Vertical integration in the e-commerce sector

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Introduction

- We study the implications of *vertical* integration in the e-commerce sector.
- Specifically, we consider the possibility that a (major) retailer and/or a platform buys one or several of the parcel delivery operators, or sets up its own delivery network.
- *Horizontal* mergers are typically considered as "suspicious" and potentially anti-competitive.
- Literature on *vertical* mergers yields more mixed results.

- Potential benefits:
  - reduction of transaction costs,
  - elimination of double marginalization.
- But it also involves the danger of "foreclosure".
- Concept covers a wide range of anti-competitive practices, including the extension of market power in one market segment (upstream or downstream) to a different market segment, the possibility to raise competitor's cost, etc.
- In the postal sector these issues are particularly relevant. Some big retailers/platforms already have significant market power in their relevant markets, which gives them monopsony power towards parcel delivery operators.

- We use a simple two-stage Cournot model to study the implication of vertical integration in different scenarios.
- First, we assume that the integration of a retailer will lead to an integrated monopoly, and compare the independent oligopoly to the integrated monopoly.
- Second, we study integration when the number of active firms is endogenous. For some range of fixed costs the integrated monopoly is indeed the only sustainable equilibrium induced by the integration of a single retailer.
- Third, we account for a specific feature of the delivery sector by distinguishing between urban (low cost) and rural (high cost) customers. We consider a scenario where the integrated operator delivers only to urban customers, while relying on a delivery operator for the rural customers.

Independent vs integrated operators

- Present two examples: linear demand and constant elasticity demand (each with constant marginal cost)
- First concentrate on surplus, which does not account for fixed costs. These will be reintroduced and included in welfare analysis.
- With **linear demand** independent operators yields a larger output than the integrated solution if and only if

$$\frac{I}{I+1}\frac{J}{J+1} > \frac{N}{N+1}.$$

  - violated for $J = 2, I = 2$,
  - to obtain a better solution than under the integrated monopoly it takes at least 3 retailers and 3 delivery operators.

- With **constant elasticity demand (CED)** the independent oligopoly always yields the larger surplus.
- Intuitively, CED leads to more intense competition so that pressure on the price outweighs the cost of double marginalization even for a duopoly.

Endogenous number of firms

- Fixed costs:
  - integration may induce exit,
  - are accounted for in welfare.
- Interesting case: fixed costs
  - are sufficiently large to induce exit of all independent firms,
  - but not too large so that higher surplus in independent oligopoly outweighs replication of fixed costs.
- Illustrative example with CED, $\varepsilon = 1.1$

scenario	3*3	1i, 2r, 2o	1i, 1r, 2o	1i, 2r, 1o	1i, 1r, 1o	1i
Total output	3.72	4.23	3.27	3.07	2.42	0.63
Total surplus	10.84	10.91	10.76	10.72	10.56	9.46
Prof. int.	–	0.259	0.39	0.43	0.539	0.86
Prof. ret.(s)	0.114	0.064	0.14	0.030	0.066	–
Prof. d.o.(s)	0.079	0.064	0.05	0.167	0.122	–

- Integration of a single firm and the subsequent changes in market structure thus lead to a welfare loss if the following three conditions hold: *(i)* $1.38 > 2 * G_j + 2 * F_i$, *(ii)* $G_j > G_{\min} = 0.066$, and *(iii)* $F_i = F_{\min} > 0.064$.
- The first condition is necessarily satisfied if 3*3 is sustainable.
- Relevant range is larger the smaller ε.

Multiple integration

Scenario	3i	2i, 1r, 1o	2i
Total output	5.53	4.88	4.23
Total welfare	11.03	10.98	10.91
Profit integrated	0.12	0.18	0.26
Profit retailer(s)		0.03	
Profit delivery operator(s)		0.04	

- For any given number of firms multiple integration is welfare superior.

Extension: two delivery areas

- Two types of customers according to their location: urban or rural.
- Delivery costs are larger for rural than for urban customers.
- Delivery operators (when independent) charge a uniform delivery rate and retailers a uniform price.
- A vertically integrated firm on the other hand delivers only in urban areas.

- Urban and rural customers have identical demand functions; their shares are α^U and $\alpha^R = 1 - \alpha^U$.
- Total demand is then given by $X(p) = \alpha^U X(p) + \alpha^R X(p)$.
- Rural and urban deliveries involve specific fixed costs denoted by F_i^U and F_i^R. Marginal delivery costs of delivery operator i, are denoted k_i^U and k_i^R.

Illustration

Parameters: $k_U = 0.05$, $k_R = 0.1$, $\alpha^R = 0.25$, $c = 0.1$, $p(X) = X^{-1/\varepsilon}$, $\varepsilon = 1.11$.

Scenario	2*2	Full int. (1i+1r+1o)	Urban int.
Total output	1.99	2.22	0.65
Uniform delivery rate t	0.19	0.26	0.80
Total surplus	10.39	10.47	9.48
Prof. integrated	–	0.53	0.55
Prof. ret.(s)	0.24	0.06	0.03
Prof. d.o.(s)	0.13	0.12	0.27

- Urban integration decreases surplus even when it increases under full integration.
- Two conflicting effects (studied analytically in the paper):
  - increases competitors cost,
  - eliminates double marginalization for integrated urban delivery.
- It is indeed optimal for integrated firm to integrate urban delivery only.
- Intuitive, but not *a priori* obvious because the rural delivery rate faced by the integrated firm is subject to a markup (it is above the firm's marginal cost).

Summary and conclusion

- Comparison between independent oligopoly and integrated monopoly involves a tradeoff between competition and double marginalization which will have the opposite effect.
  - No general result, but with linear demand we need at least 3 firms (upstream and downstream) for oligopoly to yield larger surplus.
  - With CED this is always true.

- When the number of firms is endogenous:
  - while the integration of a single retailer-delivery operator pair may initially be welfare improving, the resulting market structure may not be sustainable,
  - there exist a range of fixed costs for which the integrated monopoly emerges (following a single integration) and is welfare inferior to the initial independent equilibrium *even when the reduction in the number of fixed costs is taken into account,*
- Multiple integration is typically welfare superior (for a given total number of firms) to the integration of a single retailer-delivery operator.

- When customers differ according to their location, urban or rural, involving different delivery costs:
  - urban integration is more likely to have an adverse effect on welfare than full integration,
  - we provide examples where the integrated firm finds it beneficial not to deliver in rural areas, even though the operators' delivery rate will include a markup above marginal cost.