Research in Economics 70 (2016) 558–568

Contents lists available at ScienceDirect

Research in Economics

journal homepage: www.elsevier.com/locate/rie

Product design and decision rights in vertical structures

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ARTICLE INFO

Article history:
Received 31 July 2016
Accepted 22 September 2016
Available online 2 October 2016

Keywords:
Information
Store brand
Private label
Vertical structures
Product design
Decision rights

ABSTRACT

The paper argues that the emergence of private labels can be partially explained by the new information technologies available at the retail level. In our approach, the owner of a brand has "decision rights" on product design, while the details of the production and distribution are left to contractual negotiation. Manufacturers have privileged information about the cost of improving quality, while distributors have private information on the impact of quality on demand. We show that ownership of the brand should be allocated to the party with a relative informational advantage. In particular, if the information of the distributor improves due to a technological shock on data collection and information management, it may become optimal for the distributor to introduce its own brand, rather than to distribute a manufacturer's brand.

1. Introduction

The development of distributor brands over the past decade has raised several issues concerning the notion of brand ownership. Several factors may contribute to explain why large distributors have decided to develop their own brands (see the survey of Berges-Sennou et al., 2004). For instance, well-established distributors with large distribution networks may leverage their position by developing reputation effects over a large range of products. This incentive to intervene as a producer may be reinforced in contexts where concentration is high at the upstream level, because the distributor controlling its own brand increases its bargaining position in a negotiation with dominant producers.[1] Actually, Scott Morton and Zettelmeyer (2004) show evidence of the positive correlation between private label introduction and the market share of leading national brands.[2] Notice however that while distributors have developed brands under their name for mass consumption goods, or standardized products, they also have opted for the creation of new brands with an initially unknown name. This is particularly true for high quality brands. Clearly while the distributors position matters for the promotion of new brands, it is not clear why it is more profitable to create and promote its own brand, rather than promoting an independent brand under a long term agreement. This remark is reinforced by the fact that the bargaining position of the producer of the new brand would be small since the distributor needs not rely on main incumbents for production.

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[1] Contributions along this line include Comanor and Rey (2000), Chintagunta et al. (2002), Kadiyali et al. (2000), Gabrielsen and Sørgard (2007), and Meza and Sudhir (2010).

[2] See also Bontemps et al. (2008) for a similar conclusion using the price level of national brands.

http://dx.doi.org/10.1016/j.rie.2016.09.003
1090-9443/

In this paper we wish to stress an aspect which is complementary and provides some light on the economics of distributor brands, namely the interaction between product design and brand ownership under incomplete contracting. In an incomplete contract setting, brand ownership allocates various decision rights to the owner and in particular, the right to decide on the design of product characteristics (Grossman and Hart, 1986). By owning the brand, a distributor can effectively control the evolution of the products under a particular brand. In this context, answering the question of whether the distributor would more profitably distribute its own brand rather than promote a brand owned at the upstream levels amounts to identifying the potential inefficiencies and conflicts that may arise in the product design process.

We then develop on the fact that, in an optimal relationship, the agent with the most relevant information should be allocated the right to decide on the evolution of the products characteristics.[3] Notice that the development of computerized technologies has changed the balance on this respect in a dramatic way, as distributors have now access to fast, reliable and essential information through sales records, as well as the ability to treat this huge data. The idea demonstrated below is that the better informed party should be the one who chooses the characteristics of the product, a decision that belongs to the owner of the brand. Thus a shift in the information structure can justify a shift in the ownership of brands (with an idea similar to Schmalensee, 1982, that the informational advantage is used in the design of products).

Another aspect that one should bear in mind is that there may be a conflict of interest between large producers and distributors that can hardly be resolved at the development stage. Producers and distributors do not face the same objective for two reasons. First, distributors may be more concerned about the potential cannibalization of competing brands by one brand, as they distribute several brands. Second the markets are not the same, as large producers serve several markets through several distributors. While contracts help to resolve these issues concerning prices and marketing, this is more problematic at the development stage. In this context, a distributor may prefer to develop its own brand if it appears that the choices of large producers in terms of product design are too far from their needs.

In the paper we present a model of vertical structure with bilateral asymmetric information (Section 2). We analyze successively the case where the distributor owns the brand and designs the product (Section 3) and the case where the producer owns the brand (Section 4). In Section 5, we compare the aggregate profit of the vertical structure under the two ownership structures. Section 6 discusses a variant in which the bargaining power and the ownership do not coincide. The last section concludes.

2. A base model

We consider a distributor and a producer of some product, who have different information about the cost and the demand for such a product. This difference in information may lead to different choices in terms of product design. The distributor is the sole distributor in the area and the producer the sole producer. They produce/distribute a branded product, where the brand may belong to the distributor or the producer. Expected demand is $D(p-\alpha x)$ where $x \in \mathbb{R}$ is the product characteristic – referred to as quality – and α is a demand shifter. The distributor gross profit is $pD(p-\alpha x)$, where the price is normalized for distribution cost. The inverse of D is denoted P so that the retail price is $p=P(Q)+\alpha x$.

A quantity Q of quality $x \geq 0$ can be produced by the producer at a production cost $C(Q,x,\beta)=cQ+\phi(\beta,x)$. Hence, the unit variable cost is independent of quality, while there is a fixed cost that varies with the product characteristics (as Mills, 1995, does for national brands versus private labels[4]) and depends on the producer's type β.[5] Thus we assume that the main cost for the producers is caused by the need to reshape the production line so as to adjust to the new product design. Once this is done the unit cost is basically the same for all levels of quality.[6]

The informational asymmetry comes from the fact that the distributor privately knows the demand shifter α, while the producer privately knows the cost parameter β. For conciseness, we assume that the demand shifter α can take only two values, α_1 or α_2, where $\alpha_1<\alpha_2$, and the cost parameter β can take only two values, β_1 or β_2, where $\beta_1<\beta_2$. We denote by $f(\alpha_i)$ the probability that $\alpha=\alpha_i$ and by $g(\beta_i)$ the probability that $\beta=\beta_i$. The vector of information (α,β) can thus take four values $\{\alpha_i,\beta_j\}$, $i=1,2$, $j=1,2$. Information is soft and therefore cannot be transmitted. Demand and cost functions are supposed to be twice differentiable and to verify:

(i) $QP(Q)$ is concave and $P(0)$ is large.
(ii) $\phi(\beta,x)$ is increasing and convex in x, $\phi(\beta,0)=\frac{\partial\phi}{\partial x}(\beta,0)=0$ and $\lim_{x\to+\infty}\phi(\beta,x)=+\infty$.
(iii) $\Delta(x)\equiv\phi(\beta_2,x)-\phi(\beta_1,x)$ is positive and increasing for $x>0$.

[3] The view that an organization may "delegate" decisions to informed party is developed by Dessein (2002), among others.

[4] Contrary to Mills (1995) who justifies that the production of national brands involves a higher fixed cost due to advertising, here we do not impose the ad hoc assumption that private labels would not incur a fixed cost but assume that the fixed cost is related to quality (x) which implies the same correlation between fixed cost national brand versus private label as for Mills (1995) given that he considers that national brands are of better quality than private labels.

[5] In what follows, some results depend on the fact that the marginal cost is known. It could depend on x also with no changes in the main conclusions.

[6] An alternative interpretation is that the fixed cost is an opportunity cost supported by the producer, due to the effect of the quality distributed on his profits on other markets.