Lecture 14
Game Theory II:
Salt market simulations
(Bertrand price competition)

15.011/0111 Economic Analysis for Business Decisions
Oz Shy

Low supplies of road salt lead to higher prices in U.S.

Eleanor Mueller, USA TODAY Network 2:41 p.m. EST November 18, 2014

USA TODAY
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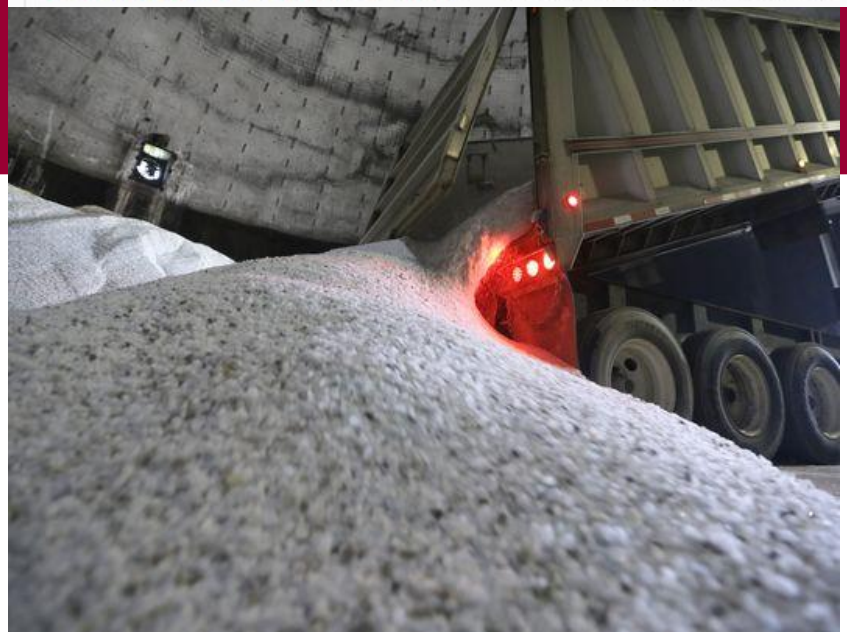

As the weather turns cold, municipalities and suppliers across the nation are facing a one-two punch of road-salt shortages and higher prices. The shortages came in the wake of last winter, when much of the U.S. experienced record-setting low temperatures that drove up demand for the ice-melting chemical. With cities and counties basing their salt-buying decisions on three- or five-year usage averages, expectations set by last winter have increased the average amount purchased.

This year's early winter left cities "struggling to find supplies" and avoid last winter's double-digit price spikes.

Getting the perfect amount of road salt is a Catch-22: if you wait too long to transport it, the very roads you are trying to clear become impassable to receive salt shipments. But buying it upfront poses its own challenges.

Heavily regulated by antitrust laws, salt producers are tight-lipped on how supply and demand affects their prices, said Lori Roman, president of the Salt Institute, a nonprofit advocacy group for salt.

Price fixing (collusion) among suppliers

Columbus, Ohio • Oct 13, 2015 • 61° Overcast
The Columbus Dispatch

TRANSPORTATION

Road-salt price jump curbed by settlement

An $11.5 million class-action settlement with two salt companies will give some Ohio entities financial help this year.

...announced a $11.5 million settlement with Cargill and Morton in June that ended a 2012 lawsuit that accused the companies of fixing prices, forcing buyers to pay above-market rates — in some cases, more than $100 a ton. Both companies have denied wrongdoing.

Salt Simulation
A Bertrand Pricing Game

1. Two players are two identical firms (identical cost structure)

2. Simultaneous move price-setting (Bertrand) repeated game (with an unknown termination date, when the show ends)

3. Lower price than rival ⇒higher current market share, but,

4. Rival firm may retaliate and lower its price next round

5. Your goal: To maximize long-run cumulative profit

6. Price collusion is illegal almost worldwide (antitrust law)

7. Your clients are municipalities that buy salt for de-icing

8. Each round you can get feedback on:
   a. Market shares
   b. Revenue and Profits
   c. Costs

Salt Simulation

Instructions

Be sure to join the market you are assigned

Troubleshooting:

Idea 1: Refresh

Idea 2: Logout & use a different browser

Chrome/Firefox/Safari recommended.

Salt Simulation

Need:

1 Volunteer as my Consultant

2 Volunteers to take us on

Practice Round:

- Sensitivity of Industry Demand to price: Low
- Firm Demand Curve: Relatively Inelastic
- Industry Demand: Stable

Salt Simulation

- At the game click on: Play as part of a CLASS http://forio.com/simulation/mit-sloan-salt/index.htm
  - **Choose screen ID [for example: Team A]**
  - **Enter Class Code: 15011_2015_Round_1**
  - **If you see "start game", click it**
  - **Explore the simulator**
  - **I will announce when to enter the first bid**
- Sensitivity of Industry Demand to price: Low
- Firm Demand Curve: Relatively Inelastic
- Industry Demand: Stable (neither increasing nor decreasing)

Salt Simulation

ROUND 2

- Sensitivity of Industry Demand to price: Low
- Firm Demand Curve: Relatively Inelastic
- Industry Demand: Stable

When is the last round? Uncertain!

Salt Simulation

1 Representative for Each Team:

Come down to get your Market Assignment

Salt Simulation

- At the game click on: Play as part of a CLASS
http://forio.com/simulation/mit-sloan-salt/index.htm
  - **Choose screen ID [For example: Team A]**
  - **Enter Class Code: 15011_2015_Round_2**
  - **If you see "start game", click it**
  - **Explore the simulator**
  - **I will announce when to enter the first bid**
- Sensitivity of Industry Demand to price: Low
- Firm Demand Curve: Relatively Inelastic
- Industry Demand: Stable


CAUTION
LOW SALT
AREA

Salt Simulation

ROUND 3

- **Sensitivity of Industry Demand to price: Low**
- **Firm Demand Curve: Relatively Elastic**
- **Industry Demand: Declining**

Salt Simulation

ROUND 3

- **LOGOUT**
- **Choose screen ID [For example: Team A]**
- **Enter Class Code: 15011_2015_Round_3**

- Sensitivity of Industry Demand to price: Low
- Firm Demand Curve: Relatively Elastic (changed!)
- Industry Demand: Declining (changed!)

Salt Simulation

ROUND 4 (If Time)

- Sensitivity of Industry Demand to price High (changed!)
- Firm Demand Curve: Relatively Elastic
- Industry Demand: Declining

Salt Simulation

ROUND 4

- **LOGOUT**
- **Choose screen ID [For example: Team A]**
- **Enter Class Code: 15011_2015_Round_4**

Sensitivity of Industry Demand to price: High

Firm Demand Curve: Relatively Elastic

Industry Demand: Declining

Take-Aways

Reputation games IN GENERAL are difficult

- Especially in volatile environments

Outcomes tend to be positively correlated

- Building trust can be costly
- Goal is not to beat opponent

Duopoly Analysis: See next time