A Survey on the Economic Impact of the Development of Private Labels

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ABSTRACT

This paper is a survey of the recent literature devoted to the economics of private labels. In the first section of this paper we provide some statistics about the development of private labels for different products in different countries. Using the results from econometric studies, we also analyse the empirical factors that favour the development of private labels. In the second section, we discuss the reasons retailers introduce private labels i.e. to increase their bargaining power, and to discriminate demand. In the third section we deal with the empirical consequences of the development of private labels on producers and retailers. In the fourth section we review questions that are less frequently discussed. Finally in section five we draw some conclusions about the impact of the development of PLs on welfare.

JEL : L22, L66

KEYWORDS : Industrial Organization, Vertical Structure, Private Labels

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Introduction

What is a private label (hereafter PL)? The PLMA (Private Label Manufacturers' Association) defines a PL as follows: "PL products encompass all merchandise sold under a retailer's brand. That brand can be the retailer's own name or a name created exclusively by that retailer. In some cases, a retailer may belong to a wholesale group that owns the brands that are available only to the members of the group.''[2] According to Nielsen, PLs are brands that belong to a retailer or a grocery firm and that are distributed exclusively by that retailer. The French law (2001 May 15th) that deals with new economic regulations provides the following definition: a PL "is considered to be a product sold within a retailer brand, whose characteristics are defined by the firm (or the group of firms) that sells the product and is the owner of the brand".

These definitions bring out two main ideas. First, it is the retailer who owns and controls the brand whereas this was traditionally the role of the producer. Second, the retailer has exclusive rights to the product. This means that different retailers do not sell identical PLs, which is not the case when retailers sell name-brands. Thus the development of PLs does not only change the relations between producers and retailers (because of the retailer's new role), but also affects competition between retailers, because PLs are an additional way of differentiating between retailers.

Different approaches to the economics of PL are possible. One is the analysis of retailers without taking upstream firms and their relationships with retailers into account. With this approach, the reports published in the literature about oligopoly or about the optimal choice of a range of products by oligopolists apply. How firms choose their optimal range of products is influenced by two opposite effects (Champsaur and Rochet, 1989). On the one hand, the range of products needs to be as wide as possible in order to discriminate among consumers. On the other hand, each firm's products need to be differentiated in order to reduce the impact of price competition. Gilbert and Matutes (1993), assuming differentiation between products is due to brands' name, showed that two firms will compete on a wide range of products because the differentiation due to the brand name weakens competition between products.

Nevertheless, the former analysis fails to reveal the stakes related to procurement as well as to surplus distribution on a vertical structure. A number of reports are devoted to the analysis of vertical relationships and specially the impact of contracts and vertical restraints between producers and retailers. According to these authors, the brand is almost always defined by the upstream producer and there is equivalence between the brand and the upstream manufacturer. Moreover these studies generally focus on the vertical structure made up of a producer and his retailer(s), and deal with, first, coordination within the structure and, second, the competition between vertical structures (for a survey, see Rey, 1997). Coordination problems in a vertical structure mainly concern price setting, optimal level of services and risk sharing. The authors generally showed that vertical restraints allow better coordination within the vertical structure. Consumers generally benefit from these vertical restraints but this depends on the intensity of competition downstream. The more intense the competition downstream, the more likely it is that consumers will benefit from restraints. The second point dealt with in the studies is the impact of vertical restraints on competition between vertical structures. As in the first case, the impact of vertical restraints is ambiguous when competition

[2] PLMA, see www.plmainternational.com

between vertical structures is weak. In this case, restraints may have a strongly negative impact on consumers that is not fully compensated for by the positive impact on the vertical structures themselves.

As emphasised by Comanor and Rey (2000), published reports mainly deal with the case of one producer and several retailers. The case of large retailers who wish to profit from their position in order to deter the entry of new retailers has been analysed less frequently. Moreover, as Rey pointed out with reference to these reports (Rey, 1997), as vertical restraints on the brand are generally designed by the upstream producer there is a limit to the use of their results in the economic analysis of PLs.

The purpose of this paper is to survey the recent literature devoted to the economic impact of the development of PLs. Dobson (1998) has analysed the economic welfare implication of PLs and discussed conditions under which their development is likely to affect positively or negatively welfare. Since 1998, numerous empirical and theoretical papers have been published. This article offers a survey of these recent contributions. It is worth noting that this literature is part of a growing one related to the analysis of retailer power: that is the buying power as well as the selling power of retailers. Yet, concentration of the retail sector is increasing in numerous countries and a lot of competition cases now concern the retailing activities.

In the first section of this paper we provide some statistics about the development of private labels for different products in different countries. Using the results from econometric studies, we also analyse the empirical factors that favour the development of private labels. In the second section, we discuss the reasons retailers introduce private labels i.e. to increase their bargaining power, and to discriminate demand. In the third section we deal with the empirical consequences of the development of private labels on producers and retailers. In the fourth section we review questions that are less frequently discussed. Finally in section five we draw some conclusions about the impact of the development of PLs on welfare.

1. Market share of private labels and factors that favour the introduction and the penetration of private labels

1.1 Background

In Europe the penetration of PLs varies from country to country. However, in all countries the market share in volume is higher than the market share in value. Thus, these products are generally sold at a lower price than the average price. Nevertheless, it is difficult to compare the situation in different European countries because the definition of a PL varies. In particular, it is important to know if discount products are included or not.[3]

**Table 1: Market share of private labels in some OECD countries. Year 2001 (%).**

Country	Volume (1)	Value (2)	(1) / (2)
Italy	12.8	11.1	*115*
United States*	20.0	15.5	*129*
The Netherlands	20.7	18.6	*111*
Spain	23.6	17.0	*138*
France	24.3	20.8	*116*
Germany	31.0	24.0	*129*
Belgium	36.4	26.9	*135*
United-Kingdom	41.0	39.0	*105*

* US Data are for the year 2000   Source: PLMA / AC Nielsen 2002

As illustrated in the graph below, the more concentrated the retail sector, the bigger the market share of private labels.

Figure 1: Private Label penetration rate and retail concentration.
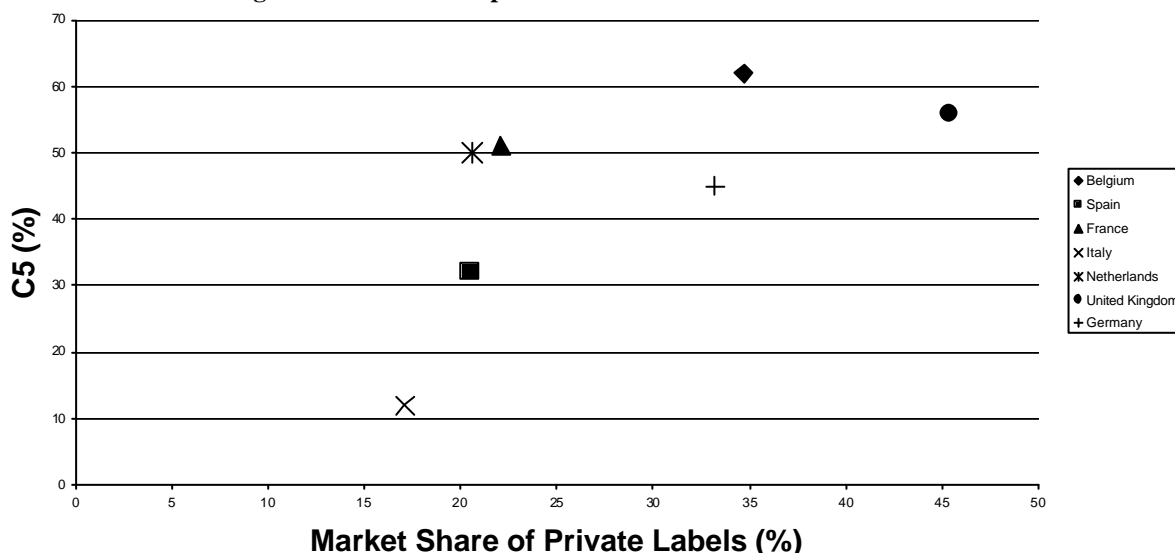
Within a given country, the PL market share varies with the product category and, within a given category, the PL market share varies with the product. Different factors can influence the penetration of PLs. Some are related to the supply (structure of supply, ease of entry, innovation policy, etc) and others to the characteristics of demand. For example, the goods that require a high

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[3] By discount products, we refer to products sold at very low price, generally in specific retail outlets.

level of consumer confidence (baby food, health and beauty products, etc.) generally exhibit low rates of PL penetration. (Tables 2 and 3).

Table 2: Market share of private labels per category of products in European countries. Year 2002 (%).

Country	Frozen Food		Confectionery		Non-alcoholic beverages		Health and Beauty	
	Value	*Volume*	*Value*	*Volume*	*Value*	*Volume*	*Value*	*Volume*
Italy	17.3	21.0	-	-	9.8	11.5	1.8	2.8
The Netherlands	20.2	25.7	13.8	14.2	11.2	11.9	3.6	6.3
Spain	33.9	46.3	11.4	16.3	10.1	18.1	7.6	14.8
France	36.3	40.9	12.2	14.0	16.0	19.8	5.9	9.9
Germany*	36.0	46.4	25.0	28.3	20.0	23.1	6.8	14.7
Belgium	49.0	59.8	17.9	25.7	26.3	39.8	8.9	20.8
United Kingdom	45.4	46.3	18.8	18.8	35.9	47.1	17.9	24.4

* Excluding Aldi which sells almost exclusively private labels. Including Aldi, the market share of private labels would be greater by 10 points.

Source: PLMA / AC Nielsen 2002

As shown in Table 3, penetration of PLs has increased in recent years in almost all categories.

Table 3: Penetration of PLs by product category in France (%)

	2000	1999	1998	1997	2000/1997
Groceries	21.8	21.1	19.,9	18.7	*117*
Drinks	19.9	19.1	18.9	18.,6	*107*
Cleaning products	24.8	22.,9	20.7	20.0	*124*
Health and beauty products	7.3	7.1	6.6	5.9	*124*
Frozen products	33.8	31.7	29.7	29.0	*117*
Tobacco products	32.9	33.3	28.9	28.6	*115*
Dairy products	26.4	26.1	25.7	24.2	*109*
Cheese	21.5	20.0	19.4	18.8	*114*
Cooked pork meats	37.7	35.2	32.5	24.2	*156*
Delicatessen	26.4	23.1	19.2	17.2	*153*

Source: Linéaires (www.lineaires.com).

As discussed before, private label penetration depends on the country as well as the product category. It also depends on the retailer as shown in Table 4.

Table 4: Market share of private labels by retailers' groups in France (according to Secodip, 2001)

Retailer's name	Private Label Market Share in volume (%)
Intermarché	31.3
Carrefour	24.6
Champion	23.1
Système U	22.2
Leclerc	20.7
Casino	27.4
Géant	19.3
Cora	18.6
Match	18.2
Monoprix / Prisunic	17.1
Auchan	18.5
Atac	16.1

Source: Secodip from retailers, 2001

According to PLMA, manufacturers of PL products can be classified in three general categories:
- Large-scale manufacturers who produce both their own brands and PL products;
- Medium and small manufacturers who specialise in particular product lines and concentrate almost exclusively on producing PLs;
- Major retailers and wholesalers who operate their own manufacturing plants and provide PL products for their own stores.

In the French dairy sector for example, examples can be found in each of the above categories. Thus almost all large dairy firms produce both their own brands and PLs (Besnier, Bongrain, Nestlé, SODIAAL, Entremont). Medium and small manufacturers have been specialising (at least for some years), in PL production (for example, Senoble, which began with PL production, has now developed its own brand). Finally at least one retailer has its own production line for dairy products (Intermarché owns a production unit in St Père, France).

1.2 Factors that favour the introduction and the development of private labels

We have shown that PL penetration varies across products as well as across retailers. Several researchers have tried to explain why this is the case. Raju, Sethuraman and Dhar (1995) showed that the introduction of PLs is more likely when the product market consists of a large number of national brands (hereafter NB).[4] They also found a positive impact (on the probability of the introduction of PLs) on the amount of sales in the category. In a recent study, Scott Morton and Zettelmeyer (2000) showed that the introduction of PLs is more likely when the leading NB has a large market share. Their results confirm the positive impact of the total value of category sales. Moreover, their results suggest that the advertising / total sales ratio has a positive impact on the probability of the introduction of private labels. Finally, they found that a large number of producers also favour the introduction of PLs. However, since they controlled for the market share of the leader, this may be the consequence of a greater ability on the part of the retailer to find a firm able to produce his PL.

In a study on the market share of PLs in the U.S. for 34 categories of products in 106 different locations, Dhar and Hoch (1997) showed that 40% of the variance of their sample (variance of the market share of PLs across products, retailers and locations) was explained by differences across categories of products and that 17% of variance originated from retailers.

This study (Dhar and Hoch, 1997, p 211), showed the main factors that favour a large market share for private labels were the following:
- High quality relative to the NB;
- Low variability of quality of PLs;
- High product category sales (this finding is not confirmed by other studies; Raju *et al.* (1995) did not find a significant impact of this variable on the market share of PLs);
- High gross margins (in %);
- A small number of national manufacturers operating in the category (this result is the same as that of Raju *et al.* (1995), who showed that the market share of a PL increases when the number of NB decreases[5]);
- Low national advertising expenditures.

The six above factors explained 70% of the variance of the market share of PLs in a sample of 185 products. The main factors that influence the market share of PLs sold by a given retailer are the following:

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[4] By National Brands we refer to brands that are designed by and belong to upstream manufacturers and that are distributed at a national scale.

[5] Thus, according to the results of Raju *et al.* (1995), the factors that favour the probability of the introduction of a private label and those that favour their development are not identical.

- The number of NBs actually sold by the retailer has a negative impact. The lower the number of NBs, the larger the market share of the PLs. This could be due to the competition between products in a context of fixed retail capacity. The larger the number of products (on a specific market), the lower the market share of each 'variety'.
- The heterogeneity of the market share of NBs (for each retailer) has a positive impact. This could be due to prices. A heterogeneous market share among NBs could be linked to higher prices which would facilitate the penetration of PLs.
- Promotions on PLs and the differences in price between PLs and NBs have a positive impact. Conversely, promotions on NBs have a negative impact even if the impact is lower than that of promotions on PLs.
- Overall strategy of retailers (for example: commitment to quality, use of own name for a PL, a premium brand offering) has a positive impact.
- Wealthier consumers buy fewer PLs.

Finally, according to a survey by LSA/Fournier, the main reasons retailers develop PLs are to increase customer loyalty (16%), to improve their positioning (18%), to improve margins (25%), and to lower prices (33%). These motives are related to two main economic effects i.e. competition between retailers and vertical coordination between producers and retailers.

In the first case, PLs are viewed as an additional way of enabling consumers to differentiate between retailers. Since PLs are specific to each retailer, the supply of products will no longer be identical., In the food sector, where exclusive sales agreements are infrequent, in the absence of PLs, retailers often sell the same products. From this point of view, retailers are consequently not differentiated (although they are obviously differentiated for other reasons such as location, services, etc). As PLs are specific to each retailer, their introduction thus enhances differentiation between retailers. And finally, this is also a way to lessen price competition.

In the second case, by introducing a PL, a retailer becomes a competitor of his supplier. Thus, the retailer reinforces his bargaining position with regard to his supplier.

These two elements are not independent because the level of competition in the final market strongly influences profit sharing within vertical structures. According to Steiner (1985), the relative power between producers and retailers is directly linked to the loyalty of consumers for brands or stores: 'If consumers are more disposed to switch brands within store than stores within brand, retailers dominate manufacturers. Retail margins will be relatively high and those of manufacturers relatively low. When consumers are more disposed to switch stores within brand than brands within store, the above market power and margin are reversed.' (Steiner, 1985, p. 157-158). Consequently the development of a label that incites consumers not to change stores to find their 'preferred' product elsewhere can reinforce the bargaining power of retailers.

2. Why should retailers sell private labels?

Even if the intensity of downstream competition is not independent of upstream bargaining power, the majority of economic studies have mainly focused on bargaining power with regard to upstream firms.

2.1. Private Labels increase retailers' bargaining power

Many of the theoretical models that analyse the development of PLs have mainly focused on the impact of PLs in a vertical structure. Generally speaking, PL products are a tool for retailers to discriminate demand (by supplying a new product) and to enhance their share of profits on the vertical structure. We will see that these two are opposing forces and that the resulting choice of PL characteristics is a compromise between these two objectives.

The usual framework is a vertical structure composed of a manufacturer and a retailer, both being in a position of monopoly. The manufacturer makes a high-quality good at a constant marginal

cost. He sells this good to the retailer at a wholesale price w (we assume linear tariff contracts for the moment)., Excluding distribution costs (in order to keep the analysis simple) the retailer sells this good to consumers at a price p.[6] Within this framework, the consumer price results from a double-marginalization process. Indeed, every firm prices above its marginal cost in order to benefit from its market power. This situation, though profitable for each firm, is detrimental for the social welfare. If the retailer supplies a new product that competes with an existing one, the retailer's profit can increase to the detriment of the manufacturer's and this can lead to a reduction in the double-marginalization effect. The competition due to the new sold good limits the market power of the manufacturer, who consequently lowers his wholesale price and this leads to a decrease in the double-marginalization. Unless the supply cost of the PL is too high, the consumer's surplus rises due to the decrease in double-marginalization.

In the economic reports on private labels, the new good introduced by the retailer is assumed to be of lower quality than the existing one. This is mostly true as it seems that consumers generally perceive private labels as being of lower quality, or at least no higher than the manufacturers' brands.[7] In a survey carried out for INSEE (French National Statistical Institute). Chardon and Dumartin (1998) show that consumers who frequently buy PLs consider the quality-price ratio as being the main advantage of these products.

Reports in the literature also assume that the PL is bought by the retailer at its marginal production cost. This may be the case when the PL is produced by a competitive fringe composed of small firms, which is quite frequent in the food industry due to the relative absence of barriers to entry. It may also be the case when the production firm is vertically integrated with the retailer and the internal wholesale price is thus the marginal cost.

Assuming this to be the case, an upstream manufacturer proposes a wholesale price for a NB. The retailer can then choose whether he will sell the NB or not, as well as whether he will sell the PL or not. Finally, the retailer sets the consumers' price(s) for the NB and/or the PL. The manufacturer can react in three ways with respect to the wholesale price of the NB:

- Propose a monopoly wholesale price, just as if there were no PL;
- Propose a wholesale price sufficiently low in order to deter the retailer from introducing the PL;
- Propose a wholesale price taking into account the presence of the PL (the manufacturer accommodates the entry).

Two opposite hypotheses relative to PL production cost have been reported in the literature. They do not lead to exactly the same conclusions. Mills (1995) analysed the case where the production variable costs for the PL and the NB are the same. The production costs of the two goods only differ in the fixed costs. This can be interpreted as advertising expenses: NBs are (subjectively) considered by consumers as high-quality goods because they are extensively advertised. Advertising expenses are independent of volume sales and can therefore be considered as fixed costs. Conversely, the objective characteristics of the two goods are identical, but the qualities perceived by consumers are not: this is usually referred as subjective quality.

Based on such assumptions, Mills showed that:

- If PL quality is too low (relative to the quality of the NB), the retailer does not introduce the PL because it is considered as a too low quality substitute for the NB product. The NB manufacturer remains in a position of monopoly and sets the wholesale price to the same level as the monopoly wholesale price.
- When the PL quality is above a certain threshold, the retailer facing a monopoly wholesale price might introduce his PL. The NB manufacturer then has an incentive to lower his wholesale price in order to deter the retailer from selling his PL. The manufacturer thus sets a

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[6] Results are still valid when assuming that the retailer faces a distribution cost.

[7] This may now be less pronounced thanks to the introduction of "High-quality" private labels such as *Reflets de France*, *Saveurs etrangères.* Nevertheless the majority of private labels are perceived to be of inferior or equal quality to NB products.

limit wholesale price.The threat of a PL consequently leads to a decrease in the NB wholesale price. The higher the quality of the PL with respect to the NB, the greater the decrease
- Finally, above a specific quality threshold, PL quality is too high for the NB manufacturer to deter its introduction. The NB manufacturer consequently finds it profitable to set a wholesale price that accommodates the entry of the PL. Both products are thus sold on the market. The higher the quality of the PL, the lower the NB wholesale price. When the perceived qualities are identical, the NB wholesale price is set to marginal cost and the upstream manufacturer makes zero profit.[8]

The most important result is that the threat of a PL entry or its actual introduction leads to a decrease in the NB wholesale price. This decrease increases with an increase in PL quality. The vertical structure's profits increase (due to the decrease in the double-marginalization effect) and the retailer's profits increase more than the manufacturer's profit decreases.[9] Consumers also benefit from the supply of the PL (or from the threat of supplying a PL) since the final price of the NB decreases and market coverage increases.

Taking into account fixed costs does not allow any systematic conclusions to be drawn about the benefit to social welfare of the introduction of a PL. However, as long as the fixed costs are low, social welfare is improved by the sale of a PL.

Contrary to Mills (1995) who assumed that marginal costs were identical for both products, Bontems, Monier and Réquillart (1999) supposed that PL and NB differ in their marginal production costs. In their model, the marginal production cost increases with quality. The mechanisms at play remain the same (double marginalization), but the results are different.

Indeed, if the PL possesses a cost-disadvantage (at identical quality, manufacturing the PL is more costly than the NB), thus:
- If the PL quality is low, the NB manufacturer cannot impede the entry of the competing product at a low cost. The retailer therefore sells both products. The price of the NB first decreases as a reaction to PL quality, then, under some conditions, it can increase. Indeed, the higher the PL quality, the more competitive the PL is with respect to the NB. This leads to a decrease in the NB wholesale price. However, the increase in PL quality induces a cost increase which goes in the opposite direction. The resulting summed effect can be an increase in the price of the NB. In this case, it should be noted that the NB will disappear from the store if the cost of the PL is low enough and when the consumers' willingness to pay for quality is low (the NB quality was too high).
- For intermediate values of PL quality, the NB manufacturer sets a limit wholesale price and deters sales of the PL. In this case, the NB price increases with PL quality. The increasing cost of the PL makes the limit price strategy easier.
- Above a certain quality threshold, the NB recovers its natural monopoly position because the PL is not competitive. The NB manufacturer fixes a monopoly price and the retailer only sells the NB in his store.

When the NB has no cost-advantage (this means at the same quality, the cost of the PL is the same as that of the NB), the PL is always introduced and the NB final price decreases as a function of PL quality. The actual introduction of a PL (or the threat of introduction) improves social welfare because it lessens or avoids the double-marginalization problem.

This model, which also relies on the assumption of linear tariffs between the manufacturer and the retailer, emphasizes the importance of the role played by the cost structure of the production process in the decision to introduce a PL introduction. One conclusion is however that the development of PLs is beneficial for social welfare.

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[8] If the PL possesses a cost-advantage over the NB, for high quality values of the PL, only the PL is present on the product market and the NB is not listed any longer (see Allain and Flochel, 2001).

[9] This does not take into account the fixed costs linked with the production of the good (not modelled).

The two models presented so far also conclude that the introduction of PLs (or the threat of introduction) leads to an increase in the retailer's bargaining power with respect to the sharing of the vertical structure profits.

Caprice (2000, Chapter 2) also pointed to the increase in the retailer's bargaining power. Using a two-part tariff model between an upstream manufacturer and a retailer (the double marginalization effect vanishes because of the two-part tariff contract: the upstream firm sells at the marginal cost and the franchise fee splits the surplus). He showed that the fact that the possibility exists for a retailer to sell a PL enables him to make a higher profit. In this model, because the retailer assumes the upstream firm will make a take-it or leave-it offer, his profit is defined by his reservation profit. Without a PL, the retailer makes zero profit. If the retailer has the opportunity to sell a PL, this creates a reservation profit and the upstream manufacturer is consequently obliged to leave a rent for the retailer. The amount of this rent is equal to the profit the retailer would make by selling his PL only (i.e. his new reservation profit). The retailer thus increases his bargaining power by increasing the profit he can get in case of a disagreement with the upstream manufacturer.

Some empirical studies (see below) tend to prove that the PL invasion has resulted in an increase in NB prices in some sectors. The models presented so far do not explain such a phenomenon and rely on a Mussa-Rosen formatted demand where goods are assumed to be vertically differentiated. It is clear that the price reaction of the NB depends on the form of the final demand. Some researchers consequently tried to develop models where the increase in NB prices happens after the introduction of PLs, at least in some cases. Gabrielsen and Sørgard (2000) analysed the impact of the introduction of a PL in a vertical structure where contracts are linear in prices. The form the demand takes, which influences the final result, depends on the distinction between two kinds of consumers. Some consumers are loyal to the NB, and as long as the NB product is sold under a certain reservation price (identical for all these consumers), they will only buy the NB. The NB demand is thus inelastic. A second group of consumers is opportunist. They are characterized by a positive switching cost distributed as a function of density. They buy the NB as long as its price is not too high compared to the PL (when the PL is sold). In addition, when they buy a good, the reservation utility is not the same for all consumers. The demand for the PL is thus price-elastic. As a consequence, when only the NB is available, demand for it will increase with a decrease in the NB price. When the relative number of loyal consumers varies, the authors show that the introduction of PLs can have different effects on NB prices:
  – When the number of loyal consumers is low, the final and wholesale prices of the NB decrease. The PL is not introduced by the retailer. The upstream manufacturer consequently only needs a limit price strategy to deter the introduction of the PL. This strategy forces him to lower his wholesale price in order to leave the retailer enough profit from selling only the NB.
  – When the number of loyal consumers increases, this limit price policy becomes too costly. The wholesale and final price of the NB increase in response to the actual introduction of the PL. The NB manufacturer then only focuses on loyal consumers. As their demand is inelastic, wholesale price and final price are equal to their willingness to pay for the NB.
  – Finally, when the number of loyal consumers is very high, introduction of the PL has no impact on the NB price. Indeed, before the introduction of the PL, only loyal consumers were supplied. The wholesale and retail prices were already equal to the loyal consumers' willingness to pay.

Such results are in contradiction with the previous models presented, but the results rely on a very particular demand form from two different groups of consumers. Some (we refer to customers) are identical and have infinite switching cost for the PL. Others, on the contrary, have switching costs distributed across a specific law of probability, and their willingness to pay varies. The results are directly due to this dichotomy. However the Gabrielsen and Sørgard's study shows that the form of the final demand is a key factor in forecasting the impact of the introduction PLs on NB prices.

The main economic effects due to the actual introduction of a PL are summarized in Table 5.

The introduction of the PL always increases the retailer's profit (otherwise he would not sell it) and decreases the NB manufacturer's profit (except in cases where the profit remains constant). Regarding profit sharing in the vertical structure, the retailer is able to increase his share. The vertical structure surplus increases for two reasons: first, because the double-marginalization effect is less severe (as in Mills,1995 and in Bontems *et al.* , 1999*)* and second, because of the demand discrimination the PL provides (all models). Consumers also benefit from the introduction of PLs for the same reasons (weakened double-marginalization and increased variety).

Table 5. Economic effects of the actual introduction of a PL.

Authors / Variable	Mills	BMR	Caprice	Gabrielsen and Sørgard A	B
NB wholesale price	-	-	=	+	=
Manufacturer's fixed fee	nr	nr	-	nr	nr
retail price of NB	-	-	=	+	=
manufacturer's profit on NB	-	-	-	-	=
Retailer's profit	+	+	+	+	+
Vertical structure's profit	+	+	+	+	+
Consumers' surplus	+	+	+	+	+

BMR: Bontems, Monier and Réquillart (1999);
Nr: not relevant in this model;
A: Proportion of loyal customers neither too low neither too high;
B: Proportion of loyal consumers high.

Thus, retailers use PLs to increase their bargaining power. It should be stressed that whether or not the PL is actually introduced does not modify alter this result. The absence of PLs in certain sectors does not necessarily mean that the retailer has not used the threat of developing PL in order to increase his profits.

2.2. How do retailers choose the characteristics of private labels?

Up to now we have considered PLs as new products whose quality is lower than national brands and which are purchased at marginal cost by retailers. Under this assumption, PLs appear to be very similar to low quality products sold by small brands or brands that are not widely known. However, an essential feature of PLs is that their characteristics are fixed by retailers and not by manufacturers. Moreover, these decisions are taken strategically to enable the retailer to increase his profits. In the models presented above, this choice is driven by trading off price discrimination of final demand and willingness to increase the retailer's bargaining power in the channel.

For instance, when marginal cost increases with quality, Bontems *et al.* (1999) showed that the quality of the low quality product depends on the market structure and the identity of the player who makes the decision.[10] The following five situations are classified as a function of an increasing level of quality for a low quality product:

1. Upstream multi-product monopoly that chooses quality;
2. Upstream duopoly where one firm chooses low quality;
3. Integrated vertical structure;
4. Upstream high quality monopoly with a competitive fringe producing low quality which is chosen by the retailer;

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[10] In this framework, the quality of branded products is exogenous and not strategically determined.

5. Upstream duopoly, where the retailer chooses low quality.[11]

Thus, given the same upstream market structure (first compare cases 1 and 4, and second cases 2 and 5), it appears that the retailer chooses higher quality for a low quality product than any upstream firm would chose. This is easily understood when considering the trade-off between price discrimination and the decrease in wholesale price for branded products. Price discrimination of the final demand allows a sufficient degree of product differentiation between both goods to be maintained, whereas the biggest decrease in wholesale price is obtained when product differentiation is low. Thus, the choice by the retailer of PL characteristics takes into account these two opposing effects. Conversely, upstream producers will only consider price discrimination when choosing quality. To sum up, the retailer gains by choosing a low quality product that is close to the branded product.

Caprice (2000) has also studied the optimal private label quality when two-part tariffs are allowed.[12] In section 2.1, we showed that selling private labels enables the retailer to capture a bigger share of the channel's profit. Thus the possibility of commitment by the upstream producer is crucial for the choice of the level of quality of the PL by the retailer.

If the producer can commit to a contract before the level of quality is chosen by the retailer, then the latter chooses the optimal quality level from the channel's point of view. Indeed, two-part tariffs allow the parties to exchange the goods at marginal cost and this gives the right incentives to the retailer to maximize joint profit when considering quality choice.

On the other hand, if quality choice is irreversible or if the upstream producer cannot commit to a contract before the retailer's choice of quality, then the retailer does not maximize joint profit and chooses higher quality.[13] Indeed in this case, the retailer chooses the level of quality that will maximise disagreement payoff, which is obtained when the producer's product is not sold.

Note that in this model, for the retailer there is clearly no difference between the two situations, because his profit is always equal to his reservation profit, which is the profit he would obtain when selling only PLs. However, the upstream producer strictly prefers to commit to a contract before the retailer chooses low quality, because then the degree of product differentiation is the optimal one from the point of view of the channel's joint profit.

According to these models, the retailers would strategically choose higher quality for PLs than that that would be chosen by manufacturers. This result seems to be consistent with the marked development of 'me too' products that are replicates of NB products. In a recent study, Sayman, Hoch and Raju (2002) showed that when PLs are targeted towards NB products, this concerns primarily the strongest NB products.

Scott Morton and Zettelmeyer (2000) consider a model where a monopolist retailer bargains with several upstream producers. One of the manufacturers offers to sell a leading NB product. The retailer has a limited capacity to sell multi-products and can only offer two products on the shelf. The choice is whether to distribute either a second NB produced by a second manufacturer or a PL. The channel's profit is divided between producers and the retailer. Each producer earns a given share of the incremental profit, that is proportional to his bargaining power. The incremental profit is determined by comparing the channel's profit when the two products are on the shelf and the profit when only the competing product is sold.

Let us assume that three producers, including the PL manufacturer, compete on the market and have identical bargaining power. Available goods are differentiated along two attributes, one corresponding to vertical differentiation and the other to horizontal differentiation. Thus, branded products are assumed to be of higher (exogenous) quality than the PL. Moreover, the horizontal

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[11] In all these situations, the retailer is assumed to be a monopoly.

[12] With linear pricing, only one instrument (i.e. the quality of the PL) is available both to reduce double marginalization and to discriminate final demand as a function of quality. Conversely, two-part tariffs allow the franchise fee to be used as a second instrument.

[13] Note that the incomplete nature of the agreements can justify the impossibility for the producer to commit to a contract.

characteristic of PLs may be set in order to meet consumers' requirements, which can be of two types. A private label designed for market segment 1 will procure less utility for type 2 consumers than type 1 consumers. Assuming that the leading brand is designed for type 1 consumers; the problem for the retailer is to decide whether to sell a second NB, designed for type 2 consumers, or to sell a PL whose horizontal characteristic has to be chosen. The authors showed in this framework that the introduction of a PL always diminishes the joint profit of the channel, compared to selling the second national brand. But selling a PL also leads to a decrease in the incremental contribution to profits of the leading brand. This enables the retailer to capture an increasing share of the total surplus. Overall the retailer's choice is driven by his bargaining power. When his bargaining power is low, the retailer strictly prefers to sell a PL and conversely, when his bargaining power is high, a second national brand is chosen instead. Indeed, with an increase in his bargaining power, the retailer pays more attention to total surplus. The authors also showed that if introduced, the second NB would be designed for type 2 consumers (in order to lessen competition with the leading brand). Conversely, the PL would be introduced on the same segment as the leading brand because its main purpose is to decrease the incremental gain of the leading brand.

Once again, it appears that product positioning depends to a large extent on whether it is decided by upstream producers or by retailers. While manufacturers and retailers may both have an interest in price discrimination of the final demand, product positioning by retailers through the design of PLs allows them to capture a bigger share of the channel's surplus. As a consequence, this model shows that PLs will compete more aggressively with a leading brand than would other NBs.

One important feature of Scott Morton and Zettelmeyer's analysis is to explicitly introduce a bargaining procedure in vertical contracting in the channel. However, the modelling of final demand could be improved in order to test the robustness of their conclusions. Moreover, the assumption of equal bargaining power for all the upstream producers should be removed in order to better represent asymmetric situations.

3. Empirical analysis of the development of private labels

Empirical studies dealing with the impact of the development of PLs can be classified according to the type of data used:
- Analysis based on cross-section data;
- Analysis based on time-series data.

The first group of empirical analysis (Putsis, 1997; Cotterill, Putsis and Dhar, 2000) on the impact of the development of PLs used cross-section data relating to many different food products and many local markets.[14] The authors showed that price reaction functions have positive slopes. A decrease in the NB (PL) price is accompanied by a decrease in the PL (NB) price. According to Putsis (1997), these price function reactions are asymmetric. The PL price would react more to a variation in NB price than the NB price to a change in PL price. However, Cotterill, Putsis and Dhar (2000) did not confirm these results on asymmetric price reaction functions.

Putsis's results suggest that a larger PL market share is correlated with a decrease in the NB price and an increase in the PL price. This negative relation between the PL market share and the difference in price between the NB and the PL is rather counter-intuitive. However, if the competition between the NB and the PL is strongly influenced by the quality of both goods, this could be the result of the role of this unobserved characteristic (Mills, 1995).[15] A larger PL market share would result

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[14] For example, Putsis (1997) analysed competition between PLs and NBs over 135 food products sold in 59 geographical areas in 1991 and 1992. Cotteril, Putsis and Dhar (2000) used data from 125 food products in 54 geographical areas.

[15] According to Cotterill, Putsis and Dhar (2000), these results could originate in a inappropriate econometric treatment that does not deal with the simultaneity of demand and competitive interactions between agents in the market. Using the same kind of data and dealing with the problem of simultaneity, they found a positive link between the PL market share and the difference in price between the NB and the PL.

from a higher level of PL quality (compared with NB quality). In Table 6, we show the impact of an increase in PL quality on price and surpluses according to the two models previously described.

When PL quality increases, the NB price decreases because of the decrease in differentiation between the two products. Moreover the PL price increases in response to the increase in consumer utility (in the vertical differentiation model, the utility of every consumer increases with the quality of product). Finally, the NB market share decreases because the decrease in NB price does not compensate for the negative impact on demand for an increase in PL quality. Thus, in a cross-section analysis, the PL market share is larger when the difference between NB and PL prices is smaller, because a limited difference in price is associated with a small difference in quality between the NB and PL products.

Moreover, according to Mills and 'BMR' models, the retailer's margin for PL is greater than the margin for NB. This prediction is in accordance with empirical facts.

Table 6: Impact of an increase in PL quality

	Mills	BMR	
		A	B
Wholesale price of NB	-	-	-
Retail price of NB	-	-	-
Market share of NB (%)	-	-	-
Retail price of PL	+	+	+
Market share of PL(%)	+	+	+
Average PL NB price	+	+	+
NB producer's profit	-	-	-
Retailer's profit	+	+ then -	+
Vertical structure profit	+	+ then -	+
Consumers' surplus	+	+ then -	+

A: low level of heterogeneity between consumers;
B: high level of heterogeneity between consumers.

A second group of empirical analyses (Ward, Shimshack, Perloff and Harris, 2002; Gabrielsen, Steen and Sørgard, 2002) used time-series data, thus eliminating the effects of structure. Ward *et al.* studied the impact of the development of PL in the US. They used monthly data on prices, market shares, and advertising expenses for 34 product categories. For each category, they analysed how NBs react to the development of PLs. They showed that an increase in the PL market share is accompanied by:

- − An increase in the price of NBs (or no impact);
- − A decrease in the price of PLs (or no impact);
- − A negative impact or no impact on average prices;
- − A decrease in advertising activity for NBs.

Gabrielsen, Steen and Sørgard (2002) studied the impact of the introduction of PLs in Norway. They used weekly data on the prices and market shares of 83 products. For each product, they studied changes in NB prices over time and distinguished the period before the entry of PLs from the period after entry.[16] When the impact of the introduction of PLs is significant (17 cases and 83 products) the impact is positive (15 cases). Thus, the introduction of PL induces an increase in NB prices. The increase in NB prices is larger when the PL market share is small. Finally their results suggest that the increase in NB prices is larger for leading and nationally distributed brands.

Finally, some empirical analyses deal with the interactions between manufacturers and retailers and the measurement of profit-sharing in vertical structures. Thus Kadialy, Chintagunta and Vilcassim (2000) studied the share of profits between manufacturers and retailers on fruit juice and tuna markets

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[16] They estimate a price equation for NB (AR(1) model) which includes a dummy variable indicating if a PL product is present or not. The coefficient of this variable indicates the impact of the existence of PL.

in the US. They used a model based on conjectural variations. According to their results, manufacturers who produce high quality products (or perceived as such by consumers) gain a larger share of the profit of their vertical structure than other manufacturers. However, these estimates are based on wholesale and retail prices and do not take fixed fees into account. Chintagunta, Bonfrer and Song (2002), using data on sales from different stores of a large supermarket chain, studied the impact of the introduction of PLs in the breakfast oats market. They showed that the introduction of PLs generates a decrease in the price of the leading NB, a decrease in promotion activities of the NB and no change in the margin the retailer earns on the NB.

4. Less frequently analysed topics

We have just shown that empirical findings do not systematically support the theoretical mechanisms involved in the previous models. An inadequate treatment of product quality in the analysis could explain some gaps. The divergences could also originate in other mechanisms that were not integrated in the previous models. We discuss some of these in the following section.

4.1. Private labels, capacity constraints and competition between retailers

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According to Allain and Flochel (2000) restricting the supply of shelf space (as done by the Raffarin law in France) could slow down the development of PLs. This result is obtained with a model similar to the one developed by Bontems, Monier and Réquillart (1999). In such a framework, restricting the availability of shelf space favours NBs to the detriment of PLs because absolute margins at the retail level are larger on NBs than PLs. However, Allain and Flochel (2000) also showed that the restriction of shelf space is detrimental to upstream producers because it induces an overall decrease in the quantity of NBs sold by the retailer (this is due to the increase in price). The latter result is true only if the downstream structure does not change. With free-entry at the retail level, restriction of shelf space per retailer is not incompatible with an increase in the profit of upstream firms. Thus, the negative impact on profits of restrictions on shelf space is now lower due to the entry of new retailers. The positive impact on profit of a price increase now outweighs the negative impact of the decrease in sales.

Generally, studies on the development of PLs consider a downstream monopoly. This allows the analysis to focus on strategic interactions within a vertical structure (i.e. between retailers and producers). However, such a framework neglects interactions between retailers. Caprice (2000) investigated the strategic choice of a producer with respect to two retailers who are considering developing their own PL. He showed that for a given quality gap between a NB and a PL, the strategic choice of the upstream producer depends on the difference in production costs between the NB and the PL. When the upstream producer has only a small cost advantage (w.r.t. the producer of PL) then the NB is not sold by retailers. When the cost advantage increases, then it is better for the NB producer to offer his product to only one retailer. Finally, if the cost advantage is big enough, the producer sells his products to both retailers. The optimal choice of the upstream producer results from a trade-off between the size of his share of the cake (the share is bigger when his product is distributed by the two retailers) and the size of the cake to share (competition between retailers decrease the overall surplus).[17]

4.2. Can the Private Labels be profitable to National Brand manufacturers?

As the PLs compete directly with the NB products, *a priori*, NB manufacturers loose profits when a retailer introduces a new PL. However this issue appears to be more complicated that it seems at first

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[17] The framework of the analysis assumes two-part tariffs. Thus an increase in competition between retailers generates a decrease in the surplus of the industry since there is no double marginalization (as shown previously, with linear pricing the decrease in double marginalization generates an increase in the surplus of the industry).

sight. Private labels do indeed compete with NBs on the product market, but the question of PL production and its associated profits remains. From this point of view, NB manufacturers may find it profitable to manufacture the PL for the retailer.

One argument given by the leading NB manufacturers about producing PLs is that the production of such a good allows them to use excess production capacity. In addition, for these volumes, they do not have to incur the level of marketing and product development costs usually associated with branded products, as suggested by Bell *et al.* (1997). NB manufacturers will hence produce a good that will compete with their own, but if they refuse to produce it, others will do so. The extra revenues from the production of the PL will then go to other firms, whoever these may be: big competing manufacturers or small companies specialized in PLs production.

This reasoning nevertheless has the following caveat: it implicitly assumes that firms that may be chosen to manufacture the PL are able to make a product whose characteristics are close to those of the NB. If this is not the case, a leading NB manufacturer may see no advantage in producing the PL because there is no credible alternative for the retailer to find a "serious" competitor.[18] Coca-Cola falls into this category: due to its huge investments in advertising, its brand is so well known that no competing PL is a threat in the short term, even if some of the existing private label colas are recognized as being excellent products according to consumers' blind tests. Consequently, Coca-Cola does not manufacture PLs. Similarly, on the fresh dairy products market, Nestlé and Danone, which possess well known brands across Europe, do not produce PLs at a large scale.

It should be acknowledged these firms are an exception and that most major food producers do produce private labels. Indeed, when a close PL alternative to the NB exists, the manufacturer may often find profitable to produce its own competing good. However, the decision about who will produce the PL belongs to the retailer.

When taking the decision about who is going to produce his PL, the retailer trades-off between gains in efficiency and shares in rents. On the one hand, if the manufacturer of the NB also manufactures the PL, he may pay some costs such as packaging costs, or he may help the retailer in the definition of the PL manufacturing process and characteristics.[19] This will allow the NB manufacturer to offer a good at a lower cost than an isolated firm from the competitive fringe could. On the other hand, by having his PL produced by the manufacturer of the equivalent NB, the retailer entrusts both the goods and his profits to the same agent, i.e. the manufacturer of the NB. This will have some implications for the NB tariff proposed by the upstream manufacturer.

As shown in Bergès-Sennou (2002), when the retailer's bargaining power is low, he will prefer to entrust the production of his PL to an independent firm, because if the retailer entrusts his PL to the NB manufacturer, he has also to share the profits from the PL with the NB manufacturer. But if the retailer's bargaining power is limited, then he will get less of the profit from the PL in the negotiation than he would if the PL were produced by an independent firm. The second result is that the higher consumer loyalty to the NB, the more likely the PL is to be entrusted to the NB manufacturer. High consumer loyalty to the NB means that the PL is really not a credible alternative to the NB. In this case the retailer finds it more profitable to only benefit from the cost-advantage of the NB manufacturer. The model also predicts that the merger of buying units belonging to different retailers favours isolated firms for PL production.

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[18] The problem to the PL manufacturer who wants to produce a "me-too" may be either to overcome a technical gap or to build a reputation as high as the one developed by the leading brand. In our opinion, the second problem is more frequently observed in the food sector because the production technologies are rather standard and the R&D effort is usually low.

[19] See Le Borgne (1996): ''*La marque de distributeur: l'étude des relations fournisseur-distributeur*'', Mémoire de DESS en Droit des Affaires, Université de Bourgogne, 53 pages.

4.3 The Diversity of Private Labels

Talking about private label as a single good can be misleading in the sense that generally, private label encompasses a full quality range of products. For a given good, private label applies to *low-price* products, *me-too* products and *high-quality* products. In our opinion, low-price products are now maintained by retailers to compete with "hard-discounters", that is retailers which mainly offer PLs sold at very low prices (in Europe, Aldi is the leading hard-discounter). The issue is to "attract" or to keep consumers with low willingness to pay. The second kind of products are copies of national brands (for example, with packaging close to the one of the leading brand) and often sold at a lower price. These PLs help in obtaining price concessions from national brand manufacturers as explained in section 2. Indeed, they represent a good alternative for consumers to the leading brand product and thus compete directly with targeted national brands (see Meza and Sudhir, 2003). At last, more recently, some retailers develop a new kind of high-quality private label in order to increase consumer loyalty or to attract new consumers. Sometimes, this leads retailers to innovate and to create new categories of products that national brand manufacturers have not investigated before. For instance, this is the case of chilled-ready-eat-meals.[21] In our opinion, this recent trend mainly proceeds from the desire of retailers to soften price competition between them by increasing their differentiation.

It is worth noting that a weakness of the existing literature is that it only considers private label as a single good competing with a branded product, implicitly focusing on the me-too products.

4.4 Impact on farmers

Should the development of PL have an impact on the farm? This question is not addressed in the reviewed literature. Let us distinguish between processed products and fresh products.

With respect to processed products the impact is indirect and the question becomes: does the development of PL have an impact on final demand? If the increasing role of PL is essentially a story of substitution among brands, then the farm sector has not a lot to gain from their development. Conversely, if PL development is accompanied by an increase in the total market, then the derived demand by the food industry to agricultural products will increase. Using results from Ward *et al.* (2002), who show that the impact of PL development on prices is either zero or slightly negative, one can conclude that the expansion effect of PL development is likely to be small. Thus, the impact on the farm sector is likely to be marginal.

With respect to fresh products, the question is different. In these sectors, at least in European countries, national brands do not exist.[22] At present, retailers are developing their private labels (generally with the same name for all fruits and vegetables) in this sector. Rather than a mean to improve their bargaining power with the upstream level (as the upstream level is atomized in this sector, they already have a strong bargaining power), this is a way to better discriminate among consumers.[23] This strategy could lead to an increase in the volume and the value of the sales. If this is the case, then the impact on the farm sector should be positive. It is also noteworthy to mention that these PLs are developed using contracts with farmers. These contracts are based on requirements which are generally more demanding than the ones developed by the main cooperatives or firms involved in fresh products trade. It means that the retailers are going to develop their PL on a basis of rather high standard of quality. In particular retailers are often concerned with the environmental and health contents of their products.[24] This could increase the volume of sales and hence could represent a positive opportunity for the farm sector.

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[21] We thank the referee for mentioning this example.

[22] Some brands exist but they are mainly unknown to the final consumer. It is mainly used to facilitate exchange between suppliers and retailers. Thus they do not play the same role.

[23] This is also a way for a retailer to differentiate himself from his competitors.

[24] For example, they limit the use of pesticide.

5. Concluding remarks

Most of the models agree on the positive impact on welfare of the development of PLs in the short term. In these models, PLs are frequently considered as additional goods that allow the retailer to increase his profit to the detriment of the upstream producer, either by decreasing the wholesale price or by capturing a larger share of the surplus of the industry. In these models, consumers benefit from the increase in the number of goods available and from the positive impact of the reduction in double marginalization.[25] In practice in the shop, a PL generally replaces another product, for example a regional brand. In this case the positive impact linked to the increase in the number of goods available for the consumer in a shop disappears. However we have shown that the strategic choice of product quality by a retailer or a producer is not identical. For a given quality of the NB, the retailer designs a less differentiated good than an upstream producer would. Therefore the consumer will benefit from an increase in competition between the two products but could be penalised by the lower degree of differentiation between products. Thus, in a more realistic framework, it is not certain that the introduction and development of PLs lead to an increase in consumer surplus and to an increase in welfare. For example, Caprice (2000), using a framework of non-linear pricing, showed that when the choice of characteristics of the PL is strongly irreversible, the introduction of PL decreases welfare as compared to a case where the characteristics are chosen by the integrated vertical structure.

In a longer term analysis, even if no specific work has been done on this topic, the impact of PL could well be less positive. The argument is the following: the development of PLs leads to a different share of profits within vertical structures. A decrease in the profits of the upstream producers could lead to less innovation and thus reduce the variety of goods available to consumers. This mechanism is reinforced by the strategy of retailers who develop 'me-too' products. This strategy is nothing else than free-riding on research and development of new products. Such a free-riding will discourage the efforts devoted to the development of new products in the long term. Moreover, the development of PLs can modify competition between retailers in the long term. For example, PLs enable greater differentiation between retailers and thus lower price competition among retailers which is detrimental to welfare (for a discussion on long-term effects, see Dobson, 1998).

The economics of private labels needs to be more elaborated as a lot of questions remain to be answered. From a conceptual point of view, the consequences on inter-brand competition of the dual role of distributors who both carry the competing NB and their own PL are not fully explored. Furthermore, the strategic design of characteristics of the PL by the retailer has not been sufficiently addressed in the literature. More generally, the implications for competition policy of the PL development are not explored. In particular, this questions the way competition policy has to deal with concentration in the retail sector.

A second group of issues is related to the existence of different PLs and to the understanding of their effects. As explained before, while retailers develop a range of PLs, economic models have not accounted for as they frequently focus on a generic PL and its impact on the vertical chain.

A better understanding of these two groups of issues will certainly need to take into account the interactions between retailers. Until now, the literature generally considers a downstream monopoly. This assumption needs to be relaxed to address competition policy issue as well as heterogeneity in PLs.

A third group of questions is related to the long term implications of PLs invasion on innovation and product development. As explained before, on the one hand some PLs are clearly free riding on R&D effort from NB producers. But, on the other hand, as retailers have better information on the demand side of the market, they can participate to the R&D effort (for example by creating new products as it is sometimes observed).

On the empirical part of the agenda, it is also needed to better identify the specific interaction between PLs and NBs. At least two directions may be explored. The first one, following recent papers by Meza & Sudhir (2003) for example, is to distinguish the impact of PLs on the different NBs. The

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[25] This latter effect is only relevant in a framework of linear pricing.

second one is to distinguish between the various kinds of PLs. To sum up, the empirical analysis now needs to be much more precise and to disaggregate among PLs and among NBs.

   More generally, the analysis of the vertical relationships between producers and retailers needs to be more deeply investigated, in particular the analysis of the retailer power. Only few papers addressed this issue as most studies consider a perfectly competitive retail sector. There are some recent and interesting contributions in the Industrial Organization literature (e.g. Berto Villas-Boas, 2003) as well as in the marketing literature (e.g. Iyer and Villas-Boas, 2003). However, it seems that the empirical models have not yet used all the implications of IO models. Finally, the lack of data on wholesale prices as well as fixed fees (slotting allowances, …) and more generally on contracts between producers and retailers is a strong limit to the development of empirical work in this field. It certainly explains why until now only few empirical works have been undergone on producer-retailer relations although this is certainly a central issue in the analysis of competition in many industries.

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[26] In a study on strategic interactions between manufacturers and retailers, Berto Villas-Boas (2003) rejects the assumption of linear pricing.

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