LECTURE 9
MONOPOLY
February 18, 2020

I. OVERVIEW OF MARKET FAILURES
   A. What are market failures and why do they matter?
   B. Definition and source of monopoly

II. THE KEY FEATURE OF A MONOPOLIST: DECLINING MARGINAL REVENUE
   A. Review of firm demand curve and marginal revenue under perfect competition
   B. Demand curve facing a monopolist
   C. Marginal revenue for a monopolist
      1. Graphical derivation
      2. Derivation using calculus

III. SHORT-RUN PROFIT MAXIMIZATION FOR A MONOPOLIST
   A. MR = MC
   B. Implications

IV. WELFARE ANALYSIS OF MONOPOLY
   A. Allocative inefficiency
   B. Distributional effects

V. LONG-RUN PROFIT MAXIMIZATION FOR A MONOPOLIST
   A. Positive, negative, or zero economic profits
   B. The possibility of persistent positive profits and long-run inefficiency
   C. Example: An increase in demand

VI. GOVERNMENT RESPONSES TO MONOPOLY
LECTURE 9
Monopoly

February 18, 2020
Announcements

• Midterm 1 Logistics:
  • Tuesday, February 25, 2:10–3:30
Announcements

• **Room Assignments:**
  - Sections moving to 105 Stanley:
    - 101 and 103 (Todd Messer)
    - 109 and 110 (Pedro Pires)
    - 115 and 116 (Priscila de Oliveira)
  
  - Everyone else should come to the usual room (155 Dwinelle).
  
  - Students with DSP accommodations should hear from Todd Messer about arrangements.
Announcements (continued)

• **Midterm 1 Format:**
  - Sample midterm.
  - Short-answer questions; problems; multiple choice.
  - You do not need a bluebook.

• **Midterm 1 Coverage:**
  - Everything up through lecture on Thursday, February 20 (Externalities).
  - Lecture, section, textbook, and additional readings.
Announcements (continued)

• Hints for Studying:
  • Start now!
  • Review lecture notes and slides; study problem set suggested answers.
  • Pose yourself problems.
  • Do the sample midterm by yourself.
Announcements (continued)

- **Places to Get Help:**
  - Professor and GSI office hours.
  - Review session: Friday, February 21, 6-8 p.m. in 155 Dwinelle.
I. INTRODUCTION TO MARKET FAILURES
Overview

• So far we have been talking about well-functioning markets (lots of competition, no external effects).
  • In this case, the market outcome maximizes the total surplus.

• Now we are going to think about market failures (when markets don’t function well).
  • Will show that market outcomes in these cases do not maximize the total surplus.
  • Government intervention can make things better (reduce the deadweight loss).
Monopoly

- There is only one supplier of a good.
Barriers to Entry

• A barrier to entry is any force that prevents firms from entering a market.

• Main types of barriers to entry:
  • Patents and other legal protections.
  • High fixed costs.
  • Anti-competitive practices.
II. Key Feature of a Monopolist: Declining Marginal Revenue
Perfect Competition

Profit maximization: $P = \text{mr} = \text{mc}$
Marginal Revenue

- The additional revenue associated with producing and selling one more unit.
- The change in total revenue when one more unit is produced and sold.
Marginal revenue from $q_1$ to $q_1+1$: $(a+b) - (a) = b = P_1$.
Marginal revenue is the same at every quantity (and equal to $P_1$).

Marginal Revenue for a Competitive Firm

![Graph showing marginal revenue for a competitive firm](image)
The demand curve facing a monopolist ($\delta$) is the same as the market demand curve ($D$), and so is downward sloping (like a usual market demand curve).
Marginal Revenue (MR) for a Monopolist

Marginal revenue from 0 to 1: a.

= P₁.
Marginal revenue from $Q_2$ to $Q_2+1$: $(c+d) - (c+b)$

$= d - b < P_3$. 
Marginal revenue from $Q_4$ to $Q_4+1$: $(f+g) - (f+e) = g - e << P_5$. 

Marginal Revenue for a Monopolist
The Marginal Revenue Curve of a Monopolist
Relationship between Total Revenue and Marginal Revenue for a Monopolist

- Suppose the demand curve is:
  \[ P = \alpha - \beta Q \]

- Then total revenue as a function of Q is:
  \[
  TR = P \cdot Q \\
  = (\alpha - \beta Q) \cdot Q \\
  = \alpha Q - \beta Q^2
  \]

- Thus, marginal revenue is:
  \[
  MR = \frac{dTR}{dQ} \\
  = \alpha - 2\beta Q
  \]
Relationship between Total Revenue and Marginal Revenue for an Individual Competitive Firm

- Suppose the demand curve is:
  \[ P = \alpha \]

- Then total revenue as a function of \( q \) is:
  \[ TR = P \ q \]
  \[ = \alpha q \]

- Thus, marginal revenue is:
  \[ MR = \frac{dTR}{dq} \]
  \[ = \alpha \]
III. SHORT-RUN PROFIT MAXIMIZATION FOR A MONOPOLIST
Profit Maximization for a Monopolist

Profit Maximization: \( MR = MC \)

\( P \)

\( Q \)

\( P_1 \)

\( Q_1 \)

MR

MC

D

Profit Maximization: \( MR = MC \)
Implications of Monopoly

• A monopolist is doesn’t take the price as given.
  • However, the monopolist is constrained by the demand curve.

• A monopolist doesn’t have a supply curve.
  • For a given demand curve, there is just one quantity the monopolist is willing to supply.

• A monopolist doesn’t produce where MC = P.
  • As a result, a monopolist doesn’t produce where MC = MB.
IV. Welfare Analysis of Monopoly
Allocative Efficiency

• The sum of producer and consumer surplus (the total surplus) is as large as possible.

• The competitive market outcome is allocatively efficient.
Comparison with Perfect Competition

$Q_1$ is the monopoly outcome; $Q_c$ is what would occur under perfect competition.
Welfare Comparison with Perfect Competition

<table>
<thead>
<tr>
<th></th>
<th>Competition ($Q_c$)</th>
<th>Monopoly ($Q_1$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Surplus</td>
<td>$a+b+c+d+e$</td>
<td>$a+b$</td>
</tr>
<tr>
<td>Producer Surplus</td>
<td>$f+g+h$</td>
<td>$c+d+f+g$</td>
</tr>
<tr>
<td>Total Surplus</td>
<td>$a+b+c+d+e+f+g+h$</td>
<td>$a+b+c+d+f+g+h$</td>
</tr>
<tr>
<td>Deadweight Loss</td>
<td>$e+h$</td>
<td></td>
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</tbody>
</table>
Area c+d is consumer surplus under perfect competition, but producer surplus under monopoly.
V. **LONG-RUN PROFIT MAXIMIZATION FOR A MONOPOLIST**
Positive Economic Profits

The diagram illustrates a market with a demand curve (D), a marginal revenue (MR) curve, and marginal cost (MC) curve. The price (P) and quantity (Q) are determined at the intersection of the demand and marginal revenue curves, resulting in a profit level represented by the shaded area above the average total cost (ATC) curve at Q1 and P1.
Zero Economic Profits

\[ \text{ATC}_1, P_1 \]

\[ Q_1 \]
How Does a Monopolist Respond to Profits?

• If it is making negative profits, the monopolist will want to leave the industry.

• If it is making zero profits, it will be covering all of its opportunity costs.

• A monopolist can make positive economic profits in the long run.
Increasing Prevalence of Food Allergies

Figure 4. Average number of hospital discharges per year among children under age 18 years with any diagnosis related to food allergy: United States, 1998–2006

<table>
<thead>
<tr>
<th>Years</th>
<th>Average number of discharges per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998–2000</td>
<td>2,615</td>
</tr>
<tr>
<td>2001–2003</td>
<td>4,135</td>
</tr>
<tr>
<td>2004–2006</td>
<td>19,537</td>
</tr>
</tbody>
</table>

¹Statistically significant trend.
SOURCE: CDC/NCHS, National Health Interview Survey.
Increasing Prevalence of Food Allergies

Claim Lines with Diagnoses of Anaphylactic Food Reactions, 2007-2016
Example: Increase in Demand
VI. GOVERNMENT RESPONSES TO MONOPOLY
Policies to Deal with Monopoly

- Antitrust laws – laws designed to promote competition and prevent monopolization.
- Regulation.
- Limits on patents and other legal protections.
- Moral suasion.