# Cartel Damage Mitigation from Retailers' Store Brands

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ABSTRACT

As store brands (or private labels) are not only common in many product categories but are often procured competitively from different sources or even through vertical integration, they may be not or much less directly affected by a cartel induced overcharge. The first part of this article provides the economic foundations for how we should expect retailers to optimally adjust their store brand prices when facing higher wholesale prices on national brands. While retailers should pass on at least some of the overcharge for national brands, resulting in a price increase for national brands, theoretically their optimal response with respect to store brands is ambiguous, as there are two potentially opposing effect, a "demand diversion effect" and a "margin effect". Consumers could thus face either lower or higher store brand prices when there is a cartel of brand manufacturers. In any case, however, the optimal reaction of retailers allows them to mitigate the immediate damage inflicted by the overcharge on national brands, which raises the question to what extent such mitigation should be accounted for in follow-on cases. In the second part of the paper we illustrate our arguments with an empirical analysis of the German coffee cartel.

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## I.    INTRODUCTION

Private enforcement cases to claim cartel damages have been steadily on the rise in Europe in recent years. Apart from increased public enforcement, this is also due to the efforts of the European Commission to enable such private enforcement.[1] At least since Courage v. Crehan[2] and Manfredi[3], it is generally accepted that any individual can claim compensation for harm suffered from an infringement of EU competition rules.  The Commission provided a framework for such follow-on cases with its publication of a draft guidance paper on the quantification of harm[4] and ultimately the Directive on rules governing actions for damages under national law in 2014.[5]

As manufacturers frequently sell through retailers, many follow-on cases involve retailers claiming damages from brand manfacturers. We subsequently illustrate our analysis with the German coffee cartel. There, as well as in many other cases, retailers also sold private labels or store brands. At least in that case a direct umbrella effect on the supply of store brands seems unlikely due to the nature of the production and supply of store brands, e.g., as the respective roasting factories are even owned by retailers. Still, it would be wrong to completely dismiss store brands from the analysis of cartel damages. How store brands interfere with the direct effects from brand manufacturers' overcharges is the topic of this paper.

Conceptually, as we explore below, an overcharge on wholesale prices for branded goods can lead to both lower and higher prices for store brands. This is the result of two conflicting effects, a "demand diversion effect" and a "margin effect", which we introduce below.  In the case of the empirically analyzed German coffee cartel, however, our results indicate that both retail prices for national brands as well as those for store brands increased. From consumers' perspective we thus identify an umbrella effect also on store brands, even though the manufacturer cartel should not have resulted in higher costs of the supply of store brands to retailers. In case this was practically feasible, consumers should thus obtain compensation also for higher prices of store brands. Here, it should be noted that in Europe it is by now also accepted that the right to claim compensation for harm also notably extends to indirect damages, resulting from the passing-on of overcharges, as well as so-called "umbrella effects".[6] Following a

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[1]    Claiming such damages, of course, includes both cases from breaches of articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU), though, as will be explained, the focus of this article lies on cartel damages. Various contributions to the literature have commented in detail on the complementary nature of public and private competition law enforcement, which is also not the topic of this article. (*See e.g.*, Joshua P. Davis & Robert H. Lande, *Toward an Empirical and Theoretical Assessment of Private Antitrust*, 36 SEATTLE UNIVERSITY LAW REVIEW 1296 (2013)).

[2]    *See* Case C-453/99, Courage Ltd. v Crehan, 2001 E.C.R. I-6297.

[3]    *See* joined Cases C-295/04 to C-298/04, Manfredi, 2006 E.C.R. I-6619.

[4]    European Commission, Draft Guidance Paper on Quantifying Harm in Actions for Damages Based on Breaches of Article 101 or 102 of the Treaty on the Functioning of the European Union, 2011. Key preceding documents of the European Commission include notably the White Paper on Damages Actions for Breach of the EC Antitrust Rules, COM (2008) 165 final (2008).

[5]    Directive 2014/104/EU of the European Parliament and of the Council of November 26, 2014, on certain rules governing actions for damages under national law for infringements of the competition law provisions of the Member States and of the European Union Text with EEA relevance, 2014 O.J. (L 349).

[6]    The treatment of both passing-on claims as well as umbrella claims is notably different in the United States. Regarding umbrella claims, at least to us the general legal standing of such claims does not seem to be completely resolved. (*See e.g.*, Roger D. Blair & Virginia G. Mauerer, *Umbrella Pricing and Antitrust Standing: An Economic Analysis*, 25 JOURNAL OF REPRINTS FOR ANTITRUST LAW & ECONOMICS 913, 922-924 (1995); Jonathan M. Lave, *Umbrella Standing: The Trade-off between Plaintiff Suit and Speculative Claims,* 48 ANTITRUST BULL. 223, 225 (2003); Herbert Hovenkamp, *Economics and Federal Antitrust Law,* 372 (1985); David P. Kamp, *Monopsonistic Price Fixing and Umbrella Pricing as a Theory of Antitrust Standing: A New View of Illinois Brick,* 50 UNIVERSITY OF CINCINNATI LAW REVIEW,

respective request by Austria's highest court, the European Court of Justice ruled in 2014 that damages due to potential umbrella effects cannot be categorically denied.[7] While umbrella effects typically relate to price increases of non-cartelists selling substitute products, the considered umbrella effect on store brand prices is to our knowledge new to the literature on damages. It should however be noted again, that, as we show, the two aforementioned conflicting effects that we identify make both price increases and price decreases of store brands in the shadow of a brand manufacturer cartel possible.

Instead, irrespective of whether a retailer optimally increases or decreases retail prices for store brands, the presence of store brands should mitigate damages. To our knowledge, such mitigation has however not yet been brought forward as a defense by cartelists.

The rest of this article is organized as follows. In Section II we provide an overview of the relevant literature, both on umbrella effects and notably on the pricing of store brands, as this allows us to identify the potential effects of an increase in brand manufacturers' wholesale prices. Section III presents the case of the German coffee cartel and the respective data used in this article. As we stress there as well, this is only for illustrative purposes. Section IV provides an illustrative estimation making use of observed retail prices for both cartelists' brands as well as store brands, using a standard backcasting model. Section V derives bounds on the potential mitigation of retailers' damages. Section VI concludes.

## II.    THEORETICAL BACKGROUND

In the marketing literature, retailers' resulting joint (re-)optimization problem of choosing the prices of national and store brands falls into the area of "category management." The most related theoretical analysis is that of so-called "cross-cost pass-through."[8] It analyzes a retailer's optimal reaction to a cost increase of one product in a given category.[9] The following insights derive from this literature.

Suppose now first that, following an increase in the wholesale price of a national brand, a retailer would leave the respective retail price unchanged, in which case obviously his margin decrease would exactly reflect the overcharge. As this makes the sale of the affected national brand less attractive compared to that of another product in the same category, for which the margin remained unchanged, ceteris paribus, the retailer would now want to shift demand to the unaffected product. In our case, the retailer would want to divert demand to his store brands and would, from this

52 (1981)).

[7]    Case C-557/12, Kone AG, Otis GmbH, Schindler Aufzüge und Fahrtreppen GmbH, Schindler Liegenschaftsverwaltung GmbH, & ThyssenKrupp Aufzüge GmbH v. ÖBB-Infrastruktur AG, 2014 ECLI:EU:C:2014:1317.

[8]    See Sridhar Moorthy, A General Theory of Pass-through in Channels with Category Management and Retail Competition, 24 MARKETING SCIENCE 110 (2005).

[9]    There is, of course, a broad literature in economics and notably in marketing that analyzes store brands, both theoretically and empirically. Various studies have pointed to the benefits of store brands to enhance retailers' bargaining position vis-à-vis national brands. (See e.g., David E. Mills, Why Retailers Sell Private Labels, 4 JOURNAL OF ECONOMICS & MANAGEMENT STRATEGY 509 (1995); Philippe Bontems, et al., Strategic Effects of Private Labels, 26 EUROPEAN REVIEW OF AGRICULTURAL ECONOMICS 147 (1999); Fiona S. Morton & Florian Zettelmeyer, The Strategic Positioning of Store Brands in Retailer-Manufacturer Negotiations, 24 REVIEW OF INDUSTRIAL ORGANIZATION 161 (2004); Claire Chamboll & Sofia B. Villas-Boas, Buyer Power Through the Differentiation of Suppliers, 43 INTERNATIONAL JOURNAL OF INDUSTRIAL ORGANIZATION 56 (2015)). The strategic role of store brands vis-à-vis national brands has been empirically investigated in, for instance, Jagmohan S. Raju, et al., The Introduction and Performance of Store Brands, 41 MANAGEMENT SCIENCE 957 (1995); Pradeep K. Chintagunta, et al., Investigating the Effects of Store-Brand Introduction on Retailer Demand and Pricing Behavior, 48 MANAGEMENT SCIENCE 1242 (2002).

perspective alone, have an incentive to *decrease* the price of his store brands. We refer to this as the "margin effect". However, there is also another effect at work, which comes into play when the retailer passes on some of the overcharge and thereby increases the retail price of the national brand. This itself already diverts demand to the store brand and from this effect alone, following standard arguments, a retailer would now want to *increase* the price of the store brand. We call this the "demand diversion effect", which is just a reflection of a more standard umbrella effect.

To see the two effects at work more formally, we consider a retailer in isolation and refer to the price of a single national brand as $p_{NB}$ and to that of a single store brand as $p_{SB}$. The respective quantities are denoted by $q_{NB}$ and $q_{SB}$, respectively, which depend on both prices. Finally, the national brand's wholesale price is denoted by $w_{NB}$ and the cost of procuring the store brand by $c_{SB}$. From standard principles the following captures a retailer's marginal change in profits when he increases the store brand price $p_{SB}$, and we explain next the different ingredients:

$$\left[q_{SB} + (p_{SB} - c_{SB})\frac{\partial q_{SB}}{\partial p_{SB}}\right] + (p_{NB} - w_{NB})\frac{\partial q_{NB}}{\partial p_{SB}} \tag{1}$$

The first part, in rectangular brackets, captures the marginal effect of a change in $p_{SB}$ on the retailer's profits with the store brand, the remaining term outside the rectangular brackets captures the impact on the profits with the national brands. In both expressions, the respective derivative of demand, that is $\frac{\partial q_{SB}}{\partial p_{SB}}$ or $\frac{\partial q_{NB}}{\partial p_{SB}}$, captures how a marginal price change affects sales of the store or national brand. When the retailer's choice of the price is optimal, then a marginal adjustment should have no effect, so that the expression (1) should be zero. We now use (1) to analyze how the cartel overcharge for the national brand affects the retailer's incentive to adjust the price of the store brand.

When the wholesale price $w_{NB}$ thus increases, from expression (1) we see the two effects at work. Suppose now first, for a change in the argument, that the retailer has passed on at least some of the overcharge and thereby increased the retail price of the national brand, so that, by diversion of demand, ceteris paribus the quantity of the store brand, $q_{SB}$, increases and with it the first term in the rectangular brackets in (1). Hence, the marginal benefits from raising the store brand price increase. This results in a higher incentive to raise the store brand's price, which pushes $p_{SB}$ up.[10] The second term in (1), however, reflects the opposite tendency, namely to lower $p_{SB}$. To see this, note that, ceteris paribus, an increase in the wholesale price $w_{NB}$ reduces the retailer's margin, i.e., the difference $p_{NB} - w_{NB}$, which, as the cross-demand derivative satisifies $\frac{\partial q_{NB}}{\partial p_{SB}} > 0$, now reduces the left-hand side of (1), thus creating an incentive to reduce $p_{SB}$. How these two effects play out even in the simple case of a monopolistic retailer, is generally ambiguous.

In addition, with retailer competition, a given retailer's change in demand both for his store brands and national brands depends on the reactions of all other retailers. In the extreme case where a retailer only sells store brands and is thus not directly affected by the margin effect, only the demand diversion effect remains, albeit the increase in demand arises from price increases by other retailers. For such a retailer only the "standard" umbrella effect is at work, leading to an unambiguous rise in the price of his store brands. If a retailer sells both store brands and national brands,

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[10]  Of course, these arguments do not represent a full comparative statics analysis, as notably the partial analysis is only conducted locally at the optimal price.

which is the case for all but one retailer in the subsequently analyzed case of the German coffee market, both effects are present. Our empirical findings suggest that in this market the "demand diversion effect" still dominates.[11]

Before we proceed to the empirical analysis, the following observations are of importance. The first observation, which we repeat, is that the resulting "umbrella" effect on store brands is theoretically ambiguous, given the interaction of the "demand diversion effect" and the "margin effect." Consumers who buy store brands both under the cartel scenario and under the counterfactual scenario are thus not necessarily harmed, albeit for the analyzed case of the German coffee market this will be the case. But even if the price of store brands were to decrease, as the "margin effect" dominated, this would not imply that those consumers who consume store brands in the cartel scenario are not harmed. While the prices of the consumed products are in this case lower than they would be in the counterfactual scenario, those consumers may still be harmed if their preferred choice in the counterfactual scenario were national brands, whose prices increased under the cartel.

The last observation relates to retailers' damages. Irrespective of whether retailers' equilibrium response to higher wholesale prices for national brands is an increase or a decrease of the prices of their respective store brands, the presence of store brands allows retailers to mitigate the harm inflicted by the cartel. This will be worked out empirically and theoretically in more detail below.

III.    CASE AND DATA

A.    The Coffee Cartel in Germany

We explore the detection of a cartel among manufacturers of branded ground coffee in Germany in July 2008.[12] From the published records we know that the cartel had been operating since at least 2000, i.e., notably before the subsequently chosen period from which our analysis starts (January 2004). The German antitrust authority found all four major brand manufacturers guilty of conspiring to raise prices.[13]

Our analysis focuses on the grocery retail market, which is also the main sales channel for ground coffee. Ground coffee constitutes around 50% of total consumption, of which again more than 95% is accounted for by the sales of 500g packages, on which our subsequent analysis will focus.[14]

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[11]    Recently, new results for the related question of the cross-product cost pass-through of a multiproduct monopolist were provided by Mark Armstrong & John Vickers, *Multiproduct Pricing Made Simple,* 126 JOURNAL OF POLITICAL ECONOMY 1444 (2018). They derive conditions for when under quantity competition the resulting net effect is in fact zero.

[12]    The antitrust authority was informed by a whistleblower and undertook its "dawn raid" in July 2008. (*See* Press Release, Bundeskartellamt, Bundeskartellamt Imposes Fines on Coffee Roasters (December 21, 2009), https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2009/21_12_2009_Kaffeer%C3%B6ster.html?nn=3591568.

[13]    Two of these manufacturers have two national brands each, which we subsequently account for separately. The fact that some manufacturers therefore operate multiple brands does not affect our (reduced form) analysis.

[14]    Market shares (in terms of standardized cup equivalents) are based on own calculations over the considered sample period. Instant coffee represents the second largest category, accounting for 38% of consumption. We do not include instant coffee for two reasons. First, it is unclear to us to which extent the cartel also extended to instant coffee, where notably also other firms (such as Nestlé) represent important players in the German market. Second, industry reports suggest that ground and instant coffee indeed belong to separate markets (*Cf.* Euromonitor International Ltd, Coffee in Germany (2015)).

All considered retailers have store brands, with store brands accounting for around 25% of the German market. The German grocery retail market is also highly concentrated, with five leading retail groups, which are also the ones that we subsequently consider, accounting for around 75% of the total market. We take this, as well as detailed information on the market for coffee and notably also the provision of store brands, from an independent sector inquiry that the German antitrust authority conducted recently.[15] Learnings from the sector inquiry are particularly important in the following way. While typically little is known about the manufacturing of store brands, we learn from the sector inquiry that in Germany the manufacturing of store brands is almost exclusively undertaken by specialized manufacturers, that is, notably not the cartelists. In fact, in its competitive assessment of the industry the report notes that only one larger manufacturer is known to sometimes participate in the competitive procurement process for store brands, while retailers are also known to possess own coffee-roasting plants.[16] On those occasions where retailers procure coffee for their store brands, they can exert considerable bargaining power in the competitive process.

Conceptually, the nature of the procurement and manufacturing of store brands suggests therefore that there are neither direct nor indirect (umbrella) effects through which wholesale prices for ground coffee sold as store brands were increased because of the infringement.[17]

## B.    Data and Data Limitations

For the whole analysis we can only data from actual retail purchases. We thus have no access to the actually cartelized wholesale prices. Our analysis must thus remain illustrative in this respect. In particular, it should not be considered to provide any (empirical) evidence as to the size of actual overcharges and damages.

Retail price data collected from so-called homescan panel data pan the the period from January 2002 to December 2012. We aggregate observed transaction prices on a quarterly basis. As noted above, we consider sales through the five leading retail groups and, next to their store brands, from the five large manufacturers of national coffee brands. Throughout our analysis we ensure that the identity of all retailers and manufacturers/brands remains anonymous.

We split the sample into two time periods. The years 2009 to 2012, which constitute the final period, are considered to be competitive and are subsequently used to fit a "backcasting model" in order to calculate counterfactual prices for the first period, the years 2002 to 2008.

## IV.    ILLUSTRATIVE OVERCHARGE ESTIMATION

In this section, we conduct a reduced-form estimate of counterfactual prices and overcharges. Various models are used in practice as well as in academic publications, and we do not intend to review them or point out their particular

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[15]    *See* Bundeskartellamt, Sektoruntersuchung Lebensmitteleinzelhandel (2014), http://www.bundeskartellamt.de/Sektoruntersuchung_LEH.pdf%3F__blob%3DpublicationFile%26v%3D7. We acknowledge, however, that the information that we learn from this report may potentially not always be accurate for all years of interest, that is from 2004 to 2012.

[16]    The sector inquiry focused on the relationship between retailers and manufacturers, more generally, but it considered five different "focus categories" that were explored in detail, of which coffee constituted one.

[17]    That said, subsequent results such as the quantification of overcharges for consumers or aggregate consumer harm, across both national and store brands, are unaffected by whether such an additional (umbrella) channel was at work or not.

advantages. We make use of the so-called forecasting (or backcasting) approach. There, prices from a comparator market, which in our case is the German coffee market from January 2009 onwards, are extrapolated to the affected market, that is again the German coffee market, but now for the considered cartel period. For such extrapolation we make use of a linear regression analysis, with the world market prices of raw coffee beans as the main covariate. Thereby, a specific counterfactual price is calculated for every considered product and every considered point of time, allowing us in principle to calculate a time-varying overcharge. We apply this to the calculation of counterfactual retail prices for both national brands and store brands

We give a brief comment as to why we have not used as an alternative approach the so-called "dummy variable" method. There, typically a single (absolute or percentage) overcharge is estimated over the full considered cartel period by introducing for this period a respective indicator variable. Importantly, while the advantage of this approach is that data from both the infringement and the comparator periods is used, an underlying assumption is that all (other) coefficients are not affected by the infringement. In the considered case, however, to what extent changes in the prices of coffee beans were passed on to retailers (and with what delay) may be directly affected by the cartel. Also, hikes in the prices of coffee beans may have been used as triggers for wholesale price increases vis-à-vis retailers. By estimating the respective pass-on only with data from the comparator period and applying these coefficients to backcast counterfactual prices, this problem does not arise.[18]

The backcasting model is applied to different (aggregate) products in the competition period. Precisely, a product j is defined as a "coffee-brand-mildness-retail chain" combination for a 500g package of ground coffee, where a brand is either mild or "regular." We average prices per quarter and denote the respective prices, indexed by t for time and j for the product, by $p_{jt}$. We use as a key price determinant prices of raw coffee beans. As this is not the focus of our analysis, we do not report the respective regression results. The estimated model is then used to calculate counterfactual prices, $\hat{p}_{jt}$, for the cartel period and then the overcharge for product j at time t as $OV_{jt} = p_{jt} - \hat{p}_{jt}$. Figure 1 illustrates the estimated overcharge with one national brand and a store brand at a given retailer. For anonymity purposes, we do not give further details on the retailer or the specific coffee brand. Note that, for completeness, the estimated price is also reported for the competition period.

We observe that the counterfactual price series are both below the actual price series in the cartel period, i.e., the years before 2009, indicating that the manufacturer cartel indeed resulted in higher retail prices for the national brand and the store brand.

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[18]   Alternatively, instead of using a "single dummy variable" model, one could use a (fully) "interacted dummy variable" model, where the dummy variable for the infringement period is interacted with key covariates, here the price of coffee beans. *See* Roman Inderst & Christopher Milde, *A Practical Review of Methods to Estimate Overcharges Using Linear Regression,* https://ssrn.com/abstract=3136923 (2018) for a practical overview of these different approaches, building notably on the contributions of Justin McCrary & Daniel L. Rubinfeld, *Measuring Benchmark Damages in Antitrust Litigation,* 3 JOURNAL OF ECONOMETRIC METHODS 63 (2014); David S. Salkever, *The Use of Dummy Variables to Compute Predictions, Prediction Errors, and Confidence Intervals,* 4 JOURNAL OF ECONOMETRICS 393 (1976).
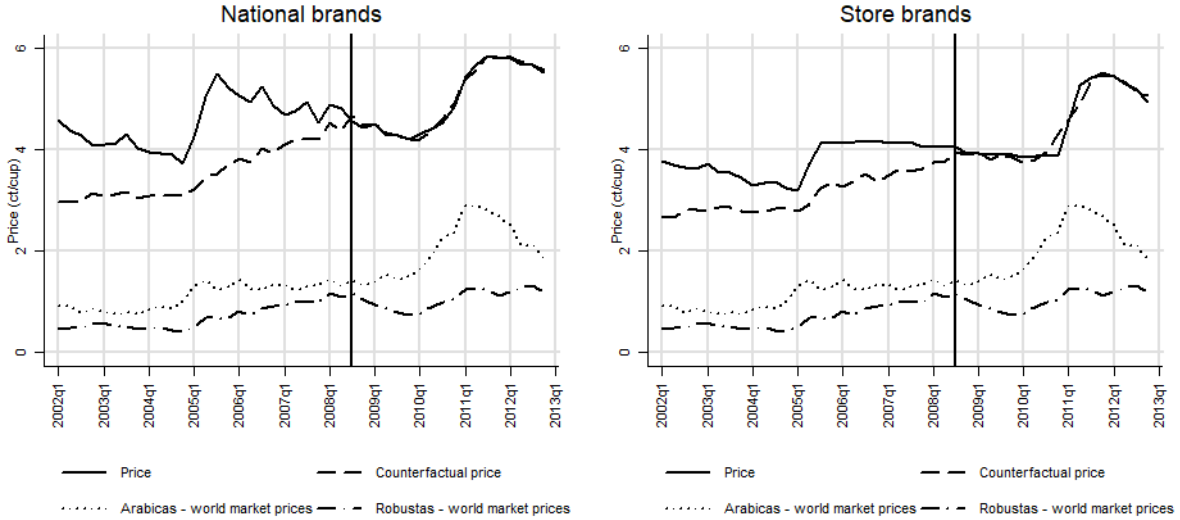
**Figure 1.** Observed and estimated (counterfactual prices), next to bean prices as key price determinant

Notably, the positive overcharge on store brands deserves some discussion. In contrast to the overcharge on cartelized brands, we found that the sign is a priori ambiguous for store brands. In principle, a retailer could react to higher wholesale prices for national brands by either increasing or decreasing its price for store brands, as we discussed in detail in Section II. We now refer to the cartel induced increase of retail prices as an overcharge, irrespective of whether this relates to national brands and store bands.

The remaining part of our study therefore focuses entirely on the cartel period from 2002 to 2008.

In order to summarize the percentage retail price increase by brand, we calculate the quantity-weighted percentage overcharge compared to the counterfactual (competitive) price for all observations for the period from 2002 to 2008 as follows:

$$OC_{\text{Brand b}} = \frac{\Sigma\Sigma(p_{jt} - \widehat{p}_{jt})q_{jt}}{\Sigma\Sigma\,\widehat{p}_{jt}\,q_{jt}} * 100 \text{ for j} \in \text{Brand b.} \tag{2}$$

Table 1 summarizes the quantity-weighted percentage overcharge by brand. Again we recall the precededing caveats on the data limitations. In particular, we have no access to cartelized wholesale prices. We observe that there is variation in the estimated retail price overcharge across brands. Notably, store brands exhibit a low overcharge compared to most national brands.

Summing up, in this case the "umbrella" effect on store brands is unambiguously positive. Therefore, retailers are already mitigating possible damages from higher wholesale prices on national brands by achieving higher retail prices and margins for their store brands.[19]

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[19] The pricing of store brands is almost uniform across retailers in this product category and the overcharge is therefore almost identical. In addition, store brands in Germany typically function as anchoring products for the entry-level price segment and do not exhibit price promotions.

**Table 1.** Percentage overcharge by brand for the cartel period from 2002 to 2008
(all from illustrative analysis with retail prices only)

| Brand | Overcharge |
|-------|------------|
| NB 1 | 28.0% |
| NB 2 | 26.9% |
| NB 3 | 20.2% |
| NB 4 | 32.8% |
| NB 5 | 24.2% |
| NB 6 | 15.0% |
| SB | 20.3% |

## V.     (CONSUMER) DAMAGES AND (RETAILER) DAMAGE MITIGATION

### A.     Consumer Damage

We first calculate consumer damages, which is a straightforward exercise, once counterfactual retail prices are established. Note first that we presume, as it is typically the case, that consumers can only claim damages for monetary losses, i.e., not forgone utility. Consequently, we calculate for given product j and given time t, the respective overpayment from the product of the overcharge and the purchased quantity. Aggregating over all products and the whole cartel period, we obtain the following results:

**Table 2.** Consumer overpayment in Million EUR for the cartel period from 2002 to 2008.

| Total Overpayment | NB Overpayment | SB overpayment |
|-------------------|----------------|----------------|
| 1,092.9 | 727.8 | 365.0 |

Thus, the overpayment for store brand purchases accounts for around 33 % of total overpayment. This reflects both the market share of store brands as well as the on average lower percentage overcharge.

In the case of the German coffee cartel, consumers thus suffered additional loss from overpaying for store brands, for which, according to the presented calculations, prices were increased as an indirect consequence of the brand manufacturer cartel. We noted above, however, that theoretically it is not clear whether such a positive umbrella (or demand diversion) effect prevails, or whether this is more than compensated for by the discussed "margin effect". If the second effect is stronger, store brand prices would decrease, again as a result of the cartel. At first, at least across all consumers this would amount to a mitigation of damages, albeit the focus on only monetary damages completely omits the loss in consumer welfare arising when, following a price increase, demand drops and when, following a change in relative prices, demand is diverted away from more expensive towards cheaper products. An exact quantification of consumer harm in this scenario requires to estimate a consumer choice model.

## B. Retailer Damage Mitigation from Store Brands

Again, for ease of exposition only consider the case of a retailer that stocks a single national and a single store brand. Using the previous notation, total profits are then

$$\pi = q_{SB}(p_{SB} - c_{SB}) + q_{NB}(p_{NB} - w_{NB}). \tag{3}$$

Likewise, with the respective counterfactual prices and quantities, counterfactual profits are

$$\hat{\pi} = \hat{q}_{SB}(\hat{p}_{SB} - c_{SB}) + \hat{q}_{NB}(\hat{p}_{NB} - \hat{w}_{NB}), \tag{4}$$

and ultimately the resulting damage is

$$\Delta\pi = \pi - \hat{\pi}. \tag{5}$$

We first strip out the effects related to the national brand. Here, the standard decomposition is as follows:

$$\Delta\pi_{NB} = q_{NB}(w_{NB} - \hat{w}_{NB}) - q_{NB}(p_{NB} - \hat{p}_{NB}) + (\hat{q}_{NB} - q_{NB})(\hat{p}_{NB} - \hat{w}_{NB}), \tag{6}$$

where the first term captures the overcharge suffered on the actual quantity, the second term the mitigation from pass-on and the third term the lost-volume effect. Typically, out of practical considerations, only the first two terms are considered in actual damage cases, less so the lost-volume effect.

In what follows, we focus on the mitigation of damages arising from store brands. Collecting the terms of $\Delta\pi$ that relate to the store brands, we have the difference

$$\Delta\pi_{SB} = q_{SB}(p_{SB} - c_{SB}) - \hat{q}_{SB}(\hat{p}_{SB} - c_{SB}). \tag{7}$$

Absent information about the retailer's costs of procuring the store brand, $c_{SB}$, we cannot quantify this expression. We can however form a lower bound as follows.[20] For this we rearrange the terms relating to the store brand as follows:

$$\Delta\pi_{SB} = q_{SB}(p_{SB} - \hat{p}_{SB}) + (q_{SB} - \hat{q}_{SB})(\hat{p}_{SB} - c_{SB}). \tag{8}$$

Now the first term in (8), i.e., the additional margin from the actual sales of the store brand, forms a lower bound on the retailer's damage mitigation.[21]

Before proceeding to the actual calculation of such a lower bound, the following observation is important. Some hard discounters do not stock national brands. The "mitigation effect" then represents already the positive net effect: When national brands become more expensive, hard discounts benefit from the increased competitiveness of their store brands and from the ability to increase also prices for store brands in the shadow of the manufacturer cartel. For this reason, we now report separately the "mitigation" bound for three types of supermarkets: full line supermarkets, soft discounters and hard discounters.

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20 To derive an upper bound, we would need counterfactual quantities. In the considered (stable) market environment there are few obvious exogenous variables for such backcasting. An alternative is to estimate a demand model and substitute counterfactual prices. As the calculation of actual damage mitigation for the considered cartel is not the focus of this paper, we do not pursue this further.

21  In fact, as we explored in Section II, as there are two countervailing effects, the "demand diversion effect" and the "margin effect," when the latter effect is stronger the retailer may even lower its price of the store brand as a reaction to the cartelized wholesale price. Then, the first term would be negative, even though there was still damage mitigation from store brands.

**Table 3.** Lower bound for damage mitigation (full line and soft discounters) and benefits from the cartel (hard discounter) in Million Euro (all from illustrative analysis with retail prices only)

| Retailer format | Bound for damage mitigation: $q_{SB}(p_{SB} - \hat{p}_{SB})$ |
| --- | --- |
| Full line supermarkets | 35.8 |
| Hard discounter | 248.7 |
| Soft discounter | 81.6 |

## VI.    CONCLUDING REMARKS

At least in Europe, in private enforcement cases attention has recently shifted to potential damages from "umbrella effects" that arise when firms that are not parties to the infringement adjust their strategies. This article provides a conceptual and empirical analysis of such umbrella effects in the case of store brands, which, to our knowledge, has been largely overlooked in the literature. Our empirical results from the German coffee cartel suggest that even though the procurement of such store brands was most likely not directly affected by the infringement, still the prices of store brands increased significantly in the shadow of the cartel, which considerably increased consumer harm. On the other hand, retailers' response to the cartelized wholesale price increase of national brands allowed them to mitigate damages.

Though the empirical findings point to a positive (umbrella) effect also for the price of store brands, we also showed that conceptually the price of store brands may both increase or decrease as an equilibrium response to higher wholesale prices for national brands. This is due to two countervailing effects: a "demand diversion effect," which pushes up store brand prices, and a "margin effect," which may make it optimal for retailers to lower the price of store brands. Importantly, even when retailers react to the infringement by decreasing instead of increasing the price of store brands, the resulting potentially large increase in store brands' market share should still lead to a reduction of overall lost profits, at least for retailers who sell (cartelized) national brands to a large extent (while retailers who sell predominantly or only store brands may gain a competitive advantage and even profit from the brand manufacturer cartel). This generally raises the question of to what extent such compensating profits on the sale of store brands should be accounted for when calculating total damages in court. Whether courts are willing to afford cartelists such a defense also seems to be a still untested question.