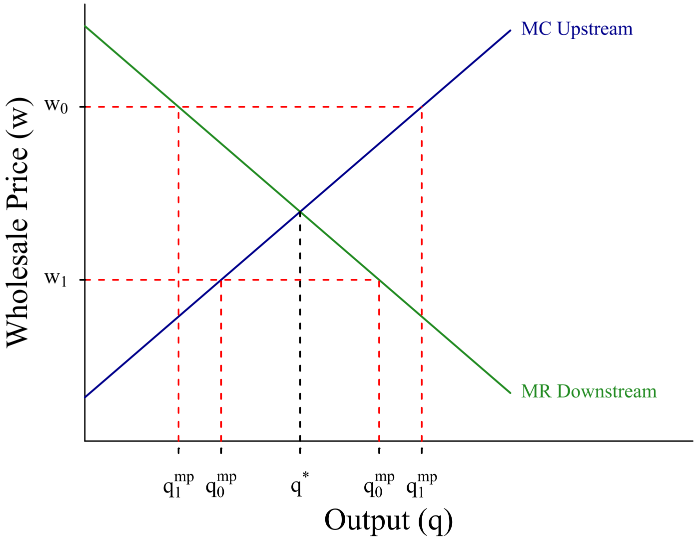
MC Upstream
MR Downstream
Wholesale Price (w)
w_0
w_1
q_1^{mp}
q_0^{mp}
q^*
q_0^{mp}
q_1^{mp}
Output (q)

Bargaining problem

$$
\begin{cases}
\max_{w_{ud}} \Big\{ \Big[w_{ud}\, q_{ud}^{ms}(w_{ud}) - \Big(C_u\big(Q_{-d} + q_{ud}^{ms}(w_{ud})\big) - C_u\big(Q_{-d}\big) \Big) \Big]^{1-\beta} \\
\qquad \times \Big[\sum_t f_t \Big(\big[P_t\big(Q_{-dt} + Q_{dt}^{ms}\big)\, Q_{dt}^{ms} - C_{dt}\big(Q_{d}^{ms}\big) \big] - \big[P_t\big(Q_{-dt} + \bar{Q}_{dt}^{-u}\big)\, \bar{Q}_{dt}^{-u} - C_{dt}^{-u}\big(\bar{Q}_{dt}^{-u}\big) \big] \Big) \Big]^{\beta} \Big\} \\
Q_{dt}^{ms}(q_{ud}) = \underset{\tilde{Q}_{dt}}{\text{argmax}}\ \ P_t(Q_{-dt} + Q_{dt})Q_{dt} - C_{dt}^{-u}(Q_{dt}) \qquad \text{where} \quad Q_{dt} = \tilde{Q}_{dt} + Q_{udt} \\
q_{ud}^{ms}(C_u, w_{ud}) = \underset{q_{ud}}{\text{argmax}}\ \sum w_{ud} q_{ud} - C_u\left(\sum q_{ud}\right)
\end{cases}
$$

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Bargaining problem

$$\begin{cases} \max\limits_{w_{ud}} \Bigg\{ \Big[w_{ud}\, q_{ud}^{mp}(w_{ud}) - \Big(C_u\big(Q_{-d} + q_{ud}^{mp}(w_{ud})\big) - C_u\big(Q_{-d}\big) \Big) \Big]^{1-\beta} \\ \qquad\qquad \times \Big[\sum_t f_t \Big(\big[P_t\big(Q_{-dt} + Q_{dt}^{mp}\big)\, Q_{dt}^{mp} - C_{dt}\big(Q_d^{mp}\big) \big] - \big[P_t\big(Q_{-dt} + \bar{Q}_{dt}^{-u}\big)\, \bar{Q}_{dt}^{-u} - C_{dt}^{-u}\big(\bar{Q}_{dt}^{-u}\big) \big] \Big) \Big]^{\beta} \Bigg\} \\ Q_{dt}^{\text{mp}}(C_{dt}),\, q_{ud}^{mp}(w_{ud}) = \arg\max\limits_{Q_{dt}},\, q_{ud} \left[P_t(Q_{-dt} + Q_{dt})Q_{dt} - C_{dt}(Q_{dt}) \right] \end{cases}$$

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Applications: Labor Unions and Farmer Cooperatives

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Industry	Sources	ψ	η	β^*
U.S. construction workers	Kroft, Mogstad, Luo, and Setzler (forthcoming)	0.29	-7.30	0.42
Chinese tobacco farmers	Rubens (2023), Ciliberto and Kuminoff (2010)	1.904	-1.14	0.92

Notes: This table reports parameters for the inverse elasticity of supply, ψ, and the own-price elasticity of downstream demand, η, as estimated in the referenced studies. The final column shows the implied efficient level of buyer power, β^*, computed from these parameters using the log-linear approximation discussed in the text.