

The Search for Trading Partners and the Cross-Border Merger Decision

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Abstract

We investigate the merger decision between two firms in an outsourcing relationship, one upstream and the other downstream. The inter-firm relationship is subject both to ex ante matching uncertainty and to contractual efficiency issues, possibly characterised by double marginalisation. Cross-border merger is assumed to solve the latter problem, but at the expense of curtailing the match-searching process. The trade-off between these two factors is assumed to determine the dynamics of foreign direct investment in this kind of industry.

1. Part of ongoing work on searching/matching and trade.
2. Desire to look more specifically at the firm-level aspects, and in particular
3. The institutional aspects affecting trade/outsourcing and FDI.

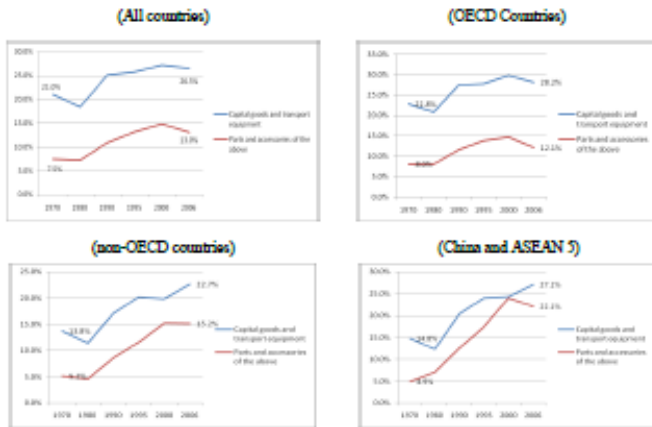
Drastic growth in international sourcing of intermediates; for example, growth in the share of imports in final sales of manufactures in developed countries

Import share of total purchases of electrical equipment and machinery

<i>Source: Spencer (2005)</i>	1974	1993
US	4.5%	11.6%
Canada	13.2%	30.9%

This drastic growth makes the choice of vertical, cross-border business structure is of increasing practical importance.

Figure 11. Trade in capital and intermediate goods as a share of total goods trade (all countries)



1. United Nations Broad Economic Categories. Capital goods and transport equipment include categories 41, 51 and 52. Intermediate goods only include categories 42 and 53, and excludes food and beverages, industrial supplies and lubricants which are often included in intermediate goods.

Source: Secretariat using UN COMTRADE

RC = Rauch/Casella (2003): look at firm matching in a one-off framework. Matches result in heterogeneity - upward-sloping supply.

RT = Rauch/Trindade (2003): link networks and informational ties to patterns of outsourcing.

GH = Grossman/Helpman (2002) also look at the match between an upstream, Southern firm and a downstream, Northern firm. Modified Krugman allows for market thickness effects, but matching is one-off.

All three studies adopt a Salop circular cylinder approach to analysing matching. Cost is linearly related to the distance between matching firms.

Antras (2003, 2005), incomplete outsourcing contracts in a dynamic general equilibrium setting.

AH = Antras/Helpman (2004): choice of integration versus outsourcing. Both suffer from potential holdup/contractual problems. Link to Hart/Moore.

GH= Grossman/Helpman (2004)

FH= Feenstra/Hanson (2005)

Two countries - N = North; S =South.

Two stages of production - u =upstream, d =downstream.

u is unskilled-labour intensive, so S has a comparative advantage in u , while N has an advantage in d .

The main market is in N .

Match quality follows a Salop circular cylinder model (as in RC, RT and GH).

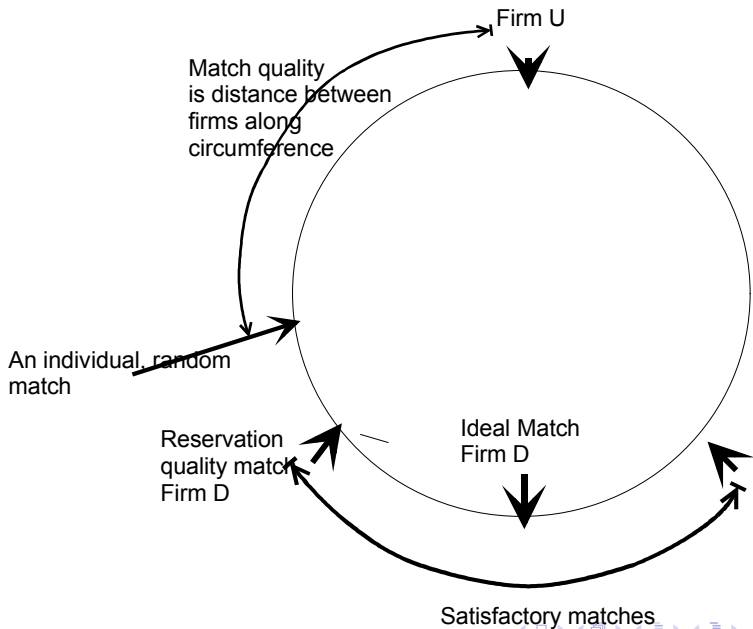
Monopolistic (Krugman/Dixit-Stiglitz) competition.

Production is by firm pairings $\{u, d\}$.

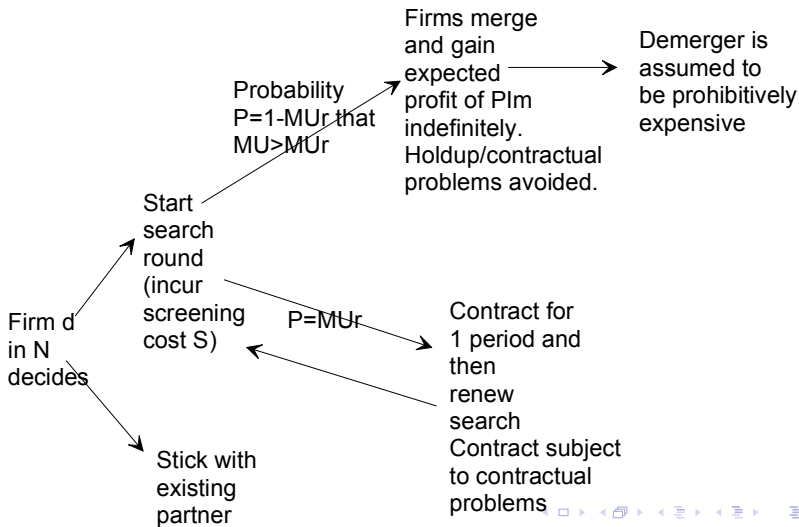
Free entry/exit.

Assume d is always in N . u has lower potential marginal cost if in S (comparative advantage), but there are trade and search costs.

Fixed cost is $F - \mu_i$, where μ_i is match quality.



Matching is for fixed contract periods, to cover relationship-specific costs and avoid a holdup problem. Contracts are likely to be lumpier where relationship-specific costs are higher (Antras, 2003).



Factors affecting the search process.

1. Pre-screening cost S .
2. Contractual inefficiency when firms do not match. Fixed costs are $F - k\mu_i$, where μ_i is match quality. k is contractual efficiency. $0 \leq k \leq 1$.
3. Merged firms have $k = 1$. However, firms cannot demerge (assumed to be prohibitively costly - otherwise firms would always merge and demerge again).

The merger decision is a balance between saving S and raising k against ending up with a lower μ_i than necessary.

Double-marginalisation results in a loss of efficiency from contracting - Spencer (2005 and various joint-authored papers).

- In theory - lump-sum payments (two-part tariff) can remove this loss of efficiency.
- In practice - this is not consistent with the nature of international contracts. Payments follow invoices, which cannot be for blank orders (unacceptable to customs authorities). Contracts and invoices have to be simple.

==> Double-marginalisation is a problem.

Table A1		Probability	Expected profit above reservation
Match			
Satisfy.	Both survive	$(1 - \mu_R)$	$\frac{1+\mu_R}{2} - \mu_R = \frac{1-\mu_R}{2}$
Unsat.		μ_R	$\frac{k\mu_R}{2} - \mu_R - S = \frac{(2-k)\mu_R}{2} - S$

Discounting, with time preference r and contract period t ,

$$\rho = \frac{1}{(1+r)^t} = -1.$$

When a match quality is μ_R , the present value of continuing the match indefinitely equals that of resuming a search.

$$\text{PV of match} = 0.$$

$$\begin{aligned} \text{PV of search} &= (1 - \mu_R)(PV^e \text{ of successful match}) \\ &+ \mu_R(\Pi^e \text{ of unsuccessful match}) \\ &+ \frac{1}{\rho(1 + \rho)}(\text{PV of search}). \end{aligned}$$

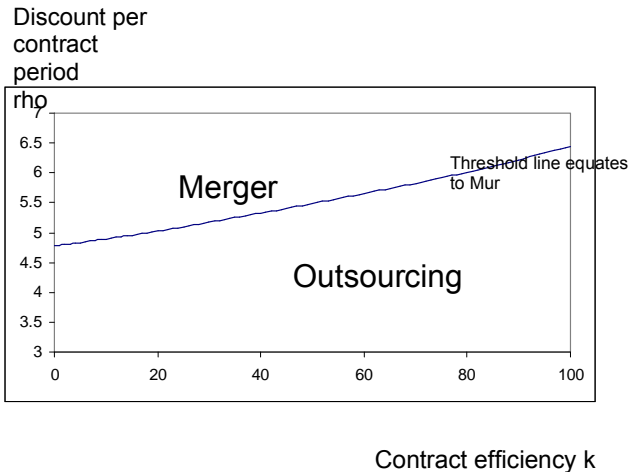
When $S = k = 0$,

$$\mu_R = 1 + \rho - \sqrt{\rho(1 + \rho)}. \quad (5)$$

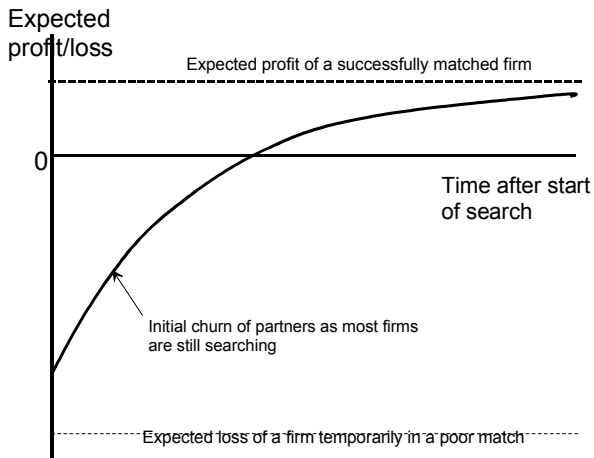
With $S, k > 0$,

$$\mu_R = \frac{1 + \rho}{1 - (1 - k)\rho} - \frac{\sqrt{(1 + \rho)(2 - k)\rho + 2\rho S(1 - (1 - k)\rho)}}{1 - (1 - k)\rho}$$

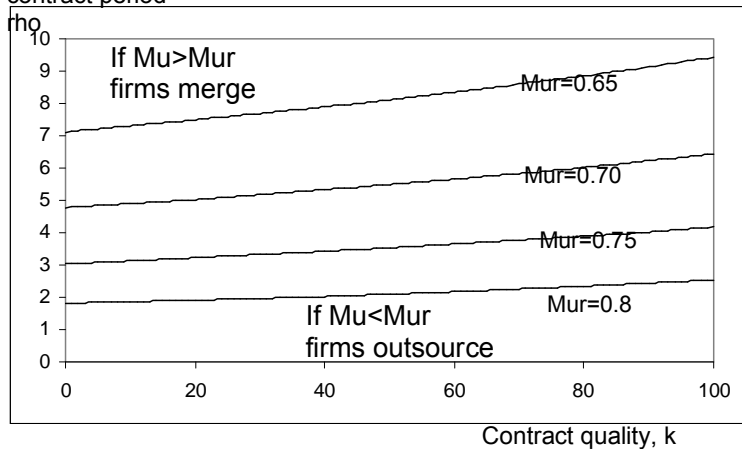
A firm's decision, given a match quality of $\mu_i = 0.7$.



The merger/outsourcing decision for a match of quality 70%

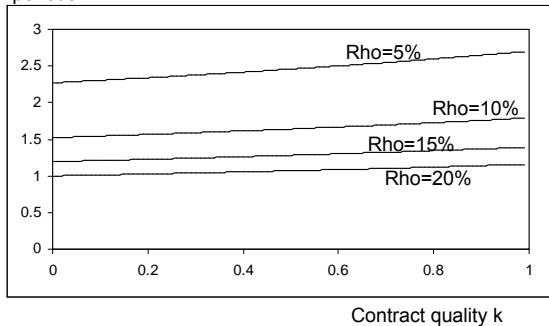


Discount per
contract period



Reservation match quality as a function of contract

Mean lag
in contract
periods



Mean lag in firms merging related to contract quality, k , and discount rate per contract period, ρ .

The proportion of searching firms on an equilibrium growth path is higher when demand for the sector is growing (G).

$$\frac{N_s}{N_m} = \frac{G}{1 - \mu_R}$$

A firm $\{u, S\}$ for a partner $\{d, N\}$ if and only if there is a sufficiently large price advantage to overcome the costs of entering into search.

We assume that fixed costs are $F - \mu_i$, so that profits for merged firms, after subtracting fixed cost,

$$\Pi_i = \Phi C^{1-\varepsilon} P^{*\varepsilon} - F + \mu_i.$$

-Based on a Krugman/Dixit-Stiglitz model.

C is the constant unit operating cost of firms type $\{u, s\}$ + their $\{d, N\}$ partners...

P^* is the CES aggregate price.

F is a constant fixed cost.

Lemma

A firm will enter if and only if the price is high enough that a reservation quality match at least breaks even.

Implication \implies A threshold industry price $P^* = \bar{P}$, such that

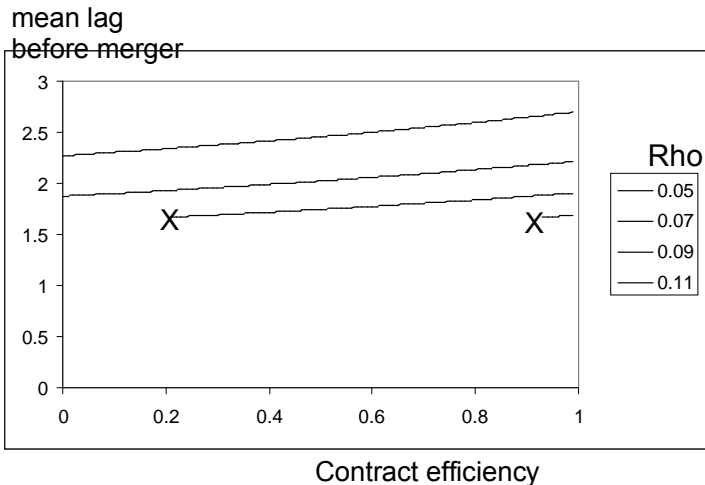
$$\begin{aligned}\mu_R &= F - \Phi C^{1-\varepsilon} \bar{P}^\varepsilon; \\ \bar{P}^\varepsilon &= \frac{F - \mu_R}{\Phi} C^{\varepsilon-1}.\end{aligned}$$

The threshold price is lower:

- The lower is F
- The lower is C
- The higher is μ_R (which implies higher k or lower ρ)

Low contract quality, k , means:

1. The mean lag before merger is shorter, BUT
2. If k is too low, no firms may enter at all.



As contracts become less efficient, firms merge sooner, but only up to the point where entry ceases completely

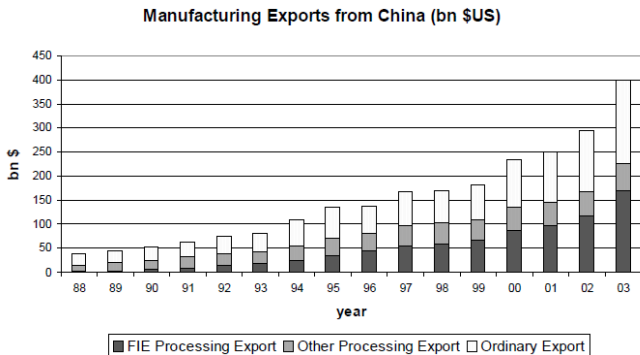


Figure 1: The Growth of Chinese Manufacturing Exports (SUS), 1988-2003

From Spencer (2005). Note that the growth in outsourcing (other processing export) precedes that in vertical FDI (FIE processing), but is eventually outscaled by it. This looks to be consistent with outsourcing as a short-run search phenomenon, rather than the GH explanation that the mix reflects lack of market thickness.