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Implications of Heterogeneous Producer Incentives for Marketing Order Continuation

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Introduction

Much of the literature on marketing orders assumes perfect competition and examines aggregate costs and benefits to producers. However, recent litigation and termination of long-lived marketing orders suggests that the use of these assumptions has led to the neglect of important distributional consequences of marketing order policies. Although mechanisms are built into marketing order laws to help prevent any one group from forming a marketing order that does not benefit all producers, it's not clear that these mechanisms are sufficient in all situations. Accordingly, the research questions for this poster are:

- 1) What are the incentives producers face in the presence of producer heterogeneity and/or market power?
- 2) How do these incentives affect voting outcomes?

Model

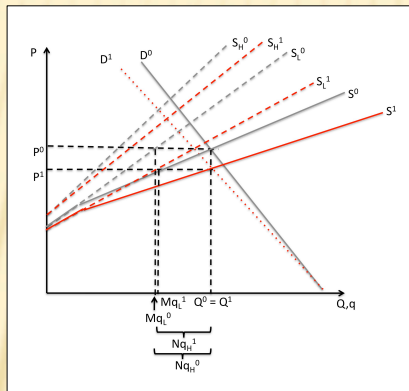
- Two types of firms, L and H, with costs: $c_H(q) > c_L(q)$ for all q
- Producer of type i has cost function: $c_i(q) = vc_i(q) + F = (a_i q^2/2) + b_i q_i + F$
- Known ad valorem tax on all producers: $\alpha(pq_i)$
- Known benefit to producers from research into cost-reducing technology: $\delta_i vc_i(q_i)$
- Market demand is linear and has form: $D(p) = \mu - p$
- Market is in equilibrium prior to vote and high cost producers are earning zero profit.
- Producers maximize profit and vote to institute or continue marketing order if profits exceed profits without marketing order.
- A new marketing order will be implemented (continued) if more than 50% of producers responsible for more than 50% of total annual output vote for it.*
- If a marketing order is not continued, the cost benefit disappears – in this setting, the tax is thus the cost to the producer of maintaining the benefit in any given period.**
- Results reported here assume neither entry nor exit occur if the marketing order passes.***

* This voting rule theoretically prevents one group of producers from creating a marketing order that does not benefit all producers.
** Integrated pest management that requires continual research to keep up with new regulations and pests is one example. Instead, assuming that the marketing order ratcheted down costs every period would require different assumptions regarding entry and exit.
*** Why is this a credible assumption? Many industries with marketing orders have high entry costs, either for machinery, land, or because crops are perennials that take several years to mature to a productive age. This means that the costs of both entry and exit are high. Since marketing orders continue to exist in many markets, we are fairly confident that not all benefits from marketing orders are dissipated by entry and exit. In our ongoing research, we are exploring the implications of other entry assumptions.

Market Structure 1: Heterogeneous Price-Takers

- All producers are price takers
- Variable cost declines for both producer types but the magnitudes differ
- The marketing order increases profits for only the low cost firms
- Scenario Price-Taking 1 in the numerical results

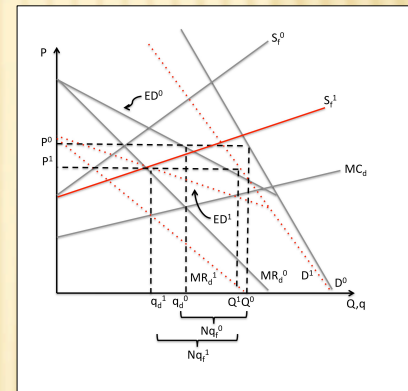
Result: The marketing order will not be formed/continued because there are more high cost producers than low cost producers at the initial equilibrium.



Market Structure 2: Dominant Firm/Competitive Fringe

- One dominant (low cost) firm and N competitive fringe (high cost) firms
- Variable costs decline for fringe firms only
- The marketing order increases profits for only the fringe firms
- Scenario Dominant 1 in the numerical results

Result: The marketing order will not be formed, because the fringe firms produce less than 50% of output. If already in place, the marketing order will be continued, because the fringe firms produce more than 50% of output if $Nq_L^1 > q_H^1$.



Evidence and Hypotheses from California Agriculture

Strawberries

Less than 13% of strawberry growers produce 75% of total acreage.¹ One firm dominates the berry market, with a large presence in strawberries and raspberries. Proprietary varieties account for nearly 50% of California acreage.² Yet all appears to be well at the California Strawberry Commission. Perhaps this is a case where everyone benefits?

Fresh Peaches and Nectarines

The Federal marketing orders for these fruits were terminated recently. Industry decline and consolidation were cited as reasons for this decision, suggesting that at a certain point, producers become heterogeneous enough that they no longer benefit from marketing orders. Some farmers lamented the loss, wondering where they would obtain market information. In heterogeneous industries like this, perhaps producers prefer other options.

Olive Oil

Olive oil producers have proposed a Federal marketing order. The process is being spearheaded by a company that produces a large portion of California and U.S. olive oil. As opposed to the stone fruits, olive oil is a growing industry in California. Is a marketing order the appropriate institution to use in an already heterogeneous industry?

¹Quick Stats, 2013. USDA National Agricultural Statistics Service. Online: <http://quickstats.nass.usda.gov/youtu/BEPCE1LA-BC42-3BEE-A037-07B9B2E0707F>.
²Kearney Pest Sheet, 2013. California Strawberry Commission. Online: http://www.californiastrawberries.com/files/Static%20Page%20Files/cscpage_text_sheet.pdf.

Selected Numerical Results

The table below reports the sensitivity of voting outcomes to changes in relative slopes of marginal cost, marginal cost intercept, and tax and benefit levels of the marketing order. Marketing order formation and continuation decisions are dependent on parameter values under both types of market behavior.

Scenario	m	a _H	a _L	b _H	b _L	F	N _H	N _L	δ _L	δ _H	α	Vote _L	Vote _H	Form?	Continue?
Price-taking 1	1070	1	0.75	30	20	100	48	27	0.1	0.04	0.05	Yes	No	No	No
Dominant 1	1070	2.25	0.01	30	20	100	73	1	0	0.25	0.05	No	Yes	No	Yes
Price-taking 2	1070	1	0.5	30	20	100	51	17	0.04	0.1	0.05	No	Yes	No	Yes
Dominant 2	1070	9	1	410	409	100	171	1	0.1	0.1	0.01	Yes	Yes	Yes	Yes
Price-taking 3	1070	1	0.07	410	409	100	4	4	0.05	0.05	0.01	Yes	Yes	Yes	Yes
Dominant 3	1070	16	0.1	410	409	100	146	1	0.2	0.2	0.01	Yes	Yes	Yes	Yes

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Intuition for Numerical Results

Price-taking 1: Low cost firms benefit more, and their cost advantage hurts high cost firms.

Price-taking 2: High cost firms benefit more, and the decrease in cost advantage hurts low cost firms. Marketing order will not be formed, but low cost firms may be trapped if marketing order already exists because high cost producers are more numerous and produce more than half of output. Price-taking 3: With high supply intercept and slope of supply and equal benefits, both firms want the marketing order.

Dominant 1: High cost firms benefit more, and decrease in cost advantage hurts dominant firm. Like the second scenario, the dominant firm may be stuck if the marketing order is already in place.

Dominant 2: With high supply intercept and slope of supply and equal benefits, both firms benefit from the marketing order despite differences. Dominant 3: Looks very similar to Dominant 2, but if benefit to low cost producer increases slightly more than the range reported here profits for high cost firm become negative and dominant firm gains market share.

Conclusions

- The voting rule does its job in many instances.
- Marketing orders can be beneficial for all producers, but existence of a marketing order is not sufficient evidence to demonstrate this is the case.
- In some cases, low cost firms may be trapped by the voting rule. A marketing order that would not be formed today might be difficult to terminate today.
- Policy implications: It is important to take market structure into account when evaluating marketing orders. If a marketing order is characterized by some producers benefiting at the expense of others, the voting rule will not always prevent its approval.

Next Steps

- Explore other entry assumptions and market structures
- Model as a unit tax rather than ad valorem tax
- Think about dynamics, expectations, producer behavior