

# 14.272 Problem Set 2

## Vertical Restraints

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### Question 1-5

Obviously you should look at the answers in Tirole. A few comments:

Qn. 2 is a good question which you should think through. The point is that vertical mergers eliminating double mark-ups or horizontal mergers between makers of complements (razors and razor blades, goods and servicing of those products) could be a good thing for the firms and for consumers. You should remember the discussion of mergers with strategic substitutes and strategic complements. In this case, you reducing your price increases the profitability of my reducing my price : independent firms will set higher prices than merged firms because they fail to take into account the externality imposed on the other firm when they increase their price.

Qn. 4 (Tirole 4.5) makes the point that service/parts tie-ins can either be because of simple monopoly concerns (extracting rent by preventing substitution to too much service) or because of price discrimination. Of course, in the Boeing example there may also be concerns about quality of parts (given that airline accidents are bad news for the entire Boeing brand), an externality a small individual airline may not take into account.

Qn. 5 discusses the provision of retail services : this a classic argument for vertical restrictions that has featured in a lot of appliance-related cases. Anti-trust authorities (e.g. in the UK) have argued that instead restrictions on retailers such as RPM have been used to raise prices and maybe help collusion between manufacturers.

### Question 6

(a) Competitive case: if retailers compete Bertrand and both retailers take the contract (I think this is being assumed here) then there can be no franchise fee. Both retailers have the same MC and so will set the same  $P=MC$

so will have no profit, hence franchise fee is impossible. Without a fee, the manufacturer simply solves

$$\begin{aligned} & \max_w w(E(h) - w - E(c)) \\ \frac{\partial E(\pi)}{\partial w} &= E(h) - w - E(c) - w = 0 \\ w^* &= \frac{E(h) - E(c)}{2}, E(\pi) = \frac{(E(h) - E(c))^2}{4} \end{aligned}$$

With exclusive territories assume that the demand facing each retailer is  $\frac{(h-p)}{2}$ . Now solve the simple double marginalization problem for the manufacturer and a single retailer. As in the standard case in class the manufacturer will set the wholesale price equal to marginal cost and extract profit via the franchise fee. Each retailer maximizes  $\frac{(p-c)(E(h)-p)}{2}$  which gives a price of  $\frac{E(h)+E(c)}{2}$ . Expected profit for the retailer (extracted by the manufacturer) is  $\frac{(E(h)-E(c))^2}{8}$ . As the manufacturer gets this from both retailers he gets the same profit as in the competitive case. This is the same result that you would get with no uncertainty about demand and costs. Why? It's because the lack of information is symmetric (i.e. neither side knows when it sets prices) and both sides are risk neutral.

(b) The competitive case already has a linear price so this case is obvious. In the exclusive territories case the manufacturer could impose the outcome price but set a wholesale price of  $\frac{E(h)-E(c)}{2}$  which gives the retailer a margin equal to its expected marginal cost of  $E(c)$ .

(c) In the competitive case you get the same result as before. The retailer sets price  $w + c$ , but the expected profit of the manufacturer is  $w(E(h) - w - E(c))$  as before. In the exclusive territories case, each retailer sets a price of  $\frac{h+c}{2}$  and gets profit of  $\frac{(h-c)^2}{8}$ . The expected value of this is extracted by the manufacturer. Apply Jensen's inequality to see that the expected profit when  $h$  and  $c$  are set optimally is higher than the profit from setting prices based on the expected  $h$  and  $c$ . The intuition is that with exclusive territories the asymmetric information is used more effectively so this is now preferred to the competitive case.

(d) This is an interesting question to think through. Recall that Glenn showed that with linear demand curves and constant marginal cost it is welfare-optimal to set a uniform price across all markets when there are linear demand curves (i.e. you should not set higher prices in markets with higher demand). Here we have the exact same issue: with exclusive territories and only demand uncertainty you set higher prices in markets (h realizations) with higher demand which is less efficient than setting the average uniform price which is what happens under competitive outcomes.

(e) Risk aversion on the part of retailers makes relying on competition more attractive. With competition retailers get zero profits for certain (there is no fixed fee, all retailers have the same marginal cost and we assume that there are no fixed cost to retailing the product). Therefore the contract under risk aversion is the same as under risk neutrality. With exclusive territories risk aversion matters. Under the risk neutral contract the retailer is the residual claimant and gets the monopoly profit (which varies with the supply and demand shocks) minus the franchise fee which is fixed. In expectation the retailer gets zero profit but with risk aversion this is worse than a certain zero profit.

To deal with risk aversion the manufacturer reduces the franchise fee and increases the wholesale price (clawing back some of the lost profit). This reduces the variance of the retailer's payoff but reintroduces the double marginalization problem which reduces the amount of available profit.

With symmetric incomplete information, competition will now be preferred to exclusive territories.

With asymmetric information, there is a trade-off between the efficient use of information (favours excl territories) and provision of insurance (favours competition). With very big retailer risk aversion competition will be favoured.

### Question 7

(a) All of the methods are likely to involve some inefficiency. Royalties will raise the marginal cost of the retailer and hence lead to double marginalization. Franchise fees would only be efficient way to extract profits if CD can identify differences in cost and demand conditions in different markets (so can charge different franchise fees) - in expectation this might be possible. Tying may make retailers make inefficient input decisions (input substitution) although in this case - with things like paper cups - this is unlikely to be a problem. Instead, as Paul said in class, tying is partly designed to allow monitoring of the franchise fees and avoid the need to audit their profits.

Clearly if everyone has the same number of cookers this is no an effective monitoring device for quantity. Dry mix foods on the other hand might be. Price discrimination comes in the form of allowing second degree price discrimination (CD makes more money from large franchise fees).

(b) The need for CD to maintain secrecy is justification for a tie because it rules out writing a contract where CD simply states what ingredients must be used. As long as CD having a manufacturer does not compromise secrecy it should not matter.

(c) The issue is whether there may be other competing brands also available to franchise fees. For example, McDonald's, Burger King or Taco Bell would - at least now - be alternatives for someone wanting to be a fast food franchisee. If CD raised its prices too much then there would be substitution to these fairly close alternatives. Simply having a brand and a trademark is not sufficient to

conclude that people can raise exercise a lot of market power. In addition, we would want some rents to accrue to CD in order to reward it for developing the brand.

(d) The question is whether franchisees act rationally in deciding which contract to take. In most settings it seems unrealistic to think that franchisees really behave too myopically. The success of McDs etc. suggests that people do consider the lifetime costs of the franchise when entering into an agreement. The arguments are basically the same as for aftermarket.