Outline

1. First-mover advantage
   - A More General Insight
   - Deterrence of Entry
   - Accommodation of Entry

2. Empirical evidence: Pharmaceutical firms’ behavior at patent expiration

3. Some other incumbent advantage stories
First-mover advantage

- It is often argued that early entrants to a market have an advantage over later entrants.
- Here we consider scenario where incumbent may enjoy advantage

  - Stackelberg model: sequential Cournot model
  - More general taxonomy of incumbent/entrant models
  - Predatory pricing; raising rivals’ costs
A Simple Model

- Heinrich von Stackelberg (1934).

- Two firms. Firm 1 (the incumbent) chooses a level of capital $K_1$, which is then fixed. Firm 2 (the potential entrant) observes $K_1$ and then chooses its level of capacity $K_2$, which is also fixed.

- The profits of firm $i$ are:

$$\Pi^i(K_1, K_2) = K_i(1 - K_1 - K_2)$$

- Recall these are the reduced-form profit functions that come from short-run price competition with given capacities.

- Key assumptions here are that
  1. $\Pi^j_i < 0$ (each firm dislikes capital accumulation by the other firm) and
  2. $\Pi^i_{ij} < 0$ (capital levels are strategic substitutes)
Solve for the SPNE of this game by backward induction.

Entrant’s Reaction Function

\[ K_2 = R_2(K_1) = \frac{1 - K_1}{2} \]

Incumbent anticipates and maximizes:

\[ \Pi^1(K_1) = K_1 \left( 1 - K_1 - \frac{1 - K_1}{2} \right) \]

The (unique) SPNE is \((K_1 = \frac{1}{2}, R_2(K_1) = \frac{1 - K_1}{2})\)

Results in outcomes

\[ K_1 = \frac{1}{2}, K_2 = \frac{1}{4}, \Pi^1 = \frac{1}{8}, \Pi^2 = \frac{1}{16} \]
Accommodation of Entry

- Despite identical profit functions, firm 1 (the incumbent) obtains a higher profit by limiting the size of firm 2’s entry.

- **First Mover Advantage** (in this game).
  - Compare (Figure here) with Cournot: $K_1 = K_2 = \frac{1}{3}$, $\Pi^1 = \Pi^2 = \frac{1}{9}$.

- Intuition is the same for more general profit functions:
  
  1. By raising $K_1$, firm 1 reduces the marginal profit from investing for firm 2 (as long as $\Pi^2_{21} < 0$)
  2. Thus firm 2 invest less, which benefits its rival (as long as $\Pi^1_2 < 0$)

- Irreversibility is crucial (F1 is not on its reaction curve ex post)
Entry Deterrence

- In the previous model firm 1 can not deter entry: small scale entry is always profitable. But this small scale entry becomes unprofitable under increasing returns to scale.

- Introduce fixed (non-sunk) cost of entry $f < \frac{1}{16}$ for firm 2.

- If $K_1 = \frac{1}{2}$ as before, firm 2 makes a profit. But $f1$ can choose capital $K_1^b$ so that
  
  $$\max_{K_2}[K_2(1 - K_2 - K_1^b) - f] = 0$$

- For $f$ close to $\frac{1}{16}$, $F1$ can increase its profits by deterring entry. For $f$ "small", prefers to accommodate entry as before. For $f > \frac{1}{16}$ $F1$ can block entry simply by choosing its monopoly capacity level.
Quantities and Capacities

- Stackelberg wrote his two-stage game in terms of quantities.

- Difficulties:
  1. What does quantity competition mean?
  2. Why does one of the firms enjoy a first mover advantage?
  3. Why does quantity have a commitment value?

- Spence and Dixit made the Stackelberg story consistent by basically interpreting quantities as capacities. With this:
  1. Profit functions are reduced-form profit functions from the capacity constrained price competition game.
  2. 1st mover advantage may come from one firm acquiring the technology earlier.
  3. Capacities have a commitment value (if they are sunk).
First Mover Advantage

- First mover does not have the advantage in all games
- As a simple example, consider Bertrand competition
- Real-world examples: Microsoft Windows, iPod, iPhone, iPad.
A More General Insight: Strategic Value of Commitment

- Physical capital may facilitate the erection of barriers to entry. Other kinds of capital may have the same effect if they have commitment value (if they are irreversible, at least in the short run).

- Example: clientele.
  - Reduces demand for potential entrant
  - More so the more imperfect the consumers’ information and the more important the costs of switching suppliers

- Stackelberg model’s main point is that commitments matter because of their influence on the rival’s actions.
  - In the capacity-accumulation game, the incumbent overinvests to force the entrant to restrict his own capacity. But this is a much more general insight.
A General Taxonomy of Entry Models

Consider the following two-firm, two-period model. In period 1, firm 1 (the incumbent) chooses an “investment” (broad interpretation) $K_1$. Firm 2 observes $K_1$ and decides whether to enter.

1. If 2 does not enter, incumbent enjoys a monopoly position in the second period: $\Pi^m_1(K_1, x^m_1(K_1))$.

2. If 2 enters, the firms make simultaneous second-period choices $x_1$ and $x_2$, determined by a (assumed unique and stable) Nash equilibrium: $x^*_1(K_1)$ and $x^*_2(K_1)$. Profits are then

$$\Pi_1(K_1, x^*_1(K_1), x^*_2(K_1)) \text{ and } \Pi_2(K_1, x^*_1(K_1), x^*_2(K_1))$$

(by convention, firm 2’s entry cost is part of $\Pi^2$).
Entry is **deterred** if \( K_1 \) is chosen so that

\[
\Pi^2(K_1, x_1^*(K_1), x_2^*(K_1)) \leq 0
\]

Entry is **accommodated** if

\[
\Pi^2(K_1, x_1^*(K_1), x_2^*(K_1)) > 0
\]
Deterrence of Entry

To deter entry, incumbent chooses $K_1$ such that

$$\Pi^2(K_1, x_1^*(K_1), x_2^*(K_1)) = 0$$

How would firm 1 best achieve this? Take the total derivative of $\Pi^2$ with respect to $K_1$. By the envelope theorem we can ignore the effect of $K_1$ on $\Pi^2$ through firm 2’s second period choice. Two terms remain:

$$\frac{d\Pi^2}{dK_1} = \frac{\partial \Pi^2}{\partial K_1} + \frac{\partial \Pi^2}{\partial x_1} \frac{dx_1^*}{dK_1}$$

- **Direct effect** on firm 2’s profit $\partial \Pi^2 / \partial K_1$. (often $\partial \Pi^2 / \partial K_1 = 0$, negative in the clientele example).

- **Strategic effect**: $K_1$ changes firm 1’s ex post behavior (by $dx_1^*/dK_1$) thus affecting firm 2’s profit (in proportion $\partial \Pi^2 / \partial x_1$).
To keep with Tirole’s terminology, we will say that investment $K_1$ makes firm 1 **tough** if $dΠ^2/dK_1 < 0$ and **soft** if $dΠ^2/dK_1 > 0$.

To deter entry firm 1 wants to invest (choose $K_1$) to make $Π^2$ low. If investment makes her tough (soft), firm 1 should **overinvest** (respectively, **underinvest**)

(over or under invest relative to the solution of the game when $K_1$ is not observable by firm 2 prior to its decision)
Example: Modified version of Spence-Dixit model.

- Firm 1 chooses an investment $K_1$, which determines firm 1’s second period marginal cost, $c_1(K_1)$, $c'_1 < 0$. In the second period, firms 1 and 2 compete in quantities: $x_1 = q_1$ and $x_2 = q_2$ (we ignore 2’s choice of investment).

- In the second period firm 1 maximizes

$$q_1(P(q_1 + q_2^*) - c_1)$$

- A higher $K_1$ shifts firm 1’s reaction curve to the right. Assuming that quantities are strategic substitutes, when firm 1’s cost decreases the firm has an incentive to produce more, which lowers the marginal value of output for firm 2. The new equilibrium involves a higher output for firm 1 and a lower output for firm 2.

- Main point here: investment makes firm 1 tough. Hence overinvestment is appropriate to deter firm 2’s entry.
Example: Development of a pre-entry clientele.

- Expenditures that make switching costly to at least some of its customers (e.g., frequent flyer discounts).
- The direct effect of $K_1$ is to reduce firm 2's potential market ($\partial \Pi_2 / \partial K_1 < 0$).
- Strategic effect has the opposite impact on firm 2's profit if firm 1 is not able to price discriminate between its customers.
  - Would like to charge high price to captive customers and low price to the non-captive segment of the market.
  - In the absence of price discrimination, however, an intermediate price is quoted, which increases with the size of the captive clientele.

A large clientele reduces how aggressive firm 1 is in price competition.

Entry deterrence might require underinvestment.
Accommodation of Entry

- Suppose now that firm 1 finds deterring entry too costly.

- Behavior in the entry-deterrence case was dictated by firm 2’s profit.

- When entry is not deterred, but only accommodated, behavior is again determined by firm 1’s profit. The incentive to invest is given by the total derivative of $\Pi_1(K_1, x_1^*(K_1), x_2^*(K_1))$ with respect to $K_1$.

- From the envelope theorem, the effect on $\Pi_1$ of the change in firm 1’s second period action is of second order. Thus, our basic equation in the entry-accommodation case is

$$\frac{d\Pi_1}{dK_1} = \frac{\partial \Pi_1}{\partial K_1} + \frac{\partial \Pi_1}{\partial x_2} \frac{dx_2^*}{dK_1}$$
Accommodation of Entry

Again, we can decompose this derivative into two effects.

\[
\frac{d \Pi^1}{dK_1} = \frac{\partial \Pi^1}{\partial K_1} + \frac{\partial \Pi^1}{\partial x_2} dx_2^* \frac{dK_1}{dK_1}
\]

1. The direct or cost-minimizing effect is \( \frac{\partial \Pi^1}{\partial K_1} \).

2. Strategic effect results from the influence of the investment on firm 2’s second period action.
Accommodation of Entry

1 Assume that $\partial \Pi^i / \partial x_j$ have the same sign for all $i$.
   - If the second period competition is in quantities $\partial \Pi^i / \partial x_j < 0$
   - If the second period competition is in prices $\partial \Pi^i / \partial x_j > 0$

2 Note that

$$\frac{dx_2^*}{dK_1} = \left( \frac{dx_2^*}{dx_1^*} \right) \left( \frac{dx_1^*}{dK_1} \right) = R'_2(x_1^*) \left( \frac{dx_1^*}{dK_1} \right)$$
With [1] and [2] we obtain

$$\text{sign} \left( \frac{\partial \Pi^1}{\partial x_2} \frac{dx_2^*}{dK_1} \right) = \text{sign} \left( \frac{\partial \Pi^2}{\partial x_1} \frac{dx_1^*}{dK_1} \right) \times \text{sign} \left( R_2' \right)$$

Thus the sign of the strategic effect and therefore the under or overinvestment prescription is contingent on

- The sign of the strategic effect in the entry-deterrence game, and
- The slope of firm 2's reaction curve:
  - $R_2' > 0$: “strategic complements” (eg. Bertrand price competition)
  - $R_2' < 0$: “strategic substitutes” (eg. Cournot quantity competition)
Accommodation of Entry: a taxonomy

- We thus have four cases, depending on whether investment makes firm 1 tough or soft and on whether second-period actions are strategic substitutes or complements (whether reaction curves are downward or upward sloping).

1. [Tough + strategic substitutes]: investment triggers a softer action by firm 2. Overinvest for both deterrence and accommodation. (Spence-Dixit model with quantity competition.) “Top Dog”

2. [Soft + Strategic Complements]: investment induces a softer action by firm 2. Underinvest to deter entry (“Lean and Hungry Look”) but overinvest to accommodate entry (“Fat Cat”). Clientele model, with post-entry price competition.

3. [Tough + Strategic Complements]: investment by firm 1 induces softer action by firm 2. Overinvest to deter entry (“Top Dog”) but underinvest to accommodate entry (“Puppy Dog”). Spence-Dixit game with post-entry price competition.

4. [Soft + Strategic Substitutes]: investment by firm 1 induces a more aggressive response by firm 2. Underinvest for both deterring and accommodating entry. (“Lean and Hungry Look”) Advertising with spillovers, with post-entry quantity competition.
Capacity investment game: A Remark

- In the modified Spence-Dixit game with quantity competition, note that firm 1’s strategy is the same whether it wants to deter or accommodate entry, because being tough both hurts and softens firm 2 in the quantity game.

- However, in the price game, firm 1’s strategy is very different depending on whether it wants to deter or accommodate entry, because being tough both hurts and make more aggressive firm 2 in the price game.
Example: Advertising with spillovers

- Incumbent’s strategic variable is advertising $A$, which shifts up demand curves for both itself and for entrant (if it enters)
- Second stage game: pricing game (strategic complements)
- For entry deterrence: larger $A$ makes firm 1 soft, so *underinvest*
- For entry accommodation: larger $A$ makes firm 2 less aggressive (set higher price) in post-entry pricing game, so *overinvest*.
- What if Cournot competition in second period?
- What if $A$ only generates benefits for incumbent’s product (enhances product differentiation)?
To look for evidence of strategic entry deterrence, need market in which *entry opportunities are observed*. Difficult.

Unique case: patent expiration in pharmaceuticals.

Look at behavior of branded producers around patent expiry.

Focus on three variables:

1. Detailing advertising
2. Journal advertising
3. Proliferation of presentational forms

Focus on how these variables change as a function of *market size*. Absent strategic entry deterrence motives, these variables should be monotonic in market size.

Paper by G. Ellison and S. Ellison
### Strategic vs. unstrategic choices

**Strategic Entry Deterrence Model**

<table>
<thead>
<tr>
<th>t = 1</th>
<th>t = 1½</th>
<th>t = 2</th>
<th>t = 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incumbent chooses A at cost $c(A)$</td>
<td>Potential entrant learns $E$.</td>
<td>Potential entrant chooses whether to enter at cost $E$.</td>
<td>Monopolist chooses $x_1$ or duopolists choose $x_1, x_2$. Profits: $\pi_i(x_1, x_2, A)$</td>
</tr>
<tr>
<td>Potential entrant observes $A$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Investment With No Entry Deterrence Motive**

<table>
<thead>
<tr>
<th>t = 1</th>
<th>t = 2</th>
<th>t = 2½</th>
<th>t = 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incumbent chooses A at cost $c(A)$</td>
<td>Potential entrant learns $E$.</td>
<td>Potential entrant observes $A$.</td>
<td>Monopolist chooses $x_1$ or duopolists choose $x_1, x_2$. Profits: $\pi_i(x_1, x_2, A)$</td>
</tr>
<tr>
<td>Potential entrant chooses whether to enter at cost $E$.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: The model
Example: advertising with spillovers

Figure 2: Equilibrium advertising levels in the model of advertising with spillovers. The figure graphs the equilibrium advertising intensity in the model of section 2.3 where advertising raises consumers' valuations both for the branded drug and for a generic substitute. The distribution of entry costs is assumed to be lognormal with mean 0.0025 and standard deviation 0.0015. The dotted line is the equilibrium advertising level when advertising is not observed until after firm 2's entry decision is made (and hence there is no entry deterrence motive.) The solid line is the equilibrium advertising level when advertising is observed in advance of the potential entry.
Empirical evidence: Pharmaceutical firms' behavior at patent expiration

Data: summary statistics

Table 2: Variable names

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Variable Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry3Yr</td>
<td>1 if entry within 3 years of patent expiration</td>
</tr>
<tr>
<td>Yr</td>
<td>Predicted entry probability</td>
</tr>
<tr>
<td>Chronic</td>
<td>0 if for acute illness; 1 if for chronic illness</td>
</tr>
<tr>
<td>HospFrac</td>
<td>Hospital fraction of revenue (for year prior to patent expiration)</td>
</tr>
<tr>
<td>Revenue3</td>
<td>Average annual revenue for 3 years prior to patent expiration (000's constant dollars)</td>
</tr>
<tr>
<td>TherSubs</td>
<td>Number of other drugs in the therapeutic class</td>
</tr>
<tr>
<td>Detail3</td>
<td>Monthly detailing advertising (000's of minutes)</td>
</tr>
<tr>
<td>Journal3</td>
<td>Monthly journal advertising expenditures (000's of constant dollars)</td>
</tr>
<tr>
<td>PresHerf3</td>
<td>HospFrac-weighted average of drugstore and hospital presentation Herfindahls</td>
</tr>
<tr>
<td>PresHerf</td>
<td>Average of PresHerf in the 3 years before patent expiration</td>
</tr>
<tr>
<td>HospPrice</td>
<td>Hospital price (in constant dollars)</td>
</tr>
<tr>
<td>DrugstorePrice</td>
<td>Drugstore price (in constant dollars)</td>
</tr>
<tr>
<td>Specialist</td>
<td>Index for how often drugs in therapeutic class are prescribed by specialist</td>
</tr>
<tr>
<td>Psych</td>
<td>1 if drug is psychoactive</td>
</tr>
<tr>
<td>Topical</td>
<td>1 if drug is applied topically</td>
</tr>
</tbody>
</table>

The table describes the variables used in the analysis.

Table 3: Summary statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Observations</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<tr>
<td>Entry3Yr</td>
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<td>0.59</td>
<td>0.50</td>
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<tr>
<td>Revenue3</td>
<td>63</td>
<td>39,355</td>
<td>55,754</td>
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<tr>
<td>log(Revenue3)</td>
<td>63</td>
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<td>2.00</td>
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<td>HospFrac</td>
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<td>0.30</td>
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<tr>
<td>Chronic</td>
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<td>0.42</td>
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<tr>
<td>TherSubs</td>
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<td>8.48</td>
<td>6.04</td>
</tr>
<tr>
<td>Detail3/Revenue3</td>
<td>69</td>
<td>0.005</td>
<td>0.008</td>
</tr>
<tr>
<td>Journal3/Revenue3</td>
<td>70</td>
<td>0.014</td>
<td>0.022</td>
</tr>
<tr>
<td>PresHerf3</td>
<td>70</td>
<td>0.54</td>
<td>0.29</td>
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<tr>
<td>DPrice_t/DPrice_{t-1}</td>
<td>245</td>
<td>1.019</td>
<td>0.067</td>
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<tr>
<td>HPrice_t/HPrice_{t-1}</td>
<td>233</td>
<td>1.010</td>
<td>0.129</td>
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</table>

The table presents summary statistics for some of the variables used in our analysis.
Table 6: Incumbent behavior versus market size: linear regressions

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Detail</th>
<th>Revenue</th>
<th>PresHerf</th>
<th>log(R)</th>
<th>log(R)^2</th>
<th>Specialist</th>
<th>Psych</th>
<th>Topical</th>
<th>Constant</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
<td>0.003</td>
<td>-0.069</td>
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<td></td>
<td></td>
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<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.016)</td>
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</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>-0.0001</td>
<td>0.0000</td>
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</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>(0.0002)</td>
<td>(0.0005)</td>
<td>(0.005)</td>
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</tr>
<tr>
<td>Number of Obs.</td>
<td>69</td>
<td>70</td>
<td>70</td>
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<td></td>
</tr>
<tr>
<td>R^2</td>
<td>0.04</td>
<td>0.06</td>
<td>0.52</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

The table reports coefficient estimates from linear regressions of three types of investment, two advertising-to-sales ratios and the Herfindahl index of presentations, on the average revenue in the three years prior to patent expiration, the square of this variable minus its mean, and appropriate controls. The unit of observation is branded drugs which lost patent protection between 1986 and 1992.

Table 7: Incumbent behavior versus market size: quintile means and monotonicity tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Monotonicity test p-value</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>H-H Test</td>
</tr>
<tr>
<td>Detail/Revenue</td>
<td>0.0051</td>
<td>0.0012</td>
<td>0.0055</td>
<td>0.0084</td>
<td>0.0041</td>
<td>0.274</td>
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<tr>
<td>Journal/Revenue</td>
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<td>0.005</td>
<td>0.011</td>
<td>0.024</td>
<td>0.018</td>
<td>0.053</td>
</tr>
<tr>
<td>PresHerf</td>
<td>0.78</td>
<td>0.64</td>
<td>0.49</td>
<td>0.44</td>
<td>0.35</td>
<td>0.336</td>
</tr>
</tbody>
</table>

The table reports the means of three types of investment, two advertising measures and the Herfindahl index of presentations, by revenue quintiles. Drugs are classified into quintiles based on the mean of their revenue for the three years prior to patent expiration. The EE and HH test columns report the p-values for two tests of non-monotonicity (Ellison and Ellison 2000, Hall and Heckman 2000).
### Results: monotonicity test 2

Table 8: Changes in incumbent behavior as expiration approaches: quintile means and monotonicity tests

<table>
<thead>
<tr>
<th></th>
<th>Fraction increasing by quintile</th>
<th>Monotonicity test p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q 1</td>
<td>Q 2</td>
</tr>
<tr>
<td><strong>Detail3</strong></td>
<td>0.75</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>(4)</td>
<td>(9)</td>
</tr>
<tr>
<td><strong>Journal3</strong></td>
<td>0.50</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>(7)</td>
</tr>
<tr>
<td><strong>PresHerf</strong></td>
<td>0.33</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>(6)</td>
<td>(12)</td>
</tr>
<tr>
<td><strong>DPrice</strong></td>
<td>0.70</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>(10)</td>
<td>(12)</td>
</tr>
<tr>
<td><strong>HPrice</strong></td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>(8)</td>
<td>(12)</td>
</tr>
</tbody>
</table>

This table reports the fraction of drugs in each revenue quintile for which the investment variable was higher in the year immediately prior to patent expiration than it was on average in the previous two years. The number of observations in each cell is in parentheses below the quintile means.
Other stories

Other examples of behavior that incumbent engages in to maintain advantage:

1. Predatory pricing: lowering price to drive rivals out of market
2. Raising rivals’ costs. Closely related to “poison pills” in takeover battles.
Some other incumbent advantage stories

Predatory pricing 1

- Incumbent prices below competitor’s cost, and drives it out of business.
- Single-period case (game tree): identical to “traditional” limit pricing model, except that entrant is already in the market.
  1. Formally: incumbent threatens to produce to keep market price at (say) $P^*$, below rival’s AC.
  2. If entrant believes this, it is price taker and produces on its MC curve, at $q(e)$. Incumbent must produce $q(i)$ to depress price to $P^*$.
  3. Graph, assuming identical firms. Incumbent suffers larger losses than rival!
- With identical firms, predation is not likely to be credible threat
Some other incumbent advantage stories

Illustration: Predatory Pricing

(Carlton/Perloff)
Predatory pricing 2

Some ways incumbent can have advantage which makes predation threat credible:

- **Size differences**: Larger incumbent firm has access to funds which small rival doesn’t. Can make predation a preferred strategy in the long-term.

- **Imperfect information**: uncertainty about incumbent’s costs. Graph. If incumbent’s costs are $AC(3)$, then even at quantity $q(i)$ it is making positive profit. But if incumbent really has lower cost, entrant shouldn’t be in the market to begin with!
Raising rivals’ costs 1

Incumbent may deter entry (or drive rivals out) by activities which raise its rivals’ costs of production.

Incumbent advantage already assumed: difficult to disentangle

- competitive business practices of dominant firm
- malignant behavior towards rivals

Example: Microsoft forces PC manufacturers who pre-install Windows OS to bundle it with Internet Explorer.

- Raises its rival’s (Netscape) selling costs
- But is this competitive business practice, or malignant behavior?
Raising rivals’ costs 2

General schematic diagram.

In general, for a RRC strategy to be credible, you need $\pi^m - C > \pi^d$. 
Raising rivals’ costs 3

- Government regulation: quotas verses tariffs. Industry may prefer quotas because limited number of import licenses locks potential rivals out of market.
- “Sleeping patents”: incumbent has more incentive to invent and patent (but never produce) potential substitutes to its product. Preemptive-innovation. Is buying out small firms a related phenomenon?
- Raise consumer switching costs: frequent flyer miles, preferred customer cards, etc. Rivals must price lower to overcome consumers’ brand loyalty.