Dynamic Vertical Foreclosure

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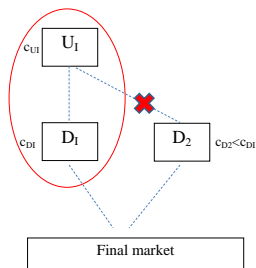
WORK IN PROGRESS

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Vertical Foreclosure

A vertically integrated firm, that dominates one market, acts in such a way to exclude (or marginalize) rivals in vertically related markets.

DIFFERENT PRACTICES: refusal to supply, interconnection/quality degradation, delays in input provision, margin squeeze.

A Debated Issue
The Chicago School Critique

- A vertically integrated firm, that controls an essential input, has the **ABILITY** to exclude downstream rivals, but rarely the **INCENTIVE** to do so, in particular if the downstream rival is more efficient that the own affiliate.

- The control of the bottleneck input enables the upstream monopolist to earn larger profits by trading with the more efficient downstream rival and **EXTRACTING (A LARGE PART OF) ITS RENTS**, rather then excluding it.

Existing Theories of Vertical Foreclosure
Imperfect Rents Extraction

- Existing theories identify the circumstances under which upstream monopolist is able to extract **LITTLE** rents from the more efficient downstream rival.
- For this reason more profitable not to trade with it and to monopolize the final market through the less efficient affiliate.
  - ► Regulation (Jullien, Rey and Saavendra, 2014; Fumagalli, Motta and Calcagno, CUP).
  - ► Opportunistic behavior (Hart and Tirole, 1990; Rey and Tirole, 2007; Reisinger and Tarantino, 2015).
  - ► Uncertainty and risk aversion (Hansen and Motta, 2013).
  - ► Competition in the provision of the input - Raising rivals' cost (Ordover et al. 1990; Allain, Chambolle and Rey, 2016).
- All these theories have a **STATIC** perspective.

THIS PAPER: Incentive to engage in vertical foreclosure does not stem from imperfect rent extraction. Rather, it has a **DYNAMIC** component.

Related Cases

- Telefonica (EC, 2007) – Genzyme (OFT, 2003)
- Allegation: margin squeeze to exclude downstream rivals
- Proposed theories of harm based on the idea that exclusion in the downstream market makes **FUTURE ENTRY/EXPANSION IN THE UPSTREAM MARKET MORE DIFFICULT**.

Literature on exclusion based on scale economies

- There exist situations in which the incumbent, **BY DEPRIVING THE RIVAL OF CRUCIAL SALES/PROFITS/BUYERS, IMPAIRS THE RIVAL'S ABILITY TO COMPETE** in other markets/periods or for other buyers.
    - Scale economies (supply and demand side), learning effects, financial market imperfections...
- The incumbent can exploit this mechanism through many different practices:
    - Exclusive dealing: Rasmusen et al. (1991), Bernheim and Whinston (1998), Segal and Whinston (2000).
    - Tying: Carlton and Waldman (2003).
    - Predatory pricing: Bolton and Scharfstein (1990), Cabral and Riordan (1994, 1997), Fumagalli and Motta (2013).
    - Selective price cuts and rebates: Innes and Sexton (1993), Karlinger and Motta (2012).
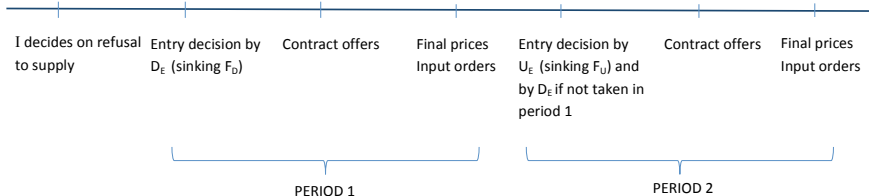
THIS PAPER: focus on refusal to supply/margin squeeze.

An example with supply side scale economies

- Vertically integrated incumbent $U_I - D_I$.
- Downstream entrant D_E and upstream entrant U_E.
- The entrants are **NOT VERTICALLY INTEGRATED**.
- Final demand: $Q = 1 - p$
- One-to-one relationship between input and final product
- The entrants are more efficient than the incumbent's affiliates: $c_{U_E} = 0 = c_{D_E}$, $c_{U_I} = c_{D_I} = c$ with $c \in \left(\underline{c}, \frac{1}{4}\right) \Rightarrow$ upstream entry increases total industry profits.
- The entrants have to pay a sunk entry cost:

$$F_U < c(1 - 2c) \tag{A1}$$

$$c(1 - 2c) - \frac{(1-c)^2}{8} < F_D < c(1 - 2c) + \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8} \tag{A2}$$

The Time-line

| I decides on refusal to supply | Entry decision by D_E (sinking F_D) | Contract offers | Final prices Input orders | Entry decision by U_E (sinking F_U) and by D_E if not taken in period 1 | Contract offers | Final prices Input orders |

PERIOD 1   PERIOD 2

- The incumbent can credibly **COMMIT NOT TO DEAL** with the independent firm, at least for one period.
- Contract offers: with probability $1/2$ take-it-or-leave-it offers upstream.
  (It is key to exclude only that all the bargaining power is upstream.)
- Imperfect rents extraction not a rationale for vertical foreclosure: the incumbent can credibly **COMMIT NOT TO OPERATE THE DOWNSTREAM AFFILIATE**.

No Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active		
Not Active		$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

No Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active		$\Pi_{D_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$ $\Pi_{U_E} = 0$
Not Active		$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

- When the independent firm in the upstream market is not active, with probability 1/2 firm D_E extracts the increase in monopoly profit due to its more efficient technology.

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No Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active		$\Pi_{D_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$ $\Pi_{U_E} = 0$
Not Active	$\Pi_{D_E} = 0$ $\Pi_{U_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$	$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

- Similarly, when the independent firm in the downstream market is not active, with probability 1/2 firm U_E extracts the increase in monopoly profit due to its more efficient technology.

No Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	**Active**	**Not Active**
Active	$\Pi_{D_E} = c(1-2c)$ $\Pi_{U_E} = c(1-2c)$	$\Pi_{D_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$ $\Pi_{U_E} = 0$
Not Active	$\Pi_{D_E} = 0$ $\Pi_{U_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$	$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

- When the independent firms are both active, they share evenly the duopoly profits produced in the final market.

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No Refusal to Supply
2nd period payoffs depending on the configuration of active firms

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- When the independent firms are both active, they share evenly the duopoly profits produced in the final market.
- Each independent firm earns larger profits when the independent firm in the vertically related market is active.
- Each independent firm benefits from competition in the vertically related market.

No Refusal to Supply
2nd period payoffs depending on the configuration of active firms

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Active	$\Pi_{D_E} = c(1-2c)$ $\boldsymbol{\Pi_{U_E} = c(1-2c)}$	$\Pi_{D_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$ $\Pi_{U_E} = 0$
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- Each independent firm earns larger profits when the independent firm in the vertically related market is active.
- Each independent firm benefits from competition in the vertically related market.

No Refusal to Supply
Entry decisions in the second period

- If D_E entered in the first period, then U_E **ALWAYS** enters in the second period.

  - $\Pi_{U_E}|Entry = c(1-2c) - F_U > 0 = \Pi_{U_E}|NoEntry$ by ass. $A1$.

- If D_E did not enter in the first period, then different continuation equilibria depending on the level of entry costs:

  - No firm enters the market in period 2 if entry costs are large enough.
  - Both firms enter the market in period 2, if entry costs are small enough.
  - Only firm U_E enters the market in period 2, if F_U is small enough and F_D is large enough.

No Refusal to Supply
Entry decision in the first period

If the incumbent does not engage in vertical foreclosure, then D_E enters downstream in the first period and U_E enters upstream in the second period.

$$\underbrace{\frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8} + c(1-2c) - F_D}_{\pi_{D_2}^{1+2}|Entry \; in \; 1} > \underbrace{max\left\{0, c(1-2c) - F_R\right\}}_{\pi_{D_2}^{1+2}|No \; Entry \; in \; 1}$$

- By assumption $A2$ total post-entry profits are sufficient to cover the entry cost.
- By entering in period 1, firm D_E earns positive profits for one more period.

Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active		
Not Active		$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active		$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$
Not Active		$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

- When the independent firm in the vertically related market is not active, under refusal to supply firm D_E is unable to make profits.

- Instead, absent refusal to supply, with probability $1/2$ firm D_E extracts the increase in monopoly profit due to its more efficient technology.

Vertical Foreclosure
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active		$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$
Not Active	$\Pi_{D_E} = 0$ $\Pi_{U_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$	$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

- Nothing changes, instead, when firm D_E is not active, while firm U_E is active: with probability 1/2 firm U_E extracts the increase in monopoly profit due to its more efficient technology.

Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active	$\Pi_{D_E} = c(1-2c) - \frac{(1-c)^2}{8}$ $\Pi_{U_E} = c(1-2c) + \frac{(1-c)^2}{8}$	$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$
Not Active	$\Pi_{D_E} = 0$ $\Pi_{U_E} = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8}$	$\Pi_{D_E} = 0$ $\Pi_{U_E} = 0$

- Under refusal to supply, the split of duopoly profits is more favorable to firm U_E.
- The fact that firm U_E is the unique supplier of firm D_E allows it to extract larger profits.

Refusal to Supply
2nd period payoffs depending on the configuration of active firms

D_E, U_E	Active	Not Active
Active	$\mathbf{\Pi_{D_E} = c(1 - 2c) - \frac{(1-c)^2}{8}}$ $\Pi_{U_E} = c(1 - 2c) + \frac{(1-c)^2}{8}$	$\mathbf{\Pi_{D_E} = 0}$ $\Pi_{U_E} = 0$
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- Refusal to supply decreases period-2 post-entry profits of firm D_E.

Refusal to Supply
Entry decisions in the second period

- If D_E entered in the first period, then U_E **ALWAYS** enters in the second period.

  - $\Pi_{U_E}|Entry = c(1-2c) + \frac{(1-c)^2}{8} - F_U > 0 = \Pi_{U_E}|NoEntry$ by ass. $A1$.

- If D_E did not enter in the first period, then firm D_E **DOES NOT ENTER** in period 2 either:

  - $\Pi_{D_E}|Entry = c(1-2c) - \frac{(1-c)^2}{8} - F_D < 0 = \Pi_{D_E}|NoEntry$ by ass. $A2$.
  - Second period post-entry profits are insufficient to cover the entry cost.

  and firm U_E enters in period 2 if and only if its entry cost is small enough:

  - $\Pi_{U_E}|Entry = \frac{(1-c)^2}{8} - \frac{(1-2c)^2}{8} - F_U > < 0 = \Pi_{U_E}|NoEntry$ by ass. $A1$.

Refusal to Supply
Entry decision in the first period

If the incumbent engages in refusal to supply, then D_E **DOES NOT ENTER THE DOWNSTREAM MARKET** and U_E enters the upstream market in the second period iff the entry cost is sufficiently low.

$$\pi_{D_2}^{1+2}|Entry \ in \ 1 = 0 + c(1 - 2c) - \frac{(1-c)^2}{8} - F_D < 0 = \pi_{D_2}^{1+2}|No \ Entry \ in \ 1$$

- Refusal to supply **DISCOURAGES FIRM D_E'S ENTRY** by:
  - limiting firm D_E's second period profits and making those insufficient to cover entry costs;
  - preventing firm D_E from earning profits in the first period.

- When F_U is large enough, lack of entry downstream discourages entry upstream.

Decision to engage in Refusal to Supply
Case I: large F_U

- **No RS**: entry downstream in period 1, entry upstream in period 2.

$$\pi_I^{NoRS} = \underbrace{\frac{(1-c)^2}{8} + \frac{(1-2c)^2}{8}}_{period1} + \underbrace{0}_{period2}$$

- **RS**: No entry downstream in either period, no entry upstream in period 2.

$$\pi_I^{RS} = \underbrace{\frac{(1-2c)^2}{4}}_{period1} + \underbrace{\frac{(1-2c)^2}{4}}_{period2}$$

- The incumbent sacrifices profits in the first period **TO PROTECT MONOPOLY POWER IN THE UPSTREAM MARKET**.

Discussion
Refusal to Supply to protect monopoly power

- In a **STATIC** context the incumbent would never engage in refusal to supply: it benefits from the presence of a more efficient downstream firm.

- The incumbent engages in refusal to supply in a **DYNAMIC** context because it affects future market structure:
  - ▶ Current downstream entry, by intensifying competition for input procurement, would **OPEN THE WAY TO FUTURE UPSTREAM ENTRY** and the incumbent's future profits would be entirely lost.

- Same flavor as in Carlton and Waldman (2002) that focuses on exclusionary tying between a primary and a complementary product.
  - ▶ However, in C& W future entry in the primary market is not profitable *per se* (entrant as efficient as the incumbent).
  - ▶ Entry in the primary market allows the entrant to extract more profits from the sale of the complementary product.
  - ▶ The primary and the complementary product need to be sold by the same firm so as to internalize the above externality.

Decision to engage in Refusal to Supply
Case II: small F_U

- **No RS**: entry downstream in period 1, entry upstream in period 2.

$$\pi_I^{NoRS} = \underbrace{\frac{(1-c)^2}{8} + \frac{(1-2c)^2}{8}}_{period1} + \underbrace{0}_{period2}$$

- **RS**: No entry downstream in either period, entry upstream in period 2.

$$\pi_I^{RS} = \underbrace{\frac{(1-2c)^2}{4}}_{period1} + \underbrace{\frac{(1-c)^2}{8} + \frac{(1-2c)^2}{8}}_{period2}$$

- The incumbent sacrifices profits in the first period **TO TRANSFER MONOPOLY POWER** from the upstream to the downstream market.

Discussion
Vertical foreclosure to transfer monopoly power

- In this case, future upstream entry cannot be prevented.
- This **REINFORCES** the incentives to engage in refusal to supply.
- Refusal to supply deprives firm D_E of the key profits to make entry viable $\Rightarrow$ In the second period the incumbent will be a safe downstream monopolist and will **EXTRACT RENTS** from the more efficient upstream rival.
- This motivation for refusal to supply cannot not arise in C& W.

Extensions

- Entrants/rivals **VERTICALLY INTEGRATED**: exclusion less likely (but still possible).
- Commitment to refusal to supply for **ONE PERIOD**: exclusion less likely (but still possible).
- Entry in both vertically related markets reduces industry profits: **WEAKER** incentives to engage in refusal to supply.

- Variant of the model with **DEMAND SIDE SCALE ECONOMIES** (network externalities):
  - ▶ Allows to study the case in which the target of exclusion is an existing rival (not a potential entrant).
  - ▶ Allows to study the case in which the incumbent engages in margin squeeze.

Crucial ingredients for this theory of harm

- Look at **FUTURE EVOLUTION OF THE MARKET** when assessing incentives to engage in vertical foreclosure.
  - ▶ Not speculative assessment of possible market developments. Future entry/expansion must be **REASONABLY LIKELY**
  - ▶ Patents are about to expire; Evidence that a rival is preparing technology or investments to enter/expand.
  - ▶ If very high entry/expansion barriers, it is unlikely that this theory applies.
- **VULNERABILITY** of the entrant/rival:
  - ▶ The rival needs to achieve critical sales (or scale, or profits, or reputation) in order to be successful.
  - ▶ **SCALE ECONOMIES** (from the supply or the demand side) need to be important in one of the vertically related markets.
- VF to protect existing dominant position hinges upon a **LINK** between future upstream entry/expansion and current downstream entry/expansion (or the other way round), something which should be checked against the facts of the case.

Cases: Telefonica, EC 2007

- Upstream market: broadband access.
- Downstream market: broadband services to the 'mass market'.
- The EC argued that Telefonica abused its dominant position by engaging in margin squeeze in the Spanish broadband market, from September 2001 to December 2006.
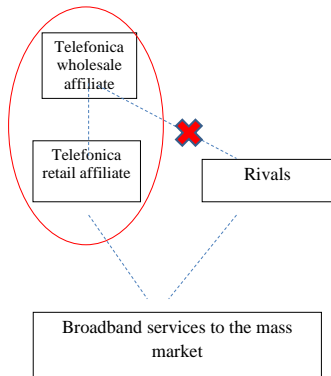
Cases: Telefonica, EC 2007
The Facts

- Competitors could operate either via ULL or wholesale broadband access (at national or regional level).
- ULL requires a significant investment in own network but allows rivals to bypass Telefonica and to gain flexibility in the provision of services.
- National and regional wholesale access requires alternative operators to invest less but they have very little flexibility in the provision of the services.
- The EC focused on wholesale broadband access.

Cases: Telefonica, EC 2007
The Facts

- Regulatory framework:
    - Retail prices regulated until November 2003.
    - Wholesale prices for national access not regulated during infringement period.
    - Wholesale prices for regional access regulated under retail minus system until 2006.
    - From 2006, the Spanish regulator decided to move to a cost-oriented regulation at the wholesale level.

Cases: Telefonica, EC 2007
The Facts

- Telefonica had a market share of 84% in the market for national access and 100% in the market for regional access.
- Telefonica has around 55% of the retail market.
- Telefonica's retail prices were fixed through whole period; at the same time broadband speeds were upgraded and several promotional offers were made: discounts and waivers of connection fees, subscription fees, equipment fees.

Cases: Telefonica, EC 2007
The Test

- As efficient competitor test: would the margin between the retail price and the wholesale price allow an equally efficient competitor to cover the downstream LRAIC?

- LRAIC (product-specific costs) including costs for additional network elements needed to provide retail services, ISP recurrent costs, customer acquisition costs (advertising, incentives and commission to the sales network) and a share of common costs (commercial structure)

- Two types of analysis:
  - Year-by-year
  - Discounted Cash Flow analysis: whole period of abuse as relevant period to take into account that in a new market a firm may suffer losses in the first years of activity. (Possible drawback: revenues larger than costs over the whole period precisely because of the abuse)

- EC found squeeze under both tests. Good to find 'robust' results.

Telefonica, EC 2007
Incentive to exclude

- Possible theory of harm:
  - ▶ Investment in LLU allows rivals to bypass Telefonica and to gain flexibility in the provision of services.
  - ▶ But extremely costly and risky.
  - ▶ Gradual entry strategy: national, then regional, then LLU when achieved a **CRITICAL CUSTOMER BASE**. ('Ladder of investment theory')
  - ▶ Foreclosure prevents rivals from achieving such a critical customer base $\Rightarrow$ discourages upstream investment in LLU.

- Downstream foreclosure to preserve the dominant position upstream.

Telefonica, EC 2007
Incentive to exclude

- Is there a significant asymmetry between Telefonica and its rivals?
- France Telecom and Ya.com are backed by strong international telecom groups.
- Theoretical and empirical works show that financially fit groups engage in cross-subsidization thereby favouring entry (discouraging predatory attacks)
- Are these firms able to match Telefonica's retail prices and achieve the critical customer base despite the losses they have to suffer, thereby investing anyway in LLU ?
- Also, growing market.

Cases:Genzyme (OFT, March 2003)

- Genzyme only producer of Cerezyme, a drug for the treatment of a rare metabolic disorder (Gaucher disease).
- The drug needs to be administered to patients at home by specialized nurses.
- In May 2001 Genzyme launched its own delivery and homecare services and adopted a pricing policy that resulted in margin squeeze (Cerezyme is sold together with homecare services at the same price as the drug sold to downstream rivals .)
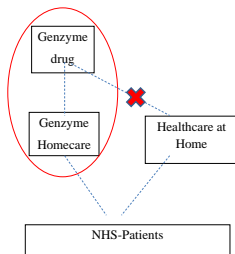
Cases: Genzyme (OFT, March 2003)

- The OFT argued that margin squeeze, by foreclosing the activity of independent providers of homecare services, had the effect of raising entry barriers in the **UPSTREAM** market.

- Possible theory of harm:
    - Alternative treatments were close to receive authorization to be marketed.
    - Alternative treatments need to be distributed by providers of homecare services with long-lasting relationship with patients.
    - According to expert witnesses: "...if there is change not just of the drug, but also of the arrangements for treatment, from the delivery driver that the patient meets each time, to the assisting nurse with whom a relationship may have been built and with whom the patient is content, then this is not an insignificant matter. "

Cases: Genzyme (OFT, March 2003)
Possible theory of harm

- Genzyme behavior was meant to exclude the existing provider (HH) and prevent new ones from building up a significant relationship with patients.

- In this way, either it would discourage entry by new drugs because reliable distribution would not be viable.

- Or it would be in the position to extract rents from new (possibly more effective) drugs.

- In the OFT decision the likelihood of future upstream entry is not entirely clear.