Inter-Format Competition Among Retailers - The Role of Private Label Products in Market Delineation.*

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Abstract

This paper analyses the extent of inter-format retail competition between supermarkets, discounters and drugstores in Germany, using data from the German market for diapers. We estimate a random coefficient logit model at the individual household level. Based on consumer substitution patterns, we calculate manufacturers' and retailers' estimated marginal costs and margins and, based on these margins, apply standard market delineation techniques which suggest that the strongest substitution patterns are between the leading manufacturer brand and private labels sold at drugstores and discounters. This finding contrasts with recent speculations by competition authorities that private label products may belong to a different antitrust market than manufacturers' brands.

Keywords: Discrete Choice, Demand Estimation, Market Delineation, Grocery Retail Markets, Antitrust.

JEL Classification: L1, L4, L8, C5 .

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1 Introduction

Ever since the UK's Competition Commission initiated the first of its three inquiries into the grocery sector in 1999 (Competition Commission 2000, 2008), the grocery retail sector in Europe has been under stringent scrutiny not only from national competition authorities in Europe, but also from the European Commission itself.[1] Increasing food prices, volatile commodity markets and perceived concerns about the functioning of the food supply chain have, in combination with market consolidation though mergers and a fair number of antitrust cases, lead to a growing public interest in competition issues in grocery retailing (European Competition Network 2012). This development is not confined to the European Union, which has even implemented a Food Task Force, but similar developments can be observed in other jurisdictions around the globe, such as the US (e.g., Cotterill 2010, Hosken et al. 2012) or Australia (e.g., Griffith 2004, Cotterill 2006). The OECD has implemented a Food Chain Analysis Network, and a fair number of competition authorities have again initiated or recently concluded detailed sector inquiries into grocery markets. Examples include Austria (Bundeswettbewerbsbehörde 2007), Australia (Australian Competition and Consumer Commission 2008), Finland (Björkroth et al. 2012), Germany (e.g., Bundeskartellamt 2011, German Monopolies Commission 2012), Hong Kong (Hong Kong Consumer Council 2013) and Portugal (Sebastião 2011).

At the heart of many inquiries is, among other things, the degree of competition between different retail formats. The proper delineation of the relevant product market is often decisive for the analysis of mergers and antitrust proceedings, as the calculation of market shares obviously depends on market definition, and - whether appropriate or not - market shares still play a major role in any competition analysis. Especially with respect to grocery retailing, market delineation is not as trivial as it may appear at first sight. On the one hand consumers face the decision which brand to buy from which retail store, depending on their preferences for both brand and/or retailer and/or format. On the other hand retailers and manufacturers have to deal with rather heterogeneous consumers, who may react quite differently to variations in prices. The complexity of these decision processes renders market definition a difficult and, therefore, often contentious exercise.

One major challenge with respect to retail grocery market delineation is to determine the

[1] For a detailed summary of recent competition law enforcement efforts and sector inquiries across the European Union European Competition Network (2012).

degree of competition between discounters, regular supermarkets, so-called hypermarkets and sometimes also corner-stores and specialized dealers such as drugstores. The significance of this inter-format competition has been highlighted in a prominent merger case in the German retail grocery market (Bundeskartellamt 2008) and has also been discussed in the UK Competition Commission's 2008 sector inquiry (Competition Commission 2008). Competition authorities have tended to take a rather strict view and mostly concluded that the degree of competition between discounters and other retail formats is rather limited (e.g., Bundeskartellamt 2008, p. 46, Competition Commission 2008, p. 67-68). The arguments are mainly based on two considerations: Firstly, the formats' category depths are typically very different, with discounters having a much lower category depth compared to supermarkets and hypermarkets. And secondly, the formats differ with respect to the extent to which they offer private labels and manufacturer brands (Bundeskartellamt 2008, p.46, Competition Commission 2008, p. 67-68). In particular the Competition Commission (2008) states

> A number of grocery retailers told us that Aldi, Lidl and Netto (the major LADs in the UK) should be included in the same product market as large grocery retailers. However, the limited number of products carried by LADs stores means that these stores are not close substitutes for similarly-sized stores operated by CGL, M&S, Sainsbury's, Somerfield and Tesco. In particular, we note that Aldi, Lidl and Netto stores typically sell fewer than 1,000 products.[footnote excluded] In comparison, large grocery retailers generally sell around 5,000 to 10,000 products in stores in the same size range as those operated by LADs (ie 500 to 1,400 sq metres). The results of our entry analysis also show that Aldi, Lidl and Netto stores are not close substitutes for the stores of large grocery retailers (see paragraph 4.71 and Table 4.5).
>
> 4.81 As a result, we believe that LADs stores should not be included in the same product market as stores belonging to large grocery retailers when the starting point for a SSNIP test is stores operated by large grocery retailers. However, we believe that LADs stores are constrained by the mid-sized and larger stores of large grocery retailers, and that there is a one-way or asymmetric constraint analogous to that observed in relation to stores of different sizes.
> (Competition Commission 2008, p.67-68)

In contrast, the German Monopolies Commission has recently argued that inter-format competition is not as limited as often suggested, but rather vivid (German Monopolies Commission 2012). Hence, the issue is far from being resolved.

In order to determine the degree of competition between various retailers its is crucial to understand consumers‘ perceptions of both private labels (as these are the main part of the discounters' assortment)[2] and manufacturer brands within the same category, and also consumers' switching behavior between these brands. Parts of the marketing literature analyze exactly this substitutability between these brands, showing the important role of private labels, which consumers often tend to regard as reasonable substitutes for manufacturer brands (Sethuraman 1995, Raju et al. 1995, Dhar and Hoch 1997, Ailawadi et al. 2008). The importance of private labels may even increase in the future, as a number of industry studies and consulting reports predict (e.g., Rabobank 2010). Moreover, private labels have recently started to compete with manufacturer brands even in premium segments of the market, while traditionally private labels were mainly located in low price product segments (Banerji and Hoch 1993). Today, however, private labels are offered across all quality segments ((Lamey et al. 2012)).

Given the increasing importance of private labels in grocery retailing it is important to understand their role in the competitive process. Three main effects have been identified in the literature: First, private labels strengthen retailers' bargaining power vis-à-vis manufacturers, as private labels give retailers additional outside options. In fact, Clark et al. (2002) found already more than ten years ago that retailers' bargaining power is positively related to a larger market share of private label products. Secondly, retailers and manufacturers are not only vertically related, but become competitors at the retail level through private labels (Daskalova 2012). And thirdly, retailers' incentives to foreclose retail markets for (new) manufacturer brands can change with the growing acceptance of private labels, which in turn might reduce manufacturers' innovation incentives and lower consumer welfare (Daskalova 2012).

The aim of this paper is now (i) to provide empirical evidence on the degree of competition between private labels and manufacturer brands and (ii) to determine the intensity of competition between private label brands offered at discounters and other formats and national brands sold at common super- or hypermarkets. In a nutshell, we examine (i)

[2]Private labels are also sold by supermarkets and hypermarkets. This can be part of a more sophisticated strategy, e.g., to increase customer loyalty (Hansen and Singh 2008, Ailawadi et al. 2008).

whether private labels and manufacturer brands form a joint antitrust market[3] and (ii) whether different retail formats belong to different antitrust markets, using data from the German market for diapers.

Applying several market definition techniques our analysis suggests that retail formats that offer a lower category depth do nevertheless compete with formats that offer a wider product range in the diaper market. The diaper market is particularly helpful in understanding retail competition as diapers are available across different retail formats, demand is relatively stable and largely independent from macroeconomic conditions. Furthermore, parents tend to be rather quality-sensitive customers. Also we would expect switching patterns to be relatively moderate compared to many other grocery products, as parents should be less willing to "conduct experiments" on their kids, especially not with diapers. This feature of the diaper market is useful because it allows us to draw some careful implications for other markets.

Using information of a German consumer panel (where consumers record all of their purchases at household level) we estimate a random coefficient random utility discrete choice model[4] (Petrin and Train 2010, Train 1998) to obtain consumer substitution patterns, from which retailer and manufacturer margins can be derived (e.g., Bonnet and Dubois 2010, Draganska et al. 2011). The margins are then used for standard market delineation techniques. In this paper two methods are used: The well known *SSNIP test* (Katz and Shapiro 2003, O'Brien and Wickelgren 2003) and the *Generalized Upward Pricing Pressure Index (GUPPI)*. The latter has been proposed by Moresi (2010) and is based on the *Upward Pricing Pressure* by (Farrell and Shapiro 2010). A nice application can be found in Affeldt et al. (2012).

Our approach has several advantages: First, it allows for a differentiated analysis as retailers' margins are derived from structural equilibrium pricing equations. Secondly, our estimations rely on rich data, which is representative for Germany, and on actual transaction prices including discounts and promotions. Thirdly, due to a random coefficients approach we are able to take into account the heterogeneity of customer decisions without

[3]However, we do not study vertical issues such as any potential change of bargaining power between retailers and manufacturers which may result from the introduction of private labels (e.g., Mills 1995, Narasimhan and Wilcox 1998, Chintagunta et al. 2002, Draganska et al. 2011).

[4]Such models are widely used in the literature, (e.g., Berry 1994, Nevo 2001, Train 2003). Examples of application can be found in (e.g., Villas-Boas 2007, Draganska et al. 2011, Bonnet and Dubois 2010, Bonnet et al. 2013)

imposing ex ante assumptions on substitution patterns, as is the case in nested logit approaches. Fourthly, and most importantly, as real substitution patterns at the individual household level can be observed we can use this information to examine how private label prices impact on prices of manufacturer brands. Finally, the diaper market in Germany has been dominated by a large manufacturer brand for a long time already. This indicates that consumers are indeed quality sensitive and switching patterns probably modest. Hence, the diaper market differs from some other consumer goods markets, where private labels tend to have higher market shares.

Our results indicate that the relevant market comprises not only of manufacturer brands, but also of private labels, which are sold across all types of formats. The closest substitutes to the leading manufacturer brand are various private labels sold at various discounters and drugstores. Interestingly, other manufacturer brands appear to be a comparatively weak substitute for the leading manufacturer brand. Quite generally, the hypothesis that manufacturer brands sold in supermarkets face only weak competition from private labels sold in drugstores and discounters cannot be supported by our analysis. The idea that differences in category depths suffice to establish different relevant antitrust markets must be treated with great caution. Moreover, diaper consumers are probably rather quality sensitive, it may be speculated that private labels may be even closer substitutes for manufacturer brands in markets where consumers can be expected to be less quality sensitive. This confirms the strength of the results. Another finding of our analysis is that an increasing level of competition is associated with decreasing retail margins.

The remainder of the paper is now organized as follows: Section 2 describes the data and the empirical strategy, section 3 provides the empirical analysis, and section 4 concludes.

2 Data and Empirical Strategy

2.1 Data Description

We use consumer data (at the household level) for the German diaper market. Data is obtained from GFK Panel Services, a German market research company, which monitors members of a representative consumer panel. The data contains information on all actual transactions of up to 40.000 households, who track their entire purchases using home-scanning devices. In contrast to check-out counter scanner data, individual purchases can be identified across all retail outlets visited.[5] The data includes information on all transactions including location, time, the quantity purchased and the price actually paid (including any discounts and promotions). The sample for customers who purchase diapers is an (obviously) subsample of all households, as not all customers have a demand for diapers (e.g., no very young kids in the household) The sample sizes are: 2003/2004: 3,678, 2005/2006: 5,657, 2007/2008: 5,072; 2009/2010: 6,757. Moreover, the GFK consumer panel has the advantage that the it refills lost households with new entries and expands over time.

The random coefficient model is estimated with some simplifying assumptions imposed on the assessment of a reasonable time frame for the choice set, the specification of product types, and the definition of an outside good.

With respect to the time frame, we consider four periods, each comprising of two years (2003/2004, 2005/2006, 2007/2008, 2009/2010).[6] We assume that within each two-year period, consumers buy diapers every week. This seems to be reasonable given that the vast majority of households (81%) buys on average one diaper package per purchase (see Table 1). Given that an average package consists of 56.6 diapers, this yields an average consumption of about eight diapers per day (see Table 1). Since data is collapsed on a weekly basis, weekly means of the explanatory variables are calculated.

Next, we define product-retailer combinations as possible choices for consumers. In other words, the same product sold by two different retailers is treated as two different alternatives because consumers may perceive the same brand sold by different retailers differently. Thus, consumers may not only switch from product A sold by retailer 1 to product B (either sold by retailer 1 or retailer 2), but also to product A sold by retailer 2.

Regarding a possible outside good, one may think of three options for the diaper market: Cotton diapers, the potty and storage. We take into account that, at some point, children do not need diapers anymore by dropping all observations before the first and after the

[5]Data derived from check-out counter scanner usually does not contain information on sales across all stores. For instance, discounters are often not included (e.g., Draganska et al. 2011).More importantly, scanner data typically cannot be used to identify purchases (or the lack thereof) by the same consumer at other outlets.

[6]Estimating two-year periods has the advantage of drastically reducing computation time.

last observed purchase of a given household. Proving that people do not store diapers is more complicated, but based on the summary statistics, we feel that storage is not a major issue for diapers. Still, there are time periods in between two purchases, where consumers do not buy any of the alternatives indicating that there is some kind of outside good.[7] Such cases have to be dropped from the sample as the estimation procedure is only able to estimate cases where one of the alternatives is chosen. However, based on the estimation sample we are able to predict marginal effects and elasticities for weeks where no purchases are observed.[8]

Finally, we exclude special types of products, such as fleece-, swimming diapers and training pants, which are not considered to be adequate substitutes. Estimation is based on top 40 retailer-product combinations to exclude niche products.[9] One drawback of the used model is that we cannot estimate multiple purchases of different products within one time period. Therefore, we exclude purchases where an individual bought more than one specific brand. In particular in the diapers market this is not a problem, because customers don't switch between brands within one time period very often.

Based on existing data four types of retail outlets are defined: Discounter, drugstore, full-line distributor and hypermarkets (see Figure 1(a))[10]. Most of the diaper products are purchased at discounters and at drugstores (i.e., market shares of the two formats add up to 71% of the total market over the 2003-2010 period), followed by hypermarkets with 23% and full-line distributors with 5%. Considering the evolution of market shares over the eight year period, it seems that market shares have steadily drifted away from discounters to drugstores whereas market shares of the two other formats remain rather constant (see Figure 2). In 2003/04 41% of all diapers were sold at discounters and around 29% at drugstores. Until 2009/10 the situation changed so that drugstores were selling over 50% of all diapers, while the market share of discounters dropped to 21%. Despite the drastic shift, both kinds of formats still sell over 70% of all diapers, which indicates that neither format should be excluded from market definition.

[7]One other reason could be that consumers switch to products which are not in the TOP 40 sample such as cotton diapers or that they are on vacation outside the country.

[8]However, we only consider those households as long as they purchase one of the TOP 40 combinations. Since purchases of the TOP 40 comprises more than 90% of all purchases this assumption is not problematic.

[9]Including more combinations also leads to several complementary relationships.

[10]Specialized shops are excluded because market shares are negligible

Figure 1(b) and Table 1 both show that private labels play a major role in the diaper market with a market share of over 50%. In particular, discounters and drugstores, who make up most of the market, differentiate themselves with high private label shares of 94% and 60% of their sales, respectively. as can be easily seen, the ratio of manufacturer brands to private labels is higher at hypermarkets and full-line distributors. Ignoring discounters/drugstores and private labels would easily lead to incorrect switching pattern predictions and, consequently, lead to results that are not representative for the market.

In general, the statistics show that competition parameters (price and promotion) vary among retailers and brands (see Figure 1(c) and (d)). As expected, the price per diaper is higher for manufacturer brands than for private labels (on average around two cents), but prices vary over all retail formats. Full-Line distributors sell their diaper products for the highest prices (18.66 cents per diaper for manufacturer brands and 17.66 cents for private label products). Lowest prices for manufacturer brands can be found in discount stores, who offer branded products for 16.46 cents per diaper. Interestingly, prices for private label diapers are lowest in hypermarkets. The low prices for branded products at discounters and really low prices for private labels at hypermarkets are probably an data issue due to the small quantity sold (see Figure 1(b)).

Promotional activity differs between manufacturer brands and private label products. Whereas between 52% and 66% of the the manufacturer brands are sold within any kind of promotional activity, private labels are rarely promoted (Figure 1(d)). It is notable that promotion activity for manufacturers brands at drugstores is lowest among all retail formats (55%), but they seem to push their private label products by rather high promotion rates (11%) compared to the other formats (1%-5%).

Table 1 shows some more general information on the variables of the GFK data on diapers. Most descriptives are quite constant over time. For instance, quantity purchases are similar and close to 1. Prices are also relatively constant over the years. However, there is one important pattern to mention. The market share of the leading brand is increasing over time, whereas the private label share remains rather constant. This indicates that second tier brands' market share is decreasing. Finally, the total bill per purchase is increasing. We do not control for changes due to inflation, but the increase is rather large which may indicate that a concentration of purchases seems to occur (i.e., more money is spend per purchase).

For the construction of the control function additional data on cost shifters is used from Thompson Reuters (electricity, oil prices, diesel) and from the German Federal statistical office (wages). Summary statistics are presented in Table 2. As can be seen we include five cost shifting variables that all have a large variation.

2.2 Empirical Strategy

Our empirical strategy aims at analyzing the substitution patterns of products sold across different retail formats. Since there are manufacturer brands sold across different retail formats as well as private labels, which are sold only sold by a particular retailer (i.e., various retailers have their own private labels), we test the hypothesis that there are strong substitution patterns between products sold over different retail formats. Given that products and product varieties differ substantially between retail formats (full-line distributer have a larger assortment than discounters, with discounters concentrating on private labels), we account for these different assortments, analyzing substitution patterns across all products provided either in discounters or in all other formats.

To test these hypotheses, our strategy consists of three steps: In a first step, we estimate a random coefficients discrete choice model for disaggregated consumer level data using a control function approach (Petrin and Train 2010) to identify the demand and the equilibrium price. This approach allows us to account for heterogeneous preferences and to derive - due to the control function approach - the demand function with the causal price effect. The control function takes advantage of exogenous cost shifters for identification. Those cost shifters are widely used in structural econometrics to overcome the endogeneity problem. In a second step, we use the results obtained from the first step and apply those factors to compute supply models. In a last step standard methods of market delineation are applied to quantify the substitution patterns and to analyze the market in a qualitative manner. The idea is to use a measure that shows whether substitution patterns of several products exceed a certain threshold to define a common market. Two market delineation techniques are applied: first the SSNIP test (Katz and Shapiro 2003, O'Brien and Wickelgren 2003) and second the GUPPI (Moresi 2010, Affeldt et al. 2012). Using both tests allows us to check the robustness of the market delineation exercise. The three following subsections describe each step in detail.

2.2.1 Demand Estimation

The demand estimation is the first and most crucial step in the analysis. The quality of information that can be revealed relies on a proper and exact specification of demand. The available data allows us to observe individual household purchasing decisions. The households‘ decisions where to buy which specific product is analyzed. Since valuation for different products is heterogeneous across consumers (either due to different characteristics or different preferences), we apply an demand estimation approach which accounts for this heterogeneity. In contrast to standard logit and multinomial logit models, the random utility approach allows to take heterogeneity among consumers into account. This heterogeneity can be attached to unobserved characteristics and, therefore, increases the precision of the estimation. The approach mostly used in the literature is the random utility approach that has been widely discussed (e.g., Nevo 2000, Train 2003).[11] The specification of demand uses a control function specification proposed by Petrin and Train (2010) and follows the implementation of Hole (2007). Thus, utility is defined as:

$$U_{njt} \quad = \quad \alpha_{rb} \quad - \quad \beta_n \, p_{jt} \quad + \quad X_{jt} \, \beta \quad + \quad \lambda \, \mu_{jt} \quad + \quad \tilde{\epsilon}_{njt}, \tag{1}$$

The utility U_{njt} captures the purchasing decisions, which are our left hand side variable. Each purchasing decision concerns retailer-product combinations. On the right hand side, α_{rb} are retailer-brand fixed effects, p_{jt} is the price as the endogenous variable, whose coefficient varies over all n households (following a log-normal distribution), X_{jt} contains product characteristics such as information whether there has been a promotion for a particular product[12] and μ is the calculated control function with λ as the corresponding parameters. The error term $\tilde{\epsilon}_{njt}$ is independently and identically drawn from GEV distribution of type I (Petrin and Train 2010).[13]

The control function approach addresses the problem that prices are endogenous by deriving a control variable for the part of the price that is correlated with unobserved factors

[11] Some examples are Train (1998), Bonnet and Requillart (2011), Petrin and Train (2010), Nevo (2001), Villas-Boas (2007), Draganska et al. (2011), Bonnet and Dubois (2010), Bonnet et al. (2013). See also the similarly approach in our own work (Haucap et al. 2013).

[12] Promotion activity is indicated in the household survey. Additionally, we define a 50% price reduction from the average price as promotion.

[13] The estimation takes 100 Halton draws into account, similar to Bonnet et al. (2013).

(e.g., supply shocks). The endogenous variable is regressed on observed characteristics and cost shifters, before the residuals are used to obtain the control function which enters as an extra variable in the original regression equation (Petrin and Train 2010). This approach is widely used for random coefficient logit models (e.g., Bonnet and Dubois 2010, Bonnet et al. 2013). Another typical example for instruments in this context are Hausman type instruments using correlations of assumed independent markets that face similar cost shocks (Nevo 2000). However, most studies prefer to let cost shifters directly enter into the estimation instead of using indirect Hausman type instruments, which require a more detailed knowledge about pricing patterns in several regional markets to meet the exogeneity assumptions.

In our approach identification relies on the exogeneity of the cost shifters for the observed market shares and their correlation to the price - an assumption that can be met reliably and is widely applied in the literature (e.g., Ailawadi et al. 2010, Bonnet and Dubois 2010, Bonnet et al. 2013, Draganska et al. 2011). Cost shifter data on prices for plastic, paper, labor, energy and diesel is collected and used as proxy variables for diaper input costs, processing costs and transport costs. Then, the price is regressed on explanatory variables of the demand equation, brand and retailer fixed effects and cost variables. Additionally, cost shifters are interacted with a private label dummy to account for the possibility of cost differences between the two product types (see Table 3). We take the part of the price regression that cannot be explained by the explanatory variables of the price equation (i.e., the residuals) as a proxy variable for supply shocks and let this control-function enter into the demand equation to get rid of the problem of simultaneous causality.

One has to consider that the standard errors are biased downwards due to the typical generated regressor problem caused by the control function. Thus, bootstrapping would be the typical way to correct this bias, which is, however, computational unfeasible. Since we are interested in the point estimates and are confronted with very small standard errors, in particular in the price variable, this bias seems not to be a serious issue.

To sum up, the random coefficient logit has convenient advantages in comparison to standard logit models (Train 2003), which allow more realistic estimation of consumer behavior than linear models or nested models. In particular, the model allows us to account for heterogeneity in customer preferences, which is important when estimating the sensitivity for prices (e.g., Nevo 2000) without considering any a-priori structure as in nested models. As we use consumer-level data, we are able to model consumer heterogeneity by allowing for random taste variations over individual consumers. This has the advantage that for every consumer and product, we are able to depict the individual‘s actual sensitivity to price changes. Next, product heterogeneity is accounted for, which gives flexible substitution patterns and reveals cross-price elasticities without imposing ex-ante substitution structures as in nested models. This is an important advantage given that a priori we do not know the actual substitution patterns. Finally, the approach offers flexibility in handling panel data by allowing for correlation in unobserved factors over time, which is rather convenient in our case, as we observe repeated household decisions.

2.2.2 Calculation of Margins

In a second step, the demand estimates are used to calculate price-cost margins.[14]. Price-cost margins again depend on the firms' profit functions and optimization behavior. The first order derivatives are easily computed using the estimated demand function. Additional information that needs be considered are ownership matrices of retailers and manufacturers.

Clearly, margins depend on the particular assumption of the supply model. However, since our main interest is in retail margins, we can take advantage of retailer margins being identical across several models by assuming that retailers compete in prices and use Nash equilibrium values, as often used in the literature. However, there may be mechanisms other than linear pricing schemes. For example, some manufacturer may want to reduce the double mark-up by using two-part tariffs or resale price maintenance (RPM). In these cases retailers set prices equal to their own marginal costs, but are compensated by a fixed transfer from the manufacturer. [15] Still, if we have free optimization by the retailer and a full transfer of the entire profit to the manufacturer, we can stick to the same optimization approach and recover retail margins. If resale price maintenance (RPM) was used with retailers pricing at marginal cost, we could assume category optimization by the manufacturer. To put it differently, the manufacturer optimizes the retail prices. the calculation is analogous to retailers optimizing just with different identity matrices.

[14] Also see Villas-Boas (2007), Ailawadi et al. (2008), Bonnet and Dubois (2010) and Bonnet et al. (2013) for a similar approach.

[15] A nice example for an in-depth discussion of the different two-part tariff models is Bonnet et al. (2013).

Hence, technically there is no major change in the margins calculated. Clearly, private labels have to be treated differently. Here we assume that retailers are fully vertically integrated with their private labels.

This yields for all other cases the relevant equation for the retailer margins, which is the first order condition of the standard multi-product profit function (e.g., Bonnet and Dubois 2010, Bonnet et al. 2013):

$$p - w - c = -(I_{r/m} S_p I_{r/m})^{-1} I_{r/m} s(p) \quad (2)$$

The left-hand-side of equation 2 provides the retailer margins, which is the price p less the manufacturer's input price w and the marginal cost c. In the case of resale price maintenance manufacturers optimize wholesale prices that are equal to final prices such that the LHS switches to $p - c$. The right-hand-side variable $I_{r/m}$ indicates the retailer (or manufacturer) identity matrix, s(p) shows the market shares and S_p is the market share response matrix (first derivatives of the market share with respect to the price). Importantly, private labels are a special case in this margin calculation, because it is not clear how contracts split profits among manufacturers and retailers. The literature treats them as being vertically integrated, with the whole margin kept by the retailer (e.g., Bonnet and Dubois 2010, Bonnet et al. 2013).

2.2.3 Market Delineation

SSNIP

In the third and final step, we use the price-cost margins and the cross-price elasticities obtained in the first two steps in order to delineate the market for diapers. This is not a trivial task as adequate substitution patterns need to be used (e.g., Katz and Shapiro 2003). We account for the retail margins using the linear pricing case, as described above, assuming optimization by retailers (linear pricing or two part-tariffs with retailers transferring a fixed fee to the manufacturer) or manufacturer (two-part tariffs with manufacturer RPM).

We use a variant of the SSNIP test presented in (Katz and Shapiro 2003, O'Brien and

Wickelgren 2003), which explicitly accounts for consumers'switching behavior. The general idea behind the test is to find a threshold for the loss in sales where a 5% or 10% price increase becomes unprofitable for a hypothetical monopolist (O'Brien and Wickelgren 2003). Of particular interest is whether private label products belong to the same relevant market as manufacturer brands. Conveniently, our specification also allows us to determine the degree of competition between retail formats. Intuitively, the SSNIP algorithm works as follows (Werden 2002): 1. Find the market leader, 2. Sort all products according to their closeness to the market leader, measured by cross-price elasticities, 3. Determine the threshold where the computed actual loss is equal to the critical loss, 4. If the critical loss exceeds the computed actual loss, a price increase would be profitable for a hypothetical monopolist and the relevant market is defined. If not, add a substitute and continue until 4. holds.

We follow the criterion of Katz and Shapiro (2003) and O'Brien and Wickelgren (2003, p.174):

$$\textit{Actual Loss} \;\equiv\; X\left[\frac{1}{m} - E^{Cross}\right] \;=\; \frac{X}{X + m} \;\equiv\; \textit{Critical Loss}, \tag{3}$$

where X is the amount of the price increase, m is the margin and E^{Cross} are the cross-price elasticities. The relevant market is, according to the authors, found, when the actual loss is no larger than the critical loss. In other words, when $\textit{Actual Loss} \leq \textit{Critical Loss}$, the algorithm stops and the market is defined. When, instead, the Actual Loss exceeds the Critical Loss, a price increase is not profitable due to a too narrow market definition (O'Brien and Wickelgren 2003).

Rearranging (5) yields that the Actual Loss exceeds the Critical Loss if and only if (O'Brien and Wickelgren 2003, p.175):

$$\frac{X}{m\,(X + m)} = \frac{\textit{Critical Loss}}{m} > E^{Cross} \tag{4}$$

GUPPI

The concept of the *Gross Upward Pricing Pressure Index* (GUPPI) (e.g., Salop and

Moresi 2009, Moresi 2010) is conceptually based on the *Upward Pricing Pressure* method proposed by Farrell and Shapiro (2010). The measure of the *Upward Pricing Pressure* method takes into account unilateral effects to increase prices after a merger and therefore has been proposed as a measure of merger analysis which is less sensitive to particular market definitions (Farrell and Shapiro 2010). The GUPPI is an adjustment that accounts for different pricing means (Salop and Moresi 2009). Moresi (2010) shows how this test can be used deriving those unilateral price increases to build a SSNIP-type market delineation, which uses the common 5 % and 10 % thresholds for market delineation.

We apply this and use the formal definition of Salop and Moresi (2009) and utilize the formal description given in Moresi (2010, p.6):[16]

$$GUPPI_i = DR_{i,j} * m_i * P_j/P_i \tag{5}$$

The GUPPI is described as the value for the particular diversion ratio $DR_{i,j}$, which provides information on the actual substitution patterns between the two products under consideration, multiplied with the price-cost margin m_i, which is computed using the estimated demand parameters resp. the underlying supply model and multiplied with a price normalization P_j/P_i, which accounts for pricing differences between the products.

Moresi (2010) shows that a market definition similar to the SSNIP test can be derived by the formula $GUPPI_i > 2s$ (p.7), with s denoting the increase in price level used analogously in the SSNIP test. Affeldt et al. (2012) mention that this definition “relating the GUPPI to the SSNIP is based on a profit-maximizing SSNIP not simply a just profitable SSNIP, i.e. to the U.S. Hypothetical Monopolist test rather than the EU SSNIP-test” (p. 9).

The derivation of the diversion ratio is important for the particular use of the GUPPI. Crucial ingredients are the substitution patterns either described in marginal effects or

[16] See also the discussion in Affeldt et al. (2012). As discussed in Moresi (2010) the formula differs to the Salop and Moresi (2009) due to pricing equality assumptions. We change the notation slightly using general subscripts instead of directly naming firms.

cross-price elasticities. We follow Affeldt et al. (2012, p.10):[17]

$$DR_{i,j} = \frac{\frac{\partial Q_j}{\partial p_i}}{\frac{\partial Q_i}{\partial p_i}} \tag{6}$$

The diversion ratio is the ratio of the marginal effects of another product's price change divided by the marginal effect of own price changes. With all necessary information at hand the GUPPI can be used as a complementary method for market definition.

3 Results

3.1 Demand Estimation

In the first step of the demand estimation the control functions for every two year period have to be recovered. The estimation (Table 3) considers several cost shifters that enter into the estimation. The cost structure is differentiated between private label producers and brand producers to control for potential structural differences in cost structures. The estimation for each period shows that all cost shifters are significant in all years. However, the sign of the different cost shifters vary if all are inserted simultaneously into the estimation equation. This is due to collinearity among all shifters[18], but does not affect the quality of the control function. There are some differences in costs between private and branded labels. The explanatory power is rather high since the R^2 is around 30% for all estimations. Therefore, we are confident to disentangle the endogenous and exogenous impact of the price with the control function.

Analyzing the random coefficient logit it is evident that, as expected, all specifications have a strongly significant impact on the price. Using the control function in the demand estimation yields a significant effect in all periods (4). Moreover the sign of the price coefficient in all specifications is negative, which is given by the log-normal distribution of the price coefficient. The standard deviation of the price is notably large, indicating

[17]However, we use still general indices rather than direct ones.

[18]This is a common pattern in the literature and can be found, for instance, in Bonnet and Dubois (2010).

that customers have very heterogeneous price preferences. Another puzzling effect is the negative promotion variable. It seems to be counterintuitive that during promotions consumers' utility is lower. However, since the promotion variable is also related to reduced prices this implies that there is a decreasing marginal disutility of the price. Taking into account brand and retailer dummies, we can see that consumers strongly value different retailer and manufacturer, as almost all variables are significant. This is in line with the empirical literature on retail grocery markets.

Table 5 provides information for price elasticities of the four two-year periods. Evidently, the own-price elasticities are all within the inelastic region of the demand function. However, taking into account the development over the years, the absolute value of the own-price elasticities is increasing from the first to the last samples considered (from values between 5 and 6 to values between 11.5 and 12). This trend is not monotone over the years since the values for the 2005/2006 period are higher than for the 2007/2008 period. The elasticities show a significant higher elasticity for manufacturer brands than for private labels in the first (2003/2004) and second period (2005/2006). This is changing in 2007/2008 where the demand for private labels is significantly more inelastic. This difference, which is small in absolute terms, becomes insignificant in 2009/2010. The difference in own-price elasticities are insignificant (2003-2008) or small (2009/2010) between discounters and other retail formats. Comparing the cross-price elasticities the Table shows significant differences between private labels and manufacturer brands, with the common finding that the cross price elasticities are slightly higher for private labels. Still, the difference is small in absolute terms. A similar pattern is shown for the differences between discounter and the other retail formats. For some years a significant higher cross price elasticity exist and this effect is not significant for all years and it is small in absolute terms.

3.2 Margins and Market Delineation

Table 6 provides information on the market delineation using the substitution patterns from the demand estimation as described in the previous subsection as well as the margins derived from the two described linear models (linear pricing and pricing with RPM). The Table reports the different brands ordered according to their closeness to the market leader, which is in our case a manufacturer brand with a market share of around 30 % in

2003/2004. The lines indicate the market delineation with the widely used 1%, 5% and 10% thresholds. As can be seen from the linear pricing example the relevant market using a 1% threshold would comprise two private labels and one other manufacturer brand. It is interesting to see that the first two followers - i.e. the two closest substitutes- of the market leader are private labels. Using the 5% leads for a market definition that virtually accounts for all brands, but one, which is then included with the 10% threshold. Since the majority of brands in the market are private labels, also those sold only discounters and drugstores, it cannot be argued that those retailer do not effectively compete against each others fiercely. As the SSNIP test directly accounts for pricing limitations by those competitors, it is clearly shown that the market leader is limited in its pricing behavior by private labels.

It could be argued that the margins are underestimated using the linear pricing model. Table 7 gives margins for the RPM model if the manufacturer sets prices, which clearly leads to a different margin distribution. Even though the market definition becomes more narrow, one private label still has to be included into the relevant product market (but no other manufacturer brand) even for the 1% threshold. Using the 5% threshold several other private labels - from both discounters and drugstores - are included jointly with one other manufacturer brand. For the 10 % threshold virtually all other brands are included in the market, with only one brand being excluded. It can be seen that no matter how the market is delineated, private labels and manufacturer brands are not split into two separate markets. On the contrary, the market for diapers appear to consist of private labels and manufacturer brands sold across all different retail formats.

The patterns uncovered for the period 2003/2004 are representative for the other periods within the linear pricing models (8, 10, 12) and RPM models (9, 11, 13). In contrast to the 2003/2004 period, the following periods are more competitive, with broader market definitions. Interestingly, the strongest competitor for the market leader is a manufacturer brand in 2005/2006 and may be defined in the RPM margin model in one market at the 1% threshold. However, this is completely different in the following period (2007/2008) where the only remaining manufacturer brand is not a close substitute. Then, in the 2009/2010 period, there are no other manufacturer brands, with only private labels remaining. However, it has to be considered that even though the market share of the market leader increased to approx. 48%, the leading brand is still effectively constrained by private labels in its pricing decisions.

In order to show the particular pricing constraint for all firms by the other firms, Table (14,16,18,20) show the *GUPPI* for the linear model and (15,17,19,21) show the *GUPPI* for the RPM. These Tables indicate, in pairwise comparisons, whether two firms exert pricing pressure on each other. The value multiplied by 2 can be used easily to check whether two firms belong to the same market or not, using the same 1%, 5% and 10% thresholds. An interesting observation is that, using this technique, mergers of two firms nearly always lead to values below the relevant 5% and 10% thresholds - an indicator that most of the products are in the same relevant market.

4 Conclusion

Given recent antitrust concerns about the degree of competition between (i) private labels and manufacturer brands and especially (ii) between various retail formats, we have used used very rich and detailed consumer panel data to analyze substitution patterns in the German retail market for diapers between 2003 and 2010. Our analysis yields that competition apparently takes fully place across different retail formats as well as between manufacturer brands and private labels. Interestingly enough, the market leader's strongest substitute is not another manufacturer brand, but a private label sold at a discounter (and in one period that of a drugstore). Given this finding, we tend to conclude that competition is not limited to particular classes of retail formats, but takes place between them. Any market delineation, therefore, should rely on actual substitution patterns. A simple segmentation of markets by retail formats, as suggested by some competition authorities, is misleading and can easily lead to erroneous decisions.

The approach applied in our analysis has allowed us to account for heterogeneous consumer preferences. Using various cost shifters, we have also shown an appropriate way to properly address endogeneity problems. As the market for diapers certainly has special characteristics such as consumers (parents), which are rather likely to be more quality sensitive than consumers of many other products, we would have expected to find a market with relatively moderate substitution patterns. Still we found that competition is alive in the market with several products belonging to the same relevant market. Given these findings, we conjecture that both inter-format competition and competition between private labels and manufacturer brands may be even more intense in markets where consumers are less quality sensitive.

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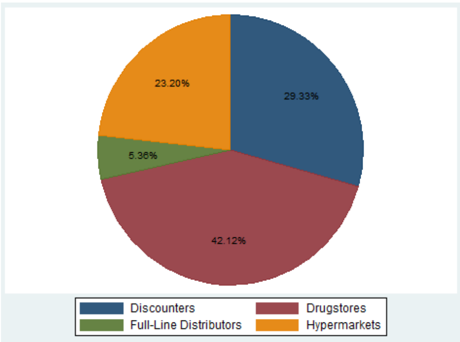
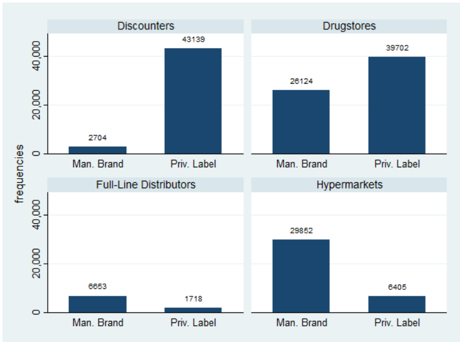
A Appendix

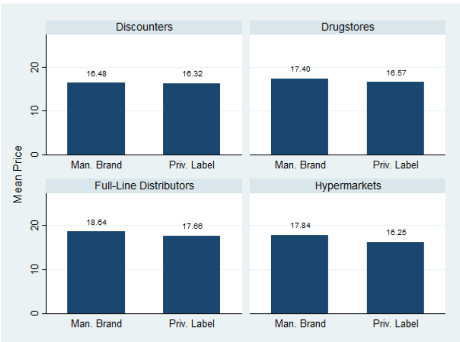
Figure 1: Descriptive Statistics over Formats



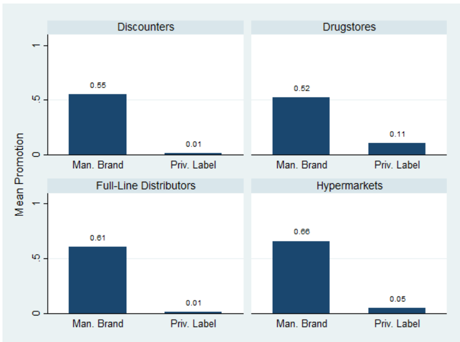
(a) Market Shares by Formats



(b) Private Labels by Format



(c) Prices by Format



(d) Promotional Activity by Format

Table 1: **Summary Statistics**

	Tot.Bill	Value	Size	Quantity	Quant=1	Price	Promo	PL
03/04								
Mean	36.24	12.70	56.89	1.25	0.81	16.73	0.25	0.61
SD	27.10	8.85	23.38	0.62	0.40	6.01	0.43	0.49
05/06								
Mean	39.10	12.32	56.45	1.23	0.81	17.13	0.26	0.60
SD	30.30	8.80	28.25	0.56	0.39	6.42	0.44	0.49
07/08								
Mean	41.66	13.16	59.03	1.26	0.79	17.14	0.28	0.59
SD	32.50	9.05	29.43	0.62	0.41	6.62	0.45	0.49
09/10								
Mean	44.77	13.16	57.69	1.29	0.77	16.83	0.32	0.54
SD	33.90	9.55	29.72	0.66	0.42	6.57	0.47	0.50
Total								
Mean	40.95	12.85	57.56	1.26	0.79	16.97	0.28	0.58
SD	31.61	9.11	28.22	0.62	0.41	6.45	0.45	0.49

Table 2: Summary statistics Control Function

Variable	Mean	SD	Min.	Max.
Work	98.519	4.753	87.463	110.397
Plastic	1.035	0.203	0.63	1.505
Paper	682.707	20.73	623.92	733.66
Energy	28.715	11.211	1.64	64.59
Diesel	29.434	12.369	9	95
N		415		

Table 3: Control Function

Variable	**03/04**		**05/06**		**07/08**		**09/10**	
Promotion	-4.528	***	-4.453	***	-3.875	***	-3.513	***
	(0.005)		(0.004)		(0.004)		(0.003)	
Plastic	0.078	*	0.961	***	0.730	***	-1.439	***
	(0.036)		(0.024)		(0.016)		(0.019)	
PL	24.385	***	8.126	***	-4.188	***	-6.820	***
	(0.338)		(0.547)		(0.177)		(0.180)	
PL#Plastic	0.339	***	0.410	***	-1.145	***	1.656	***
	(0.059)		(0.040)		(0.023)		(0.029)	
Paper	0.034	***	0.042	***	0.002	***	0.002	***
	(0.000)		(0.000)		(0.000)		(0.000)	
PL#Paper	-0.044	***	-0.021	***	0.001	***	0.010	***
	(0.000)		(0.001)		(0.000)		(0.000)	
Work	0.025	***	0.002	**	0.012	***	0.037	***
	(0.001)		(0.001)		(0.001)		(0.000)	
PL#Work	0.007	***	-0.028	***	-0.005	***	-0.059	***
	(0.001)		(0.001)		(0.001)		(0.001)	
Diesel	-0.003	***	-0.013	***	-0.008	***	-0.043	***
	(0.000)		(0.000)		(0.000)		(0.000)	
PL#Diesel	-0.002	***	0.044	***	0.009	***	0.053	***
	(0.000)		(0.000)		(0.000)		(0.001)	
Energy	0.019	***	-0.013	***	-0.018	***	0.001	***
	(0.001)		(0.000)		(0.000)		(0.000)	
PL#Energy	-0.020	***	0.029	***	0.030	***	-0.023	***
	(0.001)		(0.000)		(0.030)		(0.000)	
Brand FE	YES		YES		YES		YES	
Retailer FE	YES		YES		YES		YES	
N	4958920		6585040		6977920		8487400	
F	56616.770		67497.620		87368.950		0.000	
R2	0.303		0.286		0.328		0.335	
Adjusted R2	0.303		0.286		0.328		0.335	

note: ***1%; **5%; *10%

Table 4: Demand Estimation

Variable	03/04		05/06		07/08		09/10	
Retailer 2	0.257	***	-0.479	***	-1.323	***	1.688	***
	(0.060)		(0.037)		(0.099)		(0.077)	
Retailer 3	0.788	***	-0.175	***	2.030	***	3.809	***
	(0.058)		(0.036)		(0.070)		(0.096)	
Retailer 4	-1.534	***	-1.293	***	1.554	***	1.712	***
	(0.093)		(0.046)		(0.077)		(0.093)	
Retailer 5	-1.252	***	-0.189	***	1.224	***	3.256	***
	(0.086)		(0.026)		(0.092)		(0.077)	
Retailer 6	1.033	***	-1.261	***	2.483	***	2.094	***
	(0.056)		(0.061)		(0.079)		(0.083)	
Retailer 7			-1.372	***	1.320	***	2.959	***
			(0.055)		(0.084)		(0.098)	
Retailer 8	-1.299	***	-2.172	***	0.851	***	0.283	***
	(0.102)		(0.073)		(0.084)		(0.083)	
Retailer 9	-0.457	***	-2.494	***	-0.248	**	1.473	***
	(0.079)		(0.081)		(0.095)		(0.097)	
Retailer 10	-1.128	***			-0.480	***		
	(0.100)				(0.098)			
Retailer 11							4.360	***
							(0.087)	
Retailer 12					-0.952	***	3.098	***
					(0.069)		(0.113)	
Retailer 13	1.076	***	-0.093	***	2.885	***	2.375	***
	(0.050)		(0.025)		(0.083)		(0.074)	
Retailer 14	-1.967	***	-1.928	***	0.824	***	1.827	***
	(0.081)		(0.069)		(0.099)		(0.081)	
Retailer 15	-1.133	***	-1.893	***	1.099	***		
	(0.096)		(0.047)		(0.074)			
Retailer 16	1.692	***	-0.398	***	0.056			
	(0.054)		(0.032)		(0.066)			
Retailer 17	-0.852	***						
	(0.088)							
Brand 1	-0.416	***	1.023	***			0.602	***
	(0.081)		(0.061)				(0.032)	
Brand 2	0.719	***	0.649	***	0.233	***	0.994	***
	(0.023)		(0.026)		(0.030)		(0.106)	
Brand 3	-1.722	***	2.292	***	0.754	***	-0.268	***
	(0.080)		(0.070)		(0.054)		(0.080)	
Brand 4	0.310	***	-2.248	***	-0.124		3.688	***
	(0.096)		(0.056)		(0.075)		(0.146)	
Brand 5	-1.999	***	-2.152	***	0.931	***	-0.249	**
	(0.065)		(0.070)		(0.063)		(0.079)	
Brand 6	1.162	***	1.964	***	1.364	***	1.155	***
	(0.124)		(0.056)		(0.064)		(0.097)	
Brand 7	1.451	***	2.545	***	-0.780	***	-1.558	***
	(0.087)		(0.053)		(0.121)		(0.109)	
Brand 8	-1.116	***	0.175	***			1.861	***
	(0.062)		(0.049)				(0.061)	
Brand 9	-1.199	***	0.444	***	-0.038		0.030	
	(0.051)		(0.1089		(0.111)		(0.102)	
Brand 10	0.091	**	0.444	***	-0.900	***	-4.150	***
	(0.031)		(0.041)		(0.107)		(0.111)	
Brand 11	-1.514	***	1.733	***			-1.205	***
	(0.107)		(0.110)				(0.081)	
Brand 12	-0.995	***	-1.690	***	0.425	***	-2.930	***
	(0.064)		(0.051)		(0.079)		(0.088)	
Brand 13	-2.533	***	2.954	***	-2.540	***	-1.460	***
	(0.091)		(0.068)		(0.096)		(0.117)	
Brand 14	-2.259	***	0.336	***	-1.615	***	2.352	***
	(0.070)		(0.093)		(0.080)		(0.101)	
Brand 15					-3.506	***		
					(0.097)			
Brand 16					1.500	***		
					(0.074)			
CF	0.286	***	0.489	***	0.394	***	0.690	***
	(0.011)		(0.010)		(0.009)		(0.018)	
Promotion	-1.213	***	-1.795	***	-1.435	***	-2.006	***
	(0.053)		(0.049)		(0.038)		(0.064)	
Price	-1.100	***	-0.623	***	-0.808	***	-0.330	***
	(0.037)		(0.022)		(0.024)		(0.027)	
SD								
Price	0.500	***	0.419	***	0.574	***	-0.394	***
	(0.019)		(0.010)		(0.014)		(0.011)	
N	1080080		1535880		1456240		1754960	
LR χ^2 (1)	8197.250		19128.620		20834.900		28523.190	
Prob $\geq \chi^2$	0.000		0.000		0.000		0.000	
Log likelihood	-84695.865		-115273.760		-107640.120		-132783.680	

note: ***1%; **5%; *10%

Figure 2: Market Shares of Retail Formats over Time

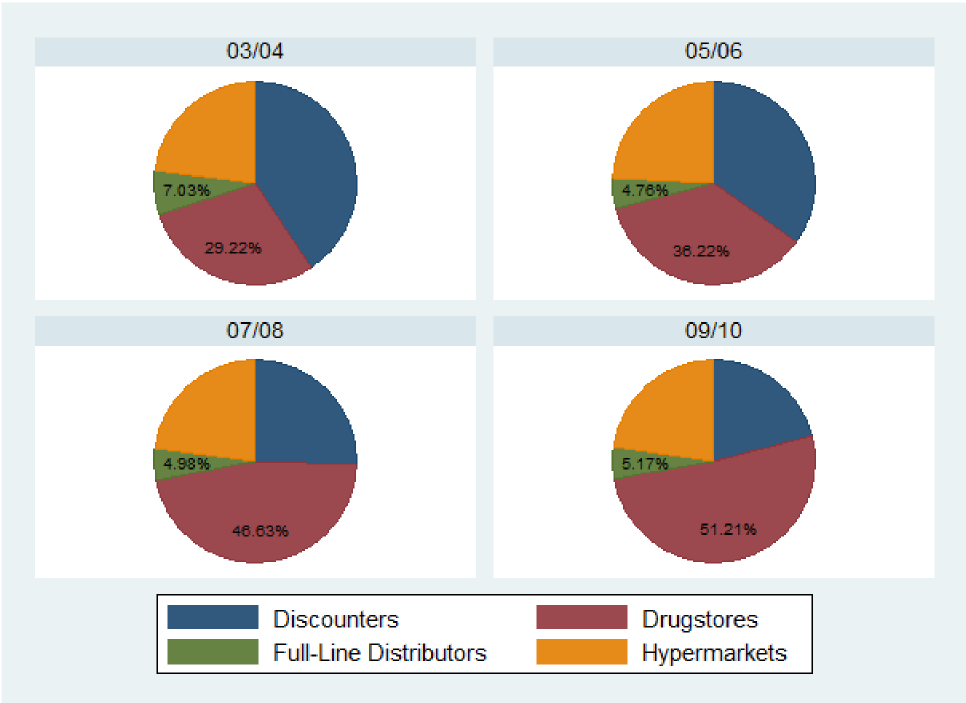


Table 5: Elasticities 2003-2010

		period 03/04		period 05/06		period 07/08		period 09/10	
	Elasticities by	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Own-Elast.	Man. Brand	-5.702	0.099	-9.138	0.103	-7.363	0.343	-11.655	0.289
	Priv. Label	-5.576	0.215	-8.871	0.431	-7.771	0.475	-11.670	0.465
	Hypermarkets	-5.702	0.099	-9.121	0.112	-7.404	0.434	-11.733	0.175
	Discounters	-5.595	0.227	-8.997	0.400	-7.776	0.449	-11.814	0.293
	Drugstores	-5.630	0.153	-8.931	0.352	-7.493	0.473	-11.441	0.476
	Full-Line Distr.	-5.720	0.126	-9.273	0.162	-7.5	0.388	-11.842	0.186
Cross-Elast.	Man. Brand	0.130	0.012	0.212	0.017	0.172	0.020	0.277	0.017
	Priv. Label	0.141	0.009	0.224	0.013	0.196	0.021	0.294	0.022
	Hypermarkets	0.134	0.013	0.215	0.019	0.173	0.025	0.276	0.019
	Discounters	0.140	0.007	0.222	0.013	0.194	0.022	0.297	0.022
	Drugstores	0.129	0.012	0.215	0.014	0.184	0.021	0.283	0.015
	Full-Line Distr.	0.128	0.021	0.201	0.019	0.174	0.023	0.277	0.033
Diff. of means	Own Elast. PL and MB	Pr(!= 0)=	0.0147	Pr(!= 0)=	0.005	Pr(!= 0)=	0.0033	Pr(!= 0)=	0.8999
	Own Elast. Disc. and others	Pr(!= 0)=	0.1257	Pr(!= 0)=	0.6046	Pr(!= 0)=	0.0443	Pr(!= 0)=	0.1085
	Cross Elast. PL and MB	Pr(!= 0)=	0.007	Pr(!= 0)=	0.033	Pr(!= 0)=	0.0005	Pr(!= 0)=	0.0121
	Cross Elast. Disc. and others	Pr(!= 0)=	0.0681	Pr(!= 0)=	0.1694	Pr(!= 0)=	0.0483	Pr(!= 0)=	0.014

Table 6: ssnip0304

Linear Pricing								
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.31	0.182	.	0.286	1.184	1.949
17	1	Drugstores	0.043	0.198	0.089	0.242	1.016	1.691
49	1	Hypermarkets	0.019	0.196	0.176	0.248	1.039	1.727
11	0	Hypermarkets	0.012	0.183	0.263	0.282	1.170	1.927
40	1	Hypermarkets	0.008	0.176	0.349	0.304	1.252	2.050
32	1	Discounters	0.059	0.184	0.436	0.281	1.164	1.919
48	1	Full-line distr.	0.008	0.181	0.522	0.290	1.197	1.968
54	1	Discounters	0.104	0.257	0.608	0.146	0.635	1.093
30	1	Discounters	0.017	0.176	0.694	0.306	1.259	2.061
20	1	Drugstores	0.019	0.175	0.779	0.309	1.270	2.078
10	1	Discounters	0.194	0.257	0.864	0.146	0.635	1.092
26	1	Discounters	0.011	0.176	0.949	0.306	1.259	2.061
7	0	Several	0.083	0.189	1.034	0.265	1.104	1.827
21	1	Several	0.100	0.187	1.118	0.272	1.129	1.864
41	1	Discounters	0.012	0.175	1.201	0.310	1.275	2.086

Table 7: ssnip0304

				RPM				
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.31	0.249	.	0.156	0.674	1.155
17	1	Drugstores	0.043	0.198	0.089	0.242	1.016	1.691
49	1	Hypermarkets	0.019	0.196	0.176	0.248	1.039	1.727
11	0	Hypermarkets	0.012	0.174	0.263	0.314	1.289	2.106
40	1	Hypermarkets	0.008	0.176	0.349	0.304	1.252	2.051
32	1	Discounters	0.059	0.184	0.436	0.281	1.165	1.919
48	1	Full-line distr.	0.008	0.181	0.522	0.29	1.198	1.969
54	1	Discounters	0.104	0.257	0.608	0.146	0.636	1.093
30	1	Discounters	0.017	0.176	0.694	0.306	1.259	2.061
20	1	Drugstores	0.019	0.17	0.779	0.327	1.338	2.18
10	1	Discounters	0.194	0.256	0.864	0.147	0.64	1.1
26	1	Discounters	0.011	0.176	0.949	0.306	1.259	2.062
7	0	Several	0.083	0.187	1.034	0.272	1.129	1.865
21	1	Several	0.1	0.187	1.118	0.272	1.129	1.864
41	1	Discounters	0.012	0.159	1.201	0.374	1.511	2.438

Table 8: ssnip0506

Linear Pricing								
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.375	0.115	.	0.691	2.620	4.023
7	0	Several	0.054	0.118	0.165	0.665	2.533	3.903
27	1	Full-line distr.	0.005	0.108	0.328	0.791	2.952	4.482
43	1	Hypermarkets	0.022	0.118	0.492	0.660	2.515	3.877
26	1	Discounters	0.025	0.110	0.655	0.756	2.836	4.323
40	1	Hypermarkets	0.007	0.110	0.818	0.754	2.830	4.314
30	1	Discounters	0.013	0.109	0.981	0.770	2.880	4.383
54	1	Discounters	0.052	0.133	1.143	0.526	2.054	3.227
32	1	Discounters	0.091	0.120	1.305	0.639	2.443	3.776
19	1	Discounters	0.007	0.109	1.466	0.767	2.872	4.372
24	1	Drugstores	0.020	0.120	1.628	0.645	2.465	3.807
20	1	Drugstores	0.043	0.117	1.789	0.672	2.556	3.934
25	1	Discounters	0.005	0.109	1.950	0.776	2.901	4.412
10	1	Discounters	0.113	0.133	2.110	0.523	2.044	3.212
49	1	Hypermarkets	0.035	0.121	2.270	0.630	2.413	3.735
21	1	Drugstores	0.107	0.132	2.429	0.536	2.091	3.279
17	1	Drugstores	0.026	0.144	2.583	0.452	1.792	2.850

Table 9: ssnip0506

				RPM				
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.375	0.176	.	0.307	1.261	2.065
7	0	Several	0.054	0.113	0.165	0.725	2.734	4.181
27	1	Full-line distr´.	0.005	0.108	0.328	0.792	2.953	4.482
43	1	Hypermarkets	0.022	0.118	0.492	0.66	2.515	3.877
26	1	Discounters	0.025	0.11	0.655	0.756	2.836	4.323
40	1	Hypermarkets	0.007	0.108	0.818	0.787	2.938	4.462
30	1	Discounters	0.013	0.109	0.981	0.769	2.88	4.383
54	1	Discounters	0.052	0.133	1.143	0.526	2.054	3.227
32	1	Discounters	0.091	0.12	1.305	0.639	2.443	3.776
19	1	Discounters	0.007	0.109	1.466	0.767	2.872	4.372
24	1	Drugstores	0.02	0.12	1.628	0.645	2.465	3.808
20	1	Drugstores	0.043	0.117	1.789	0.672	2.556	3.934
25	1	Discounters	0.005	0.109	1.95	0.776	2.901	4.412
10	1	Discounters	0.113	0.133	2.11	0.523	2.044	3.212
49	1	Hypermarkets	0.035	0.121	2.269	0.63	2.413	3.735
21	1	Drugstores	0.107	0.132	2.429	0.536	2.091	3.279
17	1	Drugstores	0.026	0.144	2.583	0.452	1.793	2.851

Table 10: ssnip0708

Linear Pricing								
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.42	0.148	.	0.427	1.705	2.723
28	1	Drugstores	0.015	0.123	0.178	0.612	2.351	3.647
10	1	Discounters	0.07	0.143	0.349	0.457	1.811	2.876
25	1	Discounters	0.005	0.124	0.517	0.602	2.319	3.602
20	1	Drugstores	0.06	0.14	0.684	0.475	1.876	2.971
54	1	Discounters	0.058	0.146	0.851	0.442	1.757	2.799
30	1	Discounters	0.006	0.124	1.018	0.605	2.328	3.615
49	1	Hypermarkets	0.011	0.138	1.183	0.489	1.924	3.04
37	1	Full-line distr.	0.01	0.133	1.348	0.527	2.058	3.232
43	1	Hypermarkets	0.032	0.141	1.511	0.471	1.862	2.951
24	1	Drugstores	0.033	0.138	1.672	0.493	1.938	3.06
21	1	Drugstores	0.164	0.149	1.831	0.421	1.682	2.689
26	1	Discounters	0.005	0.132	1.989	0.535	2.085	3.271
27	1	Full-line distributors	0.006	0.14	2.145	0.474	1.874	2.968
7	0	Several	0.015	0.144	2.299	0.449	1.783	2.836
32	1	Discounters	0.024	0.15	2.452	0.416	1.666	2.666
50	1	Discounters	0.066	0.151	2.603	0.411	1.647	2.637

Table 11: ssnip0708

RPM								
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.42	0.233	.	0.176	0.756	1.285
28	1	Drugstores	0.015	0.123	0.178	0.612	2.351	3.647
10	1	Discounters	0.07	0.143	0.349	0.457	1.811	2.876
25	1	Discounters	0.005	0.124	0.517	0.602	2.319	3.602
20	1	Drugstores	0.06	0.14	0.684	0.475	1.876	2.971
54	1	Discounters	0.058	0.146	0.851	0.442	1.757	2.799
30	1	Discounters	0.006	0.124	1.018	0.605	2.328	3.615
49	1	Hypermarkets	0.011	0.138	1.183	0.489	1.924	3.04
37	1	Full-line distr.	0.01	0.133	1.348	0.527	2.058	3.232
43	1	Hypermarkets	0.032	0.141	1.511	0.471	1.862	2.951
24	1	Drugstores	0.033	0.138	1.672	0.493	1.938	3.06
21	1	Drugstores	0.164	0.149	1.831	0.421	1.682	2.689
26	1	Discounters	0.005	0.132	1.989	0.535	2.085	3.271
27	1	Full-line distr.	0.006	0.14	2.145	0.474	1.874	2.968
7	0	Several	0.015	0.138	2.299	0.487	1.917	3.03
32	1	Discounters	0.024	0.15	2.452	0.416	1.666	2.666
50	1	Discounters	0.066	0.151	2.603	0.411	1.647	2.637

Table 12: ssnip0910

Linear Pricing								
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.477	0.094	.	1.016	3.671	5.453
22	1	Drugstores	0.099	0.127	0.244	0.572	2.215	3.455
10	1	Discounters	0.056	0.094	0.486	1.032	3.721	5.520
28	1	Drugstores	0.010	0.086	0.728	1.218	4.296	6.279
54	1	Discounters	0.039	0.093	0.970	1.044	3.759	5.571
25	1	Discounters	0.013	0.084	1.211	1.264	4.436	6.462
37	1	Full-line distr.	0.008	0.087	1.451	1.198	4.235	6.199
20	1	Drugstores	0.069	0.097	1.688	0.962	3.502	5.227
43	1	Hypermarkets	0.030	0.093	1.923	1.043	3.757	5.568
45	1	Hypermarkets	0.014	0.091	2.158	1.086	3.891	5.746
24	1	Drugstores	0.023	0.087	2.391	1.190	4.212	6.168
26	1	Discounters	0.016	0.085	2.624	1.252	4.398	6.413
50	1	Discounters	0.063	0.091	2.856	1.083	3.881	5.733
46	1	Full-line distr.	0.008	0.086	3.086	1.202	4.246	6.214
21	1	Drugstores	0.073	0.115	3.310	0.701	2.653	4.070

Table 13: ssnip0910

				RPM				
Brand	PL	Format	M.share	Perc_Margin	Cum_Cross	CLM1	CLM5	CLM10
13	0	Several	0.477	0.16	.	0.367	1.484	2.398
22	1	Drugstores	0.099	0.127	0.244	0.572	2.215	3.455
10	1	Discounters	0.056	0.094	0.486	1.032	3.721	5.52
28	1	Drugstores	0.01	0.086	0.728	1.218	4.296	6.279
54	1	Discounters	0.039	0.093	0.97	1.044	3.759	5.57
25	1	Discounters	0.013	0.084	1.211	1.264	4.435	6.461
37	1	Full-line distr.	0.008	0.087	1.451	1.198	4.235	6.199
20	1	Drugstores	0.069	0.097	1.688	0.962	3.502	5.227
43	1	Hypermarkets	0.03	0.093	1.923	1.043	3.757	5.568
45	1	Hypermarkets	0.014	0.091	2.158	1.086	3.891	5.745
24	1	Drugstores	0.023	0.087	2.391	1.19	4.212	6.168
26	1	Discounters	0.016	0.085	2.624	1.252	4.399	6.413
50	1	Discounters	0.063	0.091	2.856	1.083	3.881	5.733
46	1	Full-line distr.	0.008	0.086	3.086	1.222	4.309	6.296
21	1	Drugstores	0.073	0.115	3.31	0.701	2.653	4.07

Table 14: GUPPI Linear Pricing period 03/04

	7	10	11	13	17	20	21	26	30	32	40	41	48	49	54
7	.	0.0140	0.0050	0.0726	0.0057	0.0046	0.0058	0.0051	0.0056	0.0061	0.0059	0.0046	0.0055	0.0060	0.0126
10	0.0687	.	0.0232	0.3278	0.0289	0.0240	0.0279	0.0258	0.0290	0.0300	0.0287	0.0248	0.0271	0.0287	0.0626
11	0.0067	0.0064	.	0.0364	0.0030	0.0023	0.0027	0.0025	0.0024	0.0028	0.0023	0.0020	0.0023	0.0025	0.0057
13	0.0118	0.0108	0.0043	.	0.0048	0.0040	0.0047	0.0042	0.0043	0.0047	0.0045	0.0038	0.0043	0.0044	0.0097
17	0.0238	0.0243	0.0092	0.1218	.	0.0085	0.0091	0.0091	0.0100	0.0107	0.0095	0.0085	0.0098	0.0100	0.0221
20	0.0092	0.0097	0.0033	0.0492	0.0041	.	0.0039	0.0036	0.0041	0.0043	0.0035	0.0038	0.0038	0.0037	0.0092
21	0.0444	0.0433	0.0151	0.2227	0.0167	0.0150	.	0.0169	0.0167	0.0180	0.0155	0.0148	0.0160	0.0161	0.0379
26	0.0053	0.0054	0.0019	0.0262	0.0023	0.0018	0.0023	.	0.0021	0.0023	0.0020	0.0018	0.0020	0.0021	0.0048
30	0.0082	0.0086	0.0026	0.0384	0.0035	0.0030	0.0032	0.0030	.	0.0036	0.0033	0.0032	0.0032	0.0036	0.0077
32	0.0308	0.0308	0.0104	0.1448	0.0131	0.0110	0.0119	0.0113	0.0126	.	0.0132	0.0109	0.0116	0.0126	0.0277
40	0.0045	0.0045	0.0013	0.0212	0.0018	0.0013	0.0015	0.0015	0.0017	0.0020	.	0.0016	0.0025	0.0019	0.0038
41	0.0059	0.0065	0.0019	0.0299	0.0026	0.0024	0.0025	0.0022	0.0028	0.0028	0.0027	.	0.0025	0.0049	0.0058
48	0.0044	0.0043	0.0014	0.0210	0.0019	0.0015	0.0017	0.0016	0.0017	0.0018	0.0026	0.0015	.	0.0019	0.0039
49	0.0109	0.0107	0.0034	0.0489	0.0044	0.0034	0.0039	0.0038	0.0045	0.0046	0.0046	0.0070	0.0043	.	0.0096
54	0.0379	0.0383	0.0126	0.1791	0.0161	0.0139	0.0150	0.0140	0.0160	0.0165	0.0151	0.0136	0.0148	0.0158	.

Table 15: GUPPI RPM period 03/04

	7	10	11	13	17	20	21	26	30	32	40	41	48	49	54
7	.	0.0136	0.0048	0.0707	0.0056	0.0045	0.0057	0.0050	0.0055	0.0059	0.0057	0.0045	0.0054	0.0058	0.0123
10	0.0684	.	0.0231	0.3263	0.0288	0.0239	0.0278	0.0257	0.0289	0.0298	0.0286	0.0247	0.0269	0.0286	0.0623
11	0.0064	0.0061	.	0.0344	0.0029	0.0021	0.0026	0.0023	0.0023	0.0027	0.0022	0.0019	0.0022	0.0024	0.0054
13	0.0156	0.0143	0.0058	.	0.0063	0.0053	0.0063	0.0055	0.0057	0.0062	0.0060	0.0050	0.0057	0.0058	0.0128
17	0.0237	0.0243	0.0092	0.1219	.	0.0085	0.0091	0.0091	0.0100	0.0107	0.0095	0.0085	0.0098	0.0100	0.0221
20	0.0089	0.0095	0.0032	0.0477	0.0040	.	0.0038	0.0035	0.0040	0.0042	0.0034	0.0037	0.0037	0.0036	0.0090
21	0.0444	0.0432	0.0151	0.2227	0.0167	0.0150	.	0.0169	0.0167	0.0180	0.0155	0.0148	0.0160	0.0161	0.0379
26	0.0053	0.0054	0.0019	0.0262	0.0023	0.0018	0.0023	.	0.0021	0.0023	0.0020	0.0018	0.0020	0.0021	0.0048
30	0.0082	0.0086	0.0026	0.0384	0.0035	0.0030	0.0032	0.0030	.	0.0036	0.0033	0.0032	0.0032	0.0036	0.0077
32	0.0308	0.0307	0.0104	0.1448	0.0131	0.0110	0.0119	0.0113	0.0126	.	0.0132	0.0109	0.0116	0.0126	0.0277
40	0.0045	0.0045	0.0013	0.0212	0.0018	0.0013	0.0015	0.0015	0.0017	0.0020	.	0.0016	0.0025	0.0019	0.0038
41	0.0054	0.0059	0.0017	0.0272	0.0024	0.0022	0.0023	0.0020	0.0026	0.0025	0.0025	.	0.0022	0.0045	0.0053
48	0.0044	0.0043	0.0014	0.0210	0.0019	0.0015	0.0017	0.0016	0.0017	0.0018	0.0026	0.0015	.	0.0019	0.0039
49	0.0109	0.0107	0.0034	0.0489	0.0044	0.0034	0.0039	0.0038	0.0045	0.0046	0.0046	0.0070	0.0043	.	0.0096
54	0.0379	0.0383	0.0126	0.1791	0.0161	0.0139	0.0150	0.0140	0.0160	0.0165	0.0151	0.0136	0.0148	0.0158	.

Table 16: GUPPI Linear Pricing period 05/06

	7	10	13	17	19	20	21	24	25	26	27	30	32	40	43	49	54
7	.	0.0022	0.0376	0.0019	0.0015	0.0019	0.0016	0.0017	0.0019	0.0017	0.0014	0.0021	0.0017	0.0019	0.0016	0.0018	0.0020
10	0.0539	.	0.2715	0.0236	0.0197	0.0196	0.0168	0.0170	0.0176	0.0151	0.0128	0.0204	0.0168	0.0151	0.0170	0.0183	0.0198
13	0.0106	0.0031	.	0.0028	0.0029	0.0029	0.0029	0.0027	0.0027	0.0027	0.0025	0.0027	0.0029	0.0024	0.0027	0.0028	0.0030
17	0.0085	0.0042	0.0427	.	0.0030	0.0041	0.0025	0.0025	0.0038	0.0024	0.0019	0.0041	0.0023	0.0035	0.0030	0.0036	0.0037
19	0.0022	0.0012	0.0153	0.0010	.	0.0010	0.0007	0.0008	0.0008	0.0007	0.0005	0.0009	0.0008	0.0005	0.0009	0.0009	0.0009
20	0.0178	0.0075	0.0941	0.0088	0.0060	.	0.0055	0.0058	0.0059	0.0051	0.0040	0.0062	0.0053	0.0082	0.0053	0.0060	0.0066
21	0.0449	0.0187	0.2751	0.0158	0.0135	0.0162	.	0.0160	0.0160	0.0155	0.0143	0.0163	0.0170	0.0119	0.0153	0.0154	0.0171
24	0.0082	0.0034	0.0465	0.0028	0.0026	0.0031	0.0029	.	0.0028	0.0027	0.0022	0.0031	0.0029	0.0021	0.0028	0.0028	0.0030
25	0.0020	0.0008	0.0104	0.0009	0.0006	0.0007	0.0006	0.0006	.	0.0006	0.0005	0.0007	0.0006	0.0005	0.0006	0.0007	0.0007
26	0.0099	0.0036	0.0563	0.0032	0.0029	0.0032	0.0033	0.0032	0.0031	.	0.0026	0.0031	0.0034	0.0025	0.0030	0.0031	0.0034
27	0.0020	0.0007	0.0125	0.0006	0.0005	0.0006	0.0007	0.0006	0.0006	0.0006	.	0.0007	0.0007	0.0005	0.0006	0.0006	0.0007
30	0.0053	0.0021	0.0242	0.0023	0.0016	0.0017	0.0015	0.0016	0.0016	0.0013	0.0013	.	0.0015	0.0013	0.0016	0.0017	0.0017
32	0.0364	0.0144	0.2155	0.0108	0.0113	0.0118	0.0130	0.0120	0.0121	0.0119	0.0102	0.0121	.	0.0100	0.0120	0.0120	0.0132
40	0.0032	0.0011	0.0147	0.0014	0.0006	0.0015	0.0007	0.0007	0.0009	0.0007	0.0006	0.0009	0.0008	.	0.0007	0.0009	0.0009
43	0.0086	0.0037	0.0514	0.0036	0.0033	0.0030	0.0030	0.0030	0.0030	0.0027	0.0023	0.0033	0.0031	0.0023	.	0.0034	0.0033
49	0.0150	0.0061	0.0797	0.0066	0.0047	0.0052	0.0046	0.0046	0.0049	0.0043	0.0036	0.0056	0.0047	0.0043	0.0052	.	0.0055
54	0.0246	0.0099	0.1288	0.0105	0.0077	0.0087	0.0077	0.0075	0.0079	0.0071	0.0059	0.0085	0.0077	0.0064	0.0076	0.0083	.

Table 17: GUPPI RPM period 05/06

	7	10	13	17	19	20	21	24	25	26	27	30	32	40	43	49	54
7	.	0.0021	0.0362	0.0019	0.0014	0.0018	0.0016	0.0016	0.0018	0.0016	0.0014	0.0020	0.0017	0.0018	0.0016	0.0018	0.0019
10	0.0539	.	0.2715	0.0236	0.0197	0.0196	0.0168	0.0170	0.0176	0.0151	0.0128	0.0204	0.0168	0.0151	0.0170	0.0183	0.0198
13	0.0159	0.0047	.	0.0041	0.0044	0.0043	0.0043	0.0040	0.0041	0.0040	0.0037	0.0041	0.0044	0.0036	0.0041	0.0041	0.0044
17	0.0085	0.0042	0.0427	.	0.0030	0.0041	0.0025	0.0025	0.0038	0.0024	0.0019	0.0041	0.0023	0.0035	0.0030	0.0036	0.0037
19	0.0022	0.0012	0.0153	0.0010	.	0.0010	0.0007	0.0008	0.0008	0.0007	0.0005	0.0009	0.0008	0.0005	0.0009	0.0009	0.0009
20	0.0178	0.0075	0.0941	0.0088	0.0060	.	0.0055	0.0058	0.0059	0.0051	0.0040	0.0062	0.0053	0.0082	0.0053	0.0060	0.0066
21	0.0449	0.0187	0.2751	0.0158	0.0135	0.0162	.	0.0160	0.0160	0.0155	0.0143	0.0163	0.0170	0.0119	0.0153	0.0154	0.0171
24	0.0082	0.0034	0.0465	0.0028	0.0026	0.0031	0.0029	.	0.0028	0.0027	0.0022	0.0031	0.0029	0.0021	0.0028	0.0028	0.0030
25	0.0020	0.0008	0.0104	0.0009	0.0006	0.0007	0.0006	0.0006	.	0.0006	0.0005	0.0007	0.0006	0.0005	0.0006	0.0007	0.0007
26	0.0099	0.0036	0.0563	0.0032	0.0029	0.0032	0.0033	0.0032	0.0031	.	0.0026	0.0031	0.0034	0.0025	0.0030	0.0031	0.0034
27	0.0020	0.0007	0.0125	0.0006	0.0005	0.0006	0.0007	0.0006	0.0006	0.0006	.	0.0007	0.0007	0.0005	0.0006	0.0006	0.0007
30	0.0053	0.0021	0.0242	0.0023	0.0016	0.0017	0.0015	0.0016	0.0016	0.0013	0.0013	.	0.0015	0.0013	0.0016	0.0017	0.0017
32	0.0364	0.0144	0.2155	0.0108	0.0113	0.0118	0.0130	0.0120	0.0121	0.0119	0.0102	0.0121	.	0.0100	0.0120	0.0120	0.0132
40	0.0032	0.0011	0.0147	0.0014	0.0006	0.0015	0.0007	0.0007	0.0009	0.0007	0.0006	0.0009	0.0008	.	0.0007	0.0009	0.0009
43	0.0086	0.0037	0.0514	0.0036	0.0033	0.0030	0.0030	0.0030	0.0030	0.0027	0.0023	0.0033	0.0031	0.0023	.	0.0034	0.0033
49	0.0150	0.0061	0.0797	0.0066	0.0047	0.0052	0.0046	0.0046	0.0049	0.0043	0.0036	0.0056	0.0047	0.0043	0.0052	.	0.0055
54	0.0246	0.0099	0.1288	0.0105	0.0077	0.0087	0.0077	0.0075	0.0079	0.0071	0.0059	0.0085	0.0077	0.0064	0.0076	0.0083	.

Table 18: GUPPI Linear Pricing period 07/08

	7	10	13	20	21	24	25	26	27	28	30	32	37	43	49	50	54
7	.	0.0034	0.0190	0.0023	0.0014	0.0012	0.0014	0.0010	0.0013	0.0029	0.0018	0.0011	0.0016	0.0013	0.0017	0.0011	0.0050
10	0.0098	.	0.0840	0.0081	0.0066	0.0057	0.0068	0.0047	0.0037	0.0092	0.0067	0.0045	0.0071	0.0064	0.0066	0.0047	0.0207
13	0.0067	0.0101	.	0.0050	0.0057	0.0046	0.0048	0.0044	0.0042	0.0045	0.0047	0.0045	0.0046	0.0048	0.0046	0.0045	0.0141
20	0.0216	0.0254	0.1328	.	0.0104	0.0100	0.0097	0.0075	0.0058	0.0131	0.0110	0.0071	0.0137	0.0104	0.0120	0.0079	0.0341
21	0.0364	0.0590	0.4236	0.0296	.	0.0273	0.0275	0.0254	0.0199	0.0239	0.0281	0.0273	0.0252	0.0289	0.0265	0.0277	0.0831
24	0.0073	0.0114	0.0767	0.0063	0.0061	.	0.0052	0.0043	0.0035	0.0050	0.0051	0.0047	0.0045	0.0052	0.0051	0.0047	0.0163
25	0.0012	0.0019	0.0109	0.0008	0.0008	0.0007	.	0.0006	0.0004	0.0009	0.0008	0.0006	0.0009	0.0008	0.0008	0.0006	0.0024
26	0.0010	0.0016	0.0127	0.0008	0.0010	0.0007	0.0007	.	0.0006	0.0007	0.0008	0.0008	0.0009	0.0008	0.0007	0.0008	0.0022
27	0.0018	0.0017	0.0165	0.0009	0.0011	0.0008	0.0008	0.0009	.	0.0011	0.0009	0.0009	0.0007	0.0008	0.0007	0.0009	0.0026
28	0.0073	0.0078	0.0316	0.0035	0.0023	0.0021	0.0029	0.0017	0.0019	.	0.0025	0.0013	0.0027	0.0024	0.0043	0.0015	0.0099
30	0.0018	0.0023	0.0135	0.0012	0.0011	0.0009	0.0010	0.0008	0.0006	0.0010	.	0.0008	0.0009	0.0010	0.0010	0.0008	0.0031
32	0.0050	0.0072	0.0605	0.0036	0.0049	0.0038	0.0035	0.0037	0.0030	0.0026	0.0036	.	0.0031	0.0038	0.0033	0.0041	0.0103
37	0.0024	0.0038	0.0205	0.0023	0.0015	0.0012	0.0017	0.0014	0.0008	0.0017	0.0014	0.0010	.	0.0015	0.0014	0.0012	0.0047
43	0.0073	0.0123	0.0772	0.0063	0.0062	0.0049	0.0054	0.0043	0.0033	0.0055	0.0054	0.0045	0.0054	.	0.0053	0.0045	0.0160
49	0.0031	0.0042	0.0242	0.0024	0.0019	0.0016	0.0018	0.0013	0.0009	0.0032	0.0017	0.0013	0.0016	0.0017	.	0.0013	0.0056
50	0.0148	0.0205	0.1648	0.0110	0.0136	0.0104	0.0097	0.0103	0.0083	0.0077	0.0100	0.0111	0.0100	0.0105	0.0092	.	0.0310
54	0.0059	0.0084	0.0478	0.0044	0.0038	0.0033	0.0036	0.0026	0.0022	0.0047	0.0036	0.0026	0.0036	0.0034	0.0036	0.0029	.

Table 19: GUPPI RPM period 07/08

	7	10	13	20	21	24	25	26	27	28	30	32	37	43	49	50	54
7	.	0.0032	0.0183	0.0022	0.0013	0.0012	0.0014	0.0010	0.0013	0.0028	0.0017	0.0010	0.0015	0.0012	0.0016	0.0011	0.0048
10	0.0098	.	0.0840	0.0081	0.0066	0.0057	0.0068	0.0047	0.0037	0.0092	0.0067	0.0045	0.0071	0.0064	0.0066	0.0047	0.0207
13	0.0102	0.0153	.	0.0077	0.0086	0.0070	0.0073	0.0067	0.0064	0.0068	0.0072	0.0068	0.0071	0.0074	0.0070	0.0068	0.0215
20	0.0216	0.0254	0.1328	.	0.0104	0.0100	0.0097	0.0075	0.0058	0.0131	0.0110	0.0071	0.0137	0.0104	0.0120	0.0079	0.0341
21	0.0364	0.0590	0.4236	0.0296	.	0.0273	0.0275	0.0254	0.0199	0.0239	0.0281	0.0273	0.0252	0.0289	0.0265	0.0277	0.0831
24	0.0073	0.0114	0.0767	0.0063	0.0061	.	0.0052	0.0043	0.0035	0.0050	0.0051	0.0047	0.0045	0.0052	0.0051	0.0047	0.0163
25	0.0012	0.0019	0.0109	0.0008	0.0008	0.0007	.	0.0006	0.0004	0.0009	0.0008	0.0006	0.0009	0.0008	0.0008	0.0006	0.0024
26	0.0010	0.0016	0.0127	0.0008	0.0010	0.0007	0.0007	.	0.0006	0.0007	0.0008	0.0008	0.0009	0.0008	0.0007	0.0008	0.0022
27	0.0018	0.0017	0.0165	0.0009	0.0011	0.0008	0.0008	0.0009	.	0.0011	0.0009	0.0009	0.0007	0.0008	0.0007	0.0009	0.0026
28	0.0073	0.0078	0.0316	0.0035	0.0023	0.0021	0.0029	0.0017	0.0019	.	0.0025	0.0013	0.0027	0.0024	0.0043	0.0015	0.0099
30	0.0018	0.0023	0.0135	0.0012	0.0011	0.0009	0.0010	0.0008	0.0006	0.0010	.	0.0008	0.0009	0.0010	0.0010	0.0008	0.0031
32	0.0050	0.0072	0.0605	0.0036	0.0049	0.0038	0.0035	0.0037	0.0030	0.0026	0.0036	.	0.0031	0.0038	0.0033	0.0041	0.0103
37	0.0024	0.0038	0.0205	0.0023	0.0015	0.0012	0.0017	0.0014	0.0008	0.0017	0.0014	0.0010	.	0.0015	0.0014	0.0012	0.0047
43	0.0073	0.0123	0.0772	0.0063	0.0062	0.0049	0.0054	0.0043	0.0033	0.0055	0.0054	0.0045	0.0054	.	0.0053	0.0045	0.0160
49	0.0031	0.0042	0.0242	0.0024	0.0019	0.0016	0.0018	0.0013	0.0009	0.0032	0.0017	0.0013	0.0016	0.0017	.	0.0013	0.0056
50	0.0148	0.0205	0.1648	0.0110	0.0136	0.0104	0.0097	0.0103	0.0083	0.0077	0.0100	0.0111	0.0100	0.0105	0.0092	.	0.0310
54	0.0059	0.0084	0.0478	0.0044	0.0038	0.0033	0.0036	0.0026	0.0022	0.0047	0.0036	0.0026	0.0036	0.0034	0.0036	0.0029	.

Table 20: GUPPI Linear Pricing period 09/10

	10	13	20	21	22	24	25	26	28	37	43	45	46	50	54
10	.	0.0541	0.0037	0.0021	0.0044	0.0023	0.0037	0.0028	0.0035	0.0034	0.0030	0.0028	0.0022	0.0023	0.0109
13	0.0066	.	0.0033	0.0027	0.0039	0.0028	0.0031	0.0028	0.0030	0.0031	0.0030	0.0028	0.0025	0.0028	0.0094
20	0.0182	0.1312	.	0.0056	0.0102	0.0061	0.0094	0.0066	0.0089	0.0087	0.0077	0.0071	0.0054	0.0059	0.0273
21	0.0158	0.1670	0.0089	.	0.0086	0.0097	0.0078	0.0087	0.0079	0.0073	0.0092	0.0087	0.0079	0.0104	0.0234
22	0.0350	0.2531	0.0169	0.0090	.	0.0109	0.0168	0.0133	0.0129	0.0162	0.0136	0.0124	0.0116	0.0101	0.0489
24	0.0043	0.0417	0.0023	0.0024	0.0025	.	0.0021	0.0021	0.0019	0.0020	0.0023	0.0020	0.0017	0.0023	0.0063
25	0.0031	0.0210	0.0016	0.0008	0.0017	0.0009	.	0.0012	0.0013	0.0013	0.0012	0.0011	0.0010	0.0009	0.0043
26	0.0034	0.0278	0.0017	0.0014	0.0020	0.0014	0.0018	.	0.0013	0.0017	0.0015	0.0014	0.0012	0.0015	0.0047
28	0.0026	0.0179	0.0014	0.0008	0.0012	0.0008	0.0012	0.0008	.	0.0009	0.0009	0.0011	0.0006	0.0007	0.0038
37	0.0019	0.0139	0.0010	0.0005	0.0011	0.0006	0.0009	0.0008	0.0006	.	0.0008	0.0007	0.0008	0.0006	0.0027
43	0.0070	0.0572	0.0037	0.0028	0.0040	0.0028	0.0034	0.0029	0.0029	0.0032	.	0.0031	0.0023	0.0030	0.0102
45	0.0032	0.0261	0.0017	0.0013	0.0018	0.0013	0.0016	0.0013	0.0017	0.0014	0.0015	.	0.0024	0.0013	0.0047
46	0.0012	0.0113	0.0006	0.0006	0.0008	0.0005	0.0006	0.0006	0.0004	0.0008	0.0005	0.0011	.	0.0006	0.0019
50	0.0116	0.1192	0.0063	0.0070	0.0065	0.0064	0.0057	0.0061	0.0052	0.0056	0.0065	0.0060	0.0058	.	0.0169
54	0.0035	0.0248	0.0018	0.0010	0.0020	0.0011	0.0017	0.0012	0.0016	0.0016	0.0014	0.0013	0.0011	0.0011	.

Table 21: GUPPI RPM period 09/10

	10	13	20	21	22	24	25	26	28	37	43	45	46	50	54
10	.	0.0541	0.0037	0.0021	0.0044	0.0023	0.0037	0.0028	0.0035	0.0034	0.0030	0.0028	0.0022	0.0023	0.0109
13	0.0106	.	0.0053	0.0043	0.0062	0.0044	0.0050	0.0045	0.0047	0.0049	0.0048	0.0045	0.0041	0.0046	0.0150
20	0.0182	0.1312	.	0.0056	0.0102	0.0061	0.0094	0.0066	0.0089	0.0087	0.0077	0.0071	0.0054	0.0059	0.0273
21	0.0158	0.1671	0.0089	.	0.0086	0.0097	0.0078	0.0087	0.0079	0.0073	0.0092	0.0087	0.0079	0.0104	0.0234
22	0.0350	0.2531	0.0169	0.0090	.	0.0109	0.0168	0.0133	0.0129	0.0162	0.0136	0.0124	0.0116	0.0101	0.0489
24	0.0043	0.0417	0.0023	0.0024	0.0025	.	0.0021	0.0021	0.0019	0.0020	0.0023	0.0020	0.0017	0.0023	0.0063
25	0.0031	0.0210	0.0016	0.0008	0.0017	0.0009	.	0.0012	0.0013	0.0013	0.0012	0.0011	0.0010	0.0009	0.0043
26	0.0034	0.0278	0.0017	0.0014	0.0020	0.0014	0.0018	.	0.0013	0.0017	0.0015	0.0014	0.0012	0.0015	0.0047
28	0.0026	0.0179	0.0014	0.0008	0.0012	0.0008	0.0012	0.0008	.	0.0009	0.0009	0.0011	0.0006	0.0007	0.0038
37	0.0019	0.0139	0.0010	0.0005	0.0011	0.0006	0.0009	0.0008	0.0006	.	0.0008	0.0007	0.0008	0.0006	0.0027
43	0.0070	0.0572	0.0037	0.0028	0.0040	0.0028	0.0034	0.0029	0.0029	0.0032	.	0.0031	0.0023	0.0030	0.0102
45	0.0032	0.0261	0.0017	0.0013	0.0018	0.0013	0.0016	0.0013	0.0017	0.0014	0.0015	.	0.0024	0.0013	0.0047
46	0.0012	0.0112	0.0006	0.0006	0.0008	0.0005	0.0006	0.0005	0.0004	0.0008	0.0005	0.0011	.	0.0006	0.0018
50	0.0116	0.1192	0.0063	0.0070	0.0065	0.0064	0.0057	0.0061	0.0052	0.0056	0.0065	0.0060	0.0058	.	0.0169
54	0.0035	0.0248	0.0018	0.0010	0.0020	0.0011	0.0017	0.0012	0.0016	0.0016	0.0014	0.0013	0.0011	0.0011	.