Lobbying for Prices: Political Economy of Regulation

- When is Regulation the Answer to Market Failure?
  - Market Failure is Costly, But So Is Regulatory Failure.
  - How to Compare Costs?
- Terms of Trade Determined by Political Rather Than Market Forces.
  - Politicians Maximize Election Probability; Monopolists Maximize Profit.
  - Which Is More Efficient?
  - Does Lobbying Increase Efficiency of Electoral Outcomes (Becker, 1985)
- Monopoly Outcomes vs. Voting Outcomes.
  - With and Without Lobbying by Firms

The Literature: 1

- The Public Interest Asymmetric Information Model (the Toulouse School).
  - Imperfectly Informed Regulator/Legislator Seeks Efficiency
  - Focus on (Costly) Incentives to Reveal Information.
  - Powerful Mathematical Models.
- But Is This Regulation?
  - Does Anyone Believe that Regulators Are Interested in Economic Efficiency? (maybe in Toulouse!)
  - Considering Corruption, Bribes, Capture, etc., Is Asymmetric Information Really an Important Problem?
  - Nothing Inherently *Political*, *Public*, or *Governmental* in these Models (but see Laffont (1996) , IJIO).

The Literature: 2

- Regulation in a Political Marketplace (Chicago School)
  - Firms (and other interests) Seek Market Advantage through the Use of the Coercive Power of Government.
  - Politicians Seek Support for Re-election; Resources from Private Sector
  - A “Political Market,” in which There Is Demand and Supply of Regulation of Economic Markets.
  - Economic Efficiency No One’s Objective!
- A Powerful Idea, But Little Analytic Support.
  - Becker (1985) Attempt at a General Theory Unsatisfying.
  - Peltzman (1976, 1989) the most advanced; ad hoc modeling.

The Literature: 3

- International Trade and Lobbying for Protection.
  - A Long & Rich Literature, Which Has Not Made It Into Regulation.
  - Best Summaries: Hillman (1989) and Magee, Brock, & Young (1989).
  - Most Recent: Grossman & Helpman (1994, 1995) *AER*.
  - Chicago School, Done Well!

- But…Reduced Form Politics!
  - Gov't Objective Function Depends Upon Contributions (G&H: aggregate welfare as well). This Is a Proxy for Probability of Re-election.
  - Voting and Voters Not Explicit.
  - Similar to Peltzman Approach.

Where Are the Voters?

- Median Voter Result a Perfectly Good Way to Bring In Voters? Why Isn't It Used?
  - Restrictive Assumptions: Single Dimension, Single-Peaked Preferences.
    - But This Is OK for Many Regulatory Issues (e.g., Telecoms).
  - Median Voter Model Discontinuous; Small Changes in Inputs Lead to Big Changes in Outputs.
    - Only true for discrete choices with strongly separated constituents (e.g., abortion in the US).
  - A Model of Direct Democracy, Not Representative Democracy. Misses the Rich Institutional Structure of Real Regulation.
    - If Elections Are Important, This May Be a Reasonable Simplification

Research Objectives

- Using a Simple Voting Model, Compare Efficiency of Unregulated Monopoly with That of Regulated (Voting-Determined) Prices.
  - *Answer:* Regulation Can Do Worse.
- Extend the Political Economy Model to Include Lobbying *and* Voting. Does This Increase Efficiency (a la Becker (1985))?
  - *Answer:* Generally Not; Small Efficiency Gains Usually Offset By Large Lobbying Costs.
- Extend the Model to Include Agents That Vote Both for Prices and for Control of Firm Lobbying. Does This Increase Efficiency?
  - *Answer:* Usually; Lobbying Costs Reduced, But Can Go Too Far.

Research Approach

- Monopoly Firm with Two Products, Consumed with Different Intensities Across the Population. Constant Returns to Scale, No Information Asymmetries, Costless Regulation
- Explicitly Model Voting on Prices with Median Voter Result
  - Prices for Two Goods Reflect Preferences of Median Voter
  - No lobbying,
  - Compare Outcome with Monopoly
- Introduce New Model of Lobbying; Consuming But Non-Voting Firms Spend Resources to *Inform* "Rationally Ignorant" Voters, Raising Their Probability of Voting
  - Is Efficiency Increased?

Research Approach (Cont'd)

- Two Firms, Each Using One (Regulated) Service As Input; Strategic Variable Is Lobbying Expenditure, Seeking a More Favorable Voting Outcome.
- Firms: Exogenous or Endogenous?
  - Model 1: Firms Exogenous; Voters Care Only About Their Own Consumption Welfare.
  - Model 1a: Voters Own Both Firms (Market Portfolio) and Vote Their Combined Consumption and Investment Welfare. Stock Ownership Is Skewed.
  - Model 2: Voter Own Both Firms *and Control Them*, So Shareowners Vote for Lobbying Expenditures, Then All Vote for Prices.

What About “Bribes”?

- In This Model, Lobbying Resources Are Used to Inform Potentially Interested Voters, To Increase Their Probability of Voting.
  - Real Resources Consumed.
- But Isn’t the “Right” Model One in Which Transfers Are Made to Politicians to Improve Their Lives?
- *Stylized Fact*: Almost All the Resources Flowing to the Political Sector Are Expended on Getting Elected (TV, mailings, etc.)
  - These resources can be spent directly by the Organization (e.g., COPE).
  - Politicians as Specialists in Informing Electorate; Firms Give Resources to Politicians Who Then Influence Voters.

The Model: Production

- Monopolist Producing Two Services
  - Mass Service (everyone consumes); Demand Q_M, Price p_M.
  - Specialized Service (some consume); Demand Q_S, Price p_S.
  - Known Production Technology; Constant Returns to Scale: Profit = π = $(p_M\text{-}c_M)Q_M+(p_S\text{-}c_S)Q_S$.
  - No Price Discrimination.
- If Regulated:
  - Can Be Perfectly Monitored and Controlled by Regulator
  - Has No Influence Over Regulator
  - Need Not Produce

Model 0:Consumers/Voters

- Voters Indexed by $\theta \in [0,1]$.
- Voter θ Consumes $\lambda_Z(\theta)$ of Demand for Service Z (= M,S).
  - Assume $\lambda_M(\theta) > 0$, and $\lambda(\theta) = \lambda_S(\theta)/\lambda_M(\theta)$ is an increasing function (the meaning of mass vs. specialized).
  - Think of Service M having a uniform distribution, with Service S skewed to higher θ.
- Consumption Surplus for θ :

$$U(p_M, p_S; \theta) = \int_{p_M}^{\infty} Q_M(z)dz + \int_{p_S}^{\infty} \lambda(\theta) \cdot Q_S(z)dz$$

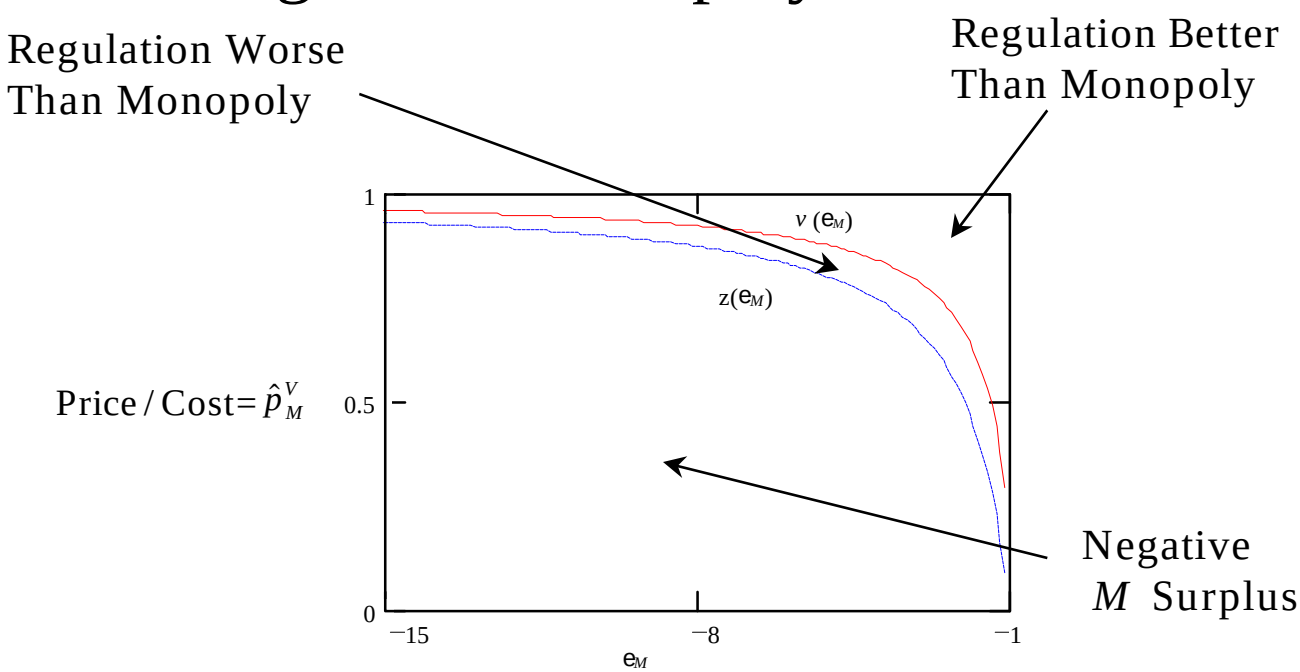
  - Separability *Not* an innocuous assumption!

The Model: Regulation

- Everyone Knows Everything.
  - Producer Has No Power (Except Not to Produce)
- Institutions Respond to Voters'/Consumers' Preferences
  - *Stylized Model*: Candidates for "Regulator" announce prices which they are committed to implement if elected.
  - No "Pie in the Sky;" Voters know that prices yielding negative profit result in zero production.
  - Prices that result in positive profits are dominated for all consumers. Hence, $\pi(p_M,p_S)=0$, so only one free price.
- Median Voter Theorem Applies.
  - Equilibrium price reflects median voter's preferences.
  - Preferences are single-peaked.

Model 0: Results

- Efficient Outcome ⇔ median = mean voter ⇔ $l(\hat{q}) = 1$.
  - If $l(\hat{q}) < 1$, mass service consumers extract profit from specialized to subsidize M so that $p_M < c_M$.
- Is This More or Less Efficient Than Unregulated Monopoly?



  - *N.B.* Constant elasticity demand, $\lambda(\theta^V) = 0$, efficiency measure = total consumer surplus.

Model 0: Results (Cont'd)

Proposition 0-1: $\lambda(\hat{q}) \gtreqless 1 \Leftrightarrow p_M \gtreqless c_M$ and $p_S \lesseqgtr c_S$

Assume isolastic demand and $\lambda(\hat{q}) = 0$.

Proposition 0-2: Median Voter Prices Are Less Efficient Than Monopoly Prices If

$$\left(\frac{\hat{p}_M}{c_M}\right)^{\varepsilon_M}\left[\frac{\hat{p}_M}{c_M} - \frac{\varepsilon_M + 1}{\varepsilon_M}\right] < \left(\frac{\varepsilon_M}{\varepsilon_M + 1}\right)^{\varepsilon_M}\left[\frac{\varepsilon_M}{\varepsilon_M + 1} - \frac{\varepsilon_M + 1}{\varepsilon_M}\right]$$

which depends upon how much surplus is available from Service S.

Proposition 0-3: As $\lambda(\hat{q}) \to 1$, $\hat{p}_Z \to c_Z$ *, and total surplus increases.*

IMPORTANT RESULT: Median Voter Regulated Monopoly Can Do Worse Than Unregulated Monopoly.

N.B. That median voter model results in inefficient outcomes is well-known; that it is worse that market failure is new.

Model 1: Consumers/Voters

- Voters are "Rationally Ignorant;" since the probability of being decisive is zero, no one becomes informed that an election is important to them, except randomly.
- Without further information, voters vote with some probability < 1.
- If resources x are expended on informing θ that this election is important, then the probability of his voting is $y(x)$, $y' > 0$, $y'' < 0$, independent of θ.
- Voters can be "targeted," so that different amounts from different sources can be spend on different voters.

Model 1: Consumer/Firms

- There are two firms; firm S has derived demand $Q^S(p_S)$, and firm M demands $Q^M(p_M)$. $\Pi^Z = \int_{p_Z}^{\infty} Q^Z(y)dy$ Firms do not vote.
- Firm Z (=M,S) can spend resources x_Z/voter on lobbying, i.e., informing specific voters on the importance of the election.
  - Firms allocate expenditures among voters: $x_Z(\theta)$, with total expenditures = $\int_0^1 x_Z(\mathrm{q})d\mathrm{q}$
  - If firm Z can increase the probability of voting among voters who prefer low p_Z, then *ceteris paribus* the median voter will change, preferring lower p_Z than otherwise.

Model 1: Lobbying

- Median voter $\hat{\theta}$ solves

$$\int_0^{\hat{\theta}} \psi(x_M(\theta)) + \psi(x_S(\theta))d\theta = \int_{\hat{\theta}}^1 \psi(x_M(\theta)) + \psi(x_S(\theta))d\theta$$

- Voter θ's preferred price $p_S(\theta)$ solves

$$\max_{p_S} \; W_M + \lambda(\theta)W_S \Leftrightarrow -\frac{dp_M}{dp_S} = \lambda(\theta)\frac{Q_S}{Q_M}.$$

with $\dfrac{dp_S}{d\theta} < 0.$

- The producer's zero profit condition is:

$$(p_M - c_M)(Q_M + Q^M) + (p_S - c_S)(Q_S + Q^S) = 0$$

which implicitly defines $p_M(p_S)$, $p'_M < 0.$

- Firms Decide How to Allocate Lobbying Expenditures Across Voters.

Model 1: Lobbying

Contribution Specialization Theorem:

Proposition 1-1: Firm M (firm S) only lobbies voters $\mathrm{q} < \hat{\mathrm{q}}$ $(\mathrm{q} > \hat{\mathrm{q}})$.

Proof: Firm *M* profits are $\Pi^M(p_M(\hat{\mathrm{q}}(x_M(\mathrm{q}))))$.

For $\mathrm{q} > \hat{\mathrm{q}}$, $$\frac{d\Pi^M}{dx_M(\mathrm{q})} = \underbrace{\Pi^{M\prime}}_{-} \underbrace{\frac{dp_M}{d\hat{\mathrm{q}}}}_{+} \underbrace{\frac{d\hat{\mathrm{q}}}{dx_M(\mathrm{q})}}_{+} < 0$$

Thus, the firm can decrease its lobbying costs and increase its gross profits by eliminating such expenditures.

Equal Allocation Theorem:

Proposition 1-2: Firm M (firm S) allocates its lobbying resources equally to all voters $\mathrm{q} < \hat{\mathrm{q}}$ $(\mathrm{q} > \hat{\mathrm{q}})$.

Proof: Follows immediately from the concavity of $\psi(x)$.

Model 1: The Lobbying Game

- Firms *M*, *S* play a one-shot lobbying game; the strategic variables are per voter lobbying expenditures (x_M,x_S). Nash equilibrium solves:

$$\max_{x_S} \Pi^S(p_S(\hat{\theta}(x_M, x_S))) - x_S(1-\hat{\theta}(x_M, x_S))$$

$$\max_{x_M} \Pi^M(p_M(\hat{\theta}(x_M, x_S))) - x_M\hat{\theta}(x_M, x_S)$$

Proposition 1-3: The Equilibrium lobbying strategies satisfy:

$$\frac{x_S - \Pi^{S\prime}}{x_S} = -\frac{1}{\varepsilon_{1-\hat{\theta}}} \text{ and } \frac{x_M - \Pi^{M\prime}}{x_M} = -\frac{1}{\varepsilon_{\hat{\theta}}}$$

where ε *is the elasticity of the median voter with respect to lobbying expenditures.*

Proof: Follows immediately from the FOC

REMARK: Modified Ramsey Rule similar to Grossman & Helpman (1994)

Model 1: Lobbying Game

Proposition 1-4: As voter responsiveness increases, lobbying expenditures decrease.

$$\frac{dx_M}{d\mathrm{e}_{\hat{\mathrm{q}}}} < 0, \quad \frac{dx_S}{d\mathrm{e}_{1-\hat{\mathrm{q}}}} < 0.$$

Proof (for Service M):

$$\frac{\P}{\P x_M}\left(\frac{x_M - \Pi'}{x_M}\right)dx_M = \frac{\P}{\P \mathrm{e}_{\hat{\mathrm{q}}}}\left(-\frac{1}{\mathrm{e}_{\hat{\mathrm{q}}}}\right)d\mathrm{e}_{\hat{\mathrm{q}}} \Leftrightarrow$$

$$\left(\frac{\Pi' - x_M \Pi''}{x_M^2}\right)dx_M = \left(\frac{1}{\mathrm{e}_{\hat{\mathrm{q}}}^2}\right)d\mathrm{e}_{\hat{\mathrm{q}}} \Leftrightarrow$$

$$\frac{dx_M}{d\mathrm{e}_{\hat{\mathrm{q}}}} = \underbrace{\left(\frac{x_M^2}{\mathrm{e}_{\hat{\mathrm{q}}}^2}\right)}_{+}\left(\frac{1}{\underbrace{\Pi'}_{-} - \underbrace{x_M}_{+}\underbrace{\Pi''}_{+}}\right) < 0.$$

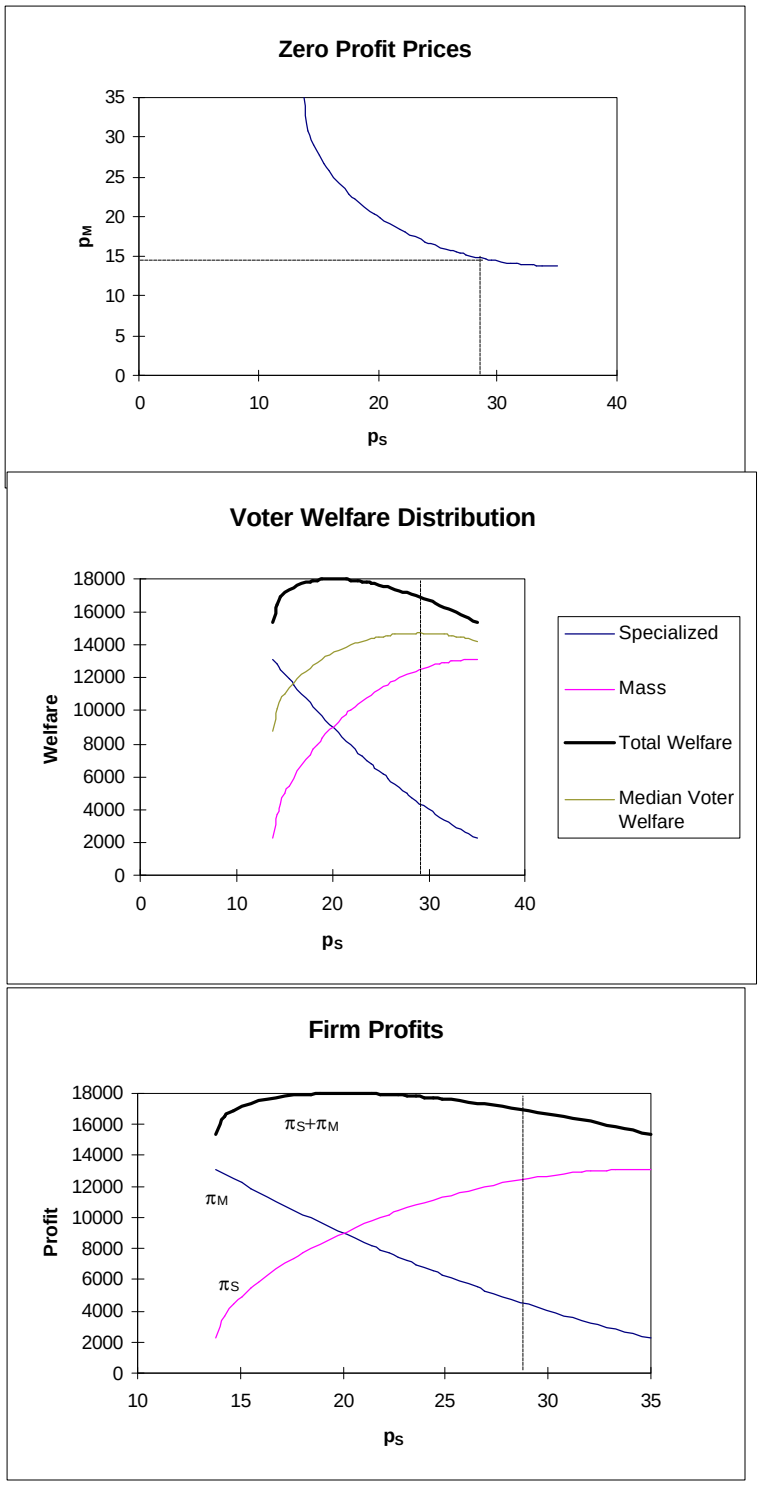
IMPORTANT RESULT: Firms respond to less responsive voters by spending more resources, rather than "giving up" on them as a bad investment. As voters become more jaded, the cost of lobbying increases.

Model 1: Baseline Example

- To Assess Model Behavior, a Baseline Numerical Example is Analyzed Via Parametric Changes.
- Baseline:
  - Linear demand: $Q_M = A_M - b_M p_M$
    $= 1000 - 20 p_M$

    identical for all: $Q_M = Q_S = Q^M = Q^S$
  - Costs: $c_S = c_M = 20$
  - Distribution of S (pdf): $(a+1)q^a = 4q^3$
  - Voter Response: $y_Z(x) = 0.1 + 0.9(1 - e^{-.01x})$

A View of the Baseline

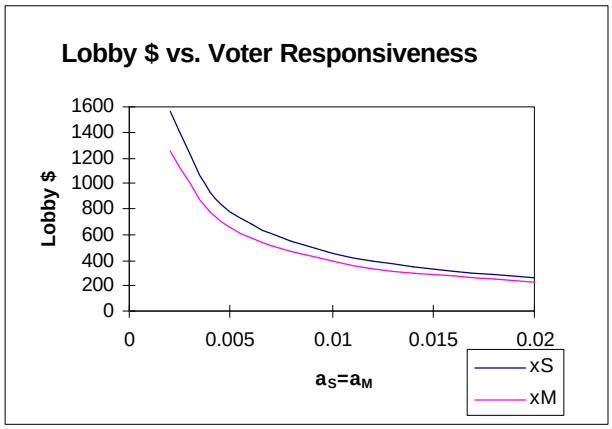


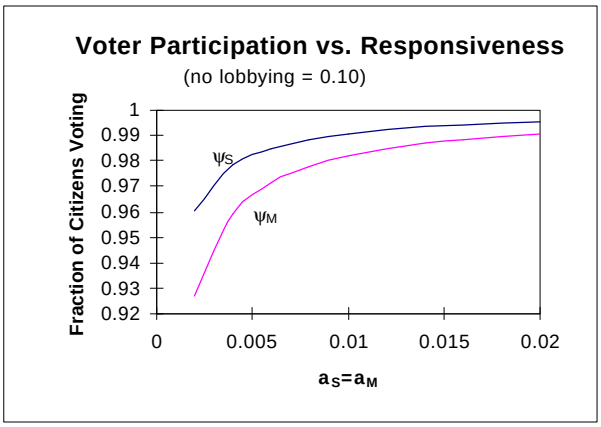
Model 1: Numerical Results

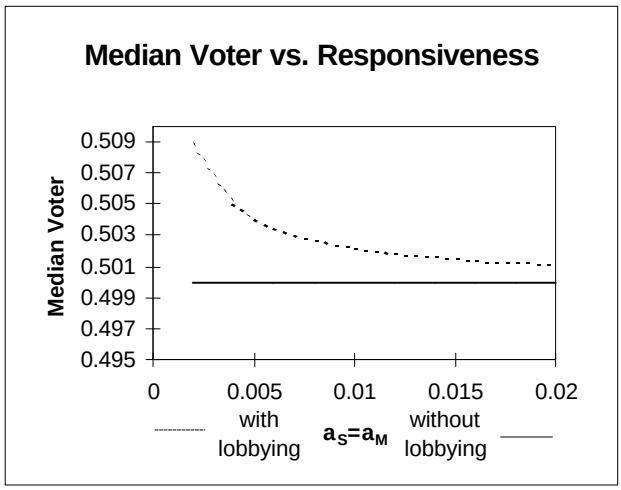
- Each parameter varied over a “reasonable” range, and model variables observed.
- Is the increase in efficiency due to lobbying (the Becker effect) more than the cost of lobbying (the Buchanan effect)?
- General Observations:
  - Firms Spend about 5% of profits on lobbying (*S*-firm = 10%, *M*-firm = 3%)
  - Firms lobby vigorously, but largely offset one another. Prices become more efficient, but not by much.
  - In all cases, lobbying leads to an increase in voter welfare but a decrease in total welfare, as firms compete away gains to lobby voters.
    - Similar to advertising models.
  - CONCLUSION: Buchanan effect outweighs Becker effect (in numerical example).

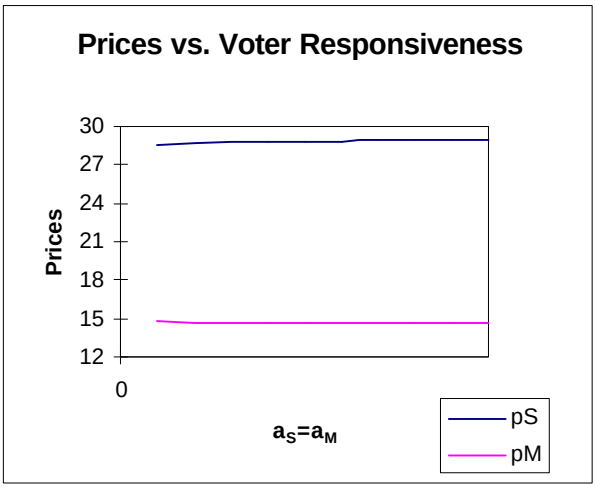
Varying Voter Responsiveness

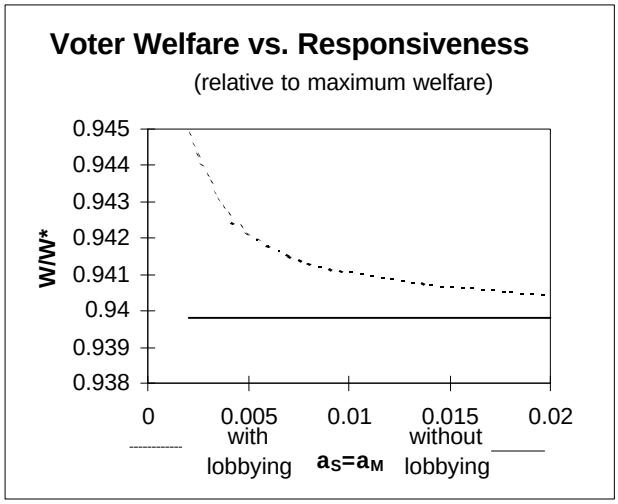
$$y_Z(x_Z) = 0.10 + 0.90 \cdot (1 - e^{-a_Z x_Z}) \quad \text{Baseline: } a_Z = .01$$

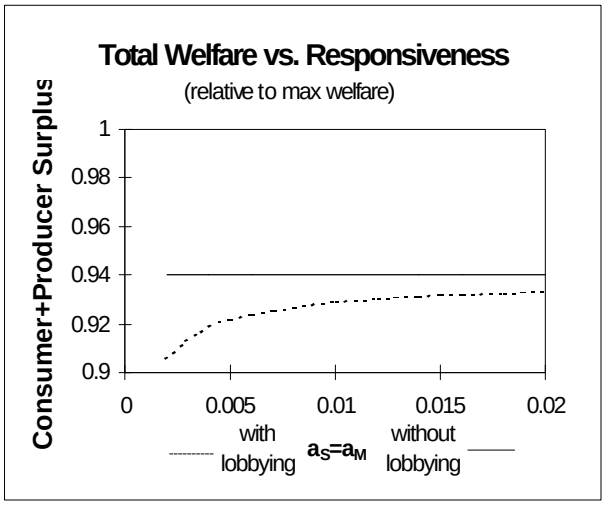








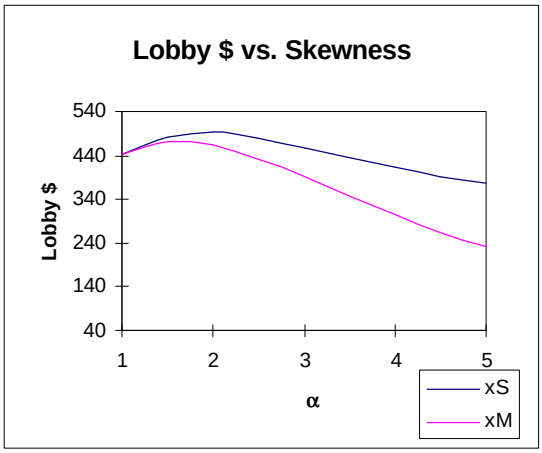


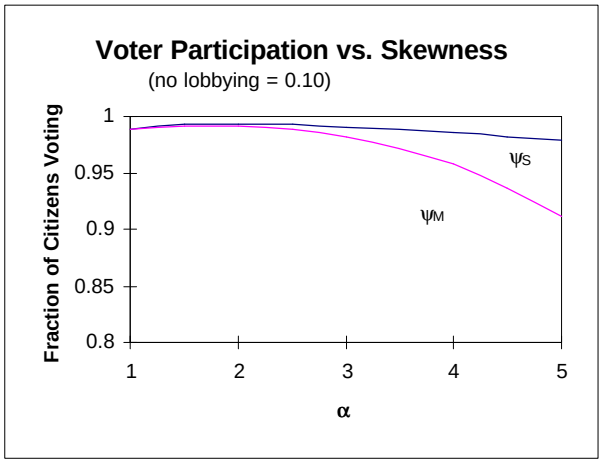


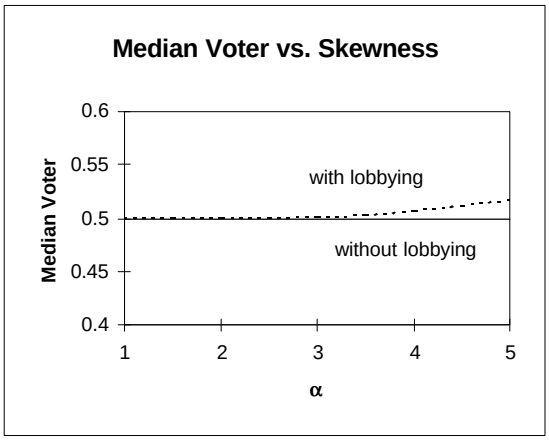
Note confirmation of Proposition 1-4.

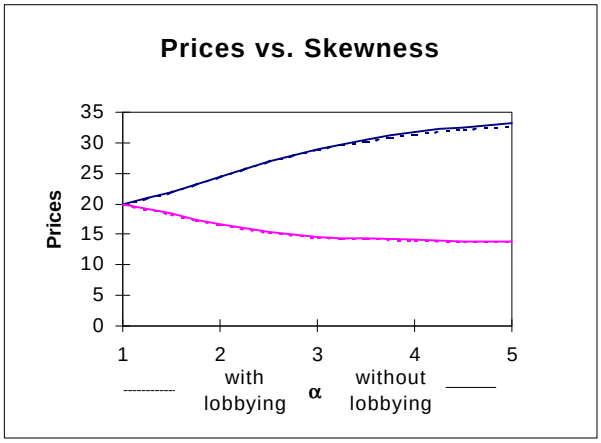
Varying Skewness of Distribution

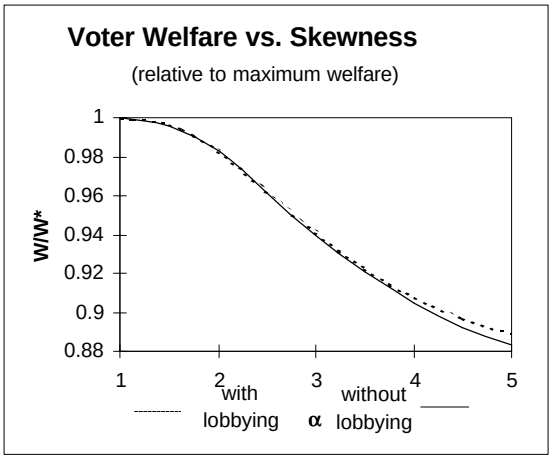
$l(q) = (a+1)q^a$ Baseline: $a = 3$

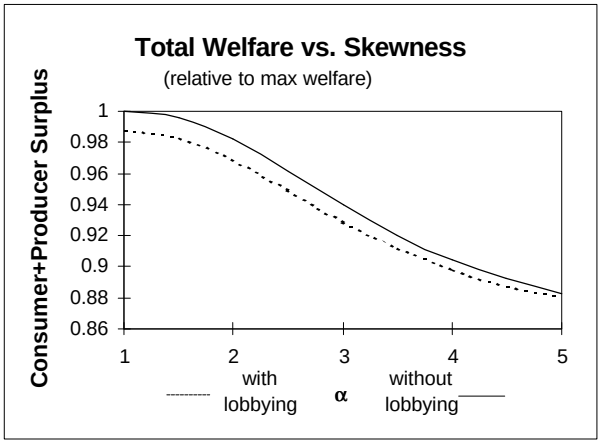






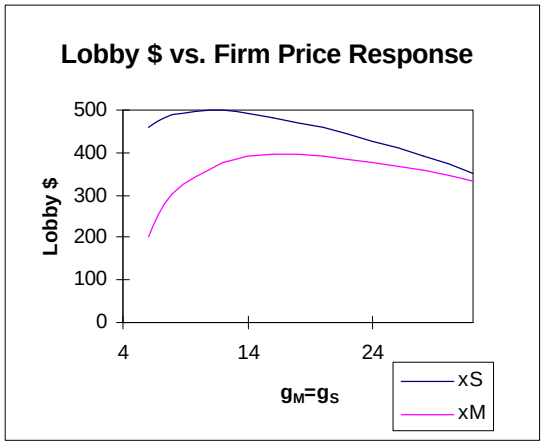






Large lobbying expenses, small effect on prices.
Effects "swamped" by changes in α.

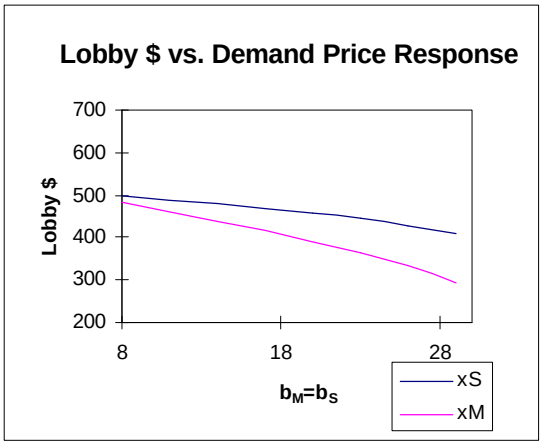
Lobby $ vs. Other Parameters



$$Q^Z = 1000 - g_Z p_Z$$

Baseline: $g_Z = 20$

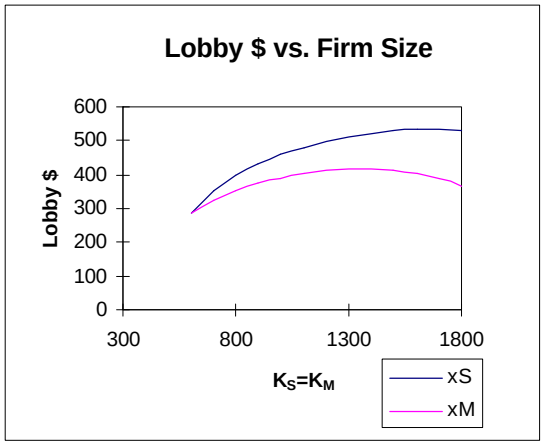
Greater firm elasticity reduces lobbying



$$Q_Z = 1000 - b_Z p_Z$$

Baseline: $b_Z = 20$

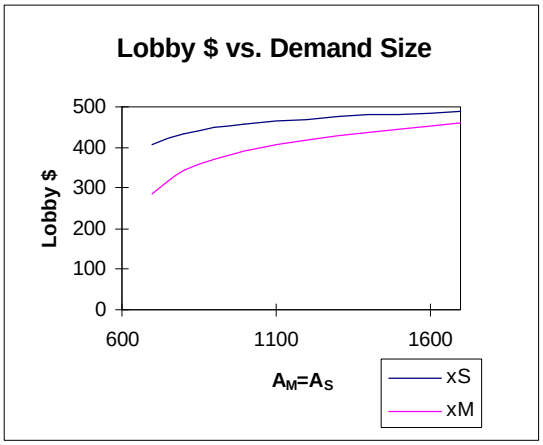
Greater consumer elasticity reduces lobbying a little



$$Q^Z = K_Z - 20 p_Z$$

Baseline: $K_Z = 1000$

Lobbying substantial even for small-demand firms



$$Q_Z = A_Z - 20 p_Z$$

Baseline: $A_Z = 1000$

Lobbying substantial even for small consumer demand

Model 1a: Voters Own Firms

- In Model 1, Firms Are Exogenous; Returns Are Not Captured by Voters
- Model 1a: Voters Own Both Firms. All Stockholders Own the Market Portfolio (CAPM), But Differ in Total Share of Market Owned.
- Distribution of Shareowning:

$$\mu(\theta) = (\beta + 1)\theta^{\beta}, \quad -1 < \beta < \infty$$

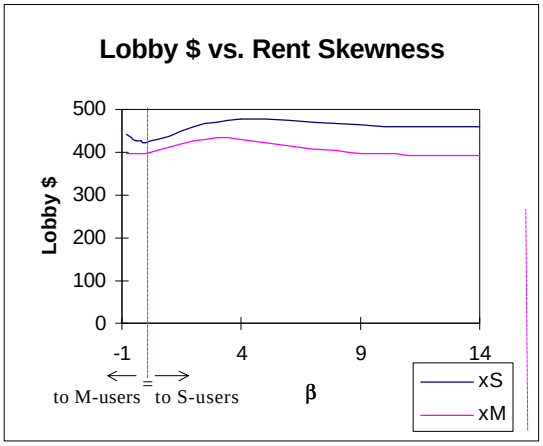
- Voters Vote The Sum of Their Consumption and Investment Values:

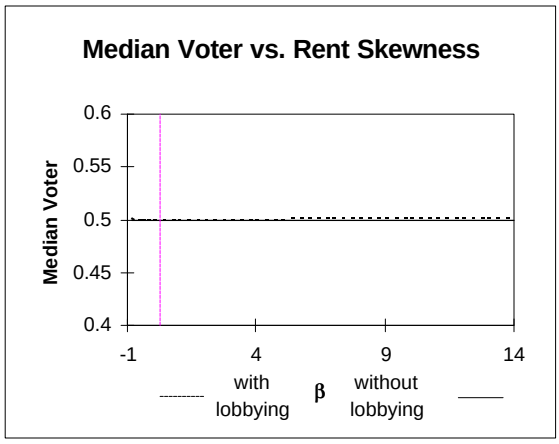
$$U(p_S;\theta) = W_M + \lambda(\theta)W_S + \mu(\theta)\left[\Pi^M + \Pi^S\right]$$

- $-1<\beta<0$: Skewed toward *M*-voters
  $0<\beta<\infty$: Skewed toward *S*-voters.

Model 1a: Varying Rent Skewness

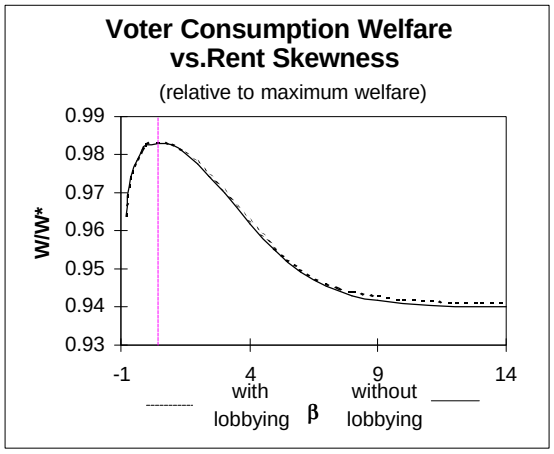
$m(q) = (b+1)q^{b}$ egalitarian: $b = 0$

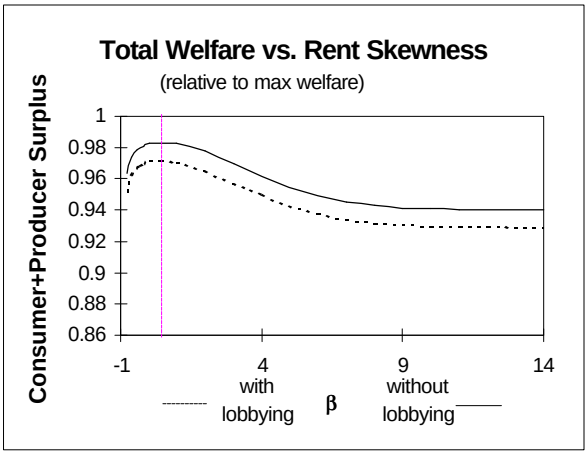




Lobbying is substantial, and does not vary much with skewness

Lobbying has little effect on prices.





Skewness distorts prices; lobbying doesn't help. Consumption welfare maximized at $b = 0$.

Similarly, total welfare maximized at $b = 0$.

Model 2: Shareowner Control

- As in Model 1a, Voters Own Firms, But in this Model, They Control Them, via Shareowner Voting.
- Thus, lobbying expenditures Are Determined by the Preferences of the Owner of the Median Share (weighted voting).
- Since everyone holds the market portfolio, the Median Share Owner Controls Both Firms, and Can Control (x_M, x_S).

Model 2: Results

Proposition 2-1: In equilibrium, at most one firm lobbies.
Proof: Median share owner internalizes all lobbying costs; optimal to eliminate all competitive lobbying.

- This structure eliminates any strategic interaction between the firms.

Proposition 2-2: Any price outcome p_S which is an equilibrium of either Model 1 can be achieved in Model 2 at lower cost.
Proof: Identical outcome can be achieved without costly competitive lobbying.

Model 2 Results (Cont'd)

Proposition 2-3: If $\tilde{q} > 0.5$ *then* $\tilde{q} > \hat{q}$;
$\tilde{q} < 0.5$ *then* $\tilde{q} < \hat{q}$;
$\tilde{q} = 0.5$ *then* $\tilde{q} = \hat{q}$
and $x_M = x_S = 0$.

It never pays the median share owner to make himself the median voter; while doing so is *ex post* optimal, it is only *ex ante* optimal if the cost of doing so is zero.

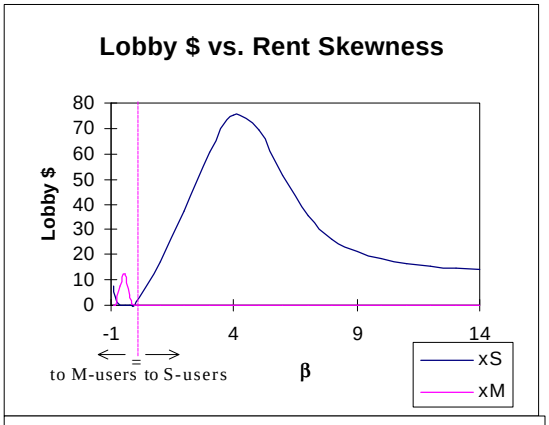
It is possible that even if the median shareowner consumes *M* only, he may wish the *S*-firm to lobby, and the median voter to be greater than 0.5.

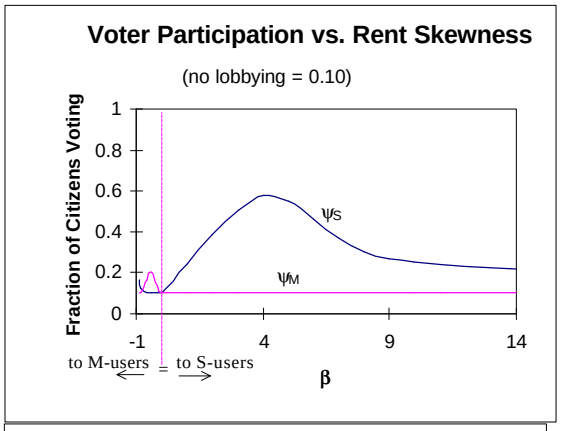
If stock ownership is sufficiently concentrated, then the median share owner will have more interest in his investment value than his consumption value.

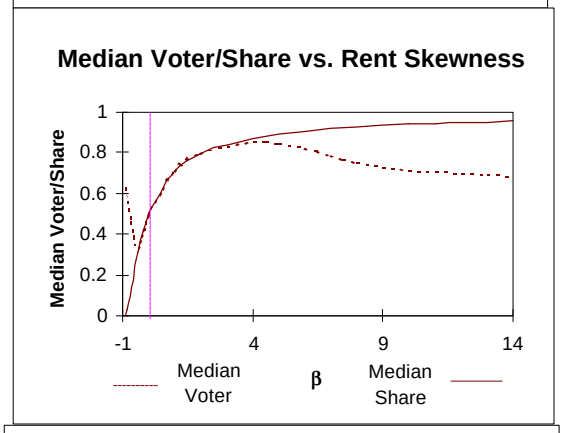
Proposition 3-4: Lobbying Can Increase Efficiency.
Proof: See example.

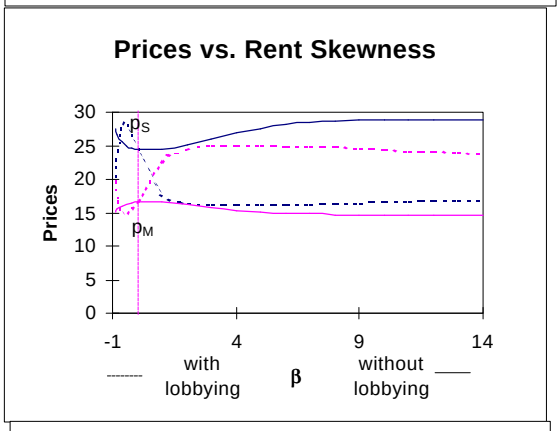
Model 2: Varying Rent Skewness

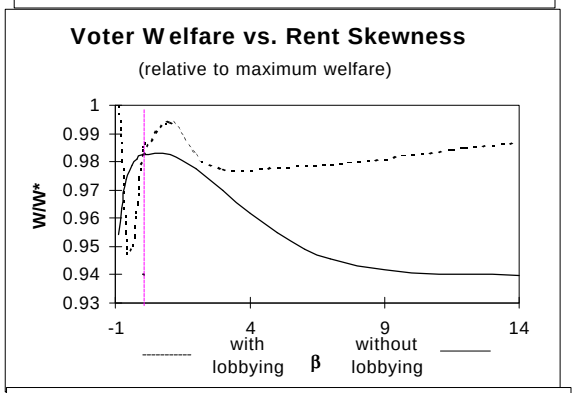
$m(q) = (b+1)q^b$ egalitarian: $b = 0$

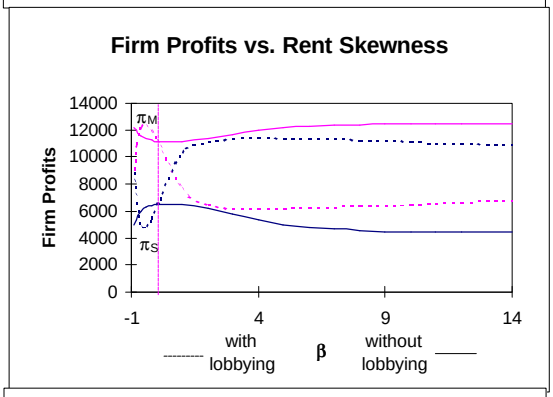


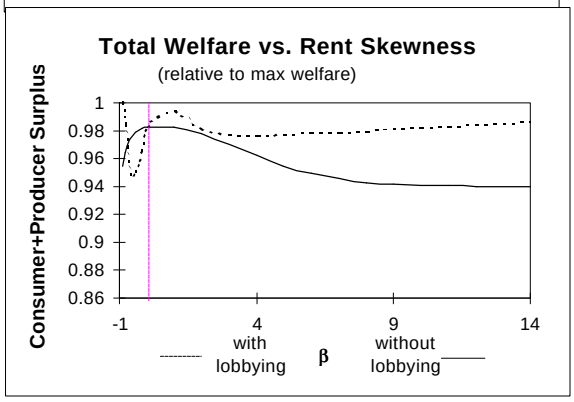


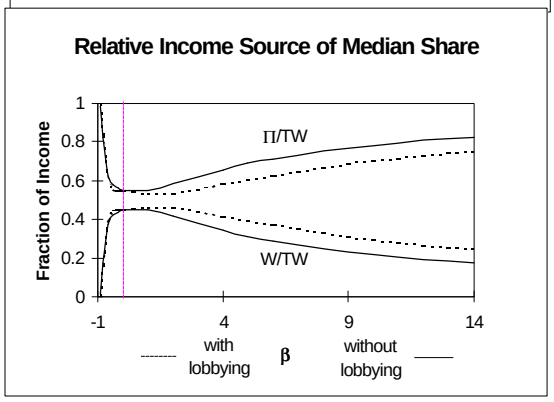












Model 2 Conclusions

- Is Model 2 ever realistic?
  - Yes, in the case of highly concentrated ownership. This would solve the inherent free rider problem (oligarchs in Third World countries and large fund managers [e.g., CalPERS]).
- Highly concentrated owners really may control elections via efficient lobbying.
  - Influence is strong enough to reverse the cross-subsidy ($p_S < c_S$) even though majority prefer $p_S > c_S$.
  - Leads to the opposite inefficiency.
  - Incentives for voting: if it is known that elections are controlled, then few will vote. This is consistent with the model.
  - Example: recent election in the Philippines (20% voter turnout).

Overall Conclusions

- Only model that incorporates both explicit voting and explicit lobbying.
- With no lobbying (Model 0), median voter prices can be less efficient than unregulated monopoly prices.
- With lobbying, economic agents can express their preferences and so improve efficiency (the Becker effect). However, it is costly to do so (the Buchanan effect).
- Numerical results suggest the Buchanan effect is larger, so lobbying reduces efficiency (Model 1), because lobbying competition forces firms to spend "too much."
  - Similar to advertising equilibria.

Overall Conclusions (Cont'd)

- Lobbying expenditures appear relatively insensitive to changes in most parameters. Even large disparities between the size of firms appear to have rather small impact.
- With owner control of firms and shareowners holding the market portfolio (Model 2), wasteful lobbying expenditures are eliminated, so the Buchanan effect is muted.
- However, highly concentrated owners may be able to reverse the inefficiency of median voter prices. Thus, the Becker effect is taken *past* the efficient price.