

A Leverage Theory of Reputation Building With Co-Branding: Complementariy in Reputation Building

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Louvre Abu Dhabi museum

“What’s the price of a good name? How about a cool \$520 million? That is the amount that Abu Dhabi, the capital of the United Arab Emirates, agreed Tuesday to pay to attach the Louvre’s name to a museum that it hopes to open in 2012.”
(NYtimes, March 6, 2007)

A general research question

- There are two sectors X and Y .
 - Firms in sector X have already established their reputation.
 - Firms in sector Y have yet to establish their reputation.
 - Is there any mechanism to leverage the reputation of a firm in X to a firm in Y ?
- ⇔ Is there any **complementarity in reputation building**?

Building reputation by **co-branding**

- We study a mechanism to leverage reputation from one sector to another through co-branding: in order to establish my brand, I attach the name of a well known brand to my brand name.
- Under what conditions does this mechanism work?

Co-branding

- “Natural” co-branding: any team production of which the contributors’ names are public such as the production of movies, artistic performances, scientific articles etc
- Co-branding in marketing
 - an extensively used strategy, especially popular in introducing new consumer products
 - Rao, Qu and Ruekert (1999, JMR): when an unknown brand cannot effectively signal its high quality, co-branding with a well-known brand of high quality can be an effective way to enter a new market.
 - Lacks a rigorous micro-foundation

Lenovo and IBM alliance

- In December 2004, Lenovo, a Chinese PC maker, acquired IBM PC division and IBM kept a 18.9 % stake in the combined company.
- The first major merger between an American company and a Chinese one.
- **Lenovo can use IBM's logo for five years for IBM Think-family products.**

According to Advani, the chief marketing officer of Lenovo

“... We also had the right to use the IBM logo for five years. We wanted to leverage that asset. Having the IBM stamp of approval on the notebook is serving as a very good bridge, because they are thinking that IBM trusts this company enough with its logo and if IBM is doing systems support, then I’m going to give these guys a shot.”

Our approach: comparative static

- We compare two cases:
 1. Benchmark: signaling with prices when both sectors are new
 2. Signaling with co-branding when one sector is mature and the other is new

More precisely, we ask:

- How is the comparison affected by the technology linking the two sectors?
- How is the comparison affected by consumers' cross-sector inference problem?

Summary of the main results

	Single input	Complementary Inputs
No inference problem	No complementarity in reputation building	No complementarity in reputation building
Inference problem	N.-A. (Not-Applicable)	Complementarity in reputation building

Literature review

- Name trade: Tadelis (AER,1999)
 - ⇒ Signaling through name trades in an adverse selection model
 - ⇒ Name trades between different generations within one sector
- What we do:
 - ⇒ Name trades across sectors within the same generation
 - ⇒ We also consider signaling through price

Roadmap

1. **The Model with Complementary Inputs**
2. Single input product
3. Complementary inputs without cross-sector inference problem
4. Complementary inputs with the cross-sector inference problem
 - 4.1 two new sectors
 - 4.2 one-mature-one-new sectors
5. Applications

Model with Complementary Inputs

- A final product is composed of one unit of input x and one unit of input y .
- There is a mass one of firms producing input x
- There is a mass one of firms producing input y
- Two-period model with common discount factor δ
- Each firm can produce at most one unit of input in each period
- Consumers are homogenous and they are more than mass one

Model: Adverse Selection

- The quality of an input can be successful or not (= failure)
- **Perfect complements**: the final product is successful (S) and renders service of value one if and only if both inputs are successful: otherwise, it fails (F) and renders no service.
- Two possible types of firms: $\theta \in \{H, L\}$
- I.I.D. in each sector
- The proportion of H type is weakly smaller in sector x than in y

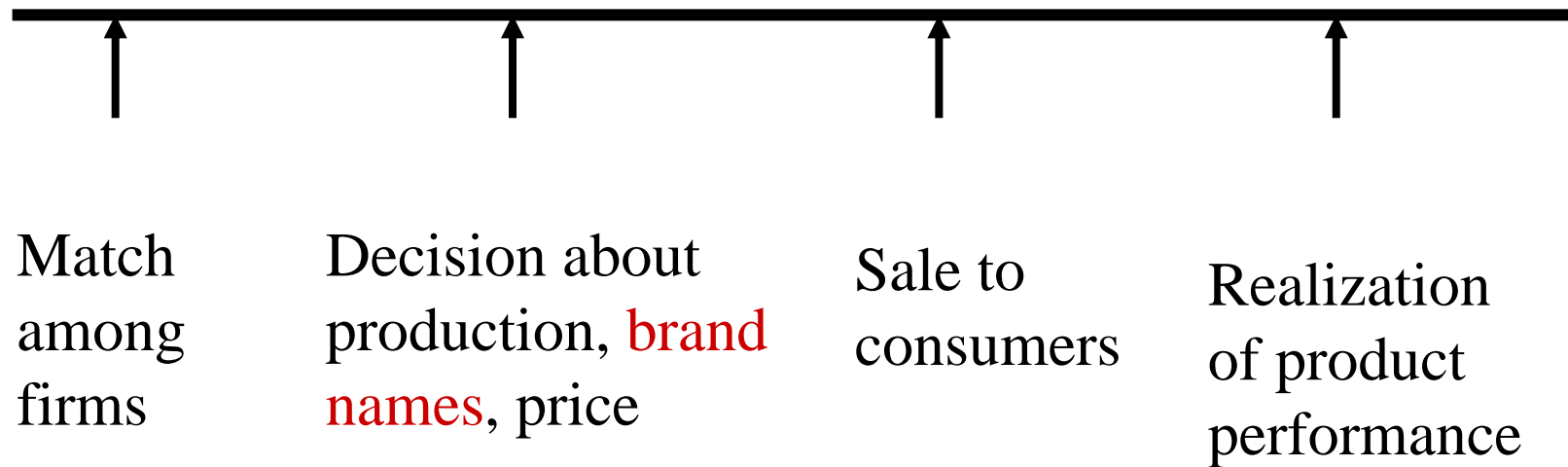
Model: Symmetric technology with learning

- In each period, type θ firm's cost is given by c_H and c_L
 - In period one, type θ firm produces a successful input with probability q_θ with $1 \geq q_H > q_L \geq 0$
 - In period two, a firm's **probability of making a successful input depends** on its type and **the realized performance of its input in period one.**
- \Rightarrow Let $q_{\theta S}$ ($q_{\theta F}$) denote type θ firm's success probability in period two: $1 \geq q_{\theta S} > q_{\theta F} \geq 0$

Model: information structure

- Each firm knows its type and other firms' types
- Consumers know only the distribution of types
- **Cross-sector inference problem:** When a final product fails, a consumer does not know whether it is due to the failure of input x or y (or due to both). However, firms have no inference problem.
- Period one outcome of each final product becomes known publicly

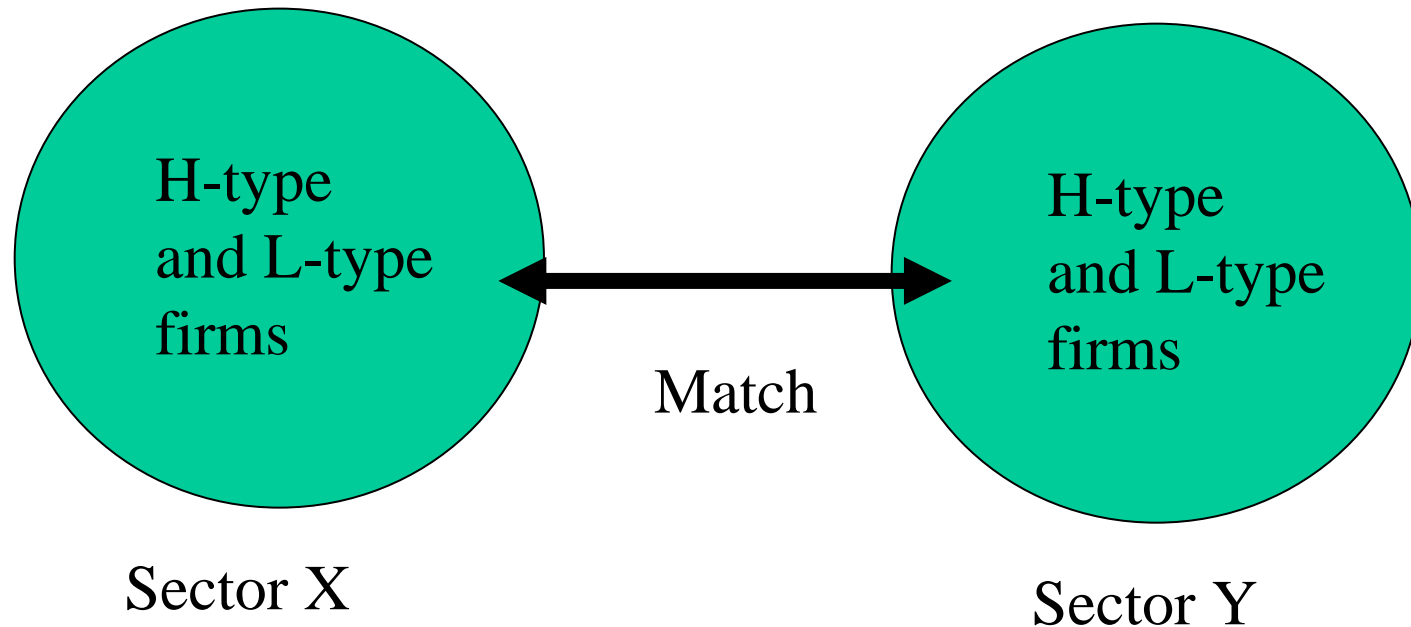
Timing in the case of two new sectors: each period



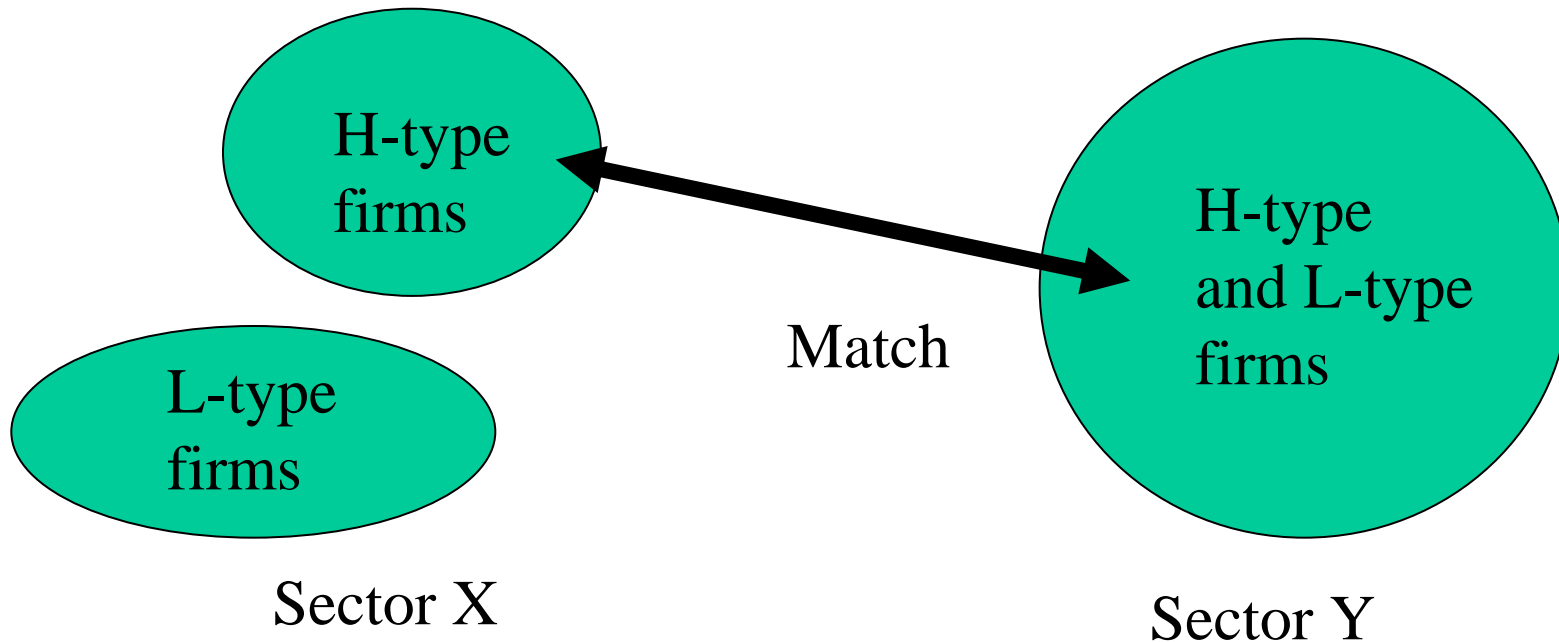
Assumptions

- Incomplete contracts: Even though the performance of each final product becomes known to all, it is not verifiable and hence not contractible.
- Short-term contracts
- In each period, it is socially desirable for only pairs of high types to produce:
 $(q_H)^2 > 2c_H > 2c_L > (q_L)^2$ and $c_H + c_L > q_H q_L$
 $q_{HF} q_{HF} > 2c_H > 2c_L > q_{LS} q_{LS}$ and $c_H + c_L > q_{HS} q_{LS}$,

Benchmark of two new sectors: types are unknown to consumers



One-mature-one-new sectors: only types of the firms in sector x is known to consumers



Methodology

- Find
 - (1) The condition to have a separating equilibrium with **signaling through prices** in the benchmark of two new sectors
 - (2) The condition to have a separating equilibrium with **signaling through co-branding** in the case of one-mature-one-new sectors
- **Complementarity in reputation building exists if (2) is more relaxed than (1)**

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Single input product

- Each input can be consumed as an independent final product

⇒ No inference problem

- Consider just one sector
- $q_H > c_H > c_L > q_L$
- $q_{HF} > c_H > c_L > q_{LS}$

Signaling through price

- Consider a separating equilibrium in period one
- Then, in period two, the price that an H type charges depends on his past record

$$\Rightarrow p_{2S}^* = q_{HS}, p_{2F}^* = q_{HF}$$

- The sufficient and necessary conditions for a separating equilibrium: p_1 should satisfy

$$(IC_L-1) p_1 \leq c_L$$

$$(IC_L-2) p_1 - c_L + \delta[q_L p_{2S}^* + (1-q_L) p_{2F}^* - c_L] \leq 0$$

$$(IR_H) p_1 - c_H + \delta[q_H p_{2S}^* + (1-q_H) p_{2F}^* - c_H] \geq 0$$

- Intuition for the separating equilibrium: An H type charges a very low price in period one since he can make much more money in period two

Signaling through name trades

- There is a limited mass ($\leq v$) of good names and an infinite number of bad names in the economy
- We look for a separating equilibrium in which a high type firm buys a good brand name and no low type buys a good brand name.
- **Timing** at period one
 1. Each type of firm makes a bid to buy a good brand name.
 2. Each good brand chooses to which firm to sell its name.
- In a separating equilibrium,
 $\Rightarrow p_{1H}^{**} = q_H, p_{2S}^{**} = q_{HS}, p_{2F}^{**} = q_{HF}$

Signaling through name trades

- The maximum willingness to pay to buy a good brand:

$$b_H = p_1^{**} - c_H + \delta[q_H p_{2S}^{**} + (1 - q_H) p_{2F}^{**} - c_H]$$

$$b_L = p_1^{**} - c_L + \delta[q_L p_{2S}^{**} + (1 - q_L) p_{2F}^{**} - c_L]$$

- A separating equilibrium exists iff $b_H > b_L$.
 - **Proposition 2:** The possibility to buy a name does not affect the condition to have a separating equilibrium
- ⇒ No complementarity in reputation building in the case of single input product
- **Intuition:** Each type's gain from building reputation is the same in both cases

Complementary inputs without consumers' inference problems

- There is **no complementarity in reputation building**: the condition for the existence of a separating equilibrium is the same regardless of the mode of signaling

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Complementary inputs with the inference problem:
two new sectors <signaling through prices>

- Assume assortative match in both periods for expositional facility
- In period two:
 - (i) $p_{2S}^{C*} = q_{HS}q_{HS}$,
 - (ii)
$$p_{2F}^{C*} = \frac{q_H}{1 + q_H} q_{HS}^x q_{HS}^y + \frac{1}{1 + q_H} q_{HF}^x q_{HF}^y$$
- The three sufficient and necessary conditions to have a separating equilibrium with p_{1}^C :

$$(IC_{LL}-1) p_{1}^C \leq 2c_L$$

$$(IC_{LL}-2) p_{1}^C - 2c_L + \delta[(q_L)^2 p_{2S}^{C*} + (1 - (q_L)^2) p_{2F}^{C*} - 2c_L] \leq 0$$

$$(IR_{HH}) p_{1}^C - 2c_H + \delta[(q_H)^2 p_{2S}^{C*} + (1 - (q_H)^2) p_{2F}^{C*} - 2c_H] \geq 0$$

Complementary inputs with the inference problem: one-mature-one-new sectors

<signaling with co-branding>

- Types of firms producing input x are known to consumers
- We look for a separating equilibrium in which a high type in sector y is associated with a good brand (i.e. a high type) in sector x and no low type in sector y is associated with a good brand in sector x.

- In a separating equilibrium:

$$(i) \quad p_{2S}^{C^{**}} = q_{HS}^x q_{HS}^y, \quad p_{2F}^{C^{**}} = \frac{q_H}{1 + q_H} q_{HS}^x q_{HS}^y + \frac{1}{1 + q_H} q_{HF}^x q_{HF}^y$$

$$(ii) \quad p_1^{C^{**}} = q_H q_H$$

Complementary inputs: one-mature-one-new sectors

- $b_{H}^{**}(b_{L}^{**})$: the maximum willingness to pay to be associated with a good brand x
- The payoff of a good brand firm in sector x , denoted by π , directly depends on its partner's type through **feedback effect**:

$$\pi^{**}(b:H) > \pi^{**}(b:L)$$

- A separating equilibrium exists iff

$$\pi^{**}(b_{H}^{**}:H) > \pi^{**}(b_{L}^{**}:L)$$

- **Proposition 5**: The condition for the existence of a separating equilibrium is more relaxed in the case of one-mature-one-new sectors than in the case of two new sectors.

⇒ **There exists complementarity in reputation building**

Stand alone gain in the absence of the inference problem

- **Stand-alone gain** (π^{SA}_{θ}): a θ -type's gain from being recognized as an H type in the absence of inference problem
- Let $V_{\theta\theta'}$ denote an $\theta\theta'$ pair's gain from masquerading as an HH pair
- We have $V_{\theta\theta'} = \pi^{\text{SA}}_{\theta} + \pi^{\text{SA}}_{\theta'}$
- Under signaling with prices, a separating equilibrium exists if $V_{\text{HH}} > V_{\text{LL}}$, which is equivalent to $\pi^{\text{SA}}_{\text{H}} > \pi^{\text{SA}}_{\text{L}}$
- Under signaling through co-branding, a separating equilibrium exists if $V_{\text{HH}} > V_{\text{HL}}$, which is equivalent to $\pi^{\text{SA}}_{\text{H}} > \pi^{\text{SA}}_{\text{L}}$

Feedback effect in the presence of the inference problem

- Assume $q_H > q_L = 0$.
- If an L type is matched with an L type, none of them suffers from the negative feedback effect.
- If an H type is matched with an L type, the former suffers a lot from the negative feedback effect.
- Hence, the presence of the inference problem, through the feedback effect, reduces an HL pair's gain from masquerading as an HH pair much more than an LL pair's gain

Application to economics of superstars

- Economics of superstars (Rosen 1981, MacDonald, Kremer, 1993)
- Empirical literature on movie stars (Albert 1998, Chisholm 2004, Ravid 1999, Wallace et als. 1993)
- They test a **signaling hypothesis**: “the commitment of a star in an early stage of a project signals the quality of the project to outside financiers.”
- We provide a formalization of the signaling hypothesis
- We identify **a premium to superstars from certifying other complementary inputs.**

Global and local brands

- Co-branding with well-known local brands can be used as a strategy to penetrate local markets by multinationals: **Danone, L'Oréal**
- Co-branding with a global brand can be used to penetrate the global market by a local brand: **Lenovo-IBM** alliance
- Our theory explains the **certification function** played by well-known brands