Essays on Structural Empirical Methods in Competition and Antitrust Analysis

D I S S E R T A T I O N

zur Erlangung des akademischen Grades
doctor rerum politicarum (dr. rer. pol.)
im Fach Volkswirtschaftslehre

einzureichen an der Wirtschaftswissenschaftlichen Fakultät
Heinrich-Heine-Universität Düsseldorf

von:	Dennis Rickert M.Sc. geboren am 23.12.1984 in Paderborn
Erstgutachter:	Prof. Dr. Justus Haucap
Zweitgutachter:	Prof. Dr. Joel Stiebale
Abgabedatum:	September 2016

Contents

1 Synopsis **1**

2 Wettbewerbsprobleme im Lebensmitteleinzelhandel **9**

2.1 Einleitung 10

2.2 Wettbewerbssituation im Lebensmitteleinzelhandel in Deutschland . . 12

2.2.1 Lebensmitteleinzelhandel im Fokus der Wettbewerbspolitik . . 12

2.2.2 Die Absatzseite des LEH in Deutschland 14

2.2.3 Die Beschaffungsseite des LEH in Deutschland 17

2.3 Marktabgrenzung und Nachfragemacht im deutschen LEH 18

2.3.1 Marktabgrenzung im LEH 18

2.3.2 Nachfragemacht im LEH 21

2.4 Ist Nachfragemacht ein Problem im deutschen LEH? 23

2.5 Probleme des aktuellen Rechtsrahmens: Das Verbot des Verkaufs unter Einstandspreisen im GWB und mögliche vertikale Preisbindungen 24

2.5.1 Verbot des Verkaufs unter Einstandspreisen 24

2.5.2 Vertikale Preisbindungen 27

2.6 Fazit und Zusammenfassung 32

2.7 Appendix 34

2.7.1 Figures 34

2.7.2 Tables 35

3 Die Bestimmung von Nachfragemacht im Lebensmitteleinzelhandel **40**

3.1 Einleitung 41

3.2 Nachfragemacht aus wettbewerbsökonomischer Sicht 43

3.3 Nachfragemacht in der praktischen Wettbewerbsanalyse 46

3.3.1 Die Bestimmung von Nachfragemacht in Sektoruntersuchungen 46

3.3.2 Die Betrachtung von Nachfragemacht in Kartellrechtsfällen . . 48
3.4 Verhandlungsmacht im Lebensmitteleinzelhandeln in der empirischen Wettbewerbsforschung 50
3.5 Bewertung der wettbewerbsrechtlichen Praxis und Fazit 53

4 Market Definition with Heterogeneous (Grocery) Retail Formats, Private Labels, and Vertical Relations 57
4.1 Introduction 58
4.2 Relevant Literature 63
4.2.1 Market Definition 63
4.2.2 Demand Substitution Patterns for Market Definition in Grocery Retailing 66
4.3 Market description and Data summary 68
4.3.1 The Market for Diapers 68
4.3.2 Data Set Description and Choice Set Construction 70
4.4 The Econometric Model 71
4.4.1 Consumer Demand 72
4.4.2 Supply-Side Equations 73
4.4.3 SSNIP test 78
4.5 Empirical Results 80
4.5.1 First Stage Regression 80
4.5.2 Demand-Side Results 81
4.5.3 Profit Margins and SSNIP tests 82
4.6 Conclusion 84
4.7 Appendix 87
4.7.1 Figures 87
4.7.2 Rivers-Vuong Test 88
4.7.3 Supply Side Models 89
4.7.4 Tables 97

5 Bargaining Power and Variety in Collusive Markets. Empirical Evidence from the German Coffee Market 104
5.1 Introduction 105
5.2 The Econometric Model 108
5.2.1 Demand Side 109
5.2.2 Supply Side 110

5.3 Data and Descriptive Statistics . . . 114
5.4 Results . . . 116
5.4.1 Demand Estimation . . . 116
5.4.2 Bargaining Power and Price-cost Margins . . . 117
5.5 Conclusion . . . 122
5.6 Appendix . . . 124

6 Consumer Switching Costs, Dynamic Pricing, and Antitrust Analysis 139
6.1 Introduction . . . 140
6.2 Literature . . . 143
6.3 Data Set and the Market for Diapers . . . 146
6.3.1 Data Set . . . 147
6.3.2 The Market for Diapers . . . 148
6.4 The Econometric Model . . . 152
6.4.1 Demand Model . . . 152
6.4.2 Supply Model . . . 157
6.5 Empirical Analysis . . . 164
6.5.1 Demand-Side Results . . . 164
6.5.2 Supply-Side Results . . . 168
6.5.3 Impact on Market Definition . . . 170
6.6 Conclusion . . . 172
6.7 Appendix . . . 175

7 Conclusion 182

List of Tables

2.1 Verfahren durch nationale Wettbewerbsbehrden von 2004 bis 2011 . . 37
2.2 Elastizitäten 38
2.3 SSNIP-Test: Kritische Verlustanalyse 2005/2006 39

4.1 Overview Supply Models 97
4.2 Rivers-Vuong Test 98
4.3 Descriptive Statistics 98
4.4 Summary Statistics and Elasticities 99
4.5 First-Stage Regression Results 100
4.6 Demand Estimation Results 101
4.7 Prices, Profits, Costs, Elasticities for MB and PL per Retail Format 102
4.8 SSNIP Test 103

5.1 Cost Information 124
5.2 Market Share, Sorted by Retailer 125
5.3 Market Share, Sorted by Brand 126
5.4 Prices per Gram, Sorted by Retailer 127
5.5 Prices per Gram, Sorted by Brand 128
5.6 Control Function Estimates 129
5.7 Demand Estimation 130
5.8 Own-Price Elasticities, Sorted by Retailer 131
5.9 Own-price Elasticities, Sorted by Brand 132
5.10 Model Overview 132
5.11 Rivers-Vuong Test for 2004 and 2005 133
5.12 Bargaining Power Estimation Table (λ omitted) 134
5.13 Supply Side Results and λ Values, Sorted by Retailer 135
5.14 Supply Side Results and λ Values, Sorted by Brand 136
5.15 Regression of Firm Characteristics on Bargaining Power 137

5.16 Comparison of Alternative Models 138

6.1 **Summary Statistics Total Panel** 175
6.2 **Summary Statistics Diaper Panel** 175
6.3 Descriptive Statistics 176
6.4 Price Average per Package Size, Diaper Class, Brand, and Retailer . . 176
6.5 Control Function 177
6.6 Demand Estimation Results 178
6.7 Partial Effects of Prices and Switching Costs 179
6.8 Distribution of Marginal Costs, Margins, and Markups 180
6.9 % Change of different specification compared to baseline model . . . 181
6.10 Results of the SSNIP test 181

List of Figures

2.1 Entwicklung der Konzentration im Lebensmitteleinzelhandel 34
2.2 Ladendichte im europäischen Einzelhandel 35
2.3 Lebensmittelpreisindizes in Europa 2012 36
2.4 Preisentwicklung im Vergleich 36

4.1 Descriptive Statistics over Formats 87

Chapter 1

Synopsis

The grocery retail industry has been subject to academic research as well as steady investigations by antitrust authorities. Increasing food prices, volatile commodity markets, deregulation of opening hours, and the rise of large discount chains—in combination with market consolidation though mergers—have triggered the evolution of European retail markets to highly concentrated market structures.[1] The process of increasing concentration raises concerns about the functioning of the food supply chain and has lead to a fair number of antitrust cases and a growing public interest in competition issues in grocery retailing (European Competition Network 2012). 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.[2] The total number of sectoral analyses conducted in Europe was 188 between and including 2004 to 2011 (European Competition Network 2012), but the number of studies are predicted to increase even further.[3]

The underlying question in all those inquiries is whether (retail) firms have obtained market power and substantially limited the degree of competition by abuse of dominance. Since large buyers can be found in many industries, the discussion of measurement, sources, and the consequences of buyer power are in the focus of both antitrust authorities and researchers. Thus, the effect of buyer power on consumer and supplier welfare is essential for any policy investigation and merger decision. Most of the sectoral analyses find that retailers exert market power vis-à-vis their suppliers with long-term effects on prices and product variety (Rodrigues 2006, Competition Commission 2008, Bundeskartellamt 2014), a view which is also mirrored in recent merger decisions (European Commission 2000, Bundeskartellamt 2008, 2010). Still, in their merger guidelines, the European Commission states that buyer power induces positive effects on competition if (i) retailers can realize low purchasing prices without reducing quantity, (ii) low prices are not used to exclude competitors and (iii) prices are pass-through to the consumers (Wey 2011). Accordingly, the eco-

[1] The five largest retailers in Germany increased their market shares in the last two decades from 50% to over 80% in 2014, slightly above the average in Western Europe with 70% (Inderst 2013), the market share of the three largest retailers in Northern Europe exceeds 90% (Allain et al. 2013).

[2] 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).

[3] For a detailed summary of recent competition law enforcement efforts and sector inquiries see the report from the European Competition Network (2012).

nomic literature has not reached a consensus on the direction of the net effects. On the one hand, strong retailers act as a countervailing power to strong manufacturers with better negotiated conditions in intermediate good markets (Galbraith 1954). On the other hand, retailers may use their market power to withhold cost saving in order to increase own profits. Moreover, manufacturers may even raise their prices in response to increased buyer power (Galbraith 1954, Dobson & Waterson 1997). Furthermore, they may apply different strategies in the presence of retailer buyer power, where they either reduce the number of products and hold-up innovation (Chen 2004) or invest in higher product quality and in cost reduction (Inderst and Wey 2007, 2011).

Since the assessment of the long-term effects of buyer power on prices, competition, and variety boils down to an empirical question, recent research has put a particular focus on the analysis of the vertical relationships between retailers and manufacturers. To a large extent, this thesis benefits from the emergence of the "New Industrial IO literature which has developed so-called structural econometric models in order to address manifold policy questions. Such structural models are used because—in contrast to reduced form analyses—they take into account the economic theory of consumer and firm behavior. In other word, they impose a structure on demand and supply to make hypotheses testable. The general framework consist of three parts: (i) demand estimation, (ii) inference on supply-side behavior, and (iii) counterfactual policy experiments. First, the demand estimation for (food) products in this the empirical literature strand often relies on the flexible random coefficient demand model as suggested by Berry et al. (1995) and Nevo (2001). The main advantage of this methodology is that it produces flexible consumer substitution patterns by dealing with unobserved consumer heterogeneity, while still being able to deal with a large number of (differentiated) products. Second, as it is difficult to obtain data on wholesale prices and costs at a detailed product level, the general methodology can be used to infer profit margins at the horizontal level without observing cost data (see e.g., Villas-Boas 2007a, Bonnet & Dubois 2010a). Third and finally, based on estimated substitution patterns and identified profit margins, researchers investigate a variety of competition policy questions, such as price competition and product differentiation (e.g., Berry et al. 1995, Goldberg 1995), mergers and market power (e.g., Nevo 2000, 2001) or product introduction (Petrin 2002).

Structural empirical methods are particularly useful for analyzing competitive effects on retail markets with vertical structures. Since bargaining outcomes and private

contracts are typically not observed by outsiders or are hardly reliable (see e.g., Villas-Boas 2007a),[4] empirical demand estimation techniques guided by economic theory allow us to infer on manufacturer and retailer profits. A growing number of studies concentrate on putting structural models into a framework of the vertical contracting of a two-tier supply chain, introducing monopoly or oligopoly pricing behavior (Sudhir 2001, Villas-Boas 2007b) and different types of contracts (Draganska et al. 2010, Bonnet & Dubois 2010a). Subsequently, profit margins and estimated substitution patterns can be used to investigate policy-relevant problems. Thus, structural empirical models, which require minimal data input—such as prices and market shares—can be essential for antitrust authorities to define markets prior to market power analysis, investigate the effects of mergers or detect cartels and calculate cartel damages. Another application may be the assessment of retail buyer power, which is a challenging task for researchers and competition authorities as it interacts with numerous factors, such as supplier size, differentiation strategies or consumer characteristics.

Given the importance of consequences of the recent decisions and the ambiguous results of the literature, the overall aim of this thesis is to provide insights into the use of structural empirical methods in complex retail market structures. The particular focus is to understand the nature of competition on retail markets, when both retailers and suppliers are strategic decision-makers facing elastic consumer demand. Since retail markets are complex and competition takes place at different levels, it is difficult to assess the competitive effects in a unified simple framework. Instead, policy analysis has to be carried out on a case-by-case analysis, carefully designing models which incorporate the specific market characteristics (Tirole 2015). To this extent, this thesis will highlight the complexity of retail markets and derive important factors which need to be considered in any policy analysis (chapters 2 and 3). A main focus here is the existence of heterogeneous retail formats (supermarkets, discounters, drugstores, and specialized stores) and the degree to which they compete for different consumer types. Specifically, chapter 2 highlights current competition problems in the grocery market and analyzes common legal practices of the German antitrust authority, in particular how retailers interact with a potentially large number of suppliers and how the specification of (incomplete) contract types (e.g., two-part tariffs, assortment size, slotting allowances, discounts) affects competition.

[4] Clearly, antitrust agencies collect this information, but do not provide it to researchers. Moreover, possible claims by damaged entities give incentives to withhold relevant information and obfuscate antitrust agencies.

On the insights derived from chapter 2, chapter 3 presents and discusses a number of empirical methods, which can be used by researchers, practitioners, and competition authorities to assess the effect of buyer power. Subsequently in chapters 4–6, we apply structural empirical methods using distinct household-level data on coffee and diaper purchases for the purpose of investigating some of most crucial questions in antitrust analysis: (i) market definition (chapter 4), (ii) bargaining power distribution between retailers and manufacturers (chapter 5), and (iii) inertia in consumer demand (chapter 6). The following paragraphs summarize the chapters of this thesis more specifically.

The second chapter entitled **Wettbewerbsprobleme im Lebensmitteleinzelhandel** investigates current topics related to competition problems in the German food retailing market. The focus of the analysis is the increasing concentration process and its determinants. Based on this, we discuss aspects of market definition particularly with regard to the rise of discounters as well as the concentration process resulting from the potential buyer power from retailers. We find that, despite a differentiation strategy in assortment depth and width, discounters can indeed be attributed to the same relevant market as supermarkets and private label products are in competition with manufacturer brands. We conclude from this result that competition authorities should include demand substitution patterns in their market delineation instead of relying on simple indicators or reduced form approaches. Next, we outline that retail buying power cannot be assessed within a general unified framework, but instead represents a dynamic phenomenon which must be considered on a case-by-case basis. Thus, the net effect of buyer power on competition and consumers is not clear. In the presence of strong manufacturers, retailers may take the role of a countervailing power, which is beneficial for consumer welfare if retailers pass-through the lower wholesale prices to consumers. We further question the common view that size is a reliable indicator of market power. Referring to a quasi-natural experiment on the beer market, we argue that small suppliers can exert market power vis-à-vis large retailers if they pursue a consequent differentiation strategy and are of local importance. Finally, the recent recommendations of the Monopoly Commission are acknowledged at length with regards to the legal treatments of buyer power in competition law. In particular, the negative opinion of the Monopolies Commission concerning the prohibition of sales below cost price as well as the treatment of vertical restraints is mentioned here.

Chapter 3 (**Die Bestimmung von Nachfragemacht im Lebensmitteleinzel-**

handel) elaborates the empirical tools for assessing buyer power with a particular focus on consequences of misspecifying the analytical framework. Recent developments in the market for (food) retailing, such as the rise of discounters, the dispersion of private labels, and the introduction of scanner check-out counters could lead to a temptation to put retailers under a general suspicion of buyer power. Particularly in vertical structures, where a retailer and supplier negotiate contract conditions, the correct and precise assessment of bargaining power is gaining in importance. The enforcement and jurisdiction of antitrust authorities crucially depend on a sound (empirical) framework for the analysis. Choosing the wrong method for calculating the direction and degree of bargaining power could lead to severe consequences for policy implications, e.g., in the area of merger analysis. The current guidelines of competition authorities in bargaining power analysis, for instance, of the German antitrust authority, propose evaluating mergers based on the simple analysis of market shares. When the market shares of the merging parties exceed a certain threshold (e.g., a threshold of 22%) then mergers are likely to be prohibited or approved solely under certain conditions. One of the main goals of this chapter is to highlight that the use of structural models can allow an effects-based analysis within a framework of the More-Economic Approach to enrich existing methods of antitrust authorities. For that purpose, we first present a theoretical framework to qualify and quantify bargaining power, before we review selected decisions of the German Cartel Office and the UK Competition Commission in light of the theoretical framework. Furthermore, we present current approaches of the econometric research field and explain how structural econometric models can be used to evaluate bargaining power. The main focus here is on the exact quantification of the degree of bargaining power. The article concludes with recommendations on how these state-of-the-art models can be included to enrich the toolbox of authorities for sectoral investigations and merger controls.

Chapter 4 entitled **Market Definition with Heterogeneous (Grocery) Retail Formats, Private Labels, and Vertical Relations** analyzes the extent of competition between private labels and manufacturer brands when several types of retail formats exist (supermarkets, discounters, and drugstores), where retailers typically interact with a potentially large number of suppliers in complex vertical structures. Thus, market definition is a challenging task for researchers and practitioners since most markets are characterized by complex vertical structures where heterogeneous manufacturers sell their differentiated products through heterogeneous retail for-

mats. In these contexts market definition has to incorporate two important concepts: consumer demand substitution for differentiated products and the vertical relationships between retailers and manufacturers. This thesis highlights the importance of incorporating (i) demand substitution when there is intra-format and inter-format competition as well as inter-brand competition, and (ii) vertical relationships in the context of market delineation. We find that the strongest substitution patterns are between the leading manufacturer brand and private labels sold at drugstores and discounters. Furthermore, we show that the results are not robust to the choice of supply model and how choosing the wrong model may lead to erroneous conclusions. Our results illustrate the importance of including demand-side analysis and adequately accounting for the vertical structure in antitrust market definition.

Another focus lies on the effect of cartels on prices and product variety. Thus, chapter 5—entitled **Bargaining Power and Variety in Collusive Markets. Empirical Evidence from the German Coffee Market**—investigates the distribution of bargaining power between retailers and manufacturers in the coffee market and examines changes over time when suppliers develop certain strategies to counteract buyer power, such as collusion and product introduction. To this extent, we develop a bargaining model—based on existing methods—which explicitly takes into account collusive behavior. In particular, we allow for collusion and bundling across different sets of interrelated products. We test this model against a range of existing models and compare the biases in the bargaining power estimates—and thus industry margins—which stem from misspecification in the bargaining structure. Furthermore, we show (i) that collusion did not involve all segments of the coffee markets, and (ii) that collusion may not be stable over time. Finally, our results indicate that bargaining power is heterogeneously distributed and cannot be simply related to firm size. It is shown how firm strategies, such as cartel formation, product innovation, and product differentiation are correlated to the distribution of bargaining power, in particular, that the introduction of innovative products shifts bargaining power, and as a consequence rents, from retailers back to manufacturers. Thus, we open the black box and provide new insights into the relationship between collusion, innovation, and the vertical distribution of bargaining power.

Competition policy increasingly focuses on weak consumer responses as a source of market frictions, where consumer switching costs have emerged as one of the key concerns in competition policy (Price & Zhu 2016). Chapter 6 (**Consumer Switching Costs, Dynamic Pricing, and Antitrust Analysis. Evidence from the**

Market for Diapers) focuses on such switching costs, which are present if the mere consumption of a brand increases the probability of repurchasing the same brand during the next shopping trip. It has be shown that the existence of inertia in consumer demand affects the estimates of price elasticities and the prediction of firm behavior (see e.g., Erdem & Sun 2001, Seetharaman 2004). However, none of the papers in the literature so far investigate how consumer inertia may affect the results of antitrust analyses. A major econometric challenge hereby is to disentangle the structural effect—stemming from switching inertia—from unobserved household heterogeneity, which is tackled by using the (Wooldridge 2005) approach. The chapter further examines how firms apply dynamic strategies when they are aware of the consumers' psychological switching costs. In particular, we find that neglecting switching costs in demand has substantial consequences for antitrust analysis since misspecification (by either neglecting switching costs, insufficiently controlling for household heterogeneity or both) in demand directly affects price elasticities, which translates into biased estimates of profit margins and marginal costs. By applying a SSNIP market definition test, we illustrate the consequences for counterfactual policy experiments by demonstrating how the degree of firm market power would be understated if demand is incorrectly specified. The method can be analogously applied to other types of policy experiments, such as merger analysis or the prediction of pricing power and price discrimination ability. Results are thus relevant for researchers, antitrust authorities, and practitioners.

Chapter 2

Wettbewerbsprobleme im Lebensmitteleinzelhandel

Co-authored with Justus Haucap, Ulrich Heimeshoff, Gordon J. Klein and Christian Wey

2.1 Einleitung

Der Lebensmitteleinzelhandel (LEH) zeichnet sich in Deutschland -wie auch international- durch eine wachsende Marktkonzentration aus. Mindestens drei Ursachen lassen sich für diesen Konzentrationsprozess identifizieren: Zunächst sind dies offensichtlich die zahlreichen Fusionen und übernahmen der letzten Jahre. Prominente Beispiele hierfür sind die Übernahme der Plus-Filialen durch Edeka und Rewe (Bundeskartellamt 2008) oder der Verkauf von Ratio-Filialen unter anderem an Edeka (Bundeskartellamt 2010b). Edeka hat zudem die Getränkemarktkette trinkgut übernommen (Bundeskartellamt 2010a), während die Schweizerische Migros durch die Übernahme der tegut-Märkte in den deutschen Markt eingetreten ist. Ein neuerer Zusammenschluss ist die Übernahme der Wasgau-Märkte durch Rewe, die kürzlich vom Bundeskartellamt genehmigt wurde (Bundeskartellamt, 2013). Die durch Fusionen und Übernahmen verursachte Marktkonzentration ist jedoch kein spezifisch deutsches Thema. Die im European Competition Network (ECN) zusammengefassten Wettbewerbsbehörden haben zwischen 2004 und 2011 fast 1300 Fusionsvorhaben im Lebensmittelbereich untersucht; davon entfiel etwa ein Drittel auf den LEH (European Competition Network 2012). Im Vergleich zu anderen Branchen ist diese Zahl beeindruckend.

Zusammenschlüsse und Übernahmen sind aber nicht die einzigen Gründe für den Konzentrationsprozess. Vielmehr fördern auch der technologische Fortschritt sowie die Marktliberalisierung die Konzentration. Wie Beck et al. (2011) empirisch belegt haben, wurden z. B. moderne Barcodes und Scannerkassen zunächst überwiegend von großen Supermarktketten eingesetzt, welche in wesentlich größerem Umfang als kleinere Wettbewerber den technischen Fortschritt nutzen und somit Produktivitätsvorteile gewinnen. Diese Produktivitätsverbesserungen resultieren in Kostensenkungen und folglich in Wettbewerbsvorteilen für die größeren Marktteilnehmer. Große Ketten profitieren so wesentlich stärker als der klassische Einzelhändler mit einer oder wenigen Verkaufsstätten vom technischen Fortschritt.

Auch Veränderungen der ordnungspolitischen Rahmenbedingungen sind selten vollkommen wettbewerbsneutral in ihrer Wirkung. So haben im Lebensmitteleinzelhandel z. B. die Reformen der Ladenöffnungszeiten auch Nebenwirkungen. Wie Wenzel (2011) zeigt, hängt die Wirkung einer Liberalisierung der Ladenöffnungszeiten stark von den Effizienzunterschieden zwischen unabhängigen Händlern und großen Ketten ab. Ist der Effizienzunterschied gering, wählt der unabhängige Händler längere Öffnungszeiten und kann von der Liberalisierung profitieren. Sind die Effizienzun-

terschiede jedoch groß, so profitieren große Ketten deutlich stärker. Ein möglicher Grund fur etwaige Effizienzunterschiede kann z. B. in einer unterschiedlichen Personalstruktur verschiedener Handelsformate liegen, aber auch auf Unterschiede in der Beschaffung zurückzuführen sein.

Vor dem Hintergrund der Größenunterschiede der Händler im Einzelhandel ist von relativ deutlichen Effizienzunterschieden auszugehen, sodass die Liberalisierung der Ladenöffnungszeiten -dem theoretischen Modell zufolge- tendenziell größere Unternehmen stärker profitieren lässt und somit zum Konzentrationsprozess beiträgt. Somit sind (a) technischer Fortschritt und (b) Reformen des regulatorischen Umfelds neben (c) Fusionen und Übernahmen wichtige Determinanten der Marktstruktur im Lebensmitteleinzelhandel in Deutschland und international.

Der vorliegende Beitrag erörtert in den folgenden Abschnitten zunächst allgemein die Wettbewerbssituation im Lebensmitteleinzelhandel in Deutschland auf der Absatzseite, bevor anschließend die Beschaffungsseite betrachtet wird. Anschließend diskutieren wir, wie eine adäquate Marktabgrenzung im Lebensmitteleinzelhandel aussehen könnte. Die Besonderheiten der Marktabgrenzung werden anhand einer empirischen Studie des Marktes für Babywindeln verdeutlicht. Darüber hinaus befassen wir uns mit der Rolle von Nachfragemacht im Lebensmitteleinzelhandel und stellen eine Fallstudie vor, die sich den Boykott einer führenden Handelskette durch einen kleinen regionalen Lieferanten zu Nutze macht, um zu zeigen, dass auch kleine Lieferanten bei einer ausgeprägten Differenzierungsstrategie und lokal hohem Marktanteil signifikante Verhandlungsmacht besitzen können. In diesem Zusammenhang wird auch die Bedeutung des Konsumentenverhaltens für die Verhandlungsmachtverteilung anhand des sogenannten One-Stop-Shoppings verdeutlicht.

Des Weiteren werden neuere Entwicklungen der Wettbewerbspolitik - sofern sie im Zusammenhang mit dem Lebensmitteleinzelhandel stehen - betrachtet. Dies sind insbesondere die laufende Sektoruntersuchung des Bundeskartellamts, die Ausführungen der Monopolkommission zum Einzelhandel sowie die relevanten Änderungen im Rahmen der jüngsten Novelle des Gesetzes gegen Wettbewerbsbeschränkungen. Der Aufsatz schließt mit einer Zusammenfassung und Schlussfolgerungen aus der Analyse für künftige Maßnahmen.

2.2 Wettbewerbssituation im Lebensmitteleinzelhandel in Deutschland

2.2.1 Lebensmitteleinzelhandel im Fokus der Wettbewerbspolitik

Der Lebensmitteleinzelhandel steht bereits seit geraumer Zeit im Fokus der Politik. Neben Diskussionen über Arbeitsbedingungen, Ladenöffnungszeiten und geklaute Bons für Leergutpfand wird auch die Qualität der Lebensmittel immer wieder in der Politik thematisiert und mit dem Thema Wettbewerb verknüpft. Die damalige Bundesministerin fur Ernährung, Landwirtschaft und Verbraucherschutz ließ z. B. folgendes im Mai 2012 in der BILD-Zeitung verlautbaren:

> *„Mich besorgt der immer aggressivere Wettbewerb unter den Lebensmittel - Discountern. Ich werbe für mehr Wertschätzung von Lebensmitteln. Unternehmen, die um jeden Preis nur ihren Marktanteil im Auge haben und denen die Wertschätzung ihrer Waren egal ist, verspielen langfristig das Vertrauen der Kunden und die Existenz ihrer Lieferanten. Der Lebensmittelhandel muss bedenken, wo es hinführt, wenn am Ende nur noch der Preis regiert. Billiger ist nicht immer besser. (...) Unsere Landwirte haben einen Anspruch auf eine anständige Bezahlung ihrer Leistungen.“* [1]

Während also in Teilen der Politik eine Sorge über zu viel Wettbewerb besteht, befürchten Wettbewerbsbehörden tendenziell eher, dass der Wettbewerb, auch aufgrund der beschriebenen Konzentrationstendenzen, zu wenig intensiv ist. Genährt wurden diese Befuürchtungen auch durch eine Durchsuchung von zahlreichen Handelsunternehmen am 14. Januar 2010. Das Kartellamt ging dem Verdacht nach, „dass sich Markenartikelhersteller mit Einzelhandelsunternehmen in den Produktbereichen Süßwaren, Kaffee und Tiernahrung über die Gestaltung der Endverbraucherpreise abgestimmt haben. Die Abstimmung von Endverbraucherpreisen im Vertikalverhältnis, d.h. zwischen Herstellern und Einzelhändlern, ist kartellrechtlich ebenso verboten wie horizontale Kartelle und kann mit Geldbußen geahndet werden“ (Bundeskartellamt 2010c).

Nach den Durchsuchungen ist bei vielen Marktteilnehmern eine nicht unerhebliche

[1] http://www.bild.de/news/standards/bild-kommentar/lebensmittel-nicht-verramschen-24121530.bild.html

Verunsicherung darüber entstanden, welche Formen der vertikalen Abstimmung als kartellrechtswidrig einzustufen sind und welche nicht. Unmittelbar relevant ist diese Frage für die betroffenen Unternehmen vor allem auch deswegen, weil sie nur dann eine Reduktion des Bußgelds erhalten können, wenn die Unternehmen keine erneuten Kartellrechtsverstöße begehen. Um diese Unsicherheit zu reduzieren, hat das Bundeskartellamt daher am 13. April 2010 den betroffenen Unternehmen eine vorläufige Bewertung bestimmter Geschäftspraktiken in Form einer Handreichung des Vorsitzenden der zuständigen 11. Beschlusskammer zukommen lassen (vgl. Bundeskartellamt 2010d). Im Kern geht es um die Frage, wann eine zulässige unverbindliche Preisempfehlung (UVP) des Herstellers in eine verbotene Preisbindung umschlägt. Das elfseitige Schreiben sollte also eine Hilfestellung für die Unternehmen sein, die bei den Ermittlungen mit dem Bundeskartellamt kooperieren. Ob dieses Ziel erreicht wurde, ist zumindest fraglich. Nach Darstellung der betroffenen Unternehmen hat sich die Verunsicherung bei den Unternehmen eher noch vergrößert. In jedem Fall hat das Schreiben nicht unerhebliche Proteste und Unmutsäußerungen provoziert (vgl. dazu exemplarisch Seidel 2011).

Gut ein Jahr nach den bereits erwähnten Durchsuchungen, am 14. Februar 2011, gab das Bundeskartellamt dann öffentlich auch bekannt, dass es eine Sektoruntersuchung zu den Beschaffungsmärkten im Lebensmitteleinzelhandel eingeleitet habe. Nach §32e GWB kann das Bundeskartellamt einen bestimmten Sektor detailliert untersuchen, wenn besondere Umstände vermuten lassen, dass der Wettbewerb im Inland möglicherweise eingeschränkt oder verfälscht ist (sog. Sektoruntersuchung). Es handelt sich dabei (zunächst) nicht um Verfahren gegen bestimmte Unternehmen, sondern um eine allgemeine Branchenuntersuchung. Die Sektoruntersuchung des Lebensmittelhandels soll nun anhand von ausgewählten Produktgruppen feststellen, welche Nachfragemacht einzelne Handelsunternehmen besitzen. Genauer ausgedrückt soll ermittelt werden, ob und in welchem Ausmaß die führenden Handelsunternehmen auf der Nachfrageseite Vorteile gegenüber ihren Wettbewerbern genießen und welche Auswirkungen solche Vorteile auf den Wettbewerb auf den Absatzmärkten haben. Mit diesen Fragen und der allgemeinen Wettbewerbssituation im Lebensmitteleinzelhandel hat sich in der Zwischenzeit auch die Monopolkommission (2012) in ihrem 19. Hauptgutachten in zwei Sonderkapiteln ausführlich auseinandergesetzt. Nach den Diskussionen im Rahmen der 8. GWB-Novelle um die Sonderregeln für den LEH (insbesondere §20 Abs. 3 und 4) werden nun als nächstes mit Spannung die Ergebnisse der laufenden Sektoruntersuchung des Bundeskartell-

amtes erwartet.
Eine intensive Diskussion der Wettbewerbsverhältnisse im Lebensmittelbereich gibt es aber nicht nur auf deutscher, sondern auch auf europäischer Ebene. So hat die Generaldirektion Wettbewerb der Europäischen Kommission im Januar 2012 eine „Task Force Food“ gegründet (vgl. Schmidt & Haucap 2013) und im Dezember 2012 eine Studie ausgeschrieben, welche die Effekte der zunehmenden Konzentration auf der Absatzseite untersuchen soll, sowie die Frage, ob Eigenmarken des Handels sich negativ auf Vielfalt und Innovation im LEH auswirken. Die Ergebnisse werden für Ende 2013 erwartet. Im Januar 2013 hat die European Commission (2013) zudem ein „Grünbuch über unlautere Handelspraktiken in der B2B-Lieferkette für Lebensmittel und Nicht-Lebensmittel in Europa“ publiziert.
Ursächlich für das gesteigerte Interesse der Europäischen Kommission an den Wettbewerbsverhältnissen im Lebensmittelbereich dürften neben den eingangs beschriebenen Konzentrationsprozessen auch die zahlreichen Missbrauchsverfahren sein, die es in der Europäischen Union zwischen 2004 und 2011 im Lebensmittelbereich gab. Tabelle 2.1 zeigt, wie sich die 182 Missbrauchsverfahren aus diesem Zeitraum auf die nationalen Wettbewerbsbehörden und die Europäische Kommission verteilen. Zudem dürfte auch die verhältnismäßig hohe Anzahl an Kartellverfahren wegen horizontaler Abstimmungen auf Herstellerebene im Lebensmittelbereich eine Rolle spielen.

2.2.2 Die Absatzseite des LEH in Deutschland

Zur genaueren Bewertung des Wettbewerbs im LEH bietet sich zunächst eine vertiefte Analyse der Marktstrukturen an. Diese Analyse sollte sowohl auf der Absatz- als auch auf der Beschaffungsseite erfolgen. Wir beginnen hier zunächst mit der Absatzseite und folgen den grundsätzlichen Indikatoren der Monopolkommission (2012).
Betrachtet man den LEH in Deutschland, fällt im Gegensatz zu vielen anderen europäischen Märkten die starke Rolle der Discounter in Deutschland auf, welche konstant einen Marktanteil von über 40% aufweisen (vgl. Lademann 2012, S.28, Abb.9). Betrachtet man die Verteilung der Marktanteile innerhalb des Segments der Discounter, so besaß Aldi (Nord und Süd) 2012 einen Marktanteil von etwa 43%, Lidl 22%, Netto 17%, Penny 10% und Norma 8%. Außerhalb des Discounts sind Edeka, Rewe, die Metro-Gruppe (Real) sowie Kaufland die wesentlichen Akteure auf dem deutschen LEH-Markt. Abbildung 2.1 zeigt die Konzentration im LEH in Deutschland bis 2011. Die fünf größten Unternehmen im LEH vereinen demnach

etwa 72% der Umsätze auf sich.
Im Jahr 2012 ist durch den Markteintritt von Ahold aus den Niederlanden sowie Migros aus der Schweiz eine gewisse weitere Bewegung in die Marktstruktur gekommen. Zudem existieren neben den Supermärkten im LEH diverse weitere Formen des Einzelhandels wie beispielsweise Drogerien, Tankstellen, Kioske oder Bäckereien. Inwieweit diese auf demselben relevanten Markt agieren wie die oben genannten Supermarktketten steht immer wieder im Zentrum wettbewerbsökonomischer und kartellrechtlicher Diskussionen im LEH. Auf die Besonderheiten und Schwierigkeiten bei der sachlichen Marktabgrenzung werden wir in Abschnitt 3 noch ausführlich eingehen. Was die geographische Marktabgrenzung angeht, ist auf der Absatzseite von regionalen Märkten auszugehen. Hier gilt es durch die Fusionskontrolle vor allem lokale Monopolisierungen zu verhindern.
Um erste Indikatoren für die Wettbewerbssituation auf der Absatzseite im LEH in Deutschland zu erhalten, bietet sich zunächst ein internationaler Quervergleich an. Gibt es Indikatoren dafür, dass es um die Wettbewerbssituation in Deutschland besser oder schlechter als bei unseren Nachbarn bestellt ist? Als erste Vergleichskriterien bieten sich beispielsweise die durchschnittliche Ladendichte (in LEH-Geschäfte pro Einwohner), der Lebensmittelpreisindex und seine Entwicklung sowie die Profitabilität der Anbieter im LEH an. Einen Überblick über die Ladendichte in europäischen Staaten gibt daher die Abbildung 2.2.
Nach Österreich weist Deutschland die höchste Ladendichte, gemessen in LEH Geschäften pro Einwohner, im europäischen Vergleich auf. Die hohe Ladendichte lässt eher auf wirksamen Wettbewerb als auf ein signifikantes Marktversagen schließen. Mehrere osteuropäische Länder und beispielsweise auch England liegen hingegen am anderen Ende des Spektrums und haben vergleichsweise niedrige Ladendichten. Auch wenn die Ladendichte allein bestenfalls ein erster Anhaltspunkt zur Beurteilung des Wettbewerbs im deutschen LEH im Vergleich zu anderen europäischen Ländern sein kann, weist die hohe Ladendichte in Deutschland eher auf intensiven als auf fehlenden Wettbewerb hin.
Als zweiter Indikator sei das Preisniveau betrachtet, da sich auf der Absatzseite Marktmacht und vor allem ihr Missbrauch üblicherweise in hohen Preisen widerspiegeln. Im europäischen Preisvergleich, für den sinnvollerweise nur Preisindizes für Warenkörbe verwendet werden können, will man nicht zahlreiche Einzelpreise vergleichen, liegt Deutschland im Mittelfeld, wie Abbildung 2.3 zeigt.
Die Lebensmittelpreise in Deutschland liegen somit geringfügig oberhalb des EU-

Durchschnitts, während die osteuropäischen Staaten am unteren Ende und Länder wie Dänemark, die Schweiz und Norwegen (erwartungsgemäß) am oberen Ende des Spektrums liegen. Dies suggeriert, dass sich Wirtschaftskraft und Einkommen der Bevölkerung spürbar auf die Lebensmittelpreise auswirken. Die unterschiedlichen volkswirtschaftlichen Bedingungen machen einen einfachen Preisvergleich daher schwierig. Vor allem aber ist darauf hinzuweisen, dass Preisindizes wie erwähnt auf einem Warenkorb beruhen, welcher sich wiederum zwischen den Ländern zum Teil erheblich unterscheidet. Während in Portugal Preise für Fisch und Wein vermutlich bedeutsam für Verbraucher sind, spielen in Deutschland Preise für Bier und Schweinefleisch eine wichtigere Rolle. Selbst benachbarte Länder wie Deutschland und Frankreich weisen in der Zusammensetzung und Gewichtung der Warenkörbe deutliche Unterschiede auf. Daher ist ein Vergleich von Lebensmittelpreisindizes nur bedingt aussagekräftig. Allerdings war auch die Preissteigerung bei Lebensmitteln seit 1993 im Vergleich zum allgemeinen Verbraucherpreisindex unterdurchschnittlich wie Abbildung 2.4 zeigt.

Die Monopolkommission (2012, Tz. 1049) hat zudem, unter Bezugnahme auf eine andere Datenquelle, darauf hingewiesen, dass (a) der Preisanstieg, gemessen am harmonisierten Verbraucherpreisindex für Nahrungsmittel und alkoholfreie Getränke, von 1997 bis 2011 in Deutschland mit 21% im Vergleich zum EU-Durchschnitt von 37% gering ausgefallen ist. Auch ist der Verbraucherpreisindex für Nahrungsmittel und alkoholfreie Getränke zwischen 1991 und 2010 lediglich um 29% gestiegen, während der Verbraucherpreisindex insgesamt in Deutschland um 46% anstieg. Der Preisauftrieb war bei Lebensmitteln somit sogar unterdurchschnittlich. Auf einen Ausbau der Marktmacht deuten auch diese Befunde nicht hin, denn eine zunehmende Marktmacht hätte in aller Regel in steigenden Preisen resultieren müssen.

Als letzte Größe soll nun die Profitabilität der Einzelhandelsunternehmen betrachtet werden als Indikator für den Wettbewerbsdruck auf Einzelhandelsmärkten. Im Rahmen der Finanzanalyse wird hier häufig auf die Gewinne vor Zinsen und Steuern (EBIT) zurückgegriffen. Ein Vergleich der EBIT-Margen für die größten Einzelhandelsunternehmen in Deutschland, Großbritannien, Niederlande und Frankreich zeigt, dass alle anderen Märkte, insbesondere Großbritannien, deutlich größere Renditen als die deutschen Einzelhandelskonzerne aufweisen, die mit EBIT-Margen um die 1% herum arbeiten. Auch aus diesem Indikator kann im Vergleich zu anderen europäischen Ländern daher prima facie nicht auf mangelnden Wettbewerb geschlossen werden (so auch Monopolkommission 2012, Tz. 1050 ff.).

Als Fazit lässt sich somit festhalten, dass sich keine Indikatoren ergeben, die für eine besondere Wettbewerbsproblematik auf der Absatzseite im LEH sprechen. Wie auch die Monopolkommission (2012) geschlussfolgert hat, sprechen die Indikatoren eher für wirksamen Wettbewerb im LEH. Auf der Absatzseite des LEH hat die Monopolkommission (2012) „kein spürbares Nachlassen der Wettbewerbsintensität“ feststellen können. Wenn dies auch in gewisser Weise für Wettbewerb und Verbraucher ein beruhigender Befund ist, so stellt sich gerade im Hinblick auf etwaige zukünftige Fusionsvorhaben trotzdem die Frage, wie sich diese auf die Wettbewerbsintensität auswirken würden. Das Bundeskartellamt geht hier von einem „abgestuften Wettbewerbsverhältnis“ (Bundeskartellamt 2008, S. 46) aus, demzufolge sog. „Hard Discounter“ wie Aldi nur in wesentlich stärker eingeschränktem Wettbewerb zu den sog. Soft Discountern wie Lidl oder Vollsortimentern wie Rewe stehen als diese untereinander, weil das Sortiment der diversen Retail-Formate sehr unterschiedlich sei. Die Monopolkommission (2012) hat diese Sichtweise in Frage gestellt und zu bedenken gegeben, dass die Aldi-Produkte im direkten Wettbewerb mit den preisgünstigen Eigenmarken des LEH stehen und hier die Preissetzungsspielräume beeinflussen. Die Preissetzungsspielräume für Herstellermarken wiederum werden aber durch die Preise der Eigenmarken des LEH beschränkt, zumal da diese oft im selben Regal zu finden sind. Indirekt wirken sich so die Aldi-Preise auch auf die Preise der Herstellermarken aus, selbst wenn diese bei Aldi kaum zu finden sind. Bevor diese spannende Frage des sog. Interformat-Wettbewerbs und der Implikationen für die Abgrenzung des kartellrechtlich relevanten Marktes detaillierter erörtert werden, wollen wir uns jedoch kurz auch der Beschaffungsseite des Marktes allgemein kurz zuwenden.

2.2.3 Die Beschaffungsseite des LEH in Deutschland

Die Betrachtung der Absatzseite des deutschen LEH macht zwar zum einen deutlich, dass es sich um einen relativ konzentrierten Markt handelt. Zum anderen gibt es aber gerade im Vergleich zu anderen europäischen LEH-Märkten keine belastbaren Hinweise auf mangelnden Wettbewerb. Das Augenmerk der Sektoruntersuchung des Bundeskartellamt (2011) als auch der European Commission (2013) gilt allerdings auch stärker den Beschaffungs- als den Absatzmärkten. Und auch in der Politik stehen die Beschaffungsmärkte stärker im Fokus, wie das obige Zitat von Ministerin Aigner deutlich macht, in dem es ihr um die „anständige Bezahlung“ der Landwirte geht. In der Tat legt zudem das deutsche Kartellrecht einen besonderen Stellenwert auf die Umverteilungseffekte von Wettbewerbsprozessen, in dem kleine Anbieter oft

in besonderer Weise gegen größere Wettbewerber oder auch vor der Macht vor und nachgelagerter Vertragspartner geschützt werden sollen. Gerade im LEH sind daher die vertikalen Strukturen zwischen Handel und Herstellern von immenser Bedeutung. Die Beschaffungsseite soll daher in diesem Abschnitt genauer betrachtet werden.
Pauschale Aussagen über die Machtverhältnisse zwischen Herstellern und Händlern lassen sich jedoch leider nicht treffen, da die Struktur im Herstellerbereich sehr heterogen ist und diese auch zwischen Produktgruppen sehr variiert. Multinationale Markenhersteller wie Nestlé und Unilever stehen neben mittleren und kleinen, zum Teil regionalen, Zulieferern im Regal. Zwischen den Händlern und den Herstellern bestehen zudem sehr komplexe Vertragsbeziehungen, denen viele Parameter zugrunde liegen. Neben dem Einstandspreis werden Zahlungsbedingungen, diverse Rabattformen auf Einzelprodukt- als auch auf Sortimentsebene, Werbekostenzuschüsse, Regalmieten, Sonderaktionen und andere Vertragsparameter verhandelt und spezifiziert. Diese Bedingungen werden zudem nach den sog. Jahresgesprächen typischerweise nachverhandelt, um neue Entwicklungen (Nachfrageschwankungen, neue Produkte, Kostenentwicklungen z. B. bei Rohstoffen) berücksichtigen zu können. Diese Komplexität der Vertragsbeziehungen und deren Verhandlung kann durch das lange Zeit in der Wettbewerbspolitik als Maßstab herangezogene Monopson- bzw. Oligopsonmodell nicht adäquat abgebildet werden. Das Monopson- bzw. Oligopsonmodell kann faktisch nicht als theoretische Grundlage für die Beschaffungssituation im LEH dienen. Wesentlich besser lassen sich diese Beziehungen und Verhandlungen durch neuere ökonomische Verhandlungsmodelle erfassen, die den Kern der neueren Literatur bilden (vgl. z. B. Inderst & Wey 2008).
Eine Pauschalbetrachtung der Beziehungen zwischen Händlern und Herstellern ist sicherlich nicht zielführend. Stattdessen muss die Komplexität der Leistungsbeziehung sowie der Vertragsgestaltung und -durchsetzung im Einzelfall betrachtet werden. Zusammenfassend ist die Beurteilung der Wettbewerbssituation auf der Beschaffungsseite im LEH deutlich schwieriger als die der Absatzseite. Aus diesem Grund werden wir im nächsten Abschnitt nach einer Analyse der adäquaten Marktabgrenzung im LEH wichtige Aspekte der Analyse von Nachfragemacht anhand des Beispiels des sogenannten „One-Stop-Shoppings“ verdeutlichen.

2.3 Marktabgrenzung und Nachfragemacht im deutschen LEH

2.3.1 Marktabgrenzung im LEH

Die Abgrenzung des relevanten Marktes im LEH dreht sich immer auch um die Frage, ob Drogerien, Hard- und Soft-Discounter sowie die sog. Vollsortimenter auf einem gemeinsamen Markt agieren oder auf sachlich getrennten Märkten (vgl. ausführlich Schröder 2012a, Schröder 2012b, Schröder & Mennenöh 2013). Wie bereits oben erwähnt, geht das Bundeskartellamt von einem abgestuften Wettbewerbsverhältnis aus. Da die Sortimentsbreite und -tiefe bei Discountern wesentlich geringer sei, würden diese insbesondere für Kunden, die alles aus einer Hand zu kaufen wünschen (sog. „One-Stop-Shopper“), keine adäquate Substitutionsmöglichkeit bieten. Aufgrund der Bedeutung des One-Stop-Shopping sei tendenziell eher von einer nach Sortimentsbreite und -tiefe abgestufte Marktabgrenzung sachgemäß (vgl. Bundeskartellamt 2008, S. 46).

Um diese Hypothese überprüfen zu können, haben wir mit Hilfe von Daten der Gesellschaft für Konsumforschung (GfK) bzw. der GfK Panel Services GmbH die Substitutionsbeziehungen auf dem Windelmarkt in Deutschland überprüft. Auf Basis einer mit Discrete Choice-Modellen geschätzten Nachfragefunktion haben wir Kreuzpreiselastizitäten zwischen Markenprodukten und Eigenmarken von Supermärkten und Discountern ermittelt (Haucap, Heimeshoff, Klein, Rickert & Wey 2013), sodass wir die Substitutions- und somit auch die Wettbewerbsbeziehungen zwischen Supermärkten und Discountern besser einschätzen können. Der Windelmarkt bietet sich für eine solche Studie des Interformat-Wettbewerbs an, weil Windeln in allen Retail-Formaten erhältlich sind und es Markenprodukte und Eigenmarken gibt. Zudem ist die Nachfrage ziemlich konstant und wenig konjunkturabhängig, sodass die ökonometrischen Schätzungen einfacher werden. Zugleich schwanken jedoch sowohl die Verkaufspreise als auch die Preise für Inputs (wie Zellstoff), welche international handelbar sind und beobachtbare Preise haben. Zudem hat man es bei Eltern als Kunden mit relativ qualitätssensitiven Verbrauchern zu tun. Somit ist zu erwarten, dass man in einem solchen Markt eine relativ weite Distanz von Eigen- und Herstellermarken in der Käuferpräferenz haben sollte. Wenn aber bereits in einem solchen Markt ein intensiver Wettbewerb zwischen Eigenmarken des von Discountern und Drogeriemärkten einerseits und Herstellermarken andererseits zu finden ist, so kann man von einem intensiven Wettbewerbsverhältnis ausgehen.

Im Detail haben wir die wöchentlichen Einkäufe der Konsumenten im GfK Verbraucher-Panel betrachtet, welche (Baby-)Windeln nachfragen (etwa 10% von allen 40.000). Diese Konsumenten haben verschiedene Hersteller- und Eigenmarken bei verschiedenen Händlern zur Auswahl. Die jeweiligen Kombinationen (Marke X bei Händler Y) erfahren unterschiedliche Wertschätzungen. Analysiert wurde nun, wie sehr die Konsumenten welche Bündel nachfragen. Dabei haben wir explizit die heterogene Präferenzenstruktur mit einem Random-Coefficient-Logit Modell berücksichtigt und so sehr präzise Eigen- und Kreuzpreiselastizitäten ermittelt.
In Tabelle 2.2 sind zum einen die durchschnittlichen Eigen- und Kreuzpreiselastizitäten für Herstellermarken und Eigenmarken angegeben, zum anderen auch für verschiedene Retail-Formate (SB-Warenhäuser, Discounter, Drogeriemärkte und Vollsortimenter). Es zeigt sich, dass die durchschnittliche Eigenpreiselastizität sehr hoch ist, während die durchschnittliche Kreuzpreiselastizität zwischen zwei verschiedenen Marken gering erscheint. Zu bedenken ist jedoch, dass 17 verschiedene Marken im Markt konkurrieren, sodass die „aggregierte“ Kreuzpreiselastizität durchaus hoch ist.
Mit Hilfe struktureller Angebotsmodelle ließen sich nun die Margen der jeweiligen Produkte identifizieren. Diese Informationen wurden dann wiederum genutzt, um eine Marktabgrenzung der jeweiligen Produkte mit Hilfe des hypothetischen Monopolistentests (auch SSNIP-Test genannt) durchzuführen. Dabei wurde ausgehend vom Marktführer Zug um Zug die Windelmarke mit der höchsten Kreuzpreiselastizität hinzugezogen, um so den SSNIP-Test durchzuführen. Die Vorgehensweise ist in Tabelle 2.3 dargestellt.
Tabelle 2.3 stellt also die Marktabgrenzung gemäß SSNIP-Test dar, ausgehend vom Marktführer der in unserer Verbrauchergruppe über 40% Marktanteil hat. Für jede Marke wird dargestellt, (i) ob es sich um eine Eigenmarke handelt oder nicht und (ii) in welchem Retail-Format diese Marke erhältlich ist. Die für den Marktführer (Marke 1) mit KVL bezeichneten Werte geben die kritischen Kreuzpreiselastizitäten an, bei denen ein Preisanstieg von 1%, 5% oder 10% nicht mehr profitabel ist. Wenn die kumulierte oder aggregierte Kreuzpreiselastizität in der sechsten Spalte diesen KVL übersteigt, dann ist eine Preiserhöhung nicht länger profitabel. Die verschiedenen kritischen Schwellenwerte, die für die Marktabgrenzung relevant sind, werden durch die horizontalen Linien markiert. Schon bei der engsten Marktabgrenzung (1%-Kriterium) fällt auf, dass der Logik des SSNIP-Tests folgend mindestens zwei Eigenmarken - nämlich die einer Drogeriemarktkette und die eines Discounters - als

engste Substitute des Marktführers zu seinem Portfolio (also somit zum relevanten Markt) gehören müssten, damit sich eine 1-prozentige Preiserhöhung lohnen würde. Anders ausgedrückt begrenzen diese beiden Eigenmarken effektiv den Preissetzungsspielraum des Marktführers. Dieses Bild setzt sich auch bei weniger konservativen Grenzen wie der weiter verbreiteten Abgrenzung nach dem 5%- oder 10%-Kriterium fort. Nach dem 5%-Kriterium gehören die Windeln in elf Handelsketten zum relevanten Markt, im Falle des 10%-Kriteriums sämtliche Windelmarken in sämtlichen Outlets.
Unsere Ergebnisse wurden auch mit alternativen Methoden zur Marktabgrenzung wie der Generalised Upward Pricing Pressure (GUPPI)-Methode auf Robustheit getestet. Die Ergebnisse der Analyse zeigen, dass die stärksten Verfolger des Marktführers zum einen Eigenmarken von Drogeriemärkten als auch von Discountern und Vollsortimentern sind. Alle diese Ergebnisse führen im Abschluss zur Erkenntnis, dass die Hypothese eines stark abgestuften Wettbewerbs zwischen Discountern, Drogeriemärkten und Vollsortimentern (welche unter anderem den Marktführer verkaufen) so nicht zu halten ist. Vielmehr scheinen alle Formattypen in einem intensiven Wettbewerb zu stehen.

2.3.2 Nachfragemacht im LEH

Es ist sicherlich unstrittig, dass die Einzelhandelsunternehmen im deutschen LEH zumindest teilweise eine gewisse Nachfragemacht gegenüber ihren Zulieferern haben. Auch die Monopolkommission (2012) ist in ihrem Gutachten zu der Schlussfolgerung gekommen, dass Nachfragemacht einzelner Händler in Teilen vorhanden sein dürfte und dies durch Einkaufskooperationen noch verschärft werden kann. Ob dies aber negative Effekte auf Wettbewerb und Verbraucher hat, ist unklar.
Lange Zeit wurde die Beurteilung der Nachfragemacht des Handels relativ pauschal anhand der Größe der Einzelhandelsunternehmen vorgenommen. Sicherlich weisen große Unternehmen oftmals mehr Verhandlungsmacht auf als kleinere Wettbewerber, aber aufgrund der bereits beschriebenen komplexen Beziehungen zwischen Herstellern und Händlern ist Größe allein kein aussagekräftiger Indikator zur Beurteilung der Verhandlungsmacht von Handelsunternehmen. So können auch kleine Hersteller ggf. starke Marken haben, die im Extremfall als „Must Stock“-Produkte angesehen werden, und die Ursache für eine starke Verhandlungsposition sind. Hingegen scheinen Hersteller von Zweit- und Eigenmarken, auch wenn sie ggf. relativ groß sind, prima facie weniger Verhandlungsmacht zu besitzen. Entscheidend dürften

oft die Ausweichmöglichkeiten der Hersteller einerseits (z. B. Lieferung an andere inländische oder auch ausländische LEH-Ketten oder an Gastronomie und andere Gewerbe) und der Verbraucher andererseits sein. Zu berücksichtigen ist hier auch die besondere Situation der sog. Verbundgruppen wie REWE und EDEKA. Bei diesen sind weitgehend selbständige Einzelhändler auf der Abnehmerseite aktiv, welche zum Teil sehr unterschiedliche Vorstellungen von der Zusammensetzung ihrer Sortimente haben und dies über die jeweiligen Gruppenstrukturen nachdrücklich kommunizieren können. Eine zentral gesteuerte Auslistung von Lieferanten oder auch nur Produktgruppen ist für diese Verbundgruppen faktisch sehr viel schwieriger als bei anderen Handelsunternehmen, sobald eine spürbare Anzahl an selbständigen Einzelhändlern dieser Verbundgruppen die jeweiligen Produkte für bedeutsam für ihr lokales Sortiment erachten.

Eine genaue Quantifizierung der Verhandlungsmacht kann daher nur auf Einzelfallebene erfolgen, weil die Verteilung der Verhandlungsmacht zwischen Zulieferern und Händlern von einer Vielzahl von Parametern abhängt. Neben Unternehmenscharakteristika (wie z. B. Sortimentstiefe und -breite sowie Kosten- und Ertragsstruktur) gehört vor allem auch das tatsächliche Konsumentenverhalten dazu. Eine besondere Rolle nimmt hier das sogenannte „One-Stop-Shopping“ ein. Dies wird anhand einer empirischen Studie deutlich, die Heimeshoff & Klein (2013) jüngst vorgelegt haben. Dabei machen die Autoren sich zu Nutze, dass zwei regionale Brauereien für eine gewisse Zeit Filialen einer großen Handelskette in Süddeutschland boykottierten, wobei die betroffenen Biermarken nur in einem Teil der Filialen des Händlers geführt wurden. Dieses Ereignis hat den Vorteil, dass eine sogenannte Treatmentgruppe und eine Kontrollgruppe gebildet werden kann, welche nicht durch den Boykott beeinflusst wurde, aber denselben allgemeinen ökonomischen Veränderungen unterlag (z. B. konjunkturelle Schwankungen, Wetterentwicklung). Im Rahmen eines Differenzen-in-Differenzen-Ansatzes, der genau diese Aufteilung in Treatment- und Kontrollgruppe ausnutzt, haben Heimeshoff & Klein (2013) den Effekt geschätzt, den der Lieferstopp (a) auf den Bierumsatz und (b) auf den Gesamtumsatz der betroffenen Filialen hatte. Wie sich zeigt, ist in den Regressionen kein Einfluss des Lieferstopps auf den Bierumsatz in den Filialen festzustellen. Vielmehr konnten etwaige Verluste durch das Fehlen einer bestimmten Biermarke durch zusätzliche Werbemaßnahmen und Sonderangebote für andere Biermarken ausgeglichen werden. Betrachtet man jedoch die Gesamtumsätze der Filialen, so ist ein signifikant negativer Einfluss des Lieferstopps festzustellen. Trotz der Stabilisierung des Bierumsatzes durch zusätzliche

Werbemaßnahmen sind Verluste beim Gesamtumsatz zu verzeichnen. Dies ist vor allem auf sogenannte One-Stop-Shopper zurückzuführen, die bevorzugt alle Einkäufe in einer Einkaufsstätte erledigen und fernbleiben, wenn ein für sie wichtiges Produkt nicht erhältlich ist. Im vorliegenden Fall finden die Käufer ihre bevorzugte Biermarke nicht im Sortiment und machen daher ihren gesamten Wocheneinkauf in einer anderen Einkaufsstätte. Stattdessen kommen verstärkt „Schnäppchenjäger“ in die betroffenen Filialen, die dort dann zwar Sonderangebote für andere Biermarken wahrnehmen, aber wenig andere Einkäufe tätigen. Für den Supermarkt ist insbesondere der Verlust der lukrativen One-Stopp-Shopper problematisch, sodass selbst ein kleiner Lieferant erhebliche Verhandlungsmacht besitzen kann, wenn er eine starke Marke besitzt.
Aus der Untersuchung sind somit zwei Schlussfolgerungen zu ziehen: Zunächst ist das Konsumentenverhalten für die Verteilung der Verhandlungsmacht zwischen Händlern und Herstellern bedeutend, wie am Beispiel des One-Stop-Shoppings gezeigt wurde. Darüber hinaus relativiert die Untersuchung die Bedeutung der Größe eines Unternehmens bei der Beurteilung seiner Verhandlungsmacht. Relativ kleine Unternehmen können durchaus große Verhandlungsmacht erlangen, wenn sie eine adäquate Differenzierungsstrategie verfolgen und infolgedessen zumindest lokal hohe Marktanteile aufweisen.
Theoretisch ist auch von Caprice & von Schlippenbach (2013) gezeigt worden, dass durch ein One-Stop-Shopping-Verhalten zwischen vormals unabhängigen Produkten Komplementaritäten entstehen, die sich entscheidend auf die Verteilung der Verhandlungsmacht zwischen Herstellern und Händlern auswirken. Diese Erkenntnisse zeigen auch, dass eine Abgrenzung des Marktes auf der Ebene einzelner Produkte beziehungsweise von Produktgruppen zu falschen Schlussfolgerungen führen kann und für den LEH oftmals nicht angemessen ist.

2.4 Ist Nachfragemacht ein Problem im deutschen LEH?

In den bisherigen Ausführungen ist bereits deutlich geworden, dass Nachfragemacht ein Phänomen ist, das zum einen im Einzelfall geprüft werden muss und zum anderen dynamisch analysiert werden sollte. Aufgrund von regelmäßigen Verhandlungen und komplexen Vertragsbeziehungen ist die Machtbalance ständigen Veränderungen unterworfen.

Im Zuge der Sektoruntersuchung des Bundeskartellamtes stellt sich aber auch die Frage, ob aus Sicht der Verbraucher die Machtverteilung zwischen Händlern und Herstellern überhaupt ein Problem darstellt. Hier wird regelmäßig die sogenannte „Theorie der Wasserbetteffekte“ herangezogen (vgl. Inderst & Wey 2008). Setzt ein Händler mit großer Verhandlungsmacht einen niedrigen Einkaufspreis durch, müssen der Theorie zufolge kleinere Händler den Herstellern höhere Einkaufspreise zahlen, um dieses zu kompensieren. Diese Händler verzeichnen damit einen Wettbewerbsnachteil gegenüber ihrem größeren Wettbewerber und würden im Extremfall vom Markt verdrängt, was wiederum zu Monopolisierungstendenzen und steigenden Preisen führen könnte. Aus empirischer Sicht gibt es jedoch bislang keine belastbaren Belege für diese Theorie (vgl. Wey 2011). Wasserbetteffekte konnten bisher im Rahmen empirischer Analysen nicht nachgewiesen werden. Ohne empirische Belege sollte man jedoch sehr vorsichtig sein, wettbewerbspolitische Handlungsempfehlungen auf ein recht wackliges Theoriegebäude zu stützen.
Die Monopolkommission sieht angesichts dieser Befunde aktuell diskutierte Vorschläge zur Reglementierung von Vertragsverhandlungen bei Nachfragemacht (vgl. European Commission 2013) auch eher kritisch. Zunächst ist nach aktuellem Forschungsstand nicht klar, wann genau Nachfragemacht überhaupt ein echtes Problem fuïr den Wettbewerbsprozess und/oder die Verbraucher darstellt. Aus diesem Grund stehen etwaige Handlungsempfehlungen ohne eine sichere theoretische und empirische Basis auf wackeligem Fundament. Vorschlägen zur Einführung eines Verhaltenskodex oder einer Markttransparenzstelle für Verhandlungen zwischen Handel und Herstellern steht die Monopolkommission (2012) zudem auch deswegen kritisch gegenüber, weil solche Instrumente sehr leicht kartellfördernd und wettbewerbsdämpfend wirken können. Auskunftsansprüche von Verbänden gegenüber einzelnen Herstellern sind deshalb ähnlich problematisch.

2.5 Probleme des aktuellen Rechtsrahmens: Das Verbot des Verkaufs unter Einstandspreisen im GWB und mögliche vertikale Preisbindungen

Weniger neu, dafür aber anhaltend sind zwei Dauerbrenner in der wettbewerbsökonomischen Debatte: zum einen das Verbot des Verkaufs unter Einstandspreisen nach

§20 Abs. 4 GWB, zum anderen das faktische per se Verbot vertikaler Preisbindung (auch wenn es sich rein juristisch betrachtet nicht um ein per se Verbot handelt).

2.5.1 Verbot des Verkaufs unter Einstandspreisen[2]

W/ährend die Gestaltungsfreiheit bei Endkundenpreisen durch das Verbot der vertikalen Preisbindung vor allem nach oben eingeschränkt ist (da vor allem Mindest- und Festpreise per se untersagt sind), regelt §20 Abs. 4 GWB, dass „Unternehmen mit gegenüber kleinen und mittleren Wettbewerbern überlegener Marktmacht [...] ihre Marktmacht nicht dazu ausnutzen [dürfen], solche Wettbewerber unmittelbar oder mittelbar unbillig zu behindern. Eine unbillige Behinderung im Sinne des Satzes 1 liegt insbesondere vor, wenn ein Unternehmen (1) Lebensmittel im Sinne des §2 Abs. 2 des Lebensmittel- und Futtermittelgesetzbuches unter Einstandspreis oder (2) andere Waren oder gewerbliche Leistungen nicht nur gelegentlich unter Einstandspreis oder (3) von kleinen oder mittleren Unternehmen, mit denen es auf dem nachgelagerten Markt beim Vertrieb von Waren oder gewerblichen Leistungen im Wettbewerb steht, für deren Lieferung einen höheren Preis fordert, als es selbst auf diesem Markt anbietet es sei denn, dies ist jeweils sachlich gerechtfertigt.“ Durch diese Norm wird also die Gestaltungsfreiheit bei der Preissetzung nach unten eingeschränkt.

Trotz zahlreicher und umfangreicher Kritik von ökonomischer und juristischer Seite ist das Verbot im Rahmen der 8. GWB-Novelle erneut verlängert worden. Nun soll das Verbot am 31.12.2017 auslaufen. Unter den vielen Kritikern sei prominent die Monopolkommission hervorgehoben, die - einem Ceterum censeo gleichend - schon lange fordert, das Verbot von Verkäufen unter Einstandspreisen aufzuheben. Die Vorschriften des §19 GWB sind ausreichend, um einen etwaigen Missbrauch einer marktbeherrschenden Stellung durch Verdrängungspreiswettbewerb zu unterbinden. Wettbewerbsökonomisch ist das viel zu strikte Verbot des Verkaufs von Produkten unter Einstandspreisen vor allem aus drei Gründen problematisch: Erstens gibt es zahlreiche Gründe, warum Produkte in verschiedenen Situationen zu nicht-kostendeckenden Preisen verkauft werden (vgl. z. B. Schmidt & Haucap 2013, S. 167 ff.). Im Einzelhandel sind dies insbesondere Komplementaritäten, welche durch die Neigung zum One-Stop-Shopping entstehen. So kann es aus Perspektive eines Händlers sinnvoll sein, insbesondere schnell drehende Produkte wie z. B. Milch, die von vielen Kunden bei nahezu jedem Einkauf erworben werden und daher eine hohe Aufmerksamkeit er-

[2]Dieser Abschnitt basiert auf Haucap & Klein (2012, S. 182 f.).

fahren, besonders günstig anzubieten und eine höhere Marge bei langsam drehenden Artikel zu kalkulieren, auf deren Preise die Verbraucher weniger achten. Eine solche Preispolitik hat nichts mit einer Verdrängungstaktik zu tun und ist auch nicht wettbewerbswidrig. Solange der typische gesamte Warenkorb eines durchschnittlichen Kunden nicht unterhalb der Summe der Einstandspreise verkauft wird, besteht aus wettbewerbsökonomischer Sicht keinerlei Problem, selbst wenn Milch in diesem Fall „verramscht“ werden mag, um die Kunden in den Supermarkt zu locken, und dies bei manchen Politikern Unbehagen auslöst.

Zweitens ist das Verbot, spätestens seit dem Urteil des OLG Düsseldorf vom 12.11.2009 (Az. VI-2 Kart 9/08 OWi) im Fall Rossmann, kaum noch justitiabel. Das OLG Düsseldorf hatte in dem Fall entschieden, dass Werbekostenzuschüsse bei der Prüfung, ob beworbene Produkte unter Einkaufspreis verkauft werden, ausschließlich für die beworbenen Produkte einkaufspreismindernd zugerechnet werden können, selbst wenn die Werbekostenzuschüsse nach dem Gesamtumsatz des Händlers mit dem Hersteller berechnet werden.
Und drittens ist festzuhalten, dass die in der Politik in Teilen verbreitete Auffassung, das Verbot würde in irgendeiner Weise den Herstellern (z. B. Milchbauern) helfen, völlig irrig ist. Ohne dass ökonomisch überhaupt klar ist, durch welche konkrete Wirkungskette das Verbot den Herstellern überhaupt helfen sollte, ist eher zu erwarten, dass das strikte Verbot von Verkäufen unter Einstandspreisen dazu führt, dass der Verhandlungsdruck auf die Erzeuger bei einem solchen Verbot noch größer wird, eben um die Endkundenpreise nicht erhöhen zu müssen. Wenn Produkte nicht länger als Werbemaßnahme oder Lockvogel-Angebot unter Einstandspreisen verkauft werden dürfen, zugleich aber Preiserhöhungen am Markt nur schwer bei den Verbrauchern durchsetzbar sind, dann wird sich der Druck erhöhen, die Einstandspreise weiter zu senken. Damit dürfte das Verbot des Verkaufs unter Einstandspreisen sogar kontraproduktiv für die Erzeuger wirken und ihre Verhandlungsposition gegenüber dem Handel eher schwächen als stärken.
Das strikte Verbot von Verkäufen unter Einstandspreisen ist aus ökonomischer Sicht heraus insgesamt als sehr problematisch einzuschätzen. In Bezug auf den Lebensmitteleinzelhandel stellt exemplarisch auch das Sondergutachten 47 der Monopolkommission (2007, Tz. 8*) über Preiskontrollen in Energiewirtschaft und Handel fest, dass *„das Per-se-Verbot von Angeboten unter Einstandspreis (...) ordnungspolitisch problematisch [ist]. Untereinstandsangebote stellen vor allem ein Marke-*

tinginstrument dar, das dem Endverbraucher in Form besonders günstiger Preise zugutekommt.“ Darüber hinaus führt die Monopolkommission (2007, Tz. 8*) aus, dass *„kleinere Handelsunternehmen (...) durch das Verbot von Untereinstandspreisen nicht vor Preiswettbewerb geschützt werden [können]. Mit §20 Abs. 4 GWB wird in erster Linie der Preiswettbewerb der großen Handelsunternehmen untereinander reduziert, was zu höheren Endverbraucherpreisen führt.“* Diese klaren Aussagen beziehen sich direkt auf die Situation im Lebensmitteleinzelhandel, in dem ein Verdrängungswettbewerb durch Untereinstandspreise sehr unwahrscheinlich ist.
Das Verbot des Verkaufs unter Einstandspreisen ist zusammenfassend aus ökonomischer Sicht als äußerst problematisch zu betrachten, da es den Wettbewerb nicht schützt, sondern - ganz im Gegenteil - ihn sogar verringert. Auch die Verhandlungsposition der Hersteller wird ein solches Verbot nicht verbessern. Darüber hinaus ist nicht zu erwarten, dass Verbraucher durch Verkäufe unter Einstandspreisen einen Schaden erleiden, sodass aus ökonomischer Sicht nichts für dieses Verbot spricht.

2.5.2 Vertikale Preisbindungen[3]

Eine vertikale Beschränkung von besonderer Bedeutung ist die Preisbindung der zweiten Hand, zu englisch: Resale Price Maintanance (RPM). Hierbei setzt der Hersteller eines Produktes oder einer Dienstleistung neben dem Herstellerabgabepreis gleichermaßen den Endpreis des Produktes fest. Zu unterscheiden ist bei den Endpreisen zwischen Mindestpreisen, Höchstpreisen und Festpreisen, welche Hersteller und Händler vereinbaren. In Deutschland ist die Preisbindung der zweiten Hand mit Ausnahme von Druckerzeugnissen wie Zeitungen, Zeitschriften und Büchern faktisch mit einem Per-se-Verbot belegt, auch wenn eine enge Auslegung des Wortlauts des GWB bzw. des AFEU eine Effizienzverteidigung zulässt. Faktisch findet dies jedoch unseres Wissens bisher keine Anwendung. Dem faktischen Per-se-Verbot liegt die Abwägung zugrunde, dass die Freiheit des Händlers, seine Preise selbst festzulegen, wichtiger ist als die Freiheit des Händlers, einen Vertrag zu schließen, in dem er auf dieses Recht verzichtet. Aus ökonomischer Perspektive gibt es allerdings wenig überzeugende Gründe für ein striktes Per-se-Verbot. Aus Effizienzgründen wäre eine differenziertere Regel besser geeignet, die am Markt generierten Tauschrenten zu maximieren und so den Wohlstand zu erhöhen. Warum ist das so?
Zunächst ist festzuhalten, dass es - wie eigentlich immer in der Ökonomie - ganz grob gesprochen zwei mögliche Erklärungen für vertikale Beschränkungen wie die Preis-

[3]Dieser Abschnitt basiert auf Haucap & Klein (2012, S. 175 ff.).

bindung der zweiten Hand gibt: Macht und Effizienz (vgl. Haucap & Klein 2012). Um diese alternativen Erklärungsansätze dreht sich im Grunde auch die gesamte Kontroverse über vertikale Vereinbarungen, die Gegenstand zahlloser Veröffentlichungen sind (vgl. für eine Übersicht Rey & Verge 2008). Lässt sich die Preisbindung der zweiten Hand besser durch das Motiv erklären, Marktmacht aufzubauen und/oder zu erhalten oder sind Effizienzgründe wichtiger? Während die Effizienzargumente sich darauf stützen, Preisbindungen als Mechanismen zu erklären, die bestimmte Formen des Markt- oder Koordinationsversagens zu überwinden helfen, gehen die Machtargumente davon aus, dass Preisbindungen entweder eine marktverschließende Wirkung entfalten oder aber die Kartellbildung fördern.

In der Tat ist zunächst klar, dass im Fall der Preisbindung der zweiten Hand der Wettbewerb innerhalb einer Wertschöpfungskette (also „intra-brand“) reduziert wird. Wichtig ist aber auch festzuhalten, dass vertikale Beschränkungen sich von horizontalen Vereinbarungen unterscheiden, welche von Unternehmen getroffen werden, die auf derselben Wertschöpfungsstufe tätig sind, also eigentlich im direkten Wettbewerb miteinander stehen (vgl. z. B. Motta 2004). Während horizontale Absprachen zumeist (wenn auch nicht immer) direkt den Wettbewerb aushebeln bzw. reduzieren, ist dies bei vertikalen Vereinbarungen nicht der Fall, da die vertragschließenden Parteien nicht in Konkurrenz zueinander stehen. Somit ist eine Schädigung dritter Parteien (z. B. der Endverbraucher) bei vertikalen Beschränkungen -anders als bei horizontalen Absprachen- nicht direkt ersichtlich. Eine Einschränkung der Vertragsfreiheit zwischen Unternehmen auf verschiedenen Stufen der Wertschöpfungskette zu begründen, ist somit ungleich schwieriger.

Die Erklärung von Preisbindungen als Instrument zum Machterhalt oder Machtaufbau durch Kartellierung oder Marktabschottung ist der ältere der beiden ökonomischen Erklärungsansätze (vgl. z. B. Comandor 1990), wird aber auch durch neuere Modelle gestützt. So argumentiert z. B. Motta (2004), dass Mindestpreisbindungen ein Instrument sein können, um ein etwaiges Selbstbindungsproblem des Herstellers gegenüber seinen potenziellen Vertriebspartnern zu lösen. Im Kern geht es darum, dass der Hersteller den Händlern keine Rabatte gewähren wird, wenn er ihnen zusichern kann, dass alle Händler denselben Endkundenpreis verlangen müssen. Somit wird der Wettbewerb auf Endkundenebene eingeschränkt. Das Modell ist allerdings für die wettbewerbspolitische Praxis aus unserer Sicht kaum relevant, insbesondere nicht im Bezug auf den Lebensmitteleinzelhandel, der durch sehr viel andere Eigenschaften charakterisiert ist wie z. B. die erheblichen Komplementaritäten zwischen

Produkten verschiedener Hersteller. Besser geeignet ist das Modell, um z. B. die Preisgestaltung bei Franchiseketten zu erklären.
Ein wichtigeres Argument gegen Preisbindungen der zweiten Hand beruht auf der Möglichkeit, dass insbesondere Mindestpreisbindungen eine Kartellierung auf Handels- und/oder Herstellerebene im Inter-Brand-Wettbewerb bewirken können (vgl. Jullien & Rey 2007, Schwalbe 2011)[4] oder auch direkt den Inter-Brand Wettbewerb reduzieren (Rey & Vergé 2010, Schwalbe 2011). Hersteller können sich einfacher koordinieren, da sie die Hoheit über die gesamte Wertschöpfungskette haben. Allerdings kann eine vertikale Beschränkung nicht mit einer Kartellierung gleichgesetzt werden, sie ist bestenfalls ein *Hilfsmittel* für eine horizontale Kartellierung. Diese entsteht aber nicht automatisch durch Vertikalbeschränkungen, vielmehr müssen bestimmte, relativ spezielle Bedingungen erfüllt sein, damit eine Vertikalbeschränkung auch tatsächlich zu einer horizontalen Kartellbildung führt. Eben dies ist, wie bereits erwähnt, ein wichtiger Unterschied zu horizontalen Absprachen.
Während vertikale Preisbindungen also zwar durchaus eine kartellierende Wirkung entfalten können, sind jedoch, wie auch schon erwähnt, ebenso effizienzsteigernde Effekte möglich. So können insbesondere Höchstpreisbindungen das Problem des doppelten Preisaufschlags verhindern oder mildern (vgl. Spengler 1950, Motta 2004). Doppelte Preisaufschläge entstehen, wenn auf verschiedenen Ebenen einer Wertschöpfungskette unvollständiger Wettbewerb herrscht. Wie erstmals Spengler (1950) gezeigt hat, führt Marktmacht auf nacheinander gelagerten Stufen der Wertschöpfungskette dazu, dass auf jeder Stufe eine Marge (oder ein Deckungsbeitrag) auf die variablen Kosten aufgeschlagen wird. Je stärker die Arbeitsteilung ausgeprägt ist, desto häufiger wird also an verschiedenen Stellen eine Marge aufgeschlagen - es kommt zum Problem der doppelten bzw. vielfachen Margenbildung, welches die Preise in die Höhe treibt. Dieses Problem ließe sich zwar theoretisch durch elaborierte mehrteilige Tarife lösen (vgl. Schwalbe 2011), doch ist dazu ein solches Ausmaß an Informationen über Kosten- und Nachfrageverläufe notwendig, dass eine vollständige Lösung des Problems zwar theoretisch denkbar, praktisch aber ziemlich unrealistisch ist. Auch durch Rabatte kann das Problem theoretisch gelöst werden (vgl. Rey & Tirole 1986, Schwalbe 2011),[5] doch erscheint auch diese Lösung eher theoretischer Natur. Zu bedenken ist auch, dass es beispielsweise

[4]Jullien und Rey (2007) argumentieren im Rahmen eines theoretischen Modells, dass durch die Preisbindung der zweiten Hand Abweichungen von einem etwaigen kollusiven Verhalten besser erkannt werden können und somit eine Koordination unter den Kartellanten leichter wird.

[5]Siehe diesbezüglich auch die Referenz in Rey & Verge (2008) sowie Rey & Tirole (1986).

nicht optimal sein kann, Werbemaßnahmen für ein Produkt und Endkundenpreise strikt unabhängig voneinander festzulegen, da beide Aktionen die Endkundennachfrage beeinflussen. Durch gezielte Marketingaktionen wie z. B. Sonderangebote, die mit gleichzeitigen Werbeaktionen verknüpft sind, lässt sich kurzfristig die Nachfrage stark erhöhen und die Aufmerksamkeit für ein Produkt steigern. Dürfte nun der Hersteller nicht mit dem Handel über die Gestaltung von Aktionspreisen und Sonderangeboten verhandeln, so würde dies den Wettbewerb zwischen Herstellern sicher stärker bremsen als eine vertikale Koordination entlang der Wertschöpfungskette.
Das zweite prominente Argument für die Effizienzwirkung vertikaler Preisbindungen stammt von Telser (1960). Sofern Händlern bestimmte Mindestpreise oder sogar Festpreise vorgegeben sind, verschiebt sich der Wettbewerb auf dieser Stufe der Güterdistribution weg vom Parameter „Preis“ hin auf andere Wettbewerbsparameter wie etwa den Standort, den angebotenen Service, die Vielfalt der angebotenen Produkte, die Beratung, die Öffnungszeiten oder anderes. Mindestpreise reduzieren dann zwar den Preiswettbewerb, nicht aber die Wettbewerbsintensität an sich. Der Wettbewerb wird „lediglich“ in andere Bahnen gelenkt. Dies kann insbesondere dann durchaus auch volkswirtschaftlich wünschenswert sein, wenn anderenfalls ein suboptimal niedriges Level an Service oder Beratung angeboten wird (vgl. Mathewson & Winter 1984, Mathewson & Winter 1994). Besonders bei beratungsintensiven Produkten besteht nämlich die Gefahr, dass Nachfrager sich in einem Geschäft beraten lassen, dann aber das Produkt bei einem Discounter oder über das Internet kaufen. In solchen Situationen kann es sinnvoll sein, durch Mindestpreisbindungen den Wettbewerb stärker in Richtung Service und Beratung zu lenken.
Dazu ist jedoch dreierlei zu bemerken: Erstens bietet eine Mindestpreisbindung keinerlei Garantie dafür, dass sich der Wettbewerb in Richtung Service und Beratung verschiebt. Ebenso ist denkbar, dass der Wettbewerb sich auf andere Parameter verlagert wie etwa die Standortwahl oder Gratis-Zugaben, die dann doch wie Preissenkungen wirken. Der deutsche Apothekenmarkt ist dafür ein Paradebeispiel. Hier scheinen sich Preisbindungen vor allem darin niederzuschlagen, dass der Wettbewerb vor allem über attraktive Standorte geführt wird und nicht über eine intensivere Beratung (vgl. Haucap et al. 2012). Zweitens können Mindestpreisbindungen auch ein überoptimal hohes Servicelevel induzieren (vgl. Winter 1993). Und drittens lässt sich das angebotene Niveau an Service und Beratung auch durch andere Formen der Vertikalvereinbarung steigern wie z. B. durch Exklusivverträge (vgl. Mathewson & Winter 1994, Lafontaine & Slade 2008, Schwalbe 2011). Das letzte Argument

hat für den Lebensmitteleinzelhandel allerdings nur begrenzte Relevanz, da Exklusivverträge aufgrund der durch die Neigung zum One-Stop-Shopping entstehenden Komplementaritäten zwischen verschiedenen Produkten nicht wirklich interessant und daher auch äußerst unüblich sind.

Für die Einordnung, wie relevant das hier vorgebrachte „Service-Argument“ im Kontext des deutschen Lebensmitteleinzelhandels ist, muss zudem berücksichtigt werden, dass die allermeisten Produkte des Lebensmitteleinzelhandels nicht besonders beratungsintensiv sind. Eine Beratung in deutschen Supermärkten ist eher unüblich, sieht man von der Fleisch- und Käsetheke einmal ab. Bei Fleisch und Käse jedoch taucht das oben beschriebene Trittbrettfahrerverhalten auch nicht auf, da Kunden sich kaum in einem Supermarkt bzgl. ihrer Fleisch- und Käseauswahl beraten lassen, um dann diese Produkte im Discount zu erwerben. Bei anderen beratungsintensiven Produkten des Lebensmitteleinzelhandels wie etwa Wein und Spezialitäten haben sich spezialisierte Geschäfte für diejenigen Kunden herausgebildet, die eine Beratung wünschen, während Kunden ohne Beratungswunsch auch im Supermarkt bzw. Discount relativ günstige Weine erhalten können. Alles in allem mag das „Service-Argument“ somit eine gewisse Berechtigung bei bestimmten Produkten des Einzelhandels haben, für den Bereich des Lebensmitteleinzelhandels entfaltet es jedoch keinerlei Schlagkraft.

Ein drittes Argument, das als eine Art Effizienzverteidigung für Vertikalpreisbindungen ins Feld geführt wird, basiert auf der Annahme, dass zu niedrige Preise das Image eines Produktes zum Schaden der Verbraucher selbst nachhaltig zerstören. Insbesondere von Branchenvertretern wird argumentiert, dass ein „Verramschen“ des Produktes das Markenimage zum Leidwesen der Verbraucher nachhaltig zerstören würde.[6] Dieses Imageargument mag zwar für bestimmte Artikel wie Statusprodukte eine gewisse Bedeutung haben, ist aber aus wettbewerbsökonomischer Perspektive nicht wirklich überzeugend.[7] Vor allem bleibt die Frage offen, warum eine Mindestpreisbindung notwendig ist, da durch den Herstellerabgabepreis ja bereits eine untere Grenze für den Endverkaufspreis existiert - es sei denn, ein Händler beab-

[6] Ökonomisch betrachtet ist das Modell, das diesem Gedanken am ehesten nahe kommt, das von (, Marvel & McCafferty 1984) die zeigen, dass ein bestimmter Mindestpreis auch als Qualitätssignal wirken kann und niedrige Preise mit minderer Qualität assoziiert werden. Marvel & McCafferty (1984) demonstrieren in ihrem theoretischen Modell, dass eine Qualitätszertifizierung durch eine Preisbindung erleichtert werden kann.

[7] Motta (2004) räumt dem Argument der Qualitätszertifizierung insbesondere für Luxusprodukte eine gewisse Plausibilität ein, betont aber, dass diese nur für eine kleine Anzahl von Produktgruppen relevant sein kann.

sichtigt dauerhaft Verluste mit dem Verkauf eines Produktes zu machen. Und selbst wenn dies aufgrund von Komplementaritäten denkbar ist, so lässt sich der Endverkaufspreis doch nichtsdestotrotz stets durch ein Anheben des Herstellerabgabepreises nach oben korrigieren, sollte der Endverkaufspreis dem Hersteller aus Imagegründen zu niedrig sein.

Auch seitens der Politik wird - ähnlich zum obigen Zitat von Ilse Aigner - wiederholt gefordert, dass Lebensmittel nicht „verramscht“ werden dürfen, ohne dass jedoch wirklich klar ist, warum Preissenkungen bei Lebensmitteln unerwünscht sind.[8] Oftmals scheint der Forderung wie beim Verbot des Verkaufs unter Einstandspreisen die doch sehr naive Vorstellung zugrunde zu liegen, dass (a) höhere Endkundenpreise automatisch höhere Erzeugerpreise induzieren und (b) dies wiederum gleichsam automatisch eine höhere Produktqualität induziert. Dies ist jedoch weder theoretisch plausibel noch empirisch haltbar. Insgesamt kann die bisweilen vorgetragene Argumentation, dass Preisbindungen notwendig sein sollen, um ein für die Verbraucher schädliches Verramschen zu verhindern, nicht überzeugen.

Als Zwischenfazit lässt sich somit festhalten, dass vertraglich vereinbarte Höchstpreise aus ökonomischer Sicht tendenziell unproblematisch sind, da sie nicht der Kartellierung dienen, aber helfen können, das Problem der mehrfachen Margenbildung zu mildern. Daher sind Höchstpreisbindungen tendenziell effizienzsteigernd.[9] Die Beurteilung ist bei Mindest- und Festpreisen dagegen deutlich anders. Eine pauschale wettbewerbspolitische Beurteilung ist hier kaum möglich, vielmehr hängt die Beurteilung von Mindest- und Festpreisbindungen auch vom Ausmaß des Inter-Brand-Wettbewerbs ab. Ist der Inter-Brand-Wettbewerb sehr ausgeprägt, d.h. gibt es viele konkurrierende Anbieter, so ist das Interesse der Anbieter eher gering, den Intra-Brand-Wettbewerb einzuschränken, wenn dies nicht zugleich Effizienzvorteile hat (vgl. Motta 2004) Bei starkem Wettbewerb zwischen Herstellern profitieren diese, ceteris paribus, schließlich von geringeren Endverbraucherpreisen und höheren Absatzmengen, solange dies nicht zu Lasten der eigenen Margen geht. In einer solchen Situation intensiven Inter-Brand Wettbewerbs sind vertikale Beschränkungen weniger kritisch zu sehen als bei weniger intensivem Inter-Brand Wettbewerb. Ist der Inter-Brand Wettbewerb jedoch nur schwach ausgeprägt, so sind Mindest- und Festpreisbindungen kritischer zu sehen.

[8] So z. B. Volker Kauder (http://bit.ly/z4jbvb) oder Matthias Platzeck (http://bit.ly/y3b0UM).

[9] Diese Sichtweise wird auch in den Richtlinien der Europäischen Kommission reflektiert, welche Höchstpreise wesentlich generöser behandeln als Mindest- und Festpreise.

2.6 Fazit und Zusammenfassung

Der Lebensmitteleinzelhandel in Deutschland steht seit geraumer Zeit im Fokus der öffentlichen Diskussion, der Politik sowie der Wettbewerbsbehörden. Durch den seit längerer Zeit andauernden Konzentrationsprozess verstärkt sich auch die Diskussion über potenzielle Nachfragemacht des Handels gegenüber ihren Lieferanten und die potenziellen Auswirkungen dieser Nachfragemacht auf Wettbewerb und Verbraucher. Die zum Teil eindeutige Festlegung der öffentlichen Diskussion auf negative Effekte der Nachfragemacht des Handels überrascht aus wissenschaftlicher Perspektive, weil Aspekte wie der Spiral- oder der Wasserbetteffekt in theoretischen Modellen nur unter sehr spezifischen Bedingungen hergeleitet werden können und empirisch bislang keineswegs belegt wurden. Es ist also unklar, wann Nachfragemacht überhaupt negative Effekte verursacht. Darüber hinaus zeigt der vorliegende Beitrag, dass eine pauschale Bewertung von Nachfragemacht nicht angemessen ist. Stattdessen muss Nachfragemacht, die in bestimmten Fällen ohne Zweifel existiert, als dynamischer Prozess gesehen werden, der im Einzelfall untersucht werden muss. Darüber hinaus steht die adäquate Marktabgrenzung im Fokus dieses Beitrags. Anhand von Haushaltspaneldaten für den Windelmarkt in Deutschland kann gezeigt werden, dass Discounter im Wettbewerb zu anderen Händlern, wie z. B. Supermärkten, stehen und hier keineswegs ein abgestuftes Wettbewerbsverhältnis, sondern ein gemeinsamer Markt vorliegt. In Bezug auf die Bedeutung von Nachfragemacht zeigt sich anhand eines quasi-natürlichen Experiments, dass auch kleine Hersteller, sofern sie eine konsequente Differenzierungsstrategie verfolgen und lokal hohe Marktanteile haben, Verhandlungsmacht besitzen können. Es ist also keineswegs so, dass große Handelsketten per se Verhandlungsmacht gegenüber kleineren Herstellern haben.

Im Zuge der öffentlichen Diskussion über Nachfragemacht werden derzeit diverse Vorschläge zur Reglementierung der Verhandlungen zwischen Handel und Herstellern gemacht, um so die Ausübung von Nachfragemacht zu begrenzen. Diese Vorschläge sind aus unserer Sicht eher kontraproduktiv und können sogar wettbewerbsdämpfend und kartellfördernd wirken. Ohne sichere empirische Belege über negative Auswirkungen von Nachfragemacht sollten potenzielle Maßnahmen mit großer Vorsicht gesehen werden. Gerade hier ist eine evidenzbasierte Wettbewerbspolitik notwendig, die auf quantitativen Analysen basiert, um nicht aufgrund mangelnder Information wenig adäquate Maßnahmen umzusetzen.

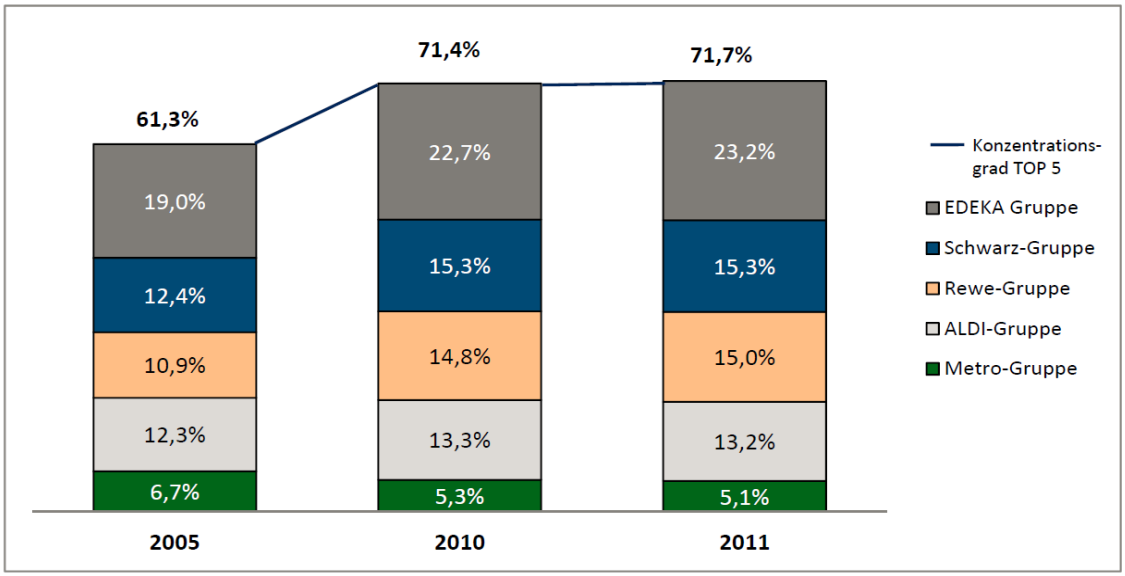
Das auch im Zuge der 8. GWB-Novelle erneut verlängerte Verbot des Verkaufs unter

Einstandspreisen ist sehr kritisch zu beurteilen, da es den Wettbewerb einschränkt und sowohl Herstellern als auch Verbrauchern eher schadet als nützt. Bei vertikalen Preisbindungen sollte tendenziell stärker eine Einzelfallbetrachtung vorgenommen werden als diese per se zu untersagen. Im Lebensmitteleinzelhandel speziell ist allerdings eher davon auszugehen, dass es keine gewichtigen Effizienzgründe für Mindestpreisvorgaben gibt, während Höchstpreisregelungen ökonomisch betrachtet unproblematisch sind.

2.7 Appendix

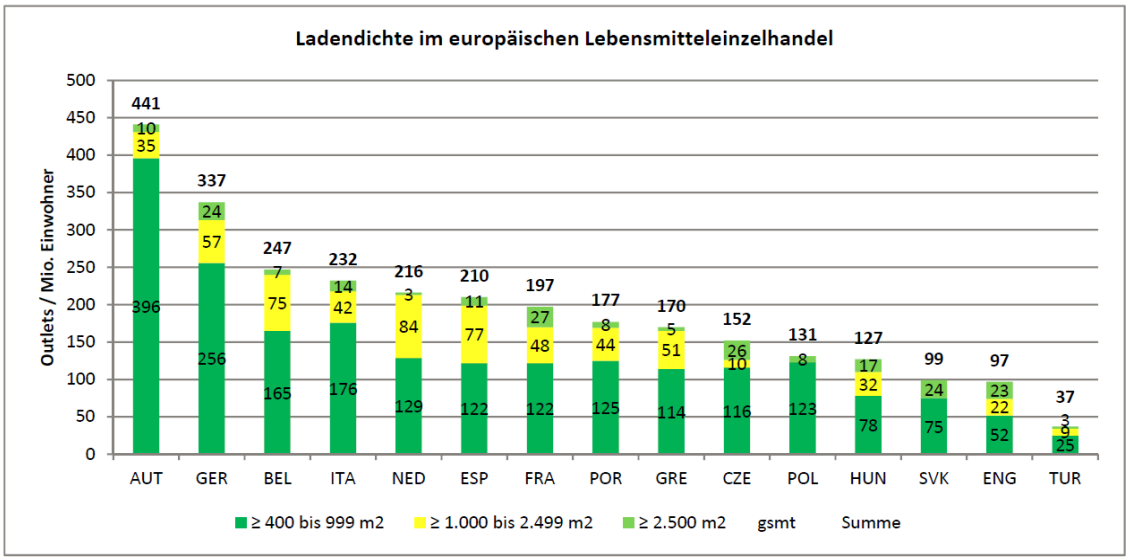
2.7.1 Figures

Figure 2.1: Entwicklung der Konzentration im Lebensmitteleinzelhandel



Quelle: TradeDimensions.

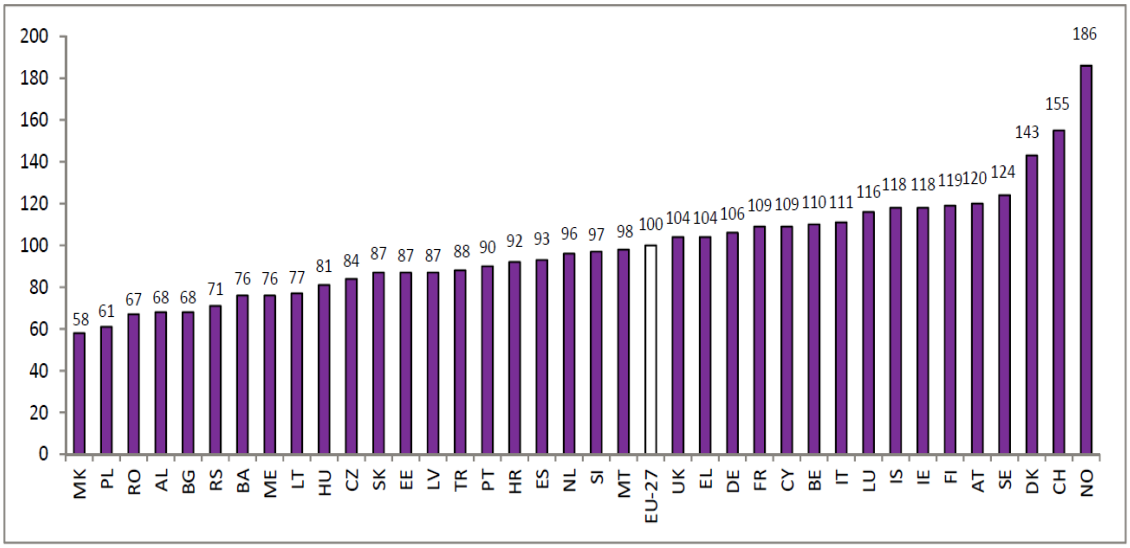
Figure 2.2: Ladendichte im europäischen Einzelhandel



Quelle: Monopolkommission (2012, Tz. 1047, Abb. V.7).

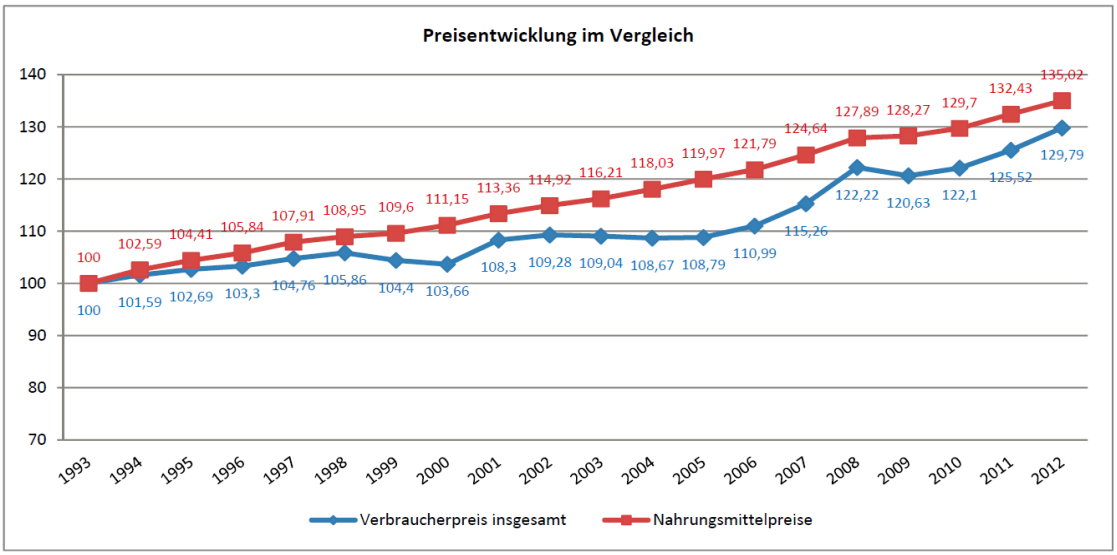
2.7.2 Tables

Figure 2.3: Lebensmittelpreisindizes in Europa 2012



Quelle: Eurostat.

Figure 2.4: Preisentwicklung im Vergleich



Eigene Darstellung, Datenquelle: Statistisches Bundesamt.

Table 2.1: Verfahren durch nationale Wettbewerbsbehrden von 2004 bis 2011

Land	Fallzahl	Land	Fallzahl
Belgien	4	Niederlande	5
Bulgarien	6	Norwegen	3
Dnemark	4	sterreich	4
Deutschland	14	Polen	4
Estland	3	Portugal	13
Finnland	4	Rumnien	10
Frankreich	12	Schweden	2
Griechenland	18	Slowakei	4
Grobritannien	1	Slowenien	2
Irland	2	Spanien	18
Italien	4	Tschechische Republik	9
Lettland	10	Ungarn	11
Litauen	2	Zypern	4
Malta	3	EU-Kommission	6
Summe		182	

Table 2.2: Elastizitäten

Zeitraum 2005/2006			
	Elastizitäten je	Mittelwert	Standardabweichung
Eigenpreiselastizität	Herstellermarke (HM)	-9.138	0.103
	Eigenmarke (EM)	-9.871	0.431
	SB-Warenhaus	-9.121	0.112
	Discounter (DC)	-8.997	0.4
	Drogerie	-8.931	0.352
	Vollsortimenter	-9.271	0.162
Kreuzpreiselastizität	Herstellermarke (HM)	0.212	0.017
	Eigenmarke (EM)	0.224	0.013
	SB-Warenhaus	0.215	0.019
	Discounter (DC)	0.222	0.013
	Drogerie	0.215	0.014
	Vollsortimenter	0.201	0.019
Mittelwertsdifferenz	Eigen.Elast EM vs. HM	$Prob(\Delta \neq 0)$	0.005
	Eigen.Elast DC vs. Andere	$Prob(\Delta \neq 0)$	0.605
	Kreuz.Elast EM vs. HM	$Prob(\Delta \neq 0)$	0.033
	Kreuz.Elast DC vs. Andere	$Prob(\Delta \neq 0)$	0.169

Table 2.3: SSNIP-Test: Kritische Verlustanalyse 2005/2006

Marke	EM	Retailformate	Marktanteil	Marge	Agg.Kreuz.Elast	KVL 1%	KVL 5%	KVL 10%
1	0	Diverse	0.42	0.15	.	0.43	1.71	2.72
2	1	Drogerie	0.02	0.12	0.18			
3	1	Discounter	0.07	0.14	0.35			
4	1	Discounter	0.01	0.12	0.52			
5	1	Drogerie	0.06	0.14	0.68			
6	1	Discounter	0.06	0.15	0.85			
7	1	Discounter	0.01	0.12	1.02			
8	1	SBW-Warenhaus	0.01	0.14	1.18			
9	1	Vollsortimenter	0.01	0.13	1.35			
10	1	SBW-Warenhaus	0.03	0.14	1.51			
11	1	Drogerie	0.03	0.14	1.67			
12	1	Drogerie	0.17	0.15	1.83			
13	1	Discounter	0.01	0.13	1.99			
14	1	Vollsortimenter	0.01	0.14	2.15			
15	0	Diverse	0.02	0.14	2.3			
16	1	Discounter	0.02	0.15	2.45			
17	1	Discounter	0.07	0.15	2.6			

Chapter 3

Die Bestimmung von Nachfragemacht im Lebensmitteleinzelhandel: Theoretische Grundlagen und empirischer Nachweis

Co-authored with Justus Haucap, Ulrich Heimeshoff, Gordon J. Klein and Christian Wey

3.1 Einleitung

Der Nachweis von Nachfragemacht gewinnt in der praktischen Wettbewerbsanalyse ein zunehmendes Gewicht. Das gilt insbesondere für den Einzelhandel, der sich durch eine zunehmende Konzentration auszeichnet. So hat die Rolle von Nachfragemacht sowohl bei der Übernahme von PLUS durch EDEKA als auch bei der Entscheidung des Bundeskartellamtes zum Fusionsfall EDEKA/Trinkgut eine kritische Rolle gespielt. (Bundeskartellamt 2008, Bundeskartellamt 2010a) Im ersten Fall wurde eine Beschaffungskooperation untersagt, und im zweiten Fall erfolgten Fusionsauflagen, wobei eine erhebliche Anzahl von Getränkefachmärkten verkauft werden musste. Diese Fälle sind nicht nur aus deutscher Sicht interessant, denn sie stehen exemplarisch für die zunehmend kritische Einschätzung von Nachfragemacht, welche auch in Entscheidungen von Wettbewerbsbehörden im Ausland zum Ausdruck kommt (Competition Commission 2000, Competition Commission 2008). Auch in der aktuellen Sektoruntersuchung des Bundeskartellamtes spielt die Analyse der Nachfragemacht eine bedeutende Rolle.

Ökonomische Theorie und Empirie zur Nachfragemacht zeigen, dass Nachfragemacht positive sowie negative Wettbewerbseffekte haben kann. Unter Ökonomen herrscht weitgehend Einigkeit darüber, dass Nachfragemacht nicht einfach als Spiegelbild von Monopolmacht auf Absatzmärkten zu sehen ist. Zum einen sind die Vertrags- und Leistungsbeziehungen zwischen Handel und Herstellern erheblich komplexer als auf Endkundenmärkten. Zum anderen ist Nachfragemacht im Gegensatz zur Angebotsmacht nicht ausschließlich nachteilig für den Verbraucher, weil erstere über geringere Einkaufspreise auch zu niedrigeren Endkundenpreisen führen können.

In der Praxis wird Nachfragemachtmacht bislang oft recht einfach mit der Größe eines Unternehmens in Verbindung gebracht. Unterstellt wird, dass Größe ursächlich für Nachfragemacht ist. Theoretische Überlegungen zeigen allerdings, dass der Zusammenhang zwischen Größe und Nachfragemacht keineswegs eindeutig ist (Inderst & Wey 2007). Auch kleinere Händler können über eine relativ große Verhandlungsmacht verfügen, wenn die Verbraucher in ihrem Absatzgebiet keine attraktiven, alternativen Einkaufsmöglichkeiten besitzen. Umgekehrt kann der Fall eintreten, dass ein relativ umsatzstarker Händler nur über eine sehr eingeschränkte Verhandlungsmacht verfügt, wenn die Lieferanten die Möglichkeit haben, die betreffenden Absatzgebiete auch über andere Händler zu versorgen. Daraus folgt, dass für das Verständnis von Nachfragemacht *zwei* Märkte, der Beschaffungsmarkt und der Ab-

satzmarkt, sowie deren Interdependenzen richtig verstanden werden müssen.[1] Erst dann können die *Wirkungen* von Nachfragemacht auf Endverbraucher richtig abgeschätzt werden.

In der wettbewerbspolitischen Praxis werden der Wasserbetteffekt und der Spiraleffekt oft als die „gefährlichsten" Auswirkungen von Nachfragemacht identifiziert, die letztlich die Verbraucher schädigen (siehe z.B. Bundeskartellamt 2010a). Insbesondere führt die Vermutung eines Spiraleffektes in der Fusionskontrolle zu einer „präventiven" Entscheidungspraxis, sodass schon relativ kleine Fusionen zwischen Händlern untersagt bzw. mit Auflagen versehen werden (siehe z.B. Bundeskartellamt 2010a). Um präventive Maßnahmen dieser Art zu rechtfertigen, sollte die Verhandlungsmacht der beteiligten Akteure möglichst genau und robust bestimmt werden. Dies ist jedoch keineswegs trivial, weil die Vertragsbeziehungen komplex sind und von Außenstehenden meist nicht eingesehen werden können.[2]

Am Beispiel des Lebensmitteleinzelhandels zeigen wir in diesem Beitrag, wie Nachfragemacht identifiziert und ihre Wirkungen untersucht werden können. Der Fokus liegt dabei auf dem deutschen Markt, ohne jedoch internationale Erfahrungen und Evidenz außer Acht zu lassen. Ziel ist es, Möglichkeiten zur Bestimmung von Verhandlungsmacht zwischen Händlern und Herstellern darzustellen und mit der praktischen Vorgehensweise von Wettbewerbsbehörden zu vergleichen. Dabei soll aufgezeigt werden, wo Probleme bestehen, welche Methoden angepasst werden können und in welchen Bereichen weiterer Forschungsbedarf besteht.

Im Folgenden charakterisieren wir zunächst ein allgemeines Modell zur Beschreibung eines Verhandlungsproblems, das der begrifflichen Präzisierung und Beschreibung des Analyserahmens dienen soll. Danach werden die Erfahrungen in der Bestimmung von Verhandlungsmacht durch Wettbewerbsbehörden im nationalen und internationalen Kontext sowie der aktuelle Stand der empirischen Forschung dargestellt. Der Beitrag schließt mit einem Fazit und einer Bewertung der genutzten Methoden.

[1] Für den Fall von Verbundgruppen sind noch zusätzlich selbstständige Einzelhändler und (genossenschaftliche) Einkaufsgemeinschaften zu unterscheiden.

[2] Eine Wettbewerbsbehörde hat oft bessere Möglichkeiten als der außenstehende Forscher, die genauen Vertragskonstellationen zu ermitteln.

3.2 Nachfragemacht aus wettbewerbsökonomischer Sicht

Um den Begriff der Nachfragemacht ökonomisch bestimmen zu können, ist es zunächst notwendig, Verhandlungsmacht angebots- sowie nachfrageseitig zu definieren. Angebotsseitige Macht ergibt sich aus der Möglichkeit eines Anbieters, Menge und Preis auf einem Absatzmarkt beeinflussen zu können. Der Extremfall angebotsseitiger Verhandlungsmacht ist der Monopolfall, bei dem nur ein einziger Anbieter auf dem relevanten Markt vorhanden ist. Das Ausmaß der monopolistischen Preissetzungsmacht hängt von der Preiselastizität der Nachfrage ab. Wenn es keine attraktiven Alternativen aus Verbrauchersicht gibt, resultieren eine überwiegend unelastische Nachfrage und damit ein erheblicher Preissetzungsspielraum. Diese Überlegungen zum Angebotsmonopol sind traditionell analog auf Beschaffungsmaärkte und das Nachfrageverhalten von Abnehmern übertragen worden (vgl. z.B. Varian 2011). Dieser sogenannten Spiegelbildtheorie in Form des Monopsons (Nachfrage-Monopol) folgend wird unterstellt, dass ein Monoposonist seine Nachfrage drosselt, um so den Einkaufspreis zu drücken.
Die Nachfrage (im Fall des Monopols) und das Angebot (im Fall des Monopsons) werden in diesen einfachen Modellen jeweils als atomistisch angenommen. Der Markttausch bleibt anonym und Transaktionen werden stets zu einheitlichen Marktpreisen abgewickelt, welche die Marktgegenseite als Datum akzeptiert. Betrachten wir jedoch die tatsächlichen Geschäftsbeziehungen zwischen Lieferanten und Händlern auf den meisten Märkten, so haben wir es meist mit *bilateralen Verhandlungsproblemen* zu tun, bei denen beide Parteien eine gewisse Verhandlungsmacht innehaben.
Ökonomische Verhandlungsmodelle können zwei zentrale Schwächen von Monopol- und Monopsonmodellen überwinden: Zum einen berücksichtigen sie, dass es auf Verhandlungsmärkten zu Preisunterschieden kommen kann (unterschiedliche Händler zahlen unterschiedliche Einstandspreise für das gleiche Produkt). Zum anderen erlauben sie die Modellierung komplexer Vertragswerke, die Effizienzverluste sowohl durch doppelte Margenbildung als auch durch Anreiz- und Koordinationsprobleme verringern helfen (Inderst & Wey 2007).[3].

[3]Eine doppelte Marge entsteht, wenn der Einkaufspreis (in EUR pro Mengeneinheit) eine Gewinnmarge enthält und der Händler auf dem Endkundenmarkt eine gewisse Marktmacht hat. Der Lieferant realisiert dann einen Gewinn mit einem Listenpreis, der über seinen Kosten liegt (erste Marge), während der Händler einen Gewinn macht, indem er den Endkundenpreis über den Listenpreis hebt (zweite Marge). Rein theoretisch kann das Problem durch komplexere Verträge

Das Grundmodell der modernen Verhandlungstheorie ist die Nash-Verhandlungslösung.[4] Um die Nash-Verhandlungslösung bestimmen zu können, müssen zunächst die möglichen Gewinne für den Fall einer Einigung bestimmt werden. Hierbei unterstellt das Modell, dass die Parteien ein Vertragswerk aufsetzen, das unabhängig von der Gewinn*aufteilung* den gemeinsamen Gewinn entlang der gesamten Wertschöpfungskette als Ganzes maximiert. Um sodann die Aufteilung dieses gesamten Gewinns bestimmen zu können, werden die jeweiligen Gewinne der Parteien bestimmt, die diese realisieren würden, wenn keine Einigung zustande kommt. Dies sind die sogenannten Drohpunkte der Parteien (auch Abbruchoptionen). Der Drohpunkt einer Partei verbessert sich, je leichter sie die jeweils andere Partei durch einen alternativen Vertragspartner austauschen kann. Darüber hinaus wird in dem Modell eine exogene Verhandlungsmacht unterstellt, die individuelle Verhandlungsfähigkeiten der Parteien widerspiegelt und die ebenfalls die Aufteilung der Tauschrenten beeinflusst. Mit Transferzahlungen (auch in Form von Regalmieten) kann nun der gemeinsame Gewinn beliebig ohne Effizienzverluste (etwa in Form der doppelten Margenbildung) aufgeteilt werden. Die beiden Parteien erhalten dabei einen umso größeren Anteil am gemeinsamen Gewinn, je besser der eigene Drohpunkt und je größer die eigene Verhandlungsmacht ist.

Die Ursachen für die Verhandlungsmacht von Händlern und Herstellern ergeben sich hier immer aus den Verhandlungsalternativen.[5] Zentral ist stets die Überlegung, wie sich der jeweilige Gewinn bei Scheitern einer Verhandlung (den Drohpunkt) entwickelt. Eine gewisse „Unverzichtbarkeit“ des einzelnen Händlers ergibt sich dabei dadurch, dass Endkunden nicht beliebig zwischen verschiedenen Verkaufsstellen des Handels wechseln. Dies generiert letztlich die Nachfragemacht. Im Extremfall hat der Händler eine perfekte Türsteher-Rolle inne („gatekeeper“), sodass ein lokales Absatzgebiet nur über einen einzigen Händler beliefert werden kann. Selbst ein relativ kleiner Händler kann daher lokale Marktmacht auf dem Absatzmarkt haben, welche nicht unbedingt mit der Gesamtgröße eines Händlers verbunden sein muss. Händler, die über lokale Absatzmarktmacht verfügen, können durch Regalflächenverknappung (auch durch Eigenmarkeneinsatz) den Wettbewerb zwischen den Liefe-

überwunden werden. Hierzu zählen zweiteilige Tarife, Regalmieten oder die Preisbindung der zweiten Hand (siehe Bester 2011)

[4]Lehrbuchdarstellungen der Nash-Verhandlungslösung finden sich in Eichberger (1993) und Muthoo (2004).

[5]Für detaillierte Überblicke vgl. Inderst & Mazzarotto (2008) und Inderst & Wey (2007). Eine grundsätzliche Systematisierung anhand der einschlägigen Literatur wird in dem Bericht der OECD vorgenommen (OECD 2009).

ranten nochmals verstärken. Der Wettbewerb um die knappen Regalflächen gleicht dann einer Auktion, wobei der Hersteller mit dem höchsten Gebot zum Zuge kommt, was einer Erhöhung der Nachfragemacht und zusätzlichem Gewinn aus Regalmieten entspricht.[6]

Zugleich gibt es aber auch gute Gründe anzunehmen, dass die absolute Größe von Händlern zu einer gewissen Nachfragemacht führt. Mit zunehmender Größe kann für einen Händler ein Herstellerwechsel oder die Produktion in Eigenregie lohnender werden. Ursächlich hierfür sind Fixkosten des Anbieterwechsels, Größenvorteile und auch die reine Finanzkraft (vgl. Katz 1987). Durch die Möglichkeit zur Produktion von Eigenmarken verbessert sich die Verhandlungsposition der Händler, da Handelsmarken im Substitutionswettbewerb mit Herstellermarken stehen. Ein Scheitern der Verhandlung mit einem Markenanbieter kann durch zusätzliche Umsätze mit Eigenmarken besser aufgefangen werden. Die Erweiterung des Sortiments um Eigenmarken verringert zudem die freie Regalfläche, was wiederum den Wettbewerb der Markenhersteller um die verbleibenden Regalplätze intensiviert und somit Nachfragemacht stärkt.

Handelsmarken stärken auch die Fähigkeit des Handels, innovative Produkte einzuführen. Das Wissen um Herstellungsprozesse erhöht zudem die die Fähigkeit, fremdes Wissen (etwa über neue Produkte) im eigenen Produktionsprozess einzusetzen (vgl. Cohen & Levinthal 1990). Es ist daher zu vermuten, dass Eigenmarken die Verhandlungsmacht des Handels stärken, wobei Innovations- und Vorreitervorteile der Herstellermarken aufgrund effektiver absorbierender Kapazitäten schnell ausgeglichen werden können.[7]

Die reine Händlergröße kann auch Nachfragemacht begründen, wenn die Produktionskosten des Lieferanten mit zunehmender Produktionsmenge steigen (z.B. aufgrund von begrenzten Produktionskapazitäten). Bei steigenden Grenzkosten werden

[6] Ein Händler, der bereits über eine gewisse Nachfragemacht verfügt, kann einen noch höheren Gewinn realisieren, wenn er die Regalfläche künstlich verknappt, um so die Lieferanten in einen noch intensiveren Wettbewerb zu treiben. Im Ergebnis kommt es dann zum Ausschluss von Lieferanten („Single-Sourcing“), so dass die Produktvielfalt erheblichen Schaden nimmt (siehe Inderst & Shaffer 2007).

[7] Es ist allerdings verfehlt, Eigenmarken alleine aus Verhandlungssicht zu interpretieren. Sie spiegeln vielmehr zusammen mit logistischen, organisatorischen und technischen Neuerungen (wie den Einsatz von Scannerkassen und der hiermit verbundenen Datenauswertung) eindrucksvoll die Innovationskraft des Handels wider, der damit zu einem wichtigen Treiber des gesamtwirtschaftlichen Produktivitätsfortschritts geworden ist. Siehe Van Ark et al. (2008) zur Bedeutung des Handels als Produktivitätstreiber und Beck et al. (2011) zur Diffusion von Scannerkassen im Handel.

kleinere Händler „marginalisiert“, sie müssen die Hersteller dann für die hohen Kosten der „letzten“ Produktionseinheiten kompensieren. Große Händler erhalten hingegen Rabatte, weil die Durchschnittskosten für ihre Abnahmemengen kleiner sind. Dieses Argument ist allerdings zweischneidig, weil eine zu große Abhängigkeit der Lieferanten von den Händlern dazu führen kann, dass große Händler für die Hersteller „pivotal“ werden (vgl. Raskovich 2003). In diesem Fall können Lieferanten ohne die großen Händler nicht mehr profitabel agieren, sodass große Händler die Hersteller für ihre fixen Produktionskosten kompensieren müssen, während die kleineren Händler hierzu keinen oder nur einen begrenzten Beitrag leisten. Die Größe der Nachfrager als Determinante von Nachfragemacht ist also nicht eindeutig, wobei der Zusammenhang zwischen Größe und Macht auch nicht-monoton sein kann. Folglich wird in Inderst & Wey (2007) darauf hingewiesen, dass aus theoretischen Überlegungen keine eindeutigen Schwellenwerte für Umsatzberechnungen und Anteilsberechnungen ableitbar sind.

3.3 Nachfragemacht in der praktischen Wettbewerbsanalyse

Dass die Analyse der Nachfragemacht eine wachsende Aufmerksamkeit erfährt, spiegelt sich zum einen in aktuellen Wettbewerbsanalysen[8] wider und zum anderen in der neueren Fallpraxis.[9][10] Im Folgenden werden zuerst einige Sektoruntersuchungen und anschließend die relevante Fallpraxis betrachtet.[11]

3.3.1 Die Bestimmung von Nachfragemacht in Sektoruntersuchungen

Die bislang wichtigste und ausführlichste Sektoruntersuchung im Lebensmitteleinzelhandel ist die der britischen Competition Commission aus dem Jahr 2008 (Competition

[8] Siehe z.B. Competition Commission (2000) und Competition Commission (2008)

[9] Siehe z.B. Bundeskartellamt (2008) und Bundeskartellamt (2010a).

[10] Siehe auch die Fallanalyse in der Zusammenfassung der Roundtable Discussion der OECD (OECD 2009).

[11] Wir gehen hier nicht weiter auf ältere sektorübergreifende Studien ein, die den Einfluss von Käuferkonzentration und Herstellergewinnen untersucht haben. An dieser Stelle sei nur auf Lustgarten (1975), Martin (1983) und Schumacher (1991) verwiesen, die alle tendenziell niedrigere Preis-Kosten-Margen der Produzenten in der Gegenwart einer konzentrierteren Nachfrage festgestellt haben.

Commission 2008). Um Nachfragemacht zu bestimmen, wurden Größenvergleiche angestellt und Preise bzw. Margen von Händlern und Herstellern verglichen. Des Weiteren wurde ein Vergleich von Endkunden- und Grohandelspreisen angestellt, um den Anteil des Handels an den Gesamtgewinnen in der Wertschöpfungskette zu messen.

Die Größenvergleiche sind relativ eindeutig. Die Umsätze der meisten Hersteller sind relativ klein im Vergleich zu den Umsätzen der vier größten britischen Händler. Die Preis- und Margenvergleiche ergaben zudem, dass gerade für große Bestellmengen erhebliche Nachlässe gewährt werden, und zwar insbesondere für Produkte, die nicht als Premiummarken klassifiziert werden. Zudem wurden für die größten Händler im Durchschnitt höhere Preisnachlässe gewährt als für andere Händler.

Die Preiseffekte wurden anhand von ökonometrischen Schätzungen ermittelt. Produktpreise wurden über einen mehrjährigen Zeitraum erhoben und mit Bestellmengen korreliert. Zur Analyse der Daten, die in Panelstruktur[12] vorliegen, wurde ein sog. „Fixed-Effects"- Ansatz genutzt. Dieser Ansatz eignet sich für heterogene Datenstrukturen und kann nicht-beobachtbare Einflussgrößen, wie z.B. die subjektive Qualität eines Produktes, berücksichtigen, solange der Einfluss dieser Faktoren im Zeitverlauf nicht variiert. In der Analyse wird angenommen, dass solche fixen Effekte für jedes Produkt vorhanden sind. Damit wird die Gefahr reduziert, dass der Einfluss des Preises auf die gekauften Mengen durch nicht beobachtbare Heterogenität verzerrt wird. Mit anderen Worten wird die Unterschiedlichkeit der Händler, z.B. hinsichtlich ihrer Effizienz, explizit berücksichtigt. Die britische Sektoruntersuchung kam dabei zu dem Schluss, dass Händlergröße den Einkaufspreis zwar generell beeinflusst, dies aber nicht bei markenstarken Produkten zutrifft.

Das geschilderte Vorgehen ist ein guter Ansatz für die quantitative Bestimmung von Nachfragemacht. Die Analyse geht über einen rein deskriptiven Vergleich von Preisen oder Markteinteilen hinaus und versucht, Einflüsse der Größe von Händlern systematisch zu erfassen. Jedoch weist die Methodik auch Defizite auf. Zum einen bleibt die ultimative Ursache für niedrigere Einstandspreise letztlich unerklärt, da die Größe eines Händlers selbst langfristig wieder von seinen Einstandspreisen beeinflusst werden kann. Zum anderen erfassen fixe Effekte zwar nicht-beobachtbare Einflüsse, die über die Zeit konstant sind. Jedoch versagt die Methode, sobald systematische Einflüsse im Zeitverlauf variieren. Das ist im Lebensmitteleinzelhandel

[12]Daten in Form von sog. Panels liegen dann vor, wenn verschiedene Beobachtungseinheiten (z.B. Preise, Packungsgrößen, etc.) über mehrere Beobachtungszeitpunkte erfasst werden.

durchaus ein Problem, da dieser ständigen strukturellen Veränderungen ausgesetzt ist. So können technologischer Fortschritt, Markteintritte und -austritte, aber auch Gesetzesänderungen im Baurecht, Planungsrecht und den Vorschriften zur Lebensmittelsicherheit Einflüsse haben, die über fixe Effekte nicht erfasst werden. Zur Lösung wird in der ökonometrischen Literatur der Einsatz sog. Instrumentvariablen vorgeschlagen.[13] Jedoch ist es grundsätzlich schwierig, geeignete Instrumente zu finden, und die Verwendung von falschen oder schwachen Instrumentvariablen kann zu hohen Messfehlern führen.

In einem nächsten Schritt der britischen Untersuchung wurden Informationen aus Unternehmensbefragungen genutzt und die Gewinnentwicklung von Herstellern und Händlern verglichen. Die Herstellergewinne entwickeln sich über die Zeit schlechter als die der Händler, was als Indikator für eine zunehmende Verhandlungsmacht der Händler gewertet wird. Allerdings ist die Aussagekraft einer solchen deskriptiven Analyse eingeschränkt, da andere mögliche Ursachen für die unterschiedliche Gewinnentwicklung nicht berücksichtigt werden.

Die Competition Commission ist in ihrer Untersuchung zu dem Ergebnis gekommen, dass eine Reihe von Indizien allgemein für Nachfragemacht des Handels gegenüber Herstellern spricht, dies jedoch keineswegs für alle Produkte und Hersteller gilt (Competition Commission 2000). Einige markenstarke Hersteller weisen sogar eine ausgeprägte Verhandlungsmacht auf, sodass Nachfragemacht dann als Gegenmacht interpretiert werden kann.

Neben der Sektoruntersuchung der britischen Competition Commission hat es Untersuchungen in Australien (Australian Competition and Consumer Commission 2008), Portugal (Rodrigues 2006), Polen, Lettland, Österreich und Schweden gegeben. Darüber hinaus laufen aktuell Untersuchungen in Deutschland und Italien. In Deutschland hat die Monopolkommission in ihrem 19. Hauptgutachten das Fehlen empirischer Evidenz bemängelt. (Monopolkommission 2012). Dies ist dadurch bedingt, dass für Untersuchungen oftmals detaillierte Daten nötig sind, die nur für Wettbewerbsbehörden verfügbar sind. Der Monopolkommission zufolge gibt es zwar

[13]Instrumentvariablen kommen in Regressionsanalysen dann zum Einsatz, wenn eine erklärende Variable mit einer unbeobachtbaren Variable im sog. Störterm einer Regression korreliert ist. Da ein Störterm nur unsystematische Einflüsse enthalten sollte, kann es zu verzerrten Ergebnissen kommen. Wenn z.B. Qualitätsunterschiede nicht gemessen werden können, so ist dies im Störterm enthalten und mit dem Preis korreliert. Gute Instrumentvariablen für den Preis sind beispielsweise Angebotsschocks, da sie in engem Zusammenhang mit dem Preis stehen, und unkorreliert mit dem Störterm sind.

Indizien für Nachfragemacht, aber keinen belastbaren Beleg für einen verbraucherseitigen Schaden.

3.3.2 Die Betrachtung von Nachfragemacht in Kartellrechtsfällen

Die OECD hat einige wichtige Wettbewerbsfälle beschrieben, in denen Nachfragemacht eine kritische Rolle gespielt hat (OECD 2009). So hat im Zusammenschlussverfahren REWE/Meinl die Firma REWE nur eine kleinere Anzahl von Meinl-Märkten als ursprünglich geplant übernommen, da ansonsten eine marktbeherrschende Stellung auf bestimmten Beschaffungsmärkten für Waren des täglichen Bedarfs in Österreich entstanden wäre (European Commission 1999). Die der Genehmigung zugrundeliegenden Auflagen zielten darauf ab, eine Verstärkung der Nachfragemacht zu begrenzen. Die Bestimmung von Nachfragemacht erfolgte hierbei zum einen qualitativ über die Analyse der Abbruchoption, also der Alternativen zu den fusionierenden Unternehmen aus Sicht der Hersteller, und zum anderen durch eine quantitative Abschätzung der Abhängigkeiten durch Marktanteilsberechnungen. Hierbei wurde ein Marktanteil von 22% auf den Beschaffungsm/ärkten als kritische Schwelle definiert, die Nachfragemacht indiziert.[14]
Im Rahmen der von der Europäischen Kommission genehmigten Fusion der Papierhersteller Enso und Stora spielte Nachfragemacht ebenfalls eine wichtige Rolle (European Commission 1998). Durch die Fusion ist der größte Papierhersteller der Welt entstanden. Die Effekte der Fusion wurden aus Sicht der Europäischen Kommission durch die Nachfragemacht der Hersteller von Verpackungsmaterialien gemildert, welche Vorprodukte bei Enso und Stora erwerben. Enso musste zudem die Beteiligung an einem Verpackungsmittelhersteller aufgeben, um die Nachfragemacht der Hersteller von Verpackungsmaterialien gegenüber dem fusionierten Papierhersteller weiter zu stärken (European Commission 1998, OECD 2009). Im Gegensatz zum REWE/Meinl-Fall galt Nachfragemacht hier in Form von Gegenmacht als wettbewerbsfördernd.

Die Analyse von Nachfragemacht nimmt somit in der internationalen Fallpraxis eine wichtige Rolle ein und kann prinzipiell sowohl wettbewerbsfördernde als

[14]Vgl. auch die Entscheidung der Europäischen Kommission (European Commission 2000) hinsichtlich der Fusion Carrefour/Promodès, in der auch die 22% Schwelle verwendet wurde (Dobson 2005).

auch wettbewerbsmindernde Wirkungen entfalten. Auch in der deutschen Fallpraxis spiegelt sich dies wider. So wurde die Nachfragemacht des Handels im Zusammenschluss von Bonduelle Frais Investissements S.A. mit mehreren deutschen Firmen als wettbewerbsfördernd im Sinne einer Gegenmacht zur fusionierenden Herstellerseite gewürdigt (Bundeskartellamt 2003a). Die händlerseitige Gegenmacht wurde in diesem Fall auf den Anstieg des Eigenmarkenanteils im Handel zurückgeführt. Ähnlich wurde im Fall Herba Germany GmbH argumentiert, in dem die Volatilität des Handelsmarkengeschäfts und die geringe Differenzierungsmöglichkeit betont wurden (Bundeskartellamt 2003b). Auch im Fall des Fusionsvorhabens der Agrana Zucker und Stärke AG mit mehreren Herstellern, darunter u.a. Zentis, wurde per se von handelsseitiger Nachfragemacht ausgegangen, der Zusammenschluss jedoch letztlich untersagt, da das Bundeskartellamt trotz Nachfragemacht des Handels eine marktbeherrschende Stellung der beteiligten Hersteller ausgemacht hat (Bundeskartellamt 2004).

Die oben genannten Fälle gehen von der Vermutung der Nachfragemacht aus, nehmen jedoch keine detaillierte Analyse vor. Eine solche gab es jedoch im Zusammenschlussverfahren EDEKA/Tengelmann (Bundeskartellamt 2008). Ähnlich, aber nicht so detailliiert, wurde bereits im Zusammenschlussverfahren EDEKA/SPAR argumentiert (Bundeskartellamt 2005). Zentral war die Bestimmung der Ausweichmöglichkeiten von Händlern und Herstellern bei Scheitern der Verhandlung. In einem qualitativen Ansatz wurden zunächst - in der Sprache des oben beschriebenen Verhandlungsmodells - die Drohpunkte beider Parteien bestimmt, also der Ertrag bei Scheitern der Verhandlung. Die Analyse betrachtete unterschiedliche Produktkategorien und unterschied dabei explizit zwischen Eigenmarken- und Herstellermarken. Zentrales Instrument der quantitativen Auswertung war der Vergleich von Marktanteilen, wobei verschiedene relative Größenvergleiche vorgenommen wurden. Insbesondere wurden die Marktanteile der Händler in den jeweiligen Beschaffungsmärkten herangezogen und dabei explizit mögliche Differenzierungsmöglichkeiten beachtet, die sich in der Unterteilung der Analyse in Herstellermarken und Eigenmarken des Handels wiederfinden.

In seiner Bewertung erörterte das Bundeskartellamt mit Rückgriff auf die Struktur der Beschaffungsmärkte, inwiefern es für Getränkehersteller Möglichkeiten zu Ausweichreaktionen gibt. In der qualitativen Analyse der Fallentscheidung hat das Bundeskartellamt sehr weitgehend nach Substitutionsmöglichkeiten und Wettbewerbs-

konstellationen gesucht, welche die Abbruchoptionen verändern und somit Nachfragemacht beschränken oder fördern.

3.4 Verhandlungsmacht im Lebensmitteleinzelhandeln in der empirischen Wettbewerbsforschung

Die Bestimmung von Verhandlungs- und insbesondere Nachfragemacht wird in wettbewerbsbehördlichen Analysen in der Regel anhand von Schlüsselindikatoren ermittelt. So hat die oben beschriebene Analyse der Competition Commission zwar systematische Zusammenhänge zwischen Händlergröße und Einkaufskonditionen aufgedeckt (Competition Commission 2008). Es ließen sich jedoch keine expliziten Aussagen über die Stärke des Effekts treffen.[15] Die Analyse findet somit nur einen *Indikator* für Nachfragemacht, nicht aber die *Ursachen*. Insbesondere die in Abschnitt 3.1 besprochenen dynamischen Entwicklungen im Lebensmitteleinzelhandel, also technologische, regulatorische und marktstrukturelle Veränderungen, werden im „Fixed-Effects"-Ansatz nicht berücksichtigt. Durch das Auslassen solcher systematischer Einflüsse werden Ergebnisse verzerrt, und der Effekt der Größe auf die Nachfragemacht wird überschätzt.

Die empirische Analyse von Nachfragemacht ist auch Gegenstand jüngerer empirischer Arbeiten. Beckert (2011) etwa zeigt einen positiven Zusammenhang zwischen Transaktionsgröße und Preisnachlässen für die britische Ziegelindustrie für den Zeitraum von 2001 bis 2006. Heimeshoff & Klein (2013) nutzen ein quasi-natürliches „Experiment", in dem es zu einem Verhandlungsabbruch zwischen zwei lokalen Brauereien und einem deutschen Einzelhändler kam. Verglichen wurden Filialen des Einzelhändlers, die von dem Lieferstopp betroffen waren, mit solchen, die weiterhin beliefert wurden. Mit Hilfe eines sog. Differenzen-in-Differenzen Ansatzes[16] konn-

[15] Auch die Annahme eines einheitlichen Einkaufspreises ist problematisch, weil in der Praxis meist mehrteilige Tarifsysteme mit fixen Zahlungen vorliegen, die von den Parteien individuell ausgehandelt werden. Die Komplexität solcher Verträge spiegelt auch die Anreizprobleme wider, die in vertikalen Beziehungen allgegenwärtig sind.

[16] Der Differenzen-in-Differenzen Ansatz ist eine Methodik, die sich zur Analyse von quasi-natürlichen Experimenten eignet. Dazu werden zwei Differenzen gebildet, um die Wirkung des betrachteten Effekts zu schätzen. Die erste Differenz ergibt sich aus einem Vorher-Nachher-Vergleich (hier: vor und nach dem Vertragsabbruch). Die zweite Differenz bildet der Vergleich von sog. Treatment- und Kontrollgruppe (hier: vom Lieferstopp betroffene und nicht betroffene Filialen). Betrachtet wird also nicht nur die Entwicklung des Umsatzes in den vom Lieferstopp betroffenen

ten die durch den Lieferstopp verursachten Umsatzverluste im Biersegment und im Gesamtgeschäft untersucht werden. Für die vom Lieferabbruch betroffenen Filialen ergaben sich demnach verhältnismäßig große Umsatzverluste, die sich nicht nur auf das Biersegment beschränken, sondern darüber hinaus noch stärker den Gesamtumsatz der betroffenen Filialen schmälern. Diese zeigt, dass auch kleinere Lieferanten durch eine hohe Kundenbindung erhebliche Verhandlungsmacht aufweisen können, weil Kunden der betroffenen Filialen bei einem Lieferstopp nicht nur ihre Biereinkäufe, sondern den gesamten Einkauf in andere Geschäfte verlagert haben.[17]

Die erwähnten Analysen nutzen allesamt eine sogenannte *reduzierte* Form, lassen daher den funktionellen Verlauf der Einflussfaktoren offen, benötigen aber sehr detaillierte Daten, die für außenstehende Forscher meist nicht vorhanden sind und selbst für Wettbewerbsbehörden nur mit erheblichem Aufwand beschafft werden können.

Im Gegensatz zu den reduzierten Ansätzen fußen sogenannte strukturelle ökonometrische Modelle auf expliziten mikroökonomischen Modellzusammenhängen, die die Ableitung von Gleichgewichtsbedingungen für alle Marktakteure (d.h. für Händler und Hersteller sowie Konsumenten) erlauben. Mit den Ergebnissen einer Nachfrageschätzung kann das Wechselverhalten der Konsumenten untersucht werden. Aus dem Wechselverhalten wiederum ergeben sich die Wettbewerbsbeziehungen aller Produkte zueinander. Dies ist im Gegensatz zur Methode der (Competition Commission 2008) eine deutliche Weiterentwicklung, da nun nicht mehr nur Indikatoren für Verhandlungsmacht bestimmt werden, sondern Verhandlungsmacht auf erklärende Faktoren untersucht wird. Der Vorteil des strukturellen Ansatzes ergibt sich insbesondere für außenstehende Forscher, die nicht die konkrete Ausgestaltung der Vertragsbeziehungen beobachten können, jedoch Vertragsmodelle zwischen Herstellern und Händlern untersuchen möchten. Werden adäquate strukturelle Annahmen getroffen, so kann das Verhandlungsmodell alleine mit (beobachtbaren) Endkundendaten und Kostentreibern aufgestellt werden. Die Beschaffung der notwendigen Daten ist grundsätzlich zwar möglich, allerdings werden sie vor allem von Marktforschungsinstituten erhoben und sind somit nicht öffentlich zugänglich (z.B. GfK

Filialen, sondern die Unterschiede zwischen den Umsätzen in den vom Lieferstopp betroffenen Filialen im Vergleich zur Umsatzentwicklung in den vom Lieferstopp nicht betroffenen Filialen zur selben Zeit.

[17] Einen weiteren Ansatz zur Bestimmung von Verhandlungsmacht liefern Lloyd et al. (2009), die anhand von Zeitreihendaten untersuchen, ob die beobachteten Transmissionsprozesse zwischen Kostenveränderungen und Endkundenpreisänderungen mit Verhandlungsmacht konform sind.

Scannerdaten für ein Haushaltspanel).
Wegweisende Arbeiten auf diesem Gebiet sind von Meza & Sudhir (2010) und Draganska et al. (2010) erstellt worden. Draganska et al. (2010) spezifizieren zunächst ein Basismodell zur Bestimmung von Verhandlungsmacht, das sie dann für die Schätzung der exogenen Verhandlungsmacht im deutschen Kaffeemarkt nutzen. Die Nachfragefunktion wird mittels einer sog. „Discrete Choice"-Analyse [18] für verschiedene Händler-Hersteller Paare geschätzt und in ein Nash-Verhandlungsmodell eingebettet, wodurch eine Abschätzung der Abbruchoptionen der Verhandlungsparteien möglich wird. Mit zusätzlichen Daten über die Rohkaffeepreise (als wichtigsten Treiber der Produktionskosten) wird dann die Verhandlungsmacht geschätzt. Die Autoren schlussfolgern, dass die Verhandlungsmacht in der vertikalen Struktur unter dem Strich zwar ausgeglichen ist, dennoch erheblich zwischen Händler-Hersteller-Paaren variiert.[19]
Kritisch an den strukturellen Ansätzen bleibt die Frage nach der korrekten Modellspezifikation, auch wenn hier statistische Tests weiterhelfen, welche die jeweiligen Modellspezifikationen anhand adäquater statistischer Maße auf ihre Modellgüte testen.[20]

[18] „Discrete Choice"-Modelle eignen sich zur Untersuchung von Märkten mit heterogenen, sich ausschließenden Produkte. Darüber hinaus berücksichtigen sie, dass Konsumenten heterogene Präferenzen hinsichtlich der Produkteigenschaften haben. Die Modellierung einer zugrundeliegenden mikroökonomischen Nutzenfunktion erlaubt die genaue Interpretation von Konsumentenverhalten und die Simulation verschiedener „Was-wäre-wenn"- Situationen

[19] Weitere Beispiele zur Verwendung struktureller Methoden sind Meza & Sudhir (2010), die die Rolle von Eigenmarken als Ursache von Nachfragemacht betrachten, und Haucap, Klein, Heimeshoff, Rickert & Wey (2013), die den deutschen Kaffeemarkt unter Einbeziehung von Discountern und ihren Eigenmarken analysieren. (Bonnet & Dubois 2010b) nutzen ein Model, das die Verhandlung über eine fixe Gebühr mit einschließt, ohne aber explizit den Verhandlungsprozess einzuschließen und können im französischen Markt für Mineralwasser ein gewisses Maß an Nachfragemacht finden.

[20] Ein häufig verwendeter Test ist der Spezifikationstest von (Rivers & Vuong 2002) welcher auch für nichtlineare Spezifikationen geeignet ist (vgl. Kapitel 15 in Davidson & MacKinnon 2004) für eine ausführliche Diskussion.

3.5 Bewertung der wettbewerbsrechtlichen Praxis und Fazit

Für die Feststellung von Nachfragemacht im Lebensmitteleinzelhandel hat insbesondere die Sektoruntersuchung der Competition Commission (2008) Maßstäbe gesetzt, da sie im Unterschied zu früheren Untersuchungen quantitative Analysen durchgeführt hat. Diese Untersuchung liefert erste wichtige Erkenntnisse, auf denen weitere Arbeiten aufbauen können. Insbesondere die Analyse des Zusammenhangs von Endkundenpreisen und Einkaufskonditionen kann wichtige Hinweise auf nachfragemächtige Händler liefern. Diese Hinweise sind jedoch, wie aufgezeigt worden ist, keine Beweise für Nachfragemacht, sondern lediglich Indizien, deren Validität durch methodische Defizite nicht eindeutig ist.

Angesichts der europäischen Fallpraxis lässt sich einerseits feststellen, dass Nachfragemacht eine wichtige Entscheidungskomponente ist und einige Aspekte der ökonomischen Literatur bereits Einzug in die wettbewerbliche Praxis gefunden haben. Das betrifft nicht nur die Interdependenzen zwischen Absatz- und Beschaffungsmärkten in den Analysen der Europäischen Kommission, sondern auch die Abbruchpositionen bzw. Drohpunkte. So ist die Definition der Europäischen Kommissionen, dass der Ausfall eines Händler als Kunden für den Hersteller finanziell nicht zu verkraften sei, sobald er mehr als 22% des Umsatzes des Herstellers ausmache, ein Beispiel dafür, wie Abbruchoptionen in den Entscheidungen der Europäischen Kommission (European Commission 1999, European Commission 2000) bewertet werden. Andererseits hat die Verwendung einer anteiligen Kennzahl auch nur begrenzte Aussagekraft. Sie ist bestenfalls als Indikator für die Abhängigkeit eines Herstellers von einem Händler zu sehen (Inderst & Wey 2007) und nur *ein* Anhaltspunkt für die Verhandlungsmacht, da weitere Bestimmungsfaktoren, die Nachfragemacht begünstigen können, außer Acht gelasse werden.

Bei der Betrachtung der deutschen Fallpraxis zeigt sich, dass die Analysetiefe von Nachfragemacht stark von der Bedeutung des Falles abhängt. In den Analysen des Bundeskartellamts (z.B. in Bundeskartellamt 2010a) wird ebenfalls nach den Abbruchoptionen der Lieferanten gefragt, indem ermittelt wird, ob und inwiefern ein Händler als Verhandlungspartner ersetzt werden kann. Diese Vorgehensweise ist grundsätzlich geeignet, um Hinweise auf Verhandlungsmacht zu erlangen. Allerdings besteht die Gefahr, dass Verhandlungsmacht zu ungenau bestimmt wird. Darüber hinaus unterbleibt eine wirkungsbasierte Analyse, die den Endkundenmarkt mitein-

bezieht.

Die quantitative Analyse von Nachfragemacht beschränkt sich in der aktuellen Praxis aufabsolute und relative Größen- und Marktanteilsvergleiche auf dem Beschaffungsmarkt. Prinzipiell kann dieser Ansatz wichtige Indizien liefern, ob nennenswerte Nachfragemachtprobleme vorliegen, lässt aber keine konkrete Aussage über das Ausmaß der Nachfragemacht zu. Zudem ist eine Analyse ausschließlich von Beschaffungsmärkten problematisch, wenn nicht gleichzeitig die Wirkung auf Konsumenten untersucht wird.

Verbesserungspotenzial bei der Bestimmung potenzieller Nachfragemacht durch das Bundeskartellamt ergibt sich aus den jüngsten Erkenntnissen und Vorteilen struktureller Modelle, die ergänzend zur Analyse von Marktanteilen und Korrelationen hinzugezogen werden können. Eine zweckmäßige Bestimmung sollte in einem ersten Schritt analysieren, ob quantitative Indizien für unterschiedliche Ausprägungen der Verhandlungsmacht vorliegen. Für eine präzisere Analyse, die auch kausale Interpretationen[21] zulässt, ist eine empirische Strategie vonnöten, die die Probleme der simultanen Kausalität[22] und Endogenität berücksichtigt und korrigiert. Hierfür gibt es keine standardisierten Lösungen, weshalb eine fallspezifische Betrachtung wichtig ist.

Der Analyserahmen von Draganska et al. (2010) beispielsweise bietet eine Möglichkeit, das Nash-Verhandlungsmodell aus Abschnitt 2.1 empirisch zu schätzen und Verhandlungsmacht quantifizierbar zu machen. Darüber ermöglicht das Modell, den Einfluss verschiedener Faktoren (z.B. Größe) auf Nachfragemacht zu untersuchen und kausal interpretierbar zu machen.

Die Quantifizierung von Unterschieden in Verhandlungspositionen mit Hilfe von strukturellen Ansätzen, ist essentiell, da Nachfragemacht immer unter Berücksichtigung der Anwendbarkeit der Schadenstheorien betrachtet werden muss. Für eine etwaige Problemidentifikation muss also entweder ein „Spiraleffekt“ oder ein „Wasserbetteffekt“ als Schadenstheorie in Frage kommen. Damit es zu derartigen Effekten kommen kann, muss Nachfragemacht allerdings besonders stark und persistent auf

[21] Eine kausale Interpretation ist dann möglich, wenn sichergestellt ist, dass die Änderung einer Variablen eine eindeutige Änderung in einer anderen Variablen bewirkt. Der kombinierte Einsatz von strukturellen Modellen mit Instrument-variablen kann helfen, Effekte in einem kausalen Zusammenhang interpretierbar zu machen.

[22] Eine simultane Kausalität besteht dann, wenn zwei Variablen sich gegenseitig beeinflussen, d.h. X einen kausalen Einfluss auf Y und Y einen kausalen Einfluss auf X hat, wie das bei Preisen und Mengen der Fall sein kann.

einem Markt ausgeprägt sein.
Allerdings kann ein Händler in der Realität zugleich eine starke Verhandlungsposition gegenüber einem (oder mehreren) Hersteller(n) haben, während er gleichzeitig eine vergleichsweise schlechte Position gegenüber einem (oder mehreren) anderen Hersteller(n) hat. Wenn zusätzlich die Verhandlungsstärke unterschiedlich verteilt ist, ist ein „Spiral-“ oder „Wasserbetteffekt“ unwahrscheinlich. Diese Theorien kommen infolgedessen nicht als Schadenstheorien in Frage.
Darüber hinaus ist die Persistenz der Effekte bedeutsam. Unternehmensstrategien, die organisatorische oder technische Innovationen nutzen und eine erfolgreiche Eigenmarkenstrategie implementieren, können temporär eine besonders starke Verhandlungsposition bedingen. Daran ist weder kartellrechtlich noch wettbewerbsökonomisch etwas auszusetzen, da man hier keine Persistenz dieser starken Position erwarten muss. Ohne diese Persistenz sind aber auch Wohlfahrtsschäden aus den benannten Schadenstheorien unwahrscheinlich. Mit anderen Worten ausgedrückt muss Nachfragemacht auch im Zeitablauf stark und stabil sein, um den Wettbewerb dauerhaft zu schädigen. Ein temporärer Effekt kann keineswegs ausreichend zur Feststellung von Nachfragemacht sein, da es sich um ein dynamisches Phänomen mit häufigen Verschiebungen der Machtverteilung zwischen den Parteien handelt. Die Bestimmung der Persistenz von Nachfragemacht ist durch den Einsatz struktureller Methoden möglich.
Das bedeutet im Umkehrschluss nicht, dass Nachfragemacht per se unschädlich ist, sondern lediglich, dass zum einen die Wahrscheinlichkeit einer Schädigung erfasst werden muss und zum anderen auch Ursachen für die potenzielle Nachfragemacht analysiert werden müssen. So kann die günstige Verhandlungsposition aus der Effizienz eines Händlers resultieren, weil dieser Kundenbedürfnisse entweder durch ein gutes Sortiment oder durch ein günstiges Preis-Leistungs-Verhältnis abdecken kann.[23] Alternativ kann ein Händler allerdings auch durch Marktmacht auf dem Absatzmarkt persistente Nachfragemacht aufbauen.
Daher muss als Fazit gelten, dass jede Wettbewerbsanalyse von Nachfragemacht mehrstufig sein muss. Zuerst steht die Feststellung möglicher Verhandlungsmacht. Dazu können zunächst deskriptive Indikatoren wie Marktanteile oder Umsatzanteile dienen. Allerdings muss im Anschluss eine systematischere Analyse stattfinden, die sich möglichst exakt an den aufgezeigten Strategien orientiert und die Stärken bzw. Schwächen einzelner Methoden anerkennt. In einem zweiten Schritt müssen

[23] Weitere Beispiele sind erfolgreiche Eigenmarkenstrategien oder spezielle Lieferservices.

dann die Determinanten der Nachfragemacht berücksichtigt werden. Das Verlassen auf die Händlergröße als Argument für Nachfragemacht kann irreführend sein. Denn eine gute Verhandlungsposition des Händlers kann auch das Resultat einer guten Händler- oder einer schlechten Herstellerstrategie sein. Diese Verhandlungspositionen sind endogen und können sich durch Unternehmerentscheidungen verändern. Wichtig ist hierbei, ob wettbewerbswidriges Verhalten diese Position festlegt. Sofern dies der Fall ist, bildet das entsprechende Verhalten auch den relevanten Ansatzpunkt für geeignete Abhilfemaßnahmen. Danach folgt in einem dritten Schritt die Identifikation eines Schadens, für den entweder Spiral- oder die Wasserbetteffekte als Schadenstheorie in Frage kommen. Voraussetzung ist jedoch zunächst eine identifizierte persistent hohe Nachfragemacht.

Chapter 4

Market Definition with Heterogeneous (Grocery) Retail Formats, Private Labels, and Vertical Relations

Co-authored with Justus Haucap, Ulrich Heimeshoff, Gordon J. Klein and Christian Wey

4.1 Introduction

Market definition is frequently applied in antitrust investigations to assess the competitive effect of mergers, horizontal/vertical agreements or abuse of dominance. The use of market definition is frequently contested in the academic literature. A number of researchers, such as Kaplow (2010, 2015), highlight the arbitrary application of definition criteria, which often neglect basic economic concepts . Instead of explicitly drawing market boundaries, some authors propose the direct assessment of market power and competitive effects (e.g., Baker & Bresnahan 1985, Nevo 2001). However, in many jurisdictions, such as the EU, market shares are not only indicative of market power, but also have immediate legal consequences since thresholds are regularly used to shift the burden of proof in antitrust investigations.[1] Consequently, antitrust authorities base—and will continue to base—their analyses on the grounds of market shares, either as a prerequisite first step for market power assessment or as a preliminary screening device to decide whether agreements have minor impacts on competition ("safe harbor"). Given the thresholds' importance, decision-makers need to define markets carefully. Applying imprecise market definition algorithms lead to erroneous conclusions regarding the degree of market power, which in turn affect antitrust enforcements in terms of evaluating certain business practices. A too narrow market definition leads to an overestimation of firm market power, which unduly restrains firm behavior vis-a-vis consumers, competitors, and business partners.

Market definition is a challenging task for researchers and practitioners since most markets are characterized by complex vertical structures where heterogeneous manufacturers sell their differentiated products through heterogeneous retail formats. The complexity of market definition exercises can be seen well at the example of grocery retailing,[2] which exhibits heterogeneous retailers (i.e., discounters, super-

[1] For instance, according to the EU merger guidelines (2004/C 31/03) firms are assumed to have a dominant position above a level of 50% market shares, whereas below 25% firms fall inside the "safe harbor" region. The horizontal merger guidelines from the US Department of Justice & the Federal Trade Commission (08/19/2010) contain similar thresholds.

[2] The grocery sector has been under stringent scrutiny—not only from national competition authorities in Europe, but also from the European Commission itself. Many competition authorities worldwide have initiated or recently concluded detailed sector inquiries into grocery markets. Examples include the UK (Competition Commission 2008), the US (see Cotterill 2010), and Germany (Bundeskartellamt 2014). A key concern of these studies was the assessment of buyer power since most grocery retailing markets evolved to highly concentrated market structures. In Germany,

markets, drugstores) with different assortment depths and breadths containing differentiated products from heterogeneous manufacturers (e.g., private labels [PL] vs. manufacturer brands [MB]). In these contexts market definition has to incorporate two important concepts: consumer demand substitution for differentiated products and the vertical relationships between retailers and manufacturers. First, neglecting the demand-side reactions at the horizontal retail level implies abstracting from supply-side pricing behavior based on consumer substitution patterns. Despite the fact that two products, e.g., MB and PL,[3] may appear to be different from the researcher's or bureaucrat's point of view—because of several qualitative criteria, such as production facilities—many, or at least some, consumers may perceive the products as substitutes.[4] Substitute products put competitive constraints on each other, which manufacturers and retailers take into account in their pricing decisions (see e.g., Nevo 2001, Sudhir 2001). Second, retailers typically interact with a potentially large number of suppliers. Bargaining parties may agree on contract types that define not only the prices for a certain product, but also on a non-linear part, a so-called slotting allowance, where manufacturers pay fixed-fees to retailers for the allowance to offer their products in the retailing store (Caprice & von Schlippenbach 2013). Furthermore, the possibility to offer private labels provides retailers the incentive to directly affect wholesale prices (Hastings & Gilbert 2005) and increase their bargaining power vis-a-vis the manufacturers (Meza & Sudhir 2010). Clearly, these studies show the effect of horizontal and vertical aspects on the firm profits.

In this study, we propose a method to define relevant markets based on consumer substitution behavior for differentiated goods and accounting for the vertical relationship between retailers and manufacturers. As in Brenkers & Verboven (2007) the approach is based on the profitability of price increases—given demand substitution and the vertical structure—and thus consistent with the SSNIP test ("small but significant increase in price") proposed by the merger guidelines. The objectives are twofold. We take the differentiated product category of diapers which is distributed via heterogeneous retailers (supermarkets, discounters, drugstores) in-

France, and the UK the combined market share of the top five retailers exceeds 70% and in Spain 60% (Inderst 2013).

[3]The same argument holds for the competition across discounter, supermarket, and drugstore products.

[4]The detailed literature survey from Berges-Sennou et al. (2004) presents numerous studies which highlight competitive relationships between PL and MB.

teracting with heterogeneous manufacturers (brand manufacturers and private label producers) to (i) uncover the degree of competition between brand labels (inter-brand competition) and across retail formats (inter-format competition) for a given product category, and (ii) to show the importance of accounting for the correct vertical market structure. This type of SSNIP analysis has also been used to define markets in case of triple play offers (Pereira et al. 2013) or in quantifying the effects from horizontal mergers in European competition policy (Ivaldi & Verboven 2005). Our model also shares similarities with the model proposed by Brenkers & Verboven (2007), who define the relevant market for automobiles, whereas we are interested in retail markets, which exhibits different characteristics than the automotive market. In particular, we highlight the importance of testing between a range of vertical supply-side equilibrium models, recently developed in the literature of empirical IO (e.g., Villas-Boas 2007b, Bonnet & Dubois 2010a), with different assumptions on the horizontal and vertical market structure and test which model explains observed pricing patterns best. We demonstrate how results are biased when researchers or practitioners assume wrong market structures.

Although economic studies have highlighted the consideration of demand substitutability and product differentiation in the **horizontal dimension** of market definition (e.g., Brenkers & Verboven 2007), most sectoral investigations and antitrust inquiries neglect demand-side aspects for differentiated goods, which support critiques in the view that market definition is somewhat arbitrary. First, to define whether discounters belong to the same relevant market as supermarkets, the UK Competition Commission (Competition Commission 2008, p.11) and the German Bundeskartellamt (2014, p.81–82) argue that the competitive relationship between discounters and supermarkets is limited due to the heterogeneous assortment depths and breadths—and thus do not count discounters as part of the relevant retail market.[5][6] Accordingly, to determine whether PLs should be the same relevant market as MBs, the Bundeskartellamt has asked manufacturers about their supply substitutability (Bundeskartellamt 2014, p.131) and concluded from the questionnaires

[5]The same logic is applied to recent decisions such as in the merger decisions of Edeka/Plus (Bundeskartellamt 2008) and Edeka/Trinkgut (Bundeskartellamt 2010a).

[6]Given the trend of increasing market shares of discounters worldwide (European Commission 2014, p.48) and the aggressive entry strategies of Aldi and Lidl in the US market (Chaudhuri 2015, Loeb 2015) this question gains in importance.

that PL do not belong to the same relevant market as MB.[7] A similar approach was chosen by the Portuguese Competition Commission, who regards discounters' products as reasonable substitutes, but not PL (Portuguese Competition Authority 2010, p.18).

The importance of including contract types in the **vertical dimension** has not yet been addressed in the market definition literature. However, the theoretical and empirical literature on market power in vertical relations has shown that supply chain members have incentives to apply strategies that directly impact retail and wholesale profit margins—for instance, multi-part tariffs (e.g., Rey & Vergé 2004, Bonnet & Dubois 2010a) or vertical integration (e.g., Hastings & Gilbert 2005, Meza & Sudhir 2010)—in order to circumvent typical efficiency problems as, for instance, double marginalization (Inderst & Wey 2011). Given that market definition will remain an essential tool for the future, structural methods of market definition should not only be rigorously based on consumer substitution patterns for differentiated goods, but also incorporate the vertical contract types.

This study provides a detailed category analysis using representative household data—including actual retail store choices of consumers—to estimate demand for disposable diapers. We examine the research questions in a three-step procedure. First, we use information on a rich household home-scan data set of a representative sample of the German population, which includes actual transaction prices. We estimate a flexible random coefficient random utility discrete choice model for differentiated goods in order to obtain flexible consumer substitution patterns. Second, we derive retailer and manufacturer margins using a range of equilibrium pricing models of vertical relationships, which are (i) linear pricing models with Bertrand competition and collusion (downstream, upstream, both) and (ii) non-linear pricing contracts, such as two-part tariff (TPT) with and without resale price maintenance (RPM). For all models, we consider both cases, that private labels either are or are not vertically integrated. We test all models and select the model which has the best fit to observed data. Third, we apply a SSNIP test for differentiated products and accounting for market power to test our hypotheses on the competitive relationships between labels and across formats. Finally, we show how results are biased, when choosing the wrong supply models to calculate profitability. A distinct advantage of the approach is that it allows inference on retailer and manufacturer costs, and thus

[7] In five of the seven considered categories (sparkling wine, ground coffee, milk coffee drinks, frozen pizza, and jam) manufacturers denied the possibility to switch production processes from MB to PL production.

profit margins, solely requiring the use of retail level scanner data. That might be useful since accounting data is typically difficult to obtain at the product level and may also be subjected to a reporting bias (see e.g., Nevo 2001), whereas retail-level data can be easily purchased from marketing agencies. This particularly applies to retail markets, where contracts are complex and the distinction between common costs and true economic costs is difficult. Our approach can thus be used instead of (or complementary to) approaches relying on accounting data or manufacturer questionnaires.

The market definition results reveal strong evidence for inter-brand and inter-format competition. A joint price increase for all manufacturer brands is not profitable, which implies that private labels put competitive constraints on the manufacturer brands. We also simulate price increases for all products within formats to determine the sign of the change in profits. As none of the formats can profitably raise prices, we find strong support for inter-format competition. We conclude from the results that demand substitution patterns should be a fixed component of any market definition exercise. Products may be substitutes from the consumers' point of view even when researchers and practitioners have contrary anecdotal evidence from production processes or questionnaires. An a priori exclusion of products without considering substitutability from the consumer perspective will lead to erroneous conclusions on the relevant market size, with direct effects on market power assessment. The results further demonstrate the importance of specifying an adequate market structure by testing between a range of equilibrium supply models. We show that the model best suited to the market is a non-linear TPT contract with RPM, where manufacturers offer their products at marginal costs but recover industry-maximizing profits via fixed fees. The robustness of market definition with regards to the contract choice is not given, and we show that erroneously assuming linear pricing contracts will result in a too wide definition of the relevant market. Researchers and practitioners should thus include demand substitution patterns and the vertical market structure into their analysis.

Our results are relevant for researchers and antitrust authorities for two reasons. First, our example highlights the importance of including demand substitution patterns and accounting the type of vertical relations in all market definition exercises. Second, our results add new evidence to the type of competition between PL and MB on the one hand and to the degree of inter-format competition on the other. These results are not constrained to the diaper market and are of relevance for other

markets with similar characteristics of a strong manufacturer brand being able to conduct RPM. This can be product categories with must-stock products, such as soft drinks, alcoholic beverages, or children food. With the methodology presented in this paper, it can be tested whether the same market structure applies. Besides the general findings for the market definition exercises, the analysis yields some specific results for the particular industry structure. First, manufacturers have the pricing power to maintain resale price maintenance, which is consistent with anecdotal evidence that retailers do not make profits from diapers as they are used to attract consumers,[8] which shifts the market power to manufacturers who are then able to extract all the profits by offering TPT contracts with RPM. That provides some contrary evidence on the prevailing assumption that retailers have high bargaining power indicating that the relationship between manufacturer and retailer is less trivial and more diverse than proposed by some antitrust agencies (e.g., Competition Commission 2008, Bundeskartellamt 2014). Second, we find that retailers' PLs are not vertically integrated, which indicates that the downstream supply side is less concentrated than expected and than assumed in the literature (see e.g., Bonnet & Dubois 2010a, Bonnet & Dubois 2015).
The remainder of the paper is organized as follows: Section 2 reviews the relevant literature. Section 3 describes the market and the data. presents the results from demand estimation and the supply side. Section 4 develops the econometric model including the demand system, supply model, and SSNIP test. Section 5 presents results from the demand side, the supply models, and the SSNIP test. Section 6 concludes.

4.2 Relevant Literature

In our study, we combine two strands of the literature. First, we contribute to the literature of market definition (section 2.1) by (i) adding vertical relationships to existing models and (ii) applying this methodology to the retailing grocery market. Second, our results are also interesting regarding the substitution patterns of consumers w.r.t. private labels when heterogeneous retail formats exist (section 2.2).

[8] see http://www.welt.de/wirtschaft/article117203610/Das-lukrative-Geschaeft-mit-Babys-Po.html

4.2.1 Market Definition

Although there are some advances on the direct assessment on market power, market definition is acknowledged to be (and to remain) an important tool for competition authorities (Brenkers & Verboven 2007). For defining relevant markets, we follow the principles outlined in the EU and US merger guidelines.[9] The test proposes to find the smallest set of insider products for which a small but significant joint price increase of 5-10% is profitable.[10] To assess the profitability of price increases, we follow the Commission Notice 97/C372/03, which states that demand substitutability is a more immediate and effective disciplinary force on suppliers than supply substitutability, which requires additional analysis of investment possibilities (see also Brenkers & Verboven 2007).[11]

Researchers have suggested the use of critical elasticity formulas to implement the SSNIP test (Harris & Simons 1991, Werden 2002). The test defines the critical elasticity for a set of homogeneous products above which a price increase would be unprofitable. If the estimated elasticity exceeds the critical elasticity, the relevant market is found, whereas another outside product should be added if the price increase in unprofitable. However, this test suffers from a logical inconsistency. If the price increase is not profitable for the homogeneous insider products, the test suggests to add one of the outside products, which are heterogeneous by definition. The new critical elasticity then has to be re-calculated, which violates the assumption of homogeneous insider products (Brenkers & Verboven 2007, Kaplow 2010). To circumvent some drawbacks of the early critical elasticity models, researchers have subsequently suggested to add equilibrium margins from economic pricing models (Katz & Shapiro 2003) and cross-price elasticities (O'Brien & Wickelgren 2003). These approaches suggest to rank for each product all competitors according to their cross-price elasticity and define the relevant market as the smallest possible set of products for which the actual loss of insider products exceeds the critical loss.

[9] See EU Official Journal (C372,09/12/1997) and the Horizontal Merger Guidelines from US DOJ and FTC (08/19/2010)

[10] Researchers also suggested the use of reduced-form approaches to find the relevant market, for instance, by looking at price differences or price correlations. However, the former criterion of price differences does not provide any information on how—or if—two products exert a competitive constraint on each other (Motta 2004, p.109) and the latter is subject to the problem of spurious correlation (Davis & Garces 2009, pp.174).

[11] However, our approach also introduces some supply-side constraints by modeling the type of interactions.

This method, however, has some difficulties. First, one needs to define a separate market for each product. Second, these approaches are difficult to apply in contexts of heterogeneous products and multi-product firms (Brenkers & Verboven 2007).[12]
The most advanced approach in market definition is based on Brenkers & Verboven (2007) who suggest to use an equilibrium pricing model derived from demand substitution for differentiated products. The approach shares features with Katz & Shapiro (2003) and O'Brien & Wickelgren (2003) in including demand patterns and equilibrium supply models. It alleviates the problems of heterogeneous products by implementing a complete integration of demand patterns in a rigorous demand parameter estimation. Using demand parameters, price-cost margins can be recovered. Then price increases for hypothetical monopolists can be simulated to evaluate the profit change before and after. For the sake of tractability, they use different market candidates instead of adding product subsequently to a candidate market. This procedure is technically closely related to the full-equilibrium models that estimate the effect of particular business practices directly (e.g., for mergers). These approaches are also based on demand substitution patterns and structural supply models, which help to uncover market settings, but they do not explicitly define market boundaries. The approach of Brenkers & Verboven (2007), however, bridges the gap between the traditional market definition techniques and the full equilibrium models.[13] Although this approach is consistent with the merger guidelines and can account for product differentiation, the competitive constraints of the supply side, i.e. the extent of vertical competition and the role of complex contracts have not been covered explicitly by Brenkers & Verboven (2007).
The competitive constraints on the supply side have become increasingly important in full-equilibrium models. Recent work has concentrated on putting structural models into a framework of the vertical contracting in two-tier supply chains, introducing monopoly or oligopoly pricing behavior (Sudhir 2001, Villas-Boas 2007a)

[12]Given this critique, a part of the literature attempts to suggest effects-based approaches, as for instance, the Upward Pricing Pressure method (UPP) proposed by Farrell & Shapiro (2010) or the Gross Upward Pricing Pressure Index (GUPPI) proposed by Moresi (2010). They propose to evaluate the effect of mergers on prices for heterogeneous products without the need to draw market boundaries. However, if applied to the context of market definition, the method is subject to the same critique.

[13]The recent literature incorporated structural demand and supply models, which on the horizontal level, were used to investigate a variety of competition policy questions, such as price competition and product differentiation (e.g., Berry 1994, Goldberg 1995), mergers and market power (e.g., Nevo 2000a, Villas-Boas 2007a) or product introduction (Petrin 2002).

and different types of contracts (Draganska et al. 2010, Bonnet & Dubois 2010a). These models stress the importance of adequately modeling the vertical relationships between retailers and manufacturers. For instance Villas-Boas (2007b) infers the vertical market structure from demand substitution patterns and can uncover pricing above marginal costs in the vertical chain, which is associated to market power assessment. Bonnet & Dubois (2010a) provide non-linear pricing models and can distinguish between different kinds of two-part tariff contracts as well as practices as resale price maintenance. Inevitably, the vertical industry structure (including the contractual structure) exhibits effects on the profitability of potential price increases. The relevance for market definition due to this effect has—to the best of our knowledge—not been analyzed in a unified framework. This is where our study aims to close a gap: To define markets a) horizontally consistent with the principles of EU and US merger guidelines and b) taking into account horizontal and vertical competitive constraints on the demand and supply side consistent with economic theory.

However, we do not only propose to add the vertical market structure to the definition process, we also use the SSNIP test to answer a particular policy question. We impose a counterfactual scenario of a potential price increase and ask whether this price increase is profitable. This specification of the SSNIP test thus shares features with a full equilibrium analysis, but with specific assumptions on price setting. As in the full equilibrium analysis, we hypothetically raise prices, but in the form of a joint price increase for candidate market. We then examine the effect on market shares, but without solving prices and market shares numerically. This form of analysis can be justified in special cases and this form of unilateral approach is not only used in practice to define markets but also to answer special policy questions, such as the defining markets in case of triple play offers (Pereira et al. 2013) or in quantifying the effects from horizontal mergers in European competition policy (Ivaldi & Verboven 2005).

4.2.2 Demand Substitution Patterns for Market Definition in Grocery Retailing

Grocery retailing is subject to particular phenomena relevant for market definition. First, next to common brand manufacturers that offer branded products, there are so-called private label products, which are offered under the retailer name. Moreover, there are heterogeneous retail formats that differ substantially regarding their

marketing strategy (i.e., supermarkets, discounters, drugstores). The different label types and different retail strategies naturally raises the question of different market segments for labels and retail formats.

The general impact of private labels on prices (and variety) of MBs is not clear. The degree of competition may depend on market characteristics, such as the retail bargaining power (Clark et al. 2002) or the number of manufacturer brands (Raju et al. 1995), and retailers' incentives to improve their outside option (Inderst 2013) or for market foreclosure (Daskalova 2012). In particular, PL are found to be a strategic tool for retailers to eliminate the double markup problem and to put competitive pressure on prices of MBs (Mills 1995). Moreover, they are also a way to offer additional varieties in the stores and a tool for supermarkets to differentiate from competitors (Bontemps et al. 2005). Moreover, results on the competitive relationship between PL and MB are mixed. The marketing literature analyzes substitutability and shows the important role of PL, which consumers often tend to regard as reasonable substitutes for MB (Sethuraman 1995, Dhar & Hoch 1997, Ailawadi et al. 2008). Cotterill et al. (2000) find a positive correlation between the prices of both types of brands (and show that the sign may switch to the opposite absent a proper control for endogeneity). Chintagunta et al. (2002) show that the price of the leading MB is decreasing with the introduction of PL, which indicates competitive reactions. Ward et al. (2002) show the opposite and find that an increase in the private label market share is consistent with an increase in MB prices and a decrease in PL prices. Bontemps et al. (2005) find similar results, but find heterogeneity of the impact in the type of PL. These studies show that a priori the competitive relationship of PL and MB is ambiguous, which highlights the need for further investigations.

Furthermore, the extent of competition between PL and MB might differ within a particular market since PL may be heterogeneous among retail formats due to heterogeneous consumer perception and/or different retail strategies of retail formats and retailers within a format. Most European markets are separated into supermarkets and hypermarkets (or full-line distributors) which offer a wide assortment, as well as hard- and soft discounter stores, whose major assortment is covered by PL (Inderst 2013) and who generally have a smaller assortment depth and breadth (Competition Commission 2008). Given that the strategy of discounters and common grocery supermarkets varies, PL strategies will differ. Bontemps et al. (2005) investigate several markets and find that the correlation of PL introduction and MB

prices indeed differ across formats.

There are several recent studies focusing on the competition between supermarkets, hypermarkets and discounters. Fox et al. (2004) study price competition between store formats (supermarkets, drugstores) and find that heterogeneity across formats is relevant. Gonzalez-Benito et al. (2005) investigate inter-format and intra-format competition and find that there are differences in the competition intensity between formats and the competition intensity within formats, including discounters. Cleeren et al. (2010) analyze the extent of inter- and intra-format competition in the German grocery retail sector. They find that supermarket profits are only affected by the entrance of *several* discounters (i.e., entry of a different format retailer), but already by the *first* entrance of another supermarket (i.e. of a retailer of the same format). They conclude that intra-format competition is stronger than inter-format competition and relate this to the literature on product differentiation. The availability of different formats first helps to discriminate between costumers before more and more entry leads to competitive pressure for the same customers.

Although recent literature of retailing has focused on the competitive relationship between private labels (PL) and manufacturer brands (MB) (see, for instance, the survey of Berges-Sennou et al. 2004) and the degree of inter-format competition (Cleeren et al. 2010), none of the studies investigates the degree of competition between PL and MB when heterogeneous retailers exist. An open question in this literature strand remains whether MB are in competition with PL from supermarkets, drugstores, and discounters. This study—in contrast to others—explicitly takes into account how retailers and manufacturers create value along the value chain by modeling the type of vertical contracts and the decision of vertical integration.

4.3 Market description and Data summary

In this section, we provide some summary statistics for the market for diapers and consumer behavior based on a German representative household panel collected by GfK Panel Services.

4.3.1 The Market for Diapers

The first step for the market definition process is to make a pre-selection of the market in the widest possible sense, which means that we first exclude complementary products and products with minor market shares based on reasonable intuitive

criteria. This process is necessary since we (i) want to focus on substitute products and (ii) avoid overrepresentation of outlier products.

Most consumers use disposable diapers, other products, such as cotton, mull, and fleece diapers, have an accumulated market share of less than 1%. We consequently exclude these products since they are unreasonable substitutes for most consumers. Next, swimming diapers and training pants are each a specialized category, which are often bought complementary to the disposable diapers for the everyday use. Since the SSNIP test asks to start with a set of substitute products, we exclude these categories. Next, we eliminate the premature baby category as a niche segment, which thus is not a reasonable substitute for all consumers. Furthermore, there are some specialized retailers, such as, for instance, cash-and-carry stores, pharmacies and also Internet purchasing, which offer diapers. As Internet purchasing is not a reasonable alternative channel for diaper purchases in our sample period 2009 and 2010, we exclude all products purchased from the Internet. In a next step, from this sample, we drop all remaining brands with market shares $< 2\%$ and retailers with shares $< 1\%$) to remove outliers and reduce the sampling error. Finally, we follow the literature analyzing European retail markets in specifying retail competition to be on the national level (Villas-Boas 2007b, Bonnet & Dubois 2010a, Draganska et al. 2010) and therefore exclude local retailers.

This market in the widest possible sense consists of 15 different retailers which can be grouped into three formats: Discounter, drugstore, and supermarket (see figure 4.1 (a) and table 4.4). Most of the diaper products are purchased at discounters and drugstores (i.e., market shares of the two formats add up to 79% of the total market, followed by supermarkets which hold the remaining share with 21%. For our market, the high market shares suggest that discounters/drugstores should not be excluded from the analysis a-priori. However, to evaluate the degree of actual substitution, we utilize a structural demand model to estimate price elasticities.

There is one manufacturer producing the manufacturer label and several manufacturers producing for private labels.[14] Figure 4.1(b) and table 4.3 both show that private labels play a major role in the diaper market with a market share of more than 50%. In particular, discounters and drugstores, who make up most of the market, differentiate themselves with high private label shares of 88% and 53% of their sales respectively. The ratio of manufacturer brands to private labels is higher in

[14]It seems reasonable to assume that retailers do not produce the diapers themselves. However, retailers may control and define the characteristics of the products.

supermarkets, which have a share of 81% of branded products. Preliminary market share analysis provides evidence that private labels are an important driver on the market. However, we cannot see whether these two label types are different market segments. Private labels may be, for instance, targeted to low-income consumers, and manufacturer brands to high-income consumers. Indeed, there are substantial price differences for both label types. As expected, the price per diaper is higher for manufacturer brands than for private labels at all retail formats, on average around two cents (for the standard manufacturer brands). But there is also a premium label of the manufacturer brand with a price level above private labels and standard manufacturer brands (see table 4.4). However, private labels perform in quality tests as well as the higher priced manufacturer brand.[15] Thus, the quality measured by this test indicates that both product types could be substitutes.

In general, the statistics show that prices vary over retailers and brands (see table 4.4). Supermarket prices for branded products range from 18 cents per diaper to 19 cents per diaper with one supermarket pricing at 21 cents, which is the highest price for the standard MB. Branded products at drugstores range from 18 to 20 cents. Surprisingly, two discounters sell manufacturer brands at the higher range of prices. These prices are around 20 cents for both retailers. Prices for the premium labels lie, on average, between 22 and 25 cents, with highest prices at Discounter 0 and Drugstore 0 and lowest prices at Drugstore 1. A high variation of prices can also be found for private label products, where lowest prices are offered by Discounter 0 and highest prices by Supermarket 5 and Drugstore 5. This patterns underlines the heterogeneous pricing strategies of retail formats regarding the private label products and branded products.

The market for diapers is particularly well-suited for our study because there are heterogeneous retail formats and heterogeneous manufacturers—either the single manufacturer brand or the private label. However, there seems to be anecdotal evidence that retailers do not have pricing power on the diaper products as they use the diapers category to attract consumers,[16] which shifts bargaining power to the manufacturer. A test of different supply models can give some more evidence on the type of vertical structure between retailers and manufacturers yielding insights on the distribution of market power. Furthermore, the market structure underlines

[15] see, for instance, the test result from "OEKOTEST" M1401, No.1, January 2014, available online: http://www.oekotest.de/cgi/index.cgi?action=heft&heftnr=M1401

[16] see http://www.welt.de/wirtschaft/article117203610/Das-lukrative-Geschaeft-mit-Babys-Po.html

that researchers and practitioners have to be careful when defining the market. The severe consequences of erroneously excluding private labels from the relevant market without considering demand substitution would imply that the diaper market is a monopoly. Instead, if private labels are in the relevant market, they are the only source of inter-brand competition.

Although we have some presumptions on the market structure, we do not know—and thus have to test—(i) whether private labels put competitive pressure on manufacturer brands, (ii) whether the type of competitive relationship varies across formats, and (iii) the types of vertical contracts between retailers and manufacturers.

4.3.2 Data Set Description and Choice Set Construction

To assess substitution patterns between brands and retailers and calculate supply-side profits, we use data from a German representative household panel collected by GfK Panel Services. The GfK Panel Services monitor the purchasing behavior of panel members whose characteristics are representative of the German population.[17] The data contain information on all actual transactions of up to 20,000 households who track their entire purchases using home-scanning devices. In contrast to scanners at the checkout counters, which can only track purchases within a particular store, this particular data set enables us to analyze switching behavior more precisely because each purchase at each retailer is recorded. Thus, we can observe each purchase from the panel, whereas scanner data typically cannot be used to identify purchases (or the lack thereof) by the same consumer at other outlets. For instance, discounters are often not included (e.g., Draganska et al. 2010).

The data set contains information on the name of the brand, label (premium, regular or private label), retailer, the number and time of the shopping trips as well as the actual price (including any discounts and promotions). We sample the time period of 2009/2010 for customers who purchase diapers (N=6,757 observations). This ensures that we exclude major trends over the years and panel attrition issues. In order to conduct our demand estimation, we work with some assumptions to construct the choice set. We assume that every month consumers face a decision as to whether to buy diapers. This seems to be reasonable given that the vast majority of households (81%) buys, on average, one diaper package per purchase (see table 4.3).

Possible choices for consumers are defined as *Brand x Retailer* combinations. In

[17] see http://www.gfk.com/de/loesungen/verbraucherpanel/

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.[18] Each of the national retailers—except for discounter 1—offers two different labels, a manufacturer brand label and a private label.

If consumers decide not to buy an inside good, then the outside option is chosen. Regarding a possible outside good, one may think of three options for the diaper market: one of the excluded products, the potty or storage. To take into account that, at some point, children do not need diapers anymore we drop all observations before the first and after the 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 between two purchases where consumers do not buy any of the alternatives, indicating that there is some kind of outside good.

4.4 The Econometric Model

Our methodology combines demand and supply-side modeling to answer the policy question of interest. With our framework we are able to assess the impact of a hypothetical price increase on consumer substitution behavior and on firm profits. We implement the SSNIP test for a precise definition of the market by using representative household data on the diaper market and test between a range of potential supply-side models including the strategic behavior of manufacturers and retailers in the vertical channel.

To this extent, we set up our empirical strategy as a three-stage procedure. Step 1 is devoted to the estimation of the demand for diapers. We model consumer purchasing behavior for diapers to predict consumer purchasing patterns in response to price variation. We use a random utility approach that is flexible enough to evaluate the heterogeneity of consumer behavior. Having identified consumer demand, in step 2 we use demand estimates and a range of vertical supply chain to derive profit margins. The general methodology allows for the oligopolistic structure of the industry and the strategic behavior of retailers and manufacturers. We then test

[18] We also drop all cases where the frequency of that bundle is below 10.

which supply model best explains pricing behavior. Step 3 consist of applying the SSNIP test to define the market.

4.4.1 Consumer Demand

The demand estimation is the first step in order to test our hypotheses. We estimate a random coefficients discrete choice model for disaggregated consumer level data using a control function approach (Petrin & Train 2010) to identify the demand function and the equilibrium price. The available data allow us to observe individual household purchasing decisions, where we can observe exactly when a household buys what specific product at which retail store. The random coefficient logit model allows us to account for heterogeneity in customer preferences, which is important when estimating price sensitivity. As we use consumer-level data, we are able to model consumer heterogeneity by allowing for random taste variations over individual consumers. Furthermore, product heterogeneity can be accounted for to obtain different elasticities for different products.

The random coefficient, random utility approach has been widely used in the literature (e.g., Nevo 2001, Bonnet & Dubois 2010a, Bonnet et al. 2013, Draganska et al. 2010).[19] To address the potential endogeneity of prices, we implement a control function approach suggested by Petrin & Train (2010), which we describe in greater detail below.

Based on the evidence from the summary statistics, we assume that consumers make monthly decisions. In each month t, consumers choose between J different products, which we define as brand-retailer bundles. Thus, consumers' latent indirect utility from product purchase (conditional on the control function) is defined as:

$$U_{nit} \;=\; \alpha_i \;-\; \beta_{1n}\, p_{it} \;+\; X_i'\, \beta_2 \;+\; \lambda\, u_{it} \;\;+\;\; \tilde{\epsilon}_{nit}, \tag{4.1}$$

On the right-hand side, α_i are product-specific effects (recall that products are defined as brand-retailer bundles), p_{it} is the endogenous price variable, whose coefficient varies over all n households, for which we assume a normal distribution. X_i contains brand and retailer fixed effects. u_{it} is the calculated control function with λ as the corresponding parameter. The error term $\tilde{\epsilon}_{nit}$ is independently and identically drawn from a generalized extreme value distribution of type I. We also model an outside good to allow for category expansion or contraction. When consumers do not purchase any product at time t, they are assumed to purchase the outside good.

[19] The estimation routine and derivation of partial effects is based on the code of Hole (2007).

Because only differences in utilities between choices are considered, the utility for the outside good can be normalized to zero, i.e., $U_{n0t} = 0$.
Choice probabilities are derived from the assumption that each consumer purchases the utility-maximizing product $U_{ni} > U_{nj} \forall j \neq i$. If we define $U_{nit} = V_{nit} + \epsilon_{nit}$, we can write the conditional choice probability for choosing a product as[20]

$$s_{nit}(\beta_n) = \frac{e^{V_{in}}}{1 + \sum_j^J e^{V_{jn}}}, \tag{4.2}$$

Choice probabilities are conditional on the random parameter β_n. Unconditional choice probabilities are defined as the integral over all possible values of β_n:

$$s_{nit} = \int s_{nit}(\beta_n) f(\beta_n, \tilde{\epsilon}) d\beta_n d\tilde{\epsilon}, \tag{4.3}$$

where $\tilde{\epsilon}$ is the iid error term and $f(\cdot)$ is the joint density distribution β_n and $\tilde{\epsilon}$, which we assume to be independent of each other (Petrin & Train 2010). This integral is solved with simulation methods. For a given random draw of a Halton series, we plug the random draw into equation 4.2 and calculate the logit choice probability. We do this 100 times and average the results, as suggested by Train (2009).

4.4.2 Supply-Side Equations

In a second step, the demand estimates are used to calculate the price-cost margins of different vertical supply models. The supply models are tested against each other to find the model providing price-cost margins, which fit observed prices best. Modeling the vertical relationship between retailers and manufacturers we follow Villas-Boas (2007a) and Bonnet & Dubois (2010a) who consider non-linear tariffs with oligopolistic retailers. The vertical structure is crucial for our analysis since we observe prices at the retail level. The magnitude of the price-cost margins depend on consumer substitution patterns (estimated by the demand function), the horizontal competition of retailers and manufacturers, and the type of contracts in the vertical structure. The logic of the profit margin derivation is as follows: We observe prices, market shares, and ownership structures and estimate the market share response matrix, which is a matrix capturing market share sensitivities w.r.t. all prices. Given that information and the type of contract, we can solve for the price-cost margins.
As in Villas-Boas (2007a) and Bonnet & Dubois (2010a), we assume a setup with

[20] See Train (2009) for a detailed derivation of the choice probabilities.

multi-product retailers and multi-product manufacturers. We consider a range of different contract types between manufacturers and retailers. These include linear pricing contracts (LP) with different assumptions on the horizontal market structure, either Bertrand-Nash competition in prices or collusion. Furthermore, firms may agree on two-part tariffs (TPT) to circumvent the double markup problem. Here we consider the following types of contracts: (i) TPT with resale price maintenance (RPM) for two different equilibria and (ii) TPT without RPM.[21] Finally, we also consider all models in the case of vertically integrated private labels. In total, we end up with 12 different models (see table 4.1) which we test against each other to select the model with the best fit via the Rivers-Vuong test (Rivers & Vuong 2002). Table 4.2 shows the results of the non-nested Rivers-Vuong test.[22] We test all 12 models against each other and select the model with the best fit. We implement our tests for a test size of $\alpha = 0.05$. This implies that the null hypothesis $H0$ of two models being asymptotically equivalent is not rejected if $-1.64 < T_n < 1.64$. $H0$ is rejected in favor of Ha (model v is better than model v') if $T_n > 1.64$ and rejected in favor of Hb (model v' is better than model v) if $T_n < -1.64$. Table 4.2 contains the comparisons of model v in the columns and models v' in the rows. The model which is strictly better than all other models is model 8, which is a TPT with RPM where the wholesale price is equal to wholesale costs and private labels are vertically integrated. Looking at the columns of the table, which compare v with v', we find all positive values in the column for model 8 showing that models 9 to 12 are worse. Looking at the row for model 8 shows all negative values, indicating that all models 1 to 7 are worse than model 8.

Two-Part Tariffs without Vertical Integration

Following the results of the Rivers-Vuong test, we select model 8 for the further analysis, which is a TPT contract with RPM with wholesale price equal to wholesale cost, where private labels are not vertically integrated. For the case of modeling non-linear contracts, we follow the setup of Rey & Vergé (2004) and Bonnet & Dubois (2010a). Rey & Vergé (2004) assume that contracts are observable where retailers and manufacturers have to agree on fixed fees and wholesale prices. Bonnet & Dubois (2010a) generalize the model to a case with multiple retailers. When manufacturers are able to exert retail price maintenance (RPM) then contracts also involve retail prices. Rey & Vergé (2004) show for TPT with RPM that for any given vector of

[21] See Bonnet & Dubois (2010a) and Villas-Boas (2007a) for an in-depth discussion of pricing in vertical chains.

[22] See Appendix for a detailed explanation of the logic behind the Rivers-Vuong test.

wholesale prices there is one optimal equilibrium outcome and they propose two intuitive equilibria: wholesale prices equal to wholesale marginal costs, and retail margins equal to zero, where the former case corresponds to the model with the best fit from the Rivers-Vuong test.

The general timing of the game is as follows:

- Manufacturers simultaneously propose contracts to all retailers
- Retailers simultaneously accept or reject offers, which are public information
- If all offers are accepted, retailers simultaneously set their prices

If one offer is rejected, then no contract is signed and retailers earn profits in the magnitude of their outside option. Retail profits are defined as

$$\Pi_r \;=\; \sum_{s \in \Theta_r} (p_s - w_s - c_s) s_s(p) - F_s \;\; \forall \; r \;=\; 1 \; ... \; , R,$$

where retail profits are defined as the sum of the per product margin over all products i in retail portfolio Θ_r. The margin for product i at time t is given by retail price p_i, the wholesale price w_i, the retail costs c_i, and the market share s_i, which is a function of all retail prices. Finally, there is a franchise fee F_s, which has to be paid from the retailer to the manufacturer:

$$\Pi_m \;=\; \sum_{k \in \Theta_m} (w_k - \mu_k) s_k(p) + F_k \;\; \forall \; m \;=\; 1 \; ... \; , M$$

Manufacturers maximize profits by choosing optimal (p, w, F):

$$\max_{\{p_k, w_k, F_k\} \forall k \in \Theta_m} \Pi_m = \sum_{k \in \Theta_m} (w_k - \mu_k) s_k(p) + F_k,$$

subject to the binding participation constraint that retailers' profits are at least as high as profits from their outside option $\Pi_r \geq \overline{\Pi}_r \;\forall \; r = 1, ..., R$. We assume that $\overline{\Pi}_r$ is a exogenous constant which can be normalized to zero.

The maximization problem for a given RPM equilibrium $p^*(w^*)$ for all $m = 1, ..., M$ can be written as:

$$\max_{\{p_k\} \forall k \in \Theta_m} \sum_{k \in \Theta_m} (p_k - \mu_k - c_k) s_k(p) + \sum_{k \notin \Theta_m} (p_k^* - w_k^* - c_k) s_k(p),$$

and has the FOC

$$\sum_{k \in \Theta^m} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) + \sum_{k \notin \Theta^m} (p_k^* - w_k^* - c_k) \frac{\partial s_k(p)}{\partial p_j} = 0 \;\; \forall \;\; j \in \Omega^m. \tag{4.4}$$

Each j of the product portfolio of manufacturer m has an FOC as above, which depends on an "own product effect," which is the first part of the equation and a "competitors' product effect," which is the last part of the equation. It is worth noting that profits depend on the total channel margin for own products and the retail margin for competitors' products.

Rey & Vergé (2004) point out that there are multiple equilibria when manufacturers exert RPM, i.e., there is one optimal vector of retail prices for any given vector of wholesale prices. However, Rey & Vergé (2004) propose two intuitive equilibria, from which one describes the case where wholesale prices are equal to the marginal cost of production ($w_k^* = \mu_k$), where manufacturers make zero profits via per unit charges but extract monopoly profits via fixed fees.[23]

Bonnet & Dubois (2010a) generalize the model of Rey & Vergé (2004) for the case of multiple differentiated manufacturers and retailers and show that the FOC for the equilibrium ($w_k^* = \mu_k$) is given by

$$\sum_{k \in \Theta^m} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) + \sum_{k \notin \Theta^m} (p_k^* - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} = 0 \quad \forall \quad j \in \Theta^m,$$

which can be summarized as:

$$\sum_{k=1,\ldots,J} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) = 0 \quad \forall \quad j \in \Theta^m, \tag{4.5}$$

where $\frac{\partial s_j}{\partial p_i}$ is the market share response matrix estimated by the first derivatives of the demand function with respect to prices. The equation shows that retailers are constrained in their pricing decision by consumers' switching behavior, i.e., by the own-price marginal effect. But they also internalize the cross-price marginal effects if multiple products are owned by the same firm. Since products are substitutes, the cross-price marginal effects are positive, which leads to higher optimal prices in case of multi-product firms compared to the assumption that the same products are produced by single-product firms.

Solving for the price-cost margin and using vector notation, we can state:

$$m \;=\; p \;-\; w \;-\; c \;=\; -\left[\Omega \Delta^{qp} \Omega\right]^{-1} \; q(p). \tag{4.6}$$

[23] A second equilibrium is one where wholesale prices are such that the retailer's price-cost margin is zero ($p_k^*(w^*) - w_k^* - c_k) = 0$. This equilibrium solution implies that retailers add retail costs to proposed wholesale prices. In that case profit-sharing rule is not identified and we can only recover the total channel margin.

$p - w - c$ is now a $Jx1$ vector containing retail margins for each product, $q(p)$ a $Jx1$ vector of market shares, Δ^{qp} is a JxJ matrix of first-order price derivatives. Ω is the ownership matrix which indicates whether firms sell multiple products. In the case of TPT with RPM ($w = \mu$) the ownership matrix is equal to the identity matrix (the diagonal is populated with 1s) because this is the outcome of a jointly profit-maximizing industry. Manufacturers offer products at their marginal costs, let retailers act as residual claimants and recover total profits with fixed fees, which leads to the industry-profit maximizing outcome. This circumvents the double markup problem as there is only one pricing decision and is thus different to linear pricing model, where both vertical levels have pricing power. Consequently, the model generates lower margins than (collusion) models with linear pricing, but it is equivalent to assuming that the upstream (downstream) level is vertically integrated and the downstream (upstream) level facilitates collusion.

This ownership matrix and the set of first-order conditions are the reason for the difference of model 8 to the linear models. In linear models, there is one expression as in equation 4.6 each for the retailers and the manufacturers. The ownership matrix then indicates which products belong to the same firm—ω is a JxJ diagonal matrix with cell entries (j, j) equal to 1 if a product is stocked by the retailer and 0 otherwise. When one level is colluding the diagonal corresponding ownership matrix contains diagonal cell entries equal to one. However, in our preferred scenario, there is solely expression 4.6, but diagonal cell entries equal to one. We refer to the appendix for a extensive comparison of all the models.

Table 4.1 summarizes all models. In total, we identify 12 different supply models, from which six are with linear prices of which four are with vertically integrated private labels, and two additional models are with vertically integrated labels. The reason why we can only identify six models with linear prices and not eight is that some models are technically the same regarding ownership assumptions. Hypothetical model seven (manufacturer collusion in case of full pass-through with vertically integrated private labels) generates the same margin as model 5 (competition in the full pass-through scenario with vertically integrated private labels) because we only have one manufacturer who can optimize and if private label margins are zero for manufacturers then the only brand in the ownership matrix is the branded manufacturer. For the same reason, hypothetical model 8 generates the same margin as model 6.

4.4.3 SSNIP test

We define the relevant market by evaluating the change in equilibrium profits after imposing a small but significant price increase of $5 \leq x \leq 10\%$[24] on a set of products in a candidate relevant market. Since market shares are defined as a function of price, we can predict how market shares change in response to the price increase. Then, we calculate current joint profits before and after the price increase for the preferred equilibrium supply-side model. If the sign of the profit change is positive, we have found the relevant market, if it is negative, we select a broader subset of products. The algorithm stops for the smallest possible set of products for which a price increase is profitable.

This test is consistent with the test defined by the merger guidelines and it shares important features with the merger simulation approach, such as data requirements and market power assumptions (Brenkers & Verboven 2007). It is noteworthy that we conduct our test solely with information on the demand-side for retailing products, a model of horizontal competition, and having selected the most suitable model for the vertical contracting. Putting the market definition into a framework of structural demand and supply has the advantage that (i) we can predict market share changes based on a very flexible demand model, which accounts for household heterogeneity, and (ii) we can derive a range of different price-cost margins from different supply models, which can be tested against each other.

We are interested (i) in uncovering the degree of competition between brand labels (inter-brand competition) and across retail formats (inter-format compeition) for a given product category, and (ii) in showing the importance of accounting for the correct vertical market structure. To show the latter, we present market definition results for two scenarios: for the "true" model 8 and for model 1, which is a linear pricing model Furthermore, we define the relevant market for diapers by accounting for the competitive constraint the products put on each other.

The implementation of the SSNIP test algorithm requires to define some prerequisites. First, the initial candidate relevant market has to be defined. This step is important as the selection has implications on market power assumptions, that is the ability to jointly raise prices. As a initial candidate relevant market, we select all manufacturer brands—excluding the premium label MB PREM.[25] If a joint price

[24] As suggested by the merger guidelines and standard textbooks (Motta 2004, Davis & Garces 2009).

[25] The analysis of the cross-price elasticities implies that MB PREM is not a close substitute for MB. Thus, we commence with the MB and add subsequently the other label types. However,

increase is not profitable, we subsequently add the PLs. According to this definition, we assume that the sole manufacturer brand has the market power to raise prices for its products at all retail stores, which seems to be a reasonable assumption. However, we also elaborate a scenario where manufacturers are able to raise prices only at a particular retailer.[26] Second, we need to define the sequence of adding products if the price increase is not profitable. We assume two different scenarios: One where we add all PL from a given retail format (supermarkets, drugstores, and discounters) and another where we add subsequently PLs from the different retail stores within the formats. In both scenarios we add the products which have the highest average cross-price elasticities to the MB. Third, in vertical structures it is not clear whether it is the retail price or the wholesale price which has to be increased. In market structures with TPT contracts and RPM, manufacturers can effectively choose the retail price in order to maximize joint industry profits.[27] For this reason, we raise the retail prices of the products in the candidate market and determine the sign of the profit change.

We get the following first-order conditions from the new maximization problem for the SSNIP market test, which can be solved for the new price-cost margins:

$$\sum_{k=1,\dots,J} (p_k - \mu_k - c_k)\frac{\partial s_k(p)}{\partial p_j} + s_j(p) = 0 \quad \forall \quad j \in \Theta^c, \tag{4.7}$$

and

$$\sum_{k=1,\dots,J} ((1+x)p_k - \mu_k - c_k)\frac{\partial s_k(p)}{\partial p_j} + s_j(p) = 0 \quad \forall \quad j \in \Theta^c, \tag{4.8}$$

Expression 4.7 differs from equation 4.5 only in the definition of the product set Θ^c, which contains now all product within the candidate relevant market. Expression 4.8 defines the profit-maximizing margin for the candidate relevant market after a price increase of $x\%$.

Furthermore, we show how results are biased, when a wrong contract type—i.e, a linear contract—is assumed. As outlined in section 4.2. the main difference between linear contracts and our preferred model 8 is the number of cross effects

we show that the general results hold for the case where manufacturers have the pricing power to increase prices for both label types.

[26] This is to test our secondary objective on the type of inter-brand vs intra-brand competition.

[27] When contracts are linear we assume full pass-through between wholesale and retail prices. Then retailers fully translate wholesale price changes to retail prices. A $x\%$ price increase of the wholesale price will then result in a $x\%$ price increase of the retail price.

internalized in the maximization problem. With linear contracts and Bertrand-Nash competition, all cross effects from the same manufacturer are internalized. Instead, model 8 assumes that vertical channel members are able to jointly maximize their surplus maximization, which means that the cross effects of all products on the market are internalized. As the cross effects in form of cross-price elasticities are positive for the logit case, we expect a price increase to be profitable for a smaller set of products than this is the case for linear contracts with Bertrand-Nash competition. Thus, the SSNIP test algorithm stops earlier, and the relevant market could be defined too narrowly.

4.5 Empirical Results

This section presents the first stage regression in section 5.1, demand side results in section 5.2, and the results of the SSNIP test in section 5.3.

4.5.1 First Stage Regression

Observed retail prices are likely to be correlated with unobserved (by the researcher) variables, such as perceived quality of product or store and promotion or advertising activity. If the unobserved variables are correlated with the purchasing decision, the estimated price coefficient is biased. To control for this endogeneity problem, we estimate our structural model of demand in two stages. In the first stage, we regress prices on characteristics from the demand equation and a set of instrument variables. In the second stage, we use the residuals from the reduced-form pricing regression as an additional explanatory variable in the demand equation to control for unobservables that affect prices and demand. Conditional on this control variable, prices are exogenous (Petrin & Train 2010).[28]

The identification strategy is standard in the literature. We follow the literature and collect data on cost shifters as potential instrument variables. Variation in costs tend to be correlated with prices but uncorrelated with unobserved demand shifters (e.g., Bonnet & Dubois 2010a, Bonnet & Dubois 2015). Data on cost shifters is obtained from Thomson Reuters databases. Polyethylen spot prices from the Thomson

[28] Alternatively, Berry et al. (1995) suggest using a contraction mapping matching observed and predicted market shares to recover product-market-level constants, which can be regressed on observed characteristics using standard IV methods. However, Berry, Linton and Pakes (2004) show that this method highly sensitive to sampling error.

Reuters ICIS Pricing database are used as a plastic cost shifter. The energy cost shifter is obtained from Thomson Reuters European Energy Exchange database. We also tested other cost shifters, i.e., paper index, oil prices, and a wage index, which did not have significant impact on prices. Furthermore, we include brand and retailer specific binary variables to account for idiosyncratic supply factors that may affect retail prices.
The estimation (table 4.5) shows the results from the first stage. Cost shifters are significant and have the expected positive sign indicating the positive correlation. Our set of instruments performs well explaining 98% of the variation in product prices.

4.5.2 Demand-Side Results

Results from the demand estimation are provided in table 6.6. The sign of the price coefficient is negative as expected. The standard deviation of the price is notably large, half as high as the price coefficient, indicating that customers have heterogeneous price preferences. Taking into account brand and retailer dummies, we can see that consumers strongly value different retailers and manufacturers, as almost all variables are significant. Using the control function in the demand estimation yields a significant positive coefficient of the control function, indicating that the control function captures a positive correlation of unobserved factors with prices.
Table 4.4 provides information on the price elasticities of all brands and retail formats. Evidently, the own-price elasticities are all within the elastic region of the demand function and range between -2.1 and -2.7. Despite a higher price of the premium labels, branded products have, on average, the lowest own-price elasticities. But the average of own-price elasticities for private labels and standard branded products both range between -2.4 and -2.7. A similar pattern is found for mean cross-price elasticities, where the lowest values are for the premium products and standard brands and private labels are more comparable, but cross-price elasticities are slightly higher for private labels. Still, the difference is small in absolute terms. On top of this ad-hoc comparison of mean values, we also test the difference of the values via t-tests. We find that own-price elasticities of PL and MB are statistically different, where private labels have a mean value of -2.62 and branded products of -2.52. Thus, consumers of branded products are slightly less elastic, but the economic significance is low. Furthermore, consumers of discounters are less elastic than other consumers: -2.5 for discounters and -2.58 for other formats. Consumers visit-

ing drugstores have a mean price sensitivity of -2.58 which is statistically different from all other formats (-2.55). However, we do not find that cross-price elasticities are statistically different from each other for any of the above-mentioned cases. The result is consistent with the fact that in quality tests private label products perform as well as the higher priced manufacturer brand.[29] We have also specified a random coefficient for the private label dummy, but it turned out that the coefficient was not significant, which is an indication that substitution patterns within PL/MB are not significantly different from substitution pattern between PL and MB (Train 2009). Table 4.7 shows own- and cross-price elasticities for the MB and for the PLs at different formats. PLs from different formats are ranked with respect to the perceived closeness to the MB. PLs from discounters are the closest substitutes followed by PLs from supermarkets and from drugstores, but the premium label is not considered to be a close substitute for consumers. We will use this ranking to add products to the initial candidate market of all MB.

4.5.3 Profit Margins and SSNIP tests

After having selected the best supply-side model—which is model 8: TPT with RPM and $w = \mu$—and given the demand estimates, we test our hypotheses by conducting a SSNIP test. We (i) uncover the degree of competition between brand labels (inter-brand competition) and across retail formats (inter-format competition) for a given product category, and we (ii) show the importance of accounting for the correct vertical market structure.

Table 4.7 also lists estimated profits and channel costs for our preferred supply model 8. Profits are highest for the premium label followed by the regular brand averaged over all formats. Brand labels are, on average, also more expensive to produce than PLs, where highest costs are estimated for the premium label. This pattern is in line with observed prices since the premium manufacturer label is observed to have highest prices.

Given these profit margins, we implement our tests. The procedure is straightforward and follows the general logic of the SSNIP test. First, we select the MB from all formats as a candidate market and we simulate whether a small and significant price increase of 5–10% is profitable to test whether MB constitute an own relevant

[29] see, for instance, the test result from "OEKOTEST" M1401, No.1, January 2014, available online: http://www.oekotest.de/cgi/index.cgi?action=heft&heftnr=M1401

market. If the price increase is not profitable, we subsequently add PL products from supermarkets, drugstores, and discounters, where the order is determined by the perceived closeness to the regular MB measured by the cross-price elasticities. This test yields the degree of inter-brand competition between MB and PL by defining the relevant market for the MBs. Second, we select all MB and PL within a format as a candidate relevant market and impose the same price increase in order to test the degree of inter-format competition.[30]

Table 4.8 shows the results of the SSNIP analysis. Imposing a 10% price increase on all MB reduces profits calculated from model 8 by 3.15%. We thus find that it is not profitable for the manufacturer to increase profits for all its brands and MBs do not constitute their own relevant market. Adding the next-best substitutes to the candidate market—which are PL from discounters—and jointly increasing prices is still not profitable. Profits change by -0.56%. After adding PL from drugstores leads to a positive profit change for model 8. We conclude from this that the relevant market consists of MBs from all formats, PL from discounters, and PL from drugstores. This result seems to be quite intuitive since consumer tests have shown that consumers perceive PL from drugstores as comparable in quality. PL from discounters have rather high frequency of purchase, which drives the magnitude of cross-price elasticities by definition. We derive the following policy implications from this: even if researchers and practitioners have anecdotal evidence from production processes or questionnaires, products may be substitutes from the consumers' point of view. Thus, demand substitution patterns should be a fixed component of any market definition exercise.

An interesting insight is the difference in the results of TPT with RPM (model 8) and LP (model 1). Assuming linear contracts would erroneously define the relevant market too widely. If we choose linear contracts for market definition, we would find that the relevant market consists of all products. To illustrate the persistence of this effect, we provide some more results from the SSNIP test with changes in the ordering of widening the candidate relevant market. In all cases—except the 5% price increase for MB + PL Disc + PL Drug—we find that assuming linear contracts

[30]Instead, we could define for each brand at each retailer the relevant market. We follow Brenkers & Verboven (2007) who argue that this procedure is quite cumbersome. We could also add the PL from different retailers instead of all PL within a format. As we are interest in the degree of inter-brand and inter-format competition, this procedure seems to be less straightforward. However, our main result—the importance of accounting for the vertical market structure—still holds, but we may find different results in the market definition.

define the market too widely. As model 8 acknowledges that the industry is jointly profit-maximizing, all cross-price effects are included in the profit maximization. This is due to the fact that we explicitly incorporate the market structure and the market power of firms. The results show that constraints on the supply side can have impact on the results of the market definition. Researchers and practitioners should thus include demand substitution patterns and the vertical market structure into their analysis.

Next, as a test for inter-format competition, we simulate whether a price increase within a format—for both MB and PL—is profitable for the set of products. Table 4.8 shows that a price increase for MB+PL Disc and MB+PL Super is not profitable. Consequently, the price for any subset of these products—MB Drug—will be unprofitable. Hence, we just have to check whether the price increase for MB Drug and PL Drug is profitable. Since the price increase is also not profitable, we find strong evidence on active competition across formats. For the given products category, none of the formats has the ability to profitably raise prices due to demand constraints in the form of consumer substitution patterns.

Table 4.8 also shows the results from including premium labels into the candidate market, which are not close substitutes either to the regular MB or to the PL. In that case the joint price increase has to be imposed solely on the regular MB labels and on the premium labels. The general results still hold because substitution to the premium labels is quite low. As in the case of premium brands excluded from the relevant market, we find inter-brand as well as inter-format competition, and we find that assuming LP would define the relevant market too widely.

4.6 Conclusion

Given the relevance of market definition in recent antitrust investigations, we aimed (i) at analyzing demand substitution patterns to uncover the degree of competition between brand labels (inter-brand competition) and across retail formats (inter-format compeition) for a given product category, and (ii) at showing the importance of accounting for the correct vertical market structure. By estimating a flexible demand model—using data from a rich and detailed representative consumer panel—we derive precise demand substitution patterns. Based on these demand substitution patterns, which are taken into account in the profit-maximization problems of firms,

we inferred firms' price-cost margins for a range of equilibrium supply models accounting for vertical industry structure. We tested which of the proposed models fits observed data best. We then conducted a SSNIP test with profit margins from the best supply model to test our hypotheses. The test has several advantages as it incorporates consumer substitution behavior, market power, and the type of vertical contracts based on recent developments of empirical structural estimation.

Notably, our study highlights the importance of including consumer substitution behavior and shows the necessity to model the vertical dimension on the supply side. We propose—following the general methods of the full-equilibrium model literature—to add a test between a range of equilibrium models prior to conducting the SSNIP test. We demonstrate that assuming the wrong type of contract, e.g., a linear contract instead of a non-linear contract between supplier and retailer, leads to strong deviations in the results in the market definition, which underlines the relevance of our results. Applying the SSNIP test, we find evidence for high degree of competition between brand labels and across retail formats for the diaper market. In our particular case, PL are the only source for inter-brand competition for a market structure where strong manufacturers exist who are able to conduct RPM. Excluding PLs therefore would have suggested that there is a monopoly on the supply-side. Any market definition should therefore rely on actual substitution patterns.

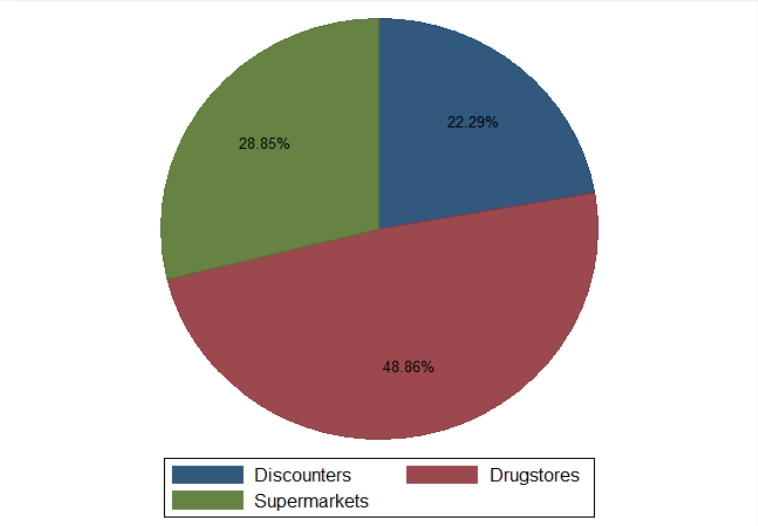
This form of inter-format and inter-brand competition is not considered in many antitrust analyses, which often exclude discounters and/or PL a-priori without considering demand-substitution patterns. Even if researchers and practitioners have anecdotal evidence from production processes or questionnaires, products may be substitutes from the consumers' point of view. Without the proposed definition exercises one might have been tempted to exclude PLs and/or discounters and/or drugstores from the relevant market. A simple segmentation of markets by retail formats is misleading and can easily lead to erroneous decisions. For instance, the German Bundeskartellamt and the British competition commission excluded discounters from their investigations without testing whether discounters' products are substitutes from the consumer point of view. This may lead to a market definition which is too narrow, where market power is overestimated. Moreover, our results show that a-priori excluding certain segments, such as discounters or PL, is not recommendable since we find that the relevant market consists of several, not all, PL from different formats. Regarding the consideration of the vertical market dimen-

sion, the results show that constraints on the supply-side can have impact on the results of the market definition. Researchers and practitioners should thus include demand substitution patterns and the vertical market structure into their analyses. These findings do not claim that the entire investigations of antitrust authorities are wrong, since an analysis of the whole grocery sector requires an investigation of more than one category, but our methodology enriches the toolbox in order to minimize the risks of erroneous conclusions.

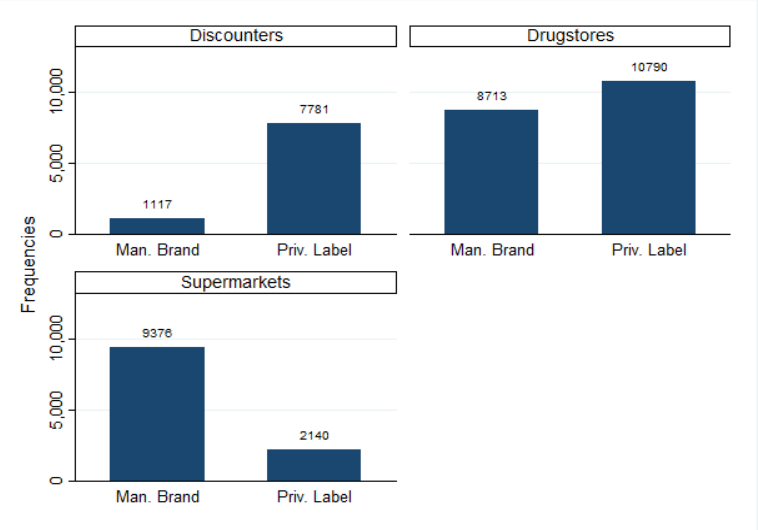
4.7 Appendix

4.7.1 Figures

Figure 4.1: Descriptive Statistics over Formats



(a) Market Shares Formats total



(b) Frequencies by Formats and Brand Type

4.7.2 Rivers-Vuong Test

Once we have obtained the price-cost margins for the different supply models, we implement the Rivers-Vuong test (Rivers & Vuong 2002) to select the supply model with the best fit using cost restrictions. To this extent, we recover total channel costs for a given supply model and add variables which affect marginal costs. We then select the model with the highest correlation with the additional variables.[31]
Total channel cost C_{it} for a given supply model v is the sum of retail and wholesale costs $C_{it}^v = \mu_{it}^v + c_{it}^v$. We assume the following holds:

$$ln(C_{it}^v) = a_i^v + Z_{it}'\gamma^v + ln(\eta_{it}^v)$$
$$E[ln(\eta_{it}^v)|a_i^v, Z_{it}] = 0$$

where a_i^v is product-specific constant, Z_{it} are observable cost shifters and η_{it}^v are unobservable cost shifters.
We want to infer which cost equation has the best statistical fit given the observed cost shifters Z_{it} and test a given supply model v against another supply model $\tilde{v}$. Because the total channel margin for a given supply model v is the sum of the retail and wholesale margin $m_{it} = m_{rit} + m_{mit}$ we can state for model v:

$$p_{it} - m_{it}^v = C_{it}^v = [exp(a_i^v + Z_{it}'\gamma^v)]\,\eta_{it}^v$$

and for the alternative model v'

$$p_{it} - m_{it}^{\tilde{v}} = C_{it}^{\tilde{v}} = \left[exp(a_i^{\tilde{v}} + Z_{it}'\gamma^{\tilde{v}})\right]\eta_{it}^{\tilde{v}}.$$

By using non-linear least squares to minimize the parameters (a_i^v, γ^v) resp. $(a_i^{\tilde{v}}, \gamma^{\tilde{v}})$, we can derive values Q_n^v and $Q_n^{\tilde{v}}$, which are the lack of fit criteria for models v and v' at the estimated parameter values:

$$\min_{(a_i^v,\gamma^v)} Q_n^v(a_i^v, \gamma^v) = \min_{(a_i^v,\gamma^v)} \frac{1}{n}\sum_{i,t} ln(\eta_{it}^v)^2.$$

resp.

$$\min_{(a_i^{\tilde{v}},\gamma^{\tilde{v}})} Q_n^{\tilde{v}}(a_i^{\tilde{v}}, \gamma^{\tilde{v}}) = \min_{(a_i^{\tilde{v}},\gamma^{\tilde{v}})} \frac{1}{n}\sum_{i,t} ln(\eta_{it}^{\tilde{v}})^2.$$

Null hypothesis is that two non-nested models are asymptotically equivalent if:

$$H_0 : \lim_{n\to\infty} \left\{E\left[Q_n^v(\bar{a}_i^v, \bar{\gamma}^v)\right] - E\left[Q_n^{\tilde{v}}(\bar{a}_i^{\tilde{v}}, \bar{\gamma}^{\tilde{v}})\right]\right\} = 0.$$

[31] The general procedure is similarly explained in Bonnet & Dubois (2010a).

Thus, if the difference of the expectation of the lack-of-fit criteria at the pseudo-true parameter values $(\bar{a}_i^v, \bar{\gamma}^v)$ resp. $(\bar{a}_i^{\tilde{v}}, \bar{\gamma}^{\tilde{v}})$ are not statistically different from each other.

Model v is asymptotically better than v' if

$$H_a : \lim_{n\to\infty} \left\{ E\left[Q_n^v(\bar{a}_i^v, \bar{\gamma}^v)\right] - E\left[Q_n^{\tilde{v}}(\bar{a}_i^{\tilde{v}}, \bar{\gamma}^{\tilde{v}})\right] \right\} < 0$$

and model v' is asymptotically better than v if

$$H_b : \lim_{n\to\infty} \left\{ E\left[Q_n^v(\bar{a}_i^v, \bar{\gamma}^v)\right] - E\left[Q_n^{\tilde{v}}(\bar{a}_i^{\tilde{v}}, \bar{\gamma}^{\tilde{v}})\right] \right\} > 0$$

The test statistic T_n is calculated as the normalized difference of the sample lack-of-fit criteria evaluated at the estimated parameters of the model $(\hat{a}_i^v, \hat{\gamma}^v)$ resp. $(\hat{a}_i^{\tilde{v}}, \hat{\gamma}^{\tilde{v}})$ and captures the statistical variation that characterizes the calculated lack-of-fit criteria:

$$T_n = \frac{\sqrt{n}}{\hat{\sigma}_n^{v\tilde{v}}} \left\{ Q_n^v(\hat{a_i}^v, \hat{\gamma}^v) - Q_n^{\tilde{v}}(\hat{a}_i^{\tilde{v}}, \hat{\gamma}^{\tilde{v}}) \right\},$$

where $\hat{\sigma}_n^{v\tilde{v}}$ is the estimated variance of the lack-of-fit differences. Rivers & Vuong (2002) have shown that the asymptotic distribution of the test values follows a standard normal distribution if two models are non-nested. To select the model with the best fit, we simply compare our empirical T_n values with the critical values of the one-sided standard normal distribution at the desired test size α.

4.7.3 Supply Side Models

Non-Collusive Linear Pricing Contracts without Vertical Integration

For illustration purposes, consider first that retailers and manufacturers agree on contracts with linear prices. We will assume a full pass-through of retailers and consider two different setups regarding the structure of private label products for each of the two pass-through scenarios: (a) they are produced by a single product profit-maximizing manufacturer and (b) retailers are vertically integrated w.r.t. private label products. In the latter case retailers choose optimal prices for their private labels and manufacturer margins are zero.

Suppose first that private labels are not vertically integrated. There are R retailers and each retailer chooses whether to stock the product i in its product category portfolio Θ_r. There are M manufacturers in the market, either branded label manufacturers or private label manufacturers, who offer a set of differentiated products Θ_m.

Profits for retailers are defined as:

$$\Pi_r \;=\; \sum_{i \in \Theta_r} \left[p_i \;-\; w_i \;-\; c_i\right] \; q_i(p) \; \forall \; r \;=\; 1 \; ... \; , R, \tag{4.9}$$

where retail profits[32] are defined as the sum of the per product margin over all products i in retail portfolio Θ_r. The margin for product i at time t is given by retail price p_i, the wholesale price w_i, the retail costs c_i, and the market share q_i, which is a function of all retail prices.
Optimal prices are found by taking the first-order conditions w.r.t. prices:

$$q_i(p) \;+\; \sum_{j \in \Theta_r} \left[p_j \;-\; w_j \;-\; c_j\right] \; \frac{\partial q_j(p)}{\partial p_i} \;=\; 0 \; \forall \; i = 1, ..., J,$$

where $\frac{\partial q_j}{\partial p_i}$ is the market share response matrix estimated by the first derivatives of the demand function with respect to prices. The equation shows that retailers are constrained in their pricing decision by consumers' switching behavior, i.e., by the own-price marginal effect. But they also internalize the cross-price marginal effects if multiple products are owned by the same firm. Since products are substitutes, the cross-price marginal effects are positive, which leads to higher optimal prices in case of multi-product firms compared to the assumption that the same products are produced by single-product firms. Solving for the price-cost margin and using vector notation, we can state:

$$m_r \;=\; p \;-\; w \;-\; c \;=\; -\left[\Omega_r \Delta^{qp} \Omega_r\right]^{-1} \; q(p). \tag{4.10}$$

$p - w - c$ is now a $Jx1$ vector containing retail margins for each product, $q(p)$ a $Jx1$ vector of market shares, Δ^{qp} is a JxJ matrix of first-order price derivatives. Ω_r is the retailer ownership matrix which indicates whether firms sell multiple products. The ownership matrix is a JxJ diagonal matrix with cell entries (j, j) equal to 1 if a product is stocked by the retailer and 0 otherwise.
Note that retailers set their prices given the manufacturer decision and thus their margins are independent of the timing. This is not the case for manufacturers, whose profits depend on the timing. When manufacturers set prices first, they anticipate how retail prices will change in response to optimal wholesale prices. Hence, retail

[32]Please note that for actual total profits, we have to multiply equation 4.9 with the market size, which we normalize to $MS = 1$. Furthermore, we drop the time subscript t. Actually, retailers make a profit in each period t, such that we have in total N observations as the product of the total amount of differentiated products J and time periods T.

prices are then a function of wholesale prices, i.e., $p(w)$, which is not the case in the simultaneous price-setting scenario. In the sequential setup, manufacturer profits depend on the pass-through rate at which wholesale price changes are translated into retail prices. Profit margins are scaled by this effect: the lower the pass-through rate, the higher the manufacturer profits. Moreover, if the pass-through rate is above 1 then manufacturers have a strategic disadvantage and profits are lower than in the case of simultaneous price setting.

Profits for manufacturers are defined as:

$$\Pi_m \;=\; \sum_{i \in \Theta_m} [w_i \;-\; \mu_i] \;\; q_i(p) \;\; \forall \;\; m \;=\; 1 \; ... \; , M, \tag{4.11}$$

where μ_i is the wholesale cost, w_i is the wholesale price and the remainder is defined as above. Taking the first-order condition w.r.t. w_i results in:

$$q_i(p) \;+\; \sum_{j \in \Theta_m} \sum_{k=1}^{J} [w_j \;-\; \mu_j] \;\; \frac{\partial q_k(p)}{\partial p_j} \;\; \frac{\partial p_j}{\partial w_i} \;\;=\;\; 0 \;\; \forall \;\; i = 1, ..., J.$$

As in Sudhir (2001), we assume full pass-through where changes in the wholesale price are fully translated into retail prices and that there are no cross-brand pass-through effects. Thus, Δ^{pw} is the identity matrix because the pass-through rate is equal to 1. Using vector notation, the margins are then given by:

$$m_m \;\;=\;\; w \;-\; \mu \;\;=\;\; -\left[\Omega_m \;\star\; (\Delta'^{pw} \Delta^{qp})\right]^{-1} \;\; q(p), \tag{4.12}$$

where everything except Δ^{pw} is defined above. Δ^{pw} is a JxJ matrix capturing the pass-through of retail price changes after wholesale price changes.

Collusive Linear Pricing Contracts without Vertical Integration

Furthermore, we are able to consider collusive practices in the vertical chain for each of the different timings by simple modifications of the ownership matrices. We first model retailer-level collusion, where retailers are jointly profit-maximizing, which is equivalent to replacing the ownership matrix of retailers in equation 4.10 with a matrix full of ones. This will generate higher prices (and profit margins) because retailers internalize the positive cross-price effects of all products in the market. Channel margins are calculated by summing the retailer collusion margins with the non-collusive manufacturer margins from equation 4.12. Channel margins of a manufacturer-level collusion model are calculated following the same logic: For collusive manufacturer margins, we replace the manufacturer ownership matrix from equation 4.12 with a matrix full of ones, whereas the retail margins are given by

equation 4.10. Furthermore, we can calculate the double-collusion model by adding together the collusive margins from both retailers and manufacturers.

Linear Pricing Contracts with Vertical Integration

We do not have detailed information on the ownership structure of private labels. Thus, we test all models in two variants: PL as vertically integrated products and PL as being produced by a single product producer. The latter case is described above. However, if private labels are vertically integrated, retailers produce their own products and thus eliminate the wholesale margin for these products, which means that manufacturers do not optimize over the private label products. To determine the channel margin for the vertical integration models, we calculate retail margins as in equation 4.10 and manufacturer margins $\tilde{m}_r$ by replacing the ownership matrix and market shares in equation 4.12 with $\tilde{\Omega}_r$ and $\tilde{q}(p)$ respectively. The former is a JxJ matrix with rows and columns equal to zero for private labels and the latter is the market share vector of manufacturer brands. Furthermore, vertical integration affects Δ^{pw}. Since wholesale prices do not matter for private labels when they are vertically integrated, we replace rows of the matrix with zeros for private labels. Columns are not replaced because the price effect of wholesale prices on private label retail prices are internalized in manufacturers' pricing decision optimization.

Two-Part Tariffs without Vertical Integration

For the case of non-linear contracts, we follow the setup of Rey & Vergé (2004) and Bonnet & Dubois (2010a). Rey & Vergé (2004) assume that contracts are observable where retailers and manufacturers have to agree on fixed fees and wholesale prices. Bonnet & Dubois (2010a) generalize the model to a case with multiple retailers. When manufacturers are able to exert retail price maintenance (RPM) then contracts also involve retail prices. In this setup, we identify three models with non-linear prices, one model with TPT without RPM and two TPT models with RPM.[33] Rey & Vergé (2004) show for TPT with RPM that for any given vector of wholesale prices there is one optimal equilibrium outcome and they propose two intuitive equilibria, which we consider to calculate the margins: wholesale prices equal to marginal costs, and retail margins equal to zero.

The general timing of the game is as follows:

- Manufacturers simultaneously propose contracts to all retailers
- Retailers simultaneously accept or reject offers, which are public information

[33] These are the same models which can be found in Bonnet & Dubois (2010a).

- If all offers are accepted, retailers simultaneously set their prices

If one offer is rejected, then no contract is signed and retailers earn profits in the magnitude of their outside option. Retail profits are defined as

$$\Pi_r \;=\; \sum_{s\in\Theta_r}(p_s - w_s - c_s)q_s(p) - F_s \;\; \forall\; r \;=\; 1 \;...\;, R,$$

where everything is defined above, except for the franchise fee F_s, which has to be paid from the retailer to the manufacturer:

$$\Pi_m \;=\; \sum_{k\in\Theta_m}(w_k - \mu_k)q_k(p) + F_k \;\; \forall\; m \;=\; 1 \;...\;, M$$

Manufacturers maximize profits by choosing optimal (p, w, F):

$$\max_{\{p_k, w_k, F_k\}\forall k\in\Theta_m} \pi_m = \sum_{k\in\Theta_m}(w_k - \mu_k)s_k(p) + F_k,$$

subject to the binding participation constraint that retailers' profits are at least as high as profits from their outside option $\pi_r \geq \overline{\pi}_r \;\forall\; r = 1, ..., R$. We assume that $\overline{\pi}_r$ is a exogenous constant which can be normalized to zero. By setting reservation utilities to zero, we can solve retailers' profits for the fixed fee:

$$\sum_{s\in\Theta_r} F_s = \sum_{s\in\Theta_r}(p_s - w_s - c_s)s_s(p). \tag{4.13}$$

Note that we can write manufacturer profits as

$$\begin{aligned}
\Pi_m &= \sum_{k\in\Theta_m}(w_k - \mu_k)s_k(p) + \sum_{k\in\Theta_m} F_k \\
&= \sum_{k\in\Theta_m}(w_k - \mu_k)s_k(p) + \sum_{k} F_k - \sum_{k\notin\Theta_m} F_k \\
&= \sum_{k\in\Theta_m}(w_k - \mu_k)s_k(p) + \sum_{r}\left(\sum_{k\in\Theta_r} F_k\right) - \sum_{k\notin\Theta_m} F_k
\end{aligned}$$

Now we can plug in equation 4.13 into manufacturer profits in order to obtain

$$\begin{aligned}
\Pi_m &= \sum_{k\in\Theta_m}(w_k - \mu_k)s_k(p) + \sum_{r}\left(\sum_{s\in\Theta_r}(p_s - w_s - c_s)s_s(p)\right) - \sum_{k\notin\Theta_m} F_k \\
&= \sum_{k\in\Theta_m}(w_k - \mu_k)s_k(p) + \sum_{k}(p_k - w_k - c_k)s_k(p) - \sum_{k\notin\Theta_m} F_k \\
&= \sum_{k\in\Theta_m}(p_k - \mu_k - c_k)s_k(p) + \sum_{k\notin\Theta_m}(p_k - w_k - c_k)s_k(p) - \sum_{j\notin\Theta_m} F_j
\end{aligned}$$

Manufacturers optimize given the chosen fixed fee of competitors and thus the fixed fee $\sum_{j \notin \Theta_m} F_j$ drops out of the maximization problem.

Let us first consider the RPM equilibria. When manufacturers are able to exert RPM, then they are able to set optimal retail prices. The maximization problem for a given RPM equilibrium $p^*(w^*)$ for all $m = 1, ..., M$ can be written as:

$$\max_{\{p_k\} \forall k \in \Theta_m} \sum_{k \in \Theta_m} (p_k - \mu_k - c_k) s_k(p) + \sum_{k \notin \Theta_m} (p_k^* - w_k^* - c_k) s_k(p),$$

and has the FOC

$$\sum_{k \in \Theta^m} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) + \sum_{k \notin \Theta^m} (p_k^* - w_k^* - c_k) \frac{\partial s_k(p)}{\partial p_j} = 0 \quad \forall \quad j \in \Omega^m. \tag{4.14}$$

Each j of the product portfolio of manufacturer m has an FOC as above, which depends on an "own product effect," which is the first part of the equation and a "competitors' product effect," which is the last part of the equation. It is worth noting that profits depend on the total channel margin for own products and the retail margin for competitors' products.

Rey & Vergé (2004) point out that there are multiple equilibria when manufacturers exert RPM, i.e., there is one optimal vector of retail prices for any given vector of wholesale prices. However, Rey & Vergé (2004) propose two intuitive equilibria. One where wholesale prices are equal to the marginal cost of production ($w_k^* = \mu_k$), where manufacturers make zero profits via per unit charges but extract monopoly profits via fixed fees. A second equilibrium is one where wholesale prices are such that the retailer's price-cost margin is zero ($p_k^*(w^*) - w_k^* - c_k) = 0$. This equilibrium solution implies that retailers add retail costs to proposed wholesale prices. In that case profit-sharing rule is not identified and we can only recover the total channel margin.

Let us first consider the equilibrium ($w_k^* = \mu_k$). The FOC is given by

$$\sum_{k \in \Theta^m} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) + \sum_{k \notin \Theta^m} (p_k^* - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} = 0 \quad \forall \quad j \in \Theta^m,$$

which can be summarized as:

$$\sum_{k=1,...,J} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) = 0 \quad \forall \quad j \in \Theta^m, \tag{4.15}$$

Using vector notation, the channel margins can be calculated as in equation 4.10, but with every entry of the ownership matrix equal to 1 instead of Ω_r because this is

the outcome of a jointly profit-maximizing industry. Manufacturers offer products at their marginal costs, let retailers act as residual claimants and recover total profits with fixed fees.

Another potential intuitive equilibrium is $(p_k^*(w^*) - w_k^* - c_k) = 0$. The FOC is given by

$$\sum_{k \in \Theta^m} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) = 0 \quad \forall \quad j \in \Theta^m, \tag{4.16}$$

Margins for this FOC can be calculated as in 4.12, but in this case 4.12 is the total channel margin since retailers make zero margins.

We also consider the case of TPT without RPM, where manufacturers choose the profit-maximizing wholesale price, which yields the following maximization routine:

$$\max_{\{w_k\} \forall k \in \Theta_m} \sum_{k \in \Theta_m} (p_k - \mu_k - c_k) s_k(p) + \sum_{k \notin \Theta_m} (p_k - w_k - c_k) s_k(p).$$

The FOCs $\forall \quad i \in \Theta^m$ are:

$$\sum_k \frac{\partial p_{kt}}{\partial w_{jt}} s_{kt}(p) + \sum_{k \in \Theta^m} \left[(p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} \frac{\partial p_j}{\partial w_i} \right] + \sum_{k \notin \Theta^m} \left[(p_k - w_k - c_k) \frac{\partial s_k(p)}{\partial p_j} \frac{\partial p_j}{\partial w_i} \right] = 0, \tag{4.17}$$

which we can solve for the total channel margin $(p_k - \mu_k - c_k)$. Solved for the price-cost margin and stated in vector notation, we get:

$$m_{mt} + m_{rt} = (\Omega_m \Delta^{qp} \Delta^{pw} \Omega_m)^{-1} (-\Omega_m \Delta^{pw} q(p) - \Omega_m \Delta^{pw} \Delta^{qp} m_r) \tag{4.18}$$

where this model is only identified if manufacturers set prices first. Then the retail margin is known by backward induction, which is not the case for simultaneous price setting.

Two-Part Tariffs with Vertical Integration

Let us now turn to the maximization problems, when private labels are vertically integrated for the two equilibria of TPT with RPM. If private labels are vertically integrated and owned by retailers who carry production costs then retailers do not pay fixed fees for these private labels and have complete pricing power. They maximize profits by choosing optimal prices for their private label portfolio $\tilde{\Theta}^r$. We get for the equilibrium $(w_k^* = \mu_k)$:

$$\max_{p_k \forall k \in \tilde{\Theta}^r} \sum_{k \in \tilde{\Theta}^r} (p_k - \mu_k - c_k) s_k(p), \tag{4.19}$$

with the corresponding FOC:

$$\sum_{k \in \Theta^r} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) = 0 \quad \forall \quad j \in \tilde{\Theta}^r, \tag{4.20}$$

This system of equations, i.e., 4.20 and 4.15, then has to be solved simultaneously, which yields the following expression for the total channel margin in vector notation:

$$m_{mt} + m_{rt} = -\left(\sum_r \Omega_r \Delta'^{qp} \tilde{\Omega}_r \Delta^{qp} \Omega_r\right)^{-1} \left(\sum_r \Omega_r \Delta'^{qp} \tilde{\Omega}_r + \sum_m \Delta'^{qp} \Omega_m\right) q_t(p), \tag{4.21}$$

where $\tilde{\Omega}_r$ is the JxJ identity matrix with diagonal elements equal to 1 if the product is a private label.[34]

For the second equilibrium $(p_k^*(w^*) - w_k^* - c_k) = 0$, we get:

$$\sum_{k \in \Theta^m} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) + \sum_{k=J',...,J} (p_k - \mu_k - c_k) \frac{\partial s_k(p)}{\partial p_j} = 0 \quad \forall \quad j \in \Theta^m, \tag{4.22}$$

where $k = J', ..., J$ are private label products. Manufacturers can choose prices for their branded products such that retail margins are zero for branded products. Recall that 4.14 implicitly includes private label products because the second part of the equation is $\sum_{k \notin \Theta_m} (p_k^* - w_k^* - c_k)$ which is the retail margin of all products not in the manufacturers' portfolio. Hence, for branded products $(p_k^*(w^*) - w_k^* - c_k) = 0 \; \forall \; k = 1, .., (J - J')$. That leaves a term for all private labels $J', ..., J$ in the third part of equation 4.22. This term depends on the retail margin $(p_k - w_k - c_k)$ which is equivalent to the channel margin $(p_k - \mu_k - c_k)$ for private labels. This gives us the channel margin in vector notation for branded products as:

$$\bar{m}_m + \bar{m}_r = -\left[\Omega_m \Delta^{qp} \Omega_m\right]^{-1} \left[\Omega_m q(p) + \Omega_m \Delta^{qp} \tilde{\Omega}(\tilde{m_r})\right], \tag{4.23}$$

and retailers' margins for private labels are given by:

$$\tilde{m}_r + \tilde{m}_r = -\left[\tilde{\Omega}_r \star \Delta^{qp}\right]^{-1} \tilde{q}(p), \tag{4.24}$$

If manufacturers do not practice RPM, but offer TPT, and private labels are vertically integrated then the FOC is the same as in 4.18. But rows and columns of the pass-through matrix is replaced with zeros and now 4.18 is not the channel margin because retailers are allowed to earn profit margins on their private labels. Retailers' profit margin on their private label products is given by equation 4.24 and the manufacturer price-cost margin in case of TPT without RPM is given by

$$m_m + m_r = (\Omega_m \Delta^{pw} \Delta^{qp} \Omega_m)^{-1} (-\Omega_m \Delta^{pw} q(p) - \Omega_m \Delta^{pw} \Delta^{qp} m_r). \tag{4.25}$$

[34] See Bonnet & Dubois (2010a) for details on how to solve this system of equations in order to get expression 4.21.

4.7.4 Tables

Table 4.1: Overview Supply Models

Model	Contract	Vertical Relation	Downstream Competition	Upstream Competition	Private Labels
1	Linear	Full PT	Bertrand-Nash	Bertrand-Nash	Not-Integrated
2	Linear	Full PT	Collusion	Bertrand-Nash	Not-Integrated
3	Linear	Full PT	Bertrand-Nash	Collusion	Not-Integrated
4	Linear	Full PT	Collusion	Collusion	Not-Integrated
5	Linear	Full PT	Bertrand-Nash	Bertrand-Nash	Integrated
6	Linear	Full PT	Collusion	Bertrand-Nash	Integrated
	Linear	Full PT	Bertrand	Collusion	Integrated
	Linear	Full PT	Collusion	Collusion	Integrated
7	TPT	No RPM	Bertrand-Nash	Bertrand-Nash	Not-Integrated
8	TPT	RPM ($w = \mu$)	Bertrand-Nash	Bertrand-Nash	Not-Integrated
9	TPT	RPM ($p = w + c$)	Bertrand-Nash	Bertrand-Nash	Not-Integrated
10	TPT	No RPM	Bertrand-Nash	Bertrand-Nash	Integrated
11	TPT	RPM ($w = \mu$)	Bertrand-Nash	Bertrand-Nash	Integrated
12	TPT	RPM ($p = w + c$)	Bertrand-Nash	Bertrand-Nash	Integrated

TPT=Two-Part Tariffs, Full PT=Full Pass-Through, RPM=Resale-Price Maintenance

Table 4.2: Rivers-Vuong Test

	1	2	3	4	5	6	7	8	9	10	11
2	0.24										
3	2.34	1.15									
4	3.80	4.91	2.33								
5	9.53	3.89	2.99	0.62							
6	4.27	7.43	1.32	-0.42	-1.39						
7	-0.77	-0.87	-0.91	-1.25	-1.29	-1.26					
8	-3.33	-3.60	-3.30	-3.76	-3.79	-3.94	-10.75				
9	-2.87	-3.11	-2.87	-3.30	-3.34	-3.45	-9.23	11.95			
10	-0.91	-1.02	-1.05	-1.40	-1.43	-1.41	-3.53	10.47	8.88		
11	-2.93	-3.17	-2.93	-3.36	-3.40	-3.52	-9.29	13.69	-2.11	-8.93	
12	-2.82	-3.05	-2.82	-3.25	-3.28	-3.39	-9.01	13.16	7.55	-8.67	-8.93

We implement our tests for a test size of $\alpha = 0.05$.

Model v *in the columns and models* v' *in the rows.*

v' *asymptotically equivalent to* v *is not rejected if* $-1.64 < T_n < 1.64$.

Model v *is better than model* v' *if* $T_n > 1.64$

Model v' *is better than model* v *if* $T_n < -1.64$

Table 4.3: Descriptive Statistics

Variable	**Mean**	**SD**	**Min**	**Max**
Total Value Shopping Trip	46.65	34.99	0.50	406.52
Value of Diaper Purchase	13.62	9.83	0.45	183.92
Package Size	59.09	29.68	2.00	800.00
Quantity of Packages per Trip	1.28	0.67	1.00	12.00
Share of Trips with Single Package Purchase	0.79	0.40	0.00	1.00
Price	17.97	2.63	13.75	29.77
Promotion	0.33	0.47	0.00	1.00
PL Share	0.51	0.50	0.00	1.00

Table 4.4: Summary Statistics and Elasticities

Label	Retailer	Price	SD	O.Elast.	SD	M.share
MB	Disc 0	17.68	0.95	-2.69	0.04	0.43
	Drug 1	18.53	0.39	-2.55	0.03	4.83
	Drug 0	19.61	1.88	-2.66	0.07	0.19
	Super 1	19.06	0.90	-2.68	0.04	0.64
	Super 2	19.02	0.42	-2.65	0.04	1.63
	Disc 2	20.69	1.17	-2.59	0.07	1.67
	Super 3	18.84	0.51	-2.70	0.04	0.32
	Drug 2	20.05	0.86	-2.67	0.05	0.32
	Disc 3	18.66	0.79	-2.69	0.04	0.34
	Super 4	18.75	0.40	-2.66	0.04	1.54
	Super 5	21.56	1.16	-2.59	0.08	0.32
	Drug 4	18.24	0.57	-2.65	0.04	1.89
	Super 0	18.75	0.60	-2.69	0.04	0.45
	Drug 5	20.65	0.63	-2.63	0.05	0.77
MB PR	Disc 0	25.76	1.34	-2.17	0.18	0.14
	Drug 1	22.44	0.72	-2.49	0.04	1.84
	Drug 0	25.10	2.25	-2.23	0.31	0.07
	Super 1	24.20	1.16	-2.37	0.12	0.24
	Super 2	23.20	0.70	-2.47	0.06	0.63
	Super 3	24.55	1.17	-2.33	0.12	0.12
	Drug 2	23.41	1.34	-2.45	0.11	0.13
	Super 4	23.34	0.74	-2.46	0.06	0.58
	Super 5	24.70	2.11	-2.29	0.24	0.14
	Drug 4	23.11	1.28	-2.46	0.11	0.69
	Super 0	24.00	0.82	-2.40	0.09	0.17
	Drug 5	24.76	1.69	-2.29	0.23	0.31
PL	Disc 1	15.34	0.19	-2.52	0.03	3.85
	Disc 0	15.00	0.32	-2.60	0.04	0.51
	Drug 1	15.81	0.23	-2.48	0.03	5.65
	Drug 0	16.62	0.84	-2.68	0.04	0.22
	Super 1	15.37	0.67	-2.61	0.05	0.81
	Super 2	16.21	0.31	-2.61	0.04	1.90
	Disc 2	17.84	0.35	-2.65	0.03	1.87
	Super 3	15.82	0.76	-2.64	0.05	0.38
	Drug 2	15.92	0.75	-2.65	0.05	0.41
	Disc 3	16.75	0.37	-2.68	0.04	0.35
	Super 4	16.21	0.45	-2.62	0.04	1.77
	Super 5	18.40	0.67	-2.70	0.04	0.36
	Drug 4	14.07	0.22	-2.48	0.03	2.58
	Super 0	16.13	1.01	-2.65	0.04	0.53
	Drug 5	18.72	0.50	-2.68	0.04	0.80

Table 4.5: First-Stage Regression Results

	b/se
plastic	4.8088***
	(0.3364)
energy	0.0567***
	(0.0078)
Brand FE	Yes
Retailer FE	Yes
r2	0.98
N	984

Standard errors in parentheses.
*Significant at 1% ***,*
*significant at 5 % ** ,*
*significant at 10% **

Table 4.6: Demand Estimation Results

	mixlog b/se
Control Function	0.0735***
	(0.0069)
Mean Price	-0.2359***
	(0.0027)
SD Price	0.1192***
	(0.0082)
MB Prem	-0.3328***
	(0.0450)
PL	-0.1838***
	(0.0172)
Retailer FE omitted	
aic	382170.1983
N	3957534

Standard errors in parentheses.
*Significant at 1% ***,*
*significant at 5 % ** ,*
*significant at 10% **

Table 4.7: Prices, Profits, Costs, Elasticities for MB and PL per Retail Format

	Price	Channel Profits	Channel Costs	Own-Price Elasticity	Cross-Price Elasticity
MB	19.2929	14.5139	4.7789	-2.6489	
	(1.3608)	(0.9214)	(0.4698)	(0.0642)	
PL Discounters	16.0602	12.5869	3.4733	-2.6113	0.0385
	(1.1508)	(0.6416)	(0.5356)	(0.0656)	(0.0013)
PL Drugstores	16.2294	12.6951	3.5343	-2.5934	0.0384
	(1.6102)	(0.9030)	(0.7272)	(0.0996)	(0.0013)
PL Supermarket	16.5513	12.8584	3.6929	-2.6430	0.0383
	(1.1521)	(0.6740)	(0.5059)	(0.0503)	(0.0013)
MB Prem	24.0470	18.4077	5.6393	-2.3683	0.0296
	(1.6277)	(1.9062)	(0.5195)	(0.1864)	(0.0035)

Standard deviations in parentheses. Cross-Price Elasticity calculated w.r.t. the MB.

Table 4.8: SSNIP Test

	Profit Change after an increase of			
	5%		10 %	
	Model 1	Model 8	Model 1	Model 8
MB	-8.93	-1.72	-17.28	-3.15
MB + PL Disc	-5.48	-0.18	-11.48	-0.56
MB + PL Disc + PL Drug	0.11	2.52	-0.74	4.61
MB + PL Super	-6.74	-0.78	-13.67	-1.64
MB + PL Super + PL Disc	-2.93	1.02	-6.81	1.59
MB + PL Super + PL Drug	-1.46	1.75	-3.95	3.04
MB + PL Drug	-4.18	0.48	-9.12	0.62
MB Drug + PL Drug	-6.65	-0.67	-13.63	-1.47
MB + MB Prem	-7.25	-0.97	-14.13	-1.74
MB + MB Prem + PL Disc	-4.22	0.35	-8.96	0.49
MB + MB Prem + PL Disc + PL Drug	1.01	2.69	1.28	5.06
MB + MB Prem + PL Super	-5.35	-0.17	-10.95	-0.44
MB + MB Prem + PL Super + PL Disc	-1.84	1.40	-4.53	2.42
MB + MB Prem + PL Super + PL Drug	-0.47	2.03	-1.79	3.69
MB + MB Prem + PL Drug	-3.03	0.90	-6.76	1.54
MB Drug + MB Prem Drug + PL Drug	-5.52	-0.062	-11.25	-0.15
All	4.05	4.05	8.07	8.07

Chapter 5

Bargaining Power and Variety in Collusive Markets. Empirical Evidence from the German Coffee Market

Co-authored with Justus Haucap, Ulrich Heimeshoff, Gordon J. Klein and Christian Wey

5.1 Introduction

The grocery retail industry has been subject to academic research as well as steady investigations by antitrust authorities. The source of this interest is the antitrust authorities' concern of increasing retail concentration[1] may lead to dominance due to an increase in the level of buyer power, with long-term effects on the leverage of market power, product variety, and innovation incentives.[2] Consequently, recent research has put a particular focus on the analysis of the vertical relationships between retailers and manufacturers.[3] However, the antitrust authorities' view has not been uniquely approved by the literature, which finds contradicting effects of buyer power on supplier strategies.[4]

Empirical research uncovering the effects of bargaining power on competitive outcomes—or firm strategies—faces the problem that bargaining outcomes and private contracts are typically not observed by outsiders and are hardly reliable (see e.g., Villas-Boas 2007a).[5] This is a particularly severe problem for markets which are subject to dominance or illegal practices where information on contracts and agreements is valuable to detect cartels and identify potential damages. Additionally, antitrust authorities often lack the econometric tools to backup hints from industry insiders or initial presumptions on collusive practices,[6] which may lead to severe biases in

[1] In Germany, France, and the UK the combined market share of the top five retailers exceeds 70% and in Spain 60% (Inderst 2013).

[2] For instance, Chen (2004) shows that countervailing power, i.e. buyer power, reduces product variety.

[3] This issue has been analyzed in manifold sectoral analyses (e.g., Competition Commission 2008, Bundeskartellamt 2014) with results generally supporting the buyer power hypothesis. That view was also mirrored in recent merger decisions, where antitrust authorities banned notified mergers (e.g., Edeka/Tengelmann, Bundeskartellamt 2008) or allowed them under the premise that certain requirements had to be met (see, for instance, the cases of Edeka/Trinkgut and Carrefour/Promedes, Bundeskartellamt 2010a, European Commission 2000).

[4] For instance, Inderst & Wey (2007) and Inderst & Wey (2011) show that buyer power may stimulate suppliers to choose strategies of process or product innovation in order to improve their products. Inderst & Shaffer (2007) and Montez (2007) focus on the investment incentives of suppliers after a horizontal downstream merger, where Montez (2007) finds possible positive effects and Inderst & Shaffer (2007) negative effects.

[5] Clearly, antitrust agencies collect this information, but do not provide it to researchers. Moreover, possible claims by damaged entities give incentives to withhold relevant information and obfuscate antitrust agencies.

[6] For the German coffee cartel the German antitrust authority (Bundeskartellamt 2009) assumed that firms colluded over the entire set of coffee products (coffee pads, espresso, common ground coffee).

the assessment of market power. Thus, structural empirical models—which often require minimal data input, such as prices and market shares—should be an inherent part of antitrust authorities' toolboxes in order to uncover true firm practices as well as bargaining outcomes and rent distributions.

The focus of this paper is on the identification of market structures, such as collusion, in empirical bargaining models. We develop a bargaining model incorporating collusion and apply the model to a market where a price-fixing cartel has been detected and prosecuted. The model can be used to test for collusive behavior and for a quantification of cartel damages, either for the purpose of fine calculation or for private litigation, which, evidently, requires a clear identification of the market conduct. Furthermore, subsequent analyses of the interaction of bargaining power and firm strategies is impossible without a clear identification strategy since, for instance, collusive agreements interact with firm strategies.[7] Thus, our paper adds to the literature by suggesting a test for collusive arrangements. To illustrate the consequences of misspecification, we apply a bargaining model to investigate the effect of variety and innovation on bargaining power, given a test for industry conduct in the previous stage.

Literature dealing with the identification of bargaining power—or more generally the distribution of rents between retailer and manufacturers—attempt to tackle the problem of unobserved contract agreements.[8] One important strand of the literature uses structural econometric models estimating market demand in order to compute a range of equilibrium supply models which allow the identification of rent distribution based on consumer substitution patterns.[9] An emerging literature strand in industrial organization thereby focuses on bargaining models, such as Meza & Sudhir (2010), Draganska et al. (2010), and Bonnet & Bouamra-Mechemache (2016). Draganska et al. (2010) develop a framework to consider explicit bargaining on wholesale prices in a Nash bargaining framework, which can be applied to markets where wholesale prices are not observed. They use a structural model of retail competition to determine retail margins and suggest the use of auxiliary regressions to estimate bargaining power parameters which identify the split of the channel mar-

[7] For instance Fershtman & Pakes (2000) claim that collusive industries may tend to provide a higher outcome in variety.

[8] See, e.g., Villas-Boas (2007a)

[9] The workhorse for a flexible demand estimation is the random coefficient logit, explained well in Nevo (2001).

gin.[10] Another important contribution to the bargaining estimation methodology is developed by Bonnet et al. (2016), who consider bargaining scenarios with product bundling. Given that their analysis is in a competitive, probably non-collusive industry,[11] they do not have to test for collusion and bundling in a joint setup. This, however, is where our analysis contributes to. Ignoring collusion in markets with collusive practices affects the bargaining setting, leading to measurement errors in bargaining power—thus also in marginal cost estimates and channel margins—and the subsequent analysis of the correlates of firm strategies with bargaining power.
This is where our paper contributes to the literature. We use the method proposed by Draganska et al. (2010) and further developed by Bonnet et al. (2016) to model bundling contracts and further extend the model to the context of collusion. Our objectives are twofold. First, we aim at implementing a bundling model in the context of collusion and test it against a range of existing bargaining models. Given the different model setups, we compare the biases in the bargaining power estimates—and thus industry margins—which stem from misspecification in the bargaining structure. Here we show, erroneously misspecifying the collusive structure—as, for instance, imposed by the German antitrust authority (Bundeskartellamt 2009)[12]—may lead to a severe misidentification of industry settings. Our secondary objective is to show correlations of bargaining power with the firm strategies of manufacturers and retailers given the true bargaining model. In particular, we show how product variety is correlated with bargaining power.
To answer our research question, we use consumer-level data on the German coffee sector for the years 2004 and 2005, which is a market with a detected cartel. Our empirical strategy is as follows: First, we estimate consumer demand—and the corresponding substitution patterns—using a random coefficient logit model. The identification of demand relies on an approach for modeling individual purchasing decisions and tackles endogeneity via a control function approach poposed by Petrin & Train (2010). Second, given estimated consumer substitution patterns, we recover industry margins using an oligopolistic model for retail competition and a model of vertical bargaining between retailers and manufacturers based on the approach originally proposed by Draganska et al. (2010). However, we follow Bonnet et al. (2016)

[10]The idea of auxiliary regressions is directly related to the work of Bresnahan (1982) who identifies oligopoly solutions.

[11]They investigate the French soft-drink market, which is a market where no collusive agreements has been detected yet.

[12]They claim that the whole market is permanently collusive.

who propose allowing for joint bargaining of product bundles and extend their approach to a context of collusion. In a third step, we test between different bargaining models. Fourth and finally, given the preferred specification of the bargaining model, we correlate bargaining power estimates with a set of variables on firm strategies.
We obtain two main results: First, in 2004 the bargaining model of collusion and product bundling explains the firms' behavior best. However, we find that collusion takes place solely for common ground coffee and not for other coffee segments, i.e., espresso and coffee pads. This indicates that collusive arrangements have an important impact on the bargaining outcomes and have to be tested for in the analysis if researchers even have a vague presumption of explicit or implicit collusion. This paper suggests the use of a non-nested test developed by Rivers & Vuong (2002) to find which model predicts the marginal costs consistent with observed cost shifters. Second, despite the official cartel was detected for the time period 2000 to 2008, we find that the product bundling contracts without collusion best explains the industry structure in 2005, which indicates that cartel members do not engage in collusion in every period. The result is in line with studies such as Ellison (1994) and Levenstein & Suslow (2006) who empirically show that collusive behavior—and deviation from cartel pricing—depend on time-varying factors, such as random demand shocks. Porter (1983) and Roux & Thöni (2015) find empirical evidence for the Green & Porter (1984) hypothesis that there may be deviations from cartel behavior that are punished without triggering a price war.
Furthermore, we find that the non-collusive outcome in 2005 coincides with an increase in variety and retailers' bargaining power, but manufacturers are able to appropriate a higher share of channel margins for their innovative products. This is interesting since a) collusive agreements are claimed to interact with variety (see e.g., Fershtman & Pakes 2000), and b) are claimed to interact with bargaining power (see e.g., Inderst & Wey 2007). Importantly, the above-mentioned studies show that neither collusive outcomes nor bargaining power are necessarily static problems, but are subject to dynamic firm strategies. As a secondary finding we show that bargaining power is correlated with a number of proxies for firm strategies, such as total variety and assortment depths. Furthermore, we identify private label products and hard discounters as main drivers for the high level of retail buyer power, which is in line with the results from e.g., Meza & Sudhir (2010) and Bonnet & Bouamra-Mechemache (2016) respectively.
The paper describes the relevant literature in section 2 and the econometric model

in section 3. Section 4 presents the data and descriptive statistics. Results are presented and discussed in section 5. Section 6 concludes.

5.2 The Econometric Model

The aim of this study is, on the one hand, to reveal bargaining power between suppliers, respectively retailers and, on the other hand, to analyze changes in bargaining power over time. To uncover this relationship in detail, we focus on one specific product category: coffee. This gives us the possibility to reveal the bargaining power between the retailer and supplier on a product level. Hence, the distribution of buyer power for a particular coffee capsule or a particular coffee sub-brand can be estimated. Moreover, the coffee category is interesting because it has been subject to dynamic changes, i.e., innovations such as coffee capsule systems, which have increased variety in the category. Our empirical strategy for the assessment of bargaining power follows the general framework of Draganska et al. (2010)—similarly used in Bonnet & Bouamra-Mechemache (2016)—and Bonnet et al. (2016). In particular, we use the idea of Bonnet et al. (2016) to use bundled sets of goods that are subject to bargaining. We add collusive sets to their set of bundles. In a first step, we estimate consumer demand and consumer substitution patterns. To this extent, we apply a random coefficient logit model. In a second step, we use the predicted demand curve and a structural model of supply to recover margins and to infer the distribution of bargaining power.[13]

5.2.1 Demand Side

The first step in the determination of buyer power parameters is the estimation of the demand side. We follow the literature on estimating consumer demand on retail markets (see, for instance, Sudhir 2001, Villas-Boas 2007b, Bonnet & Dubois 2010a), and we apply a random coefficient discrete choice model for disaggregated consumer-level data. These models have been widely used in the literature because they explicitly allow heterogeneity in consumer preferences and product differentiation in the characteristics space, which yields flexible substitution patterns and alleviates the curse of dimensionality (see e.g., Nevo 2000a, Train 2009).[14]

[13]For a detailed description of the coffee market and an extensive justification of a bargaining model see Draganska et al. (2010).

[14]The implementation of estimation is based on the code from Hole (2007).

For each year between and including 2004 to 2005 we estimate the indirect utility for consumer n product j at month t as:

$$U_{njt} = \alpha_j + \beta_n \; p_{jt} + X_{jt}\beta + \epsilon_{njt}, \tag{5.1}$$

where α_j captures product-level intercepts. p_{jt} is the price variable with coefficient β_n, which is normally distributed over n individuals. X_{jt} is a vector of product characteristics, i.e., brand fixed effects, retailer fixed effects, capsule fixed effects, and ϵ_{njt} an unobserved error term. When consumers do not purchase any product at time t, they are assumed to purchase the outside good. As only differences of utility are considered, the utility for the outside good $j = 0$ can be normalized to zero, i.e., $U_{n0t} = 0$.

As suggested by Petrin & Train (2010), we use a control function approach to account for the endogeneity problem of prices. The control function picks up unobservable factors from the demand error which are correlated with the price, such as quality, and directly enters the estimation equation. Conditional on this correction term, prices are uncorrelated with the error from the utility function. The residuals of the following first-stage regression directly enter the demand function:

$$p_{jt} = X_{jt}\delta_1 + Z_{jt}\delta_2 + u_{jt}, \tag{5.2}$$

Prices are regressed on observed characteristics affecting prices and demand X_{jt} as well as on exogenous instruments Z_{jt} that are affecting prices but not demand. u_{jt} is a serially uncorrelated idiosyncratic error with constant variance.

Households choose their utility-maximizing product and purchase j if utility is higher there, than from purchasing other products k, i.e., $U_{njt} \geq U_{nkt}$. Defining $V_{njt} = \alpha_j + \beta_n \; p_{jt} + X_{jt}\beta + \gamma u_{jt}$, we can rewrite $U_{njt} = V_{njt} + \tilde{\epsilon}_{njt}$ in order to obtain the choice probabilities as

$$s_{njt} \;=\; \frac{e^{V_{njt}}}{1 + \sum_{j=1}^{J} \; e^{V_{nkt}}}, \tag{5.3}$$

These are the logit choice probabilities, conditional on the random parameter β_n. The choice probability—conditional on the control function—is equation (5.3) which has to be calculated over all possible values of β_n.

$$s_{njt} = \int s_{njt}(\beta_n) f(\beta_n, \tilde{\epsilon}) d\beta_n d\tilde{\epsilon}, \tag{5.4}$$

where $\tilde{\epsilon}$ is an iid error term drawn from a generalized extreme value (GEV) distribution and $f(\cdot)$ is the joint density distribution β_n and $\tilde{\epsilon}$ (see Petrin and Train 2010).

This integral is solved with simulation methods. For a given random draw of a Halton series, we plug the corresponding value into equation (5.3) and calculate the logit choice probability. We do this 100 times and average the results, as suggested by Train (2009).

5.2.2 Supply Side

We consider the market for coffee with M suppliers, i.e., the processors that roast the coffee, and R retailers using standard notation. Each manufacturer produces a set of differentiated goods θ^m which are offered by retailers to the consumer, where the product stock of the retailer is denoted by θ^r. The total amount of products in the market is thus $\sum_{m=1}^{M} \theta^m = \sum_{r=1}^{R} \theta^r = J$.

Retailer r's profits are denoted by:

$$\Pi^r = \sum_{j \in \theta^r} (p_j - w_j - c_j)\, s_j(p), \tag{5.5}$$

where total profits are determined by the margin per product, market shares and market size Q, which is normalized to 1 for convenience. The margin is the retail price p_j minus the wholesale price w_j paid to the manufacturer of that product and the retail cost c_j. The retailers and manufacturers' (constant) marginal costs are denoted by c_j and μ_j. $s_j(p)$ is the market share as defined by the specification of the demand function in equation (5.3), that depends on a vector of all retail prices.

The profit of manufacturer m is denoted by:

$$\Pi^m = \sum_{j \in \theta^m} (w_j - \mu_j)\, s_j(p), \tag{5.6}$$

We define the supply model as a simultaneous decision of wholesale prices and retail prices. Thus, we assume that retail prices are the outcome of a Bertrand-Nash pricing game, where retail prices are treated as fixed when solving the bargaining problem (Draganska et al. 2010, Bonnet & Bouamra-Mechemache 2016, Bonnet et al. 2016). Given the model of retail competition, we specify a Nash bargaining model between retailers and manufacturers to derive the profit-sharing rule. Downstream retailers and upstream manufacturers bilaterally and simultaneously bargain over the wholesale prices of the J products, where each bargaining pair maximizes joint profits taking as given the outcome of all other simultaneous negotiations.[15] In

[15] We assume, following the literature, that bargaining outcomes are secret and that all parties have passive beliefs.

particular, we follow the idea proposed by Bonnet et al. (2016) to take into account different sets of goods, i.e. bargaining over bundles of goods. To this extent, we solve for retail margins and then estimate the bargaining game.
Thus, we first derive the retailers' optimal price choice. Retailers set their prices in a Bertrand-Nash pricing game, given the beliefs regarding negotiated wholesale prices and given the retail prices set by competitors:

$$\underset{\{p_j\}}{\operatorname{argmax}} \quad \Pi^r = \sum_{j \in \theta^r} \left(p_j - w_j^* - c_j\right) s_j(p), \tag{5.7}$$

where w^* corresponds to the equilibrium wholesale price of product j. Each product's profit-maximizing price must satisfy the following first-order conditions:

$$\sum_{j \in \theta^r} \left(p_k - w_k^* - c_k\right) \frac{\partial s_k(p)}{\partial p_j} + s_j(p) = 0. \tag{5.8}$$

The per-product margin is found by summing up retail and manufacturer margin and solving for $\left(p_j - w_j^* - \mu_j\right)$, which is expressed in vector notation as:

$$\gamma = p - w^* - \mu = -\left[\Omega^r \odot ME\right]^{-1} s(p). \tag{5.9}$$

$\gamma = p - w^* - \mu$ is a $J \times 1$ vector containing price cost margins and Ω^r is the $J \times J$ retailer ownership matrix with elements equal to one if owned by the same firm and zero otherwise. ME is a $J \times J$ matrix of market shares w.r.t. all prices, where the diagonal is populated by own-price derivatives and all other elements with cross-price derivatives. Finally, $s(p)$ is a $J \times 1$ vector of market shares. The symbol $\odot$ denotes the Hadamard product.
We present the vertical bargaining game for the case where manufacturers form a cartel and have the same bargaining weight for all their differentiated product-types. Following the general logic of the asymmetric Nash bargaining game, we denote the Nash product as the weighted product of the difference between the profits for successful negotiations and unsuccessful negotiations for each party.

The agreement profits, that is, when product j is being sold to consumers, are defined as (for retailers and manufacturers respectively):

$$\begin{aligned} \Pi_j^r(w, p^*) &= \left(p_j^* - w_j - c_j\right) s_j(p^*) \\ \Pi_j^m(w, p^*) &= (w_j - \mu_j) s_j(p^*), \end{aligned} \tag{5.10}$$

where p^* is the equilibrium retail price vector of products. Assuming passive beliefs and fixed retail prices, the difference of agreement and disagreement profits—the

profits in case of unsuccessful negotiations—can be written as:

$$\begin{aligned}\Pi^r_{-j}(w^*_{-j}, p^*) &= \sum_{k\in\theta^r, k\neq j} (p^*_k - w^*_k - c_k)\left[s^{-j}_k(p^*) - s_k(p^*)\right] \\ \Pi^m_{-j}(w^*_{-j}, p^*) &= \sum_{k\in\theta^m, k\neq j} (w^*_k - c_k)\left[s^{-j}_k(p^*) - s_k(p^*)\right]\end{aligned} \tag{5.11}$$

where w^*_{-j} denotes the equilibrium wholesale price vector anticipated by manufacturers during the bilateral negotiation with retailers. $s^{-j}_k(p)$ is the market share of product k when products in set j are no longer available on the market.[16] From this equation, we see that only the incremental market share gains, thus the incremental profit gains, matter for the calculation of the disagreement profits.

Optimal wholesale prices are the solution to the generalized bilateral Nash bargaining problem:

$$\underset{\{w_j\}}{\text{argmax}} \quad \left[\Pi^r_j(w, p^*) - \Pi^r_{-j}(w^*_{-j}, p^*)\right]^{\lambda} \quad \left[\Pi^m_j(w, p^*) - \Pi^m_{-j}(w^*_{-j}, p^*)\right]^{1-\lambda}. \tag{5.12}$$

Thus, the wholesale price for product j depends on profits being made when parties achieve an agreement and the profits in case negotiation break down. If parties do not reach an agreement, product j will not become part of the retailers' stock and profits will only be made with the $-j$ remaining products. While the disagreement points represent the bargaining position or threat point, the parameter of interest is λ, which determines the exogenous bargaining power. This parameter is shown to represent factors such as tactics employed by the parties, the conduct of negotiations, the information structure, and the ability to stay patient (Muthoo 2004, p.35).
The value of λ depends on the model specification (see Table 5.10). In model 1, which is the separate bargaining scenario, $\lambda = \lambda_{rms}$. Thus, every manufacturer-retailer pair has a different bargaining weight in each coffee segment s. Model 2 is the segment bundling scenario, which means that each manufacturer bargains all products from different segments jointly. Thus, $\lambda = \lambda_{rm}$. Model 3 defines the cartel scenario where cartel members have the same bargaining weight, but the weight varies over segments: $\lambda = \lambda_{rcs}$. In model 4 we have $\lambda = \lambda_{rc}$, where all cartel members and all coffee segments have the same bargaining weight, and so on.
In order to obtain the profit-maximizing solution, we have to find the wholesale price w, which maximizes the channel profits of both the manufacturer and the retailer. Taking the derivative of the Nash bargaining problem w.r.t. wholesale prices yields

[16] This assumption seems to be more reasonable than assuming than none of the products from the set of colluding firms is sold.

the following FOC:

$$\frac{\partial \Pi_j^m}{\partial w_j}\left[\Pi_j^r - \Pi_{-j}^r\right](1-\lambda) + \frac{\partial \Pi_j^r}{\partial w_j}\left[\Pi_j^m - \Pi_{-j}^m\right]\lambda = 0 \tag{5.13}$$

where the derivatives of profits w.r.t. wholesale prices cancel out because $\frac{\partial \pi_j^m}{\partial w_j} = s_j$ and $\frac{\partial \pi_j^r}{\partial w_j} = -s_j$. Hence, this can be rearranged to $\left[\Pi_j^m - \Pi_{-j}^m\right] = \frac{1-\lambda}{\lambda}\left[\Pi_j^r - \Pi_{-j}^r\right]$.

Substituting margins and market shares into profit functions, and using matrix notation, we get a $Jx1$ vector of manufacturer margins:

$$w - \mu = \left(\Omega^w \odot S\right)^{-1}\left[\left(\frac{1-\lambda}{\lambda}\right) \odot \left(\Omega^r \odot S\right)\right]\gamma, \tag{5.14}$$

where Ω^w is the manufacturer ownership matrix. S denotes a JxJ matrix with the market shares for all J products on the diagonal. The off-diagonal entries indicate the market share changes of other products when a product from j is not available.

Taking the sum of retailer and manufacturer margins yields total channel margins, which we rearrange to $p - \gamma$ to get the estimation equation:

$$p - \gamma = \left(\Omega^w \odot S\right)^{-1}\left[\left(\frac{1-\lambda}{\lambda}\right) \odot \left(\Omega^r \odot S\right)\right]\gamma + A\eta + e. \tag{5.15}$$

This is estimated, once the costs of product j have been specified depending on a vector of additional exogenous cost shifters A_j which enter with parameter weight η and on random shocks to marginal cost e_j, which we collect in vectors A and e.

5.3 Data and Descriptive Statistics

The main data set is a household panel provided by GFK Panels Services GmbH comprising the purchasing decisions of up to 20,000 households. The selected subsample consists of all households that bought coffee within the time 2004 to 2005. The overall household panel is representative of the German population, which means that the coffee subsample is also representative of German coffee buyers (see e.g., Rickert 2016). The crucial advantage of this kind of panel, besides its representativeness, is that all participants scan their purchases at home. Hence, we observe not only actual transaction prices (prices after discounts), but also consumers' switching behavior between both brands and stores. The data contain information on the type of coffee, that is, ordinary ground coffee, espresso or the single portion systems—coffee pods and capsules. Furthermore, it is possible to identify newly introduced products as a measure of strategic innovation on both, the retail and

supplier side. The sample provides information on whether consumers buy products at a given price. We define the producer-retailer-type bundles as the product level, which basically means that consumers may perceive the same brand at two different stores differently.[17] The (coffee) type—or segment—is either common ground coffee, espresso or a pad/capsule system. Given the mere size of the sample, we draw a subsample of 100,000 purchasing decisions to keep estimation feasible.

Furthermore, we gather data from several other sources to gain information on cost shifting on the supply side (Table 5.1). This data is available per month and covers the whole time period observed. These additional data include energy costs and traded raw coffee from a Thomson Reuters database. In cases where data are only available on a monthly basis interpolation techniques are used.

Some information on the retail market structure is given in Table 5.2 where sales are separated by retailer and type of coffee. Coffee can be purchased via different distribution channels such as discounters, drugstores, and full-line distributors. Beside these categories, the distribution channel also comprises shipping services. The table shows how the market shares of retailers change over time and how the market shares are distributed across the different coffee types. Evidently, the shares of common ground coffee are the largest, but espresso, coffee pads, and caps increase their market share over time. Moreover, there is a change in the market share of the various retailers over time. The same patterns apply for the coffee brands (Table 5.3). The common ground coffee brands lose market shares over time while the espresso, pad, and cap coffee increase their market shares over time. There is a substantial degree of heterogeneity with differences across brands (including private labels PL) and type of coffee. This shows some evidence of the active substitution across the products.

Tables 5.4 and 5.5 reveal some information on the price dispersion over brands, retailers, and coffee type. The average price for ground coffee in 2004 at the retailers ranges from 47 cents per gram at a discounter to 58 cents at a full-line distributor. The price increases to 55 cents at the same discounter and 69 cents at the full-line distributor in 2005, it is a drugstore that now has the highest price on average. We see a similar pattern in Table 5.5. The cheapest brand (private label PL) costs 0.46 cents in 2004. This pricing pattern seems to suggest that the coffee cartel was able to enforce significant price increases, twice, at the end of the year 2004 and in

[17] For the sake of feasible estimation, we define all products with minor market shares that are neither pads nor capsules as the outside option.

2005.[18]. However, prices might also have been driven by increases in costs or by a shock in demand (preferences), which makes it difficult for antitrust authorities to detect a cartel. It thus has to be tested whether the price increase can be attributed to collusive behavior.

Regarding the brands in the espresso, caps, and pads segment, it is worth noting that average prices are well above the price level for common ground coffee. The espresso brands[19] follow a different pricing pattern to the common ground coffee with prices decreasing for two of the three brands present in both years. Prices for caps and pads decrease over time for the incumbent brands.[20] In 2005, we see a differentiated pricing strategy for the entrants in the pads and caps category. Private labels serve the cheap price segment whereas BRAND G has a high price strategy and BRAND A chooses a price similar to the incumbents' prices. The higher price of espresso coffee compared to the price of common ground coffee indicates that espresso is quality differentiated but is not an overly drastic innovation. The similar price path of espresso and common ground coffee indicates that the coffee cartel included both coffee type segments, however, it may also be due to cost changes. Furthermore, the descriptives do not indicate whether the pad and cap segment was part of the cartel.[21] Thus, we need a test for market conduct.

5.4 Results

This section first presents the results of the demand model and the uncovered consumer substitution patterns in the German coffee market. Based on the results of the substitution patterns, we are able to compute supply-side profits. To this extent, we first compute retail margins. Given the retail margins and exogenous cost shifters, we estimate the bargaining power of retailers and manufacturers, which allows us to compute the manufacturer margins. Using this framework, we test which supply model fits observed cost data best. Finally, we show how the retailers and suppliers' distribution of bargaining power is correlated to firm strategies and product variety.

[18]See, for instance, http://www.spiegel.de/wirtschaft/unternehmen/kaffee-kartell-preisabsprachen-sollen-verbraucher-milliarden-gekostet-haben-a-668678.html

[19]One brand only offers espresso and is indicated by Brand ESP.

[20]Some brands only offer pad and cap systems and are indicated by PAD/CAP a-C.

[21]http://www.sueddeutsche.de/wirtschaft/kartellamt-millionen-bussen-pro-domo-das-kaffee-kartell-schenkte-sich-ein-1.76929

5.4.1 Demand Estimation

Table 5.6 shows the results of the control functions for the years 2004 and 2005. For identification we interact the prices for coffee (i.e., prices for arabica and robusta coffee) and energy with dummy variables for the different coffee segments. Moreover, we add a dummy variable of whether the observed unit is a pad. Estimation confirms the difference between caps and other coffees regarding their impact on the energy and coffee prices. This is reasonable since caps and pads require more processing in contrast to common coffee and are therefore differently affected by cost shocks. The explanatory value is high with an R^2 of more than 90% in both estimations.

Table 5.7 shows the results of the demand estimation years 2004 and 2005. The magnitude of the estimated standard deviation of the price coefficient varies over years. Importantly, the random coefficient for prices is always significant, indicating that customers react heterogeneously to a price change. This significance indicates the appropriateness of the random coefficient approach. Furthermore, the coefficient of the control function is always positive and significant indicating that unobserved characteristics are positively correlating with prices. Thus, price coefficients would be underestimated without the endogeneity control.

Since the price coefficients cannot be interpreted directly, Table 5.9 and 5.8 show price elasticities, averaged per brands and retailer respectively, conditional on coffee type (espresso, common ground coffee, and caps). Results show that purchases of espresso and caps are more sensitive to changes in own prices compared to common coffee. However, within a coffee segment price elasticities are relatively homogeneous, except for the caps segment in 2005 where elasticities vary, on average, between -4.63 and -6.41. Moreover, we find that the price elasticities for private labels are quite comparable in magnitude to all the other brands in a segment, apart from the year 2005 in the caps segment. In that year and segment the private label purchasers are more elastic to own-price changes. Finally, we find a structural shift in all segments from 2004 to 2005, which is indeed an indication of a shock in consumer preferences.

5.4.2 Bargaining Power and Price-cost Margins

Using consumer substitution patterns, we are able to compute retail margins thanks to equation 5.9. The bargaining power parameters of the Nash bargaining solution can be obtained using equation 5.15 with which we are able to estimate non-linear

bargaining weights. Having in hand the bargaining weight, it is straightforward to compute manufacturer margins.[22] To capture different cost trends we interact the type of coffee with the price of arabica coffee. Moreover, since some brands also use robusta coffee we also include a cost shifter on the robusta prices. We estimate all parameters for all seven models described in the previous sections. For the sake of readability we will only present the estimates for the model which best explains the data. The corresponding product-specific values are used to compute bargaining power, which is shown in the following tables.

We estimate different specifications of equation 5.15. That is, we assign different bargaining weights to the products depending on the model specification in Table 5.10. Subsequently, we use the Rivers-Vuong test to select the model with underlying marginal costs which best fit the observed cost shifters (Rivers & Vuong 2002, Bonnet & Dubois 2010a). Table 5.11 shows the results of the non-nested Rivers-Vuong test implemented for a test size of $\alpha = 0.05$. This implies that the null hypothesis $H0$ is rejected in favor of Ha (model v is better than model v') if $T_n > 1.64$ and rejected in favor of Hb (model v' is better than model v) if $T_n < -1.64$. Table 5.11 contains the comparisons of model v in the rows and models v' in the columns. The preferred model in 2004 is model 5, which models cartel bargaining bundling for ordinary roasting coffee and bundling at all segments. The preferred model in 2005 is model 2. This implies segment bargaining bundling without collusive behavior.[23] These results are interesting for two reasons. First, for the year 2004, we show that firm conduct is of a collusive type. The collusive market structure behavior directly impacts bargaining outcomes in retailer-manufacturer bargaining games. A test of market conduct is thus crucial for the identification of rent distributions. Furthermore, we show that the collusive behavior is solely in one segment and does not regard the espresso and pad segments. This finding is important since it contradicts the assumptions made by the German antitrust authority (Bundeskartellamt 2009) for the case. Clearly, a test for collusive behavior can be of huge importance to minimize incorrect assessments in the calculation of cartel damages, either for optimal cartel fines or for private litigation cases. Second, the results for 2005 indicate that collusive behavior is not necessarily stable over time, implying that researchers need to conduct tests on a period-by-period basis. Interpreting this particular ob-

[22] We apply the non-linear least squares method using the code of Bonnet & Bouamra-Mechemache (2016).

[23] Clearly, models 2 and 4 are not statistically different for a test size of 5%, but we reject the H0 hypothesis of both models being equal at the 10% level.

served change, it seems to be consistent with the model primitives of Fershtman & Pakes (2000) who argue that collusive environments may lead to the introduction of new products triggering deviations from collusive pricing. It is further in line with studies such as Ellison (1994) and Levenstein & Suslow (2006) who empirically show that collusive behavior—that is, deviation from cartel pricing—may depend on time-varying factors such as demand shocks. However, Porter (1983) and Roux & Thöni (2015) find empirical evidence for the Green & Porter (1984) hypothesis that after cartel deviation firms may return to collusive behavior without leading to the destruction of the cartel. Again, assuming the wrong market structure has immediate consequences for the assessment of cartel damages.

Given the Rivers-Vuong test, we are able to select the "true" supply model to recover supplier margins. The corresponding channel marginal cost estimates are consistent with anecdotal evidence (see tables 5.13 and 5.14): marginal costs are highest for the caps segment and lowest for common ground coffee with marginal costs for espresso ranked second. As expected, discounters have lowest values for marginal costs in the espresso and common ground coffee categories, but not in the caps segment. Furthermore, private labels have lower costs than most remaining products in the category. To a large extent, the difference in marginal costs can be explained by differences in prices.

As expected, total channel margins are higher for the espresso and caps segment. As shown in Table 5.14, the highest total margin is obtained by newly introduced products in the caps segment in 2005 (except for the private labels). Caps were a new introduction to the German market and were acknowledged as an innovation. Therefore in 2004, it came as no surprise that only a few manufacturers offered these products. However, even in the non-cartel period, brands who have caps in their brand portfolio are able to earn a higher joint surplus (see BRAND A and BRAND G and PAD/CAP A) compared to brands who solely offer brands for common ground coffee. With these innovative products suppliers were able to gain more of the joint surplus (indicated by the bargaining power factor) than brands of common ground coffee.

Tables 5.13 and 5.14 also report the distribution of the bargaining power of retailers and coffee brands per segment across time. The corresponding estimated split of the channel margin between retailers and manufacturers are presented in columns 6 and 10 in each table. Generally, the bargaining power of suppliers vis--vis the retailers seem to be subject to substantial heterogeneity across distribution channels. For

the common ground coffee we see that in 2004 retailers, on average, were able to appropriate a higher share of the channel margin. There are two major reasons for the high average of retailer buyer power: discounters and private labels. Retailers are also able to capture almost the complete channel margins of their private labels due to a bargaining power of close to 100%. Thus, private label products seem to be a device for the retailer to obtain a higher degree of the channel margins as the highest profits for the retailer are earned with private label brands. Since discounters sell a large share of private labels, this also explains the high degree of discounters' bargaining power.

Nonetheless, even without discounters, we find a substantial degree of buyer power on the coffee market since the estimated bargaining weight for retailers (excluding discounters) is, on average, 60% in 2004 and 74% in 2005. In 2004, the majority of values lie within an interval of 45.9% and 72.8%. These results are consistent with Draganska et al. (2010) who estimate retail bargaining power (excluding discounters) of well above 50%, but for the years 2000-2001. Our results indicate that there might be a further increase in retail buyer power, which is consistent with observed data.

Finally, comparing the time periods 2004 and 2005, we find that while in 2004 cartel members were able to obtain 46.3% of the channel margin, most manufacturers—except BRAND G—have significantly lower bargaining weights in 2005. This indicates that the cartel was presumably successful for the homogeneous product since channel members were able to extract a share of more than 50%. However, cartel members did not agree on collusive behavior in the time period 2005. One reason for this may be the introduction of new products.[24]

To get some more insights into the determinants of bargaining power estimates, we regress the bargaining power parameters on manufacturers and retailers characteristics. Table 5.15 presents the results. As suggested in the preceding analysis the absolute level of bargaining power for retailers is higher for their private labels. Furthermore, the share of private labels in the retail portfolio is positively related to bargaining power: The higher the private label share, the higher the degree of retailer buyer power. This was previously found by e.g., Sudhir (2001) and Meza & Sudhir (2010). The proxy for assortment size is positively related to the retailer buyer power indicating that larger retailers have more bargaining power and that (hard) discounters have a higher degree of buyer power, which is consistent with

[24]Fershtman & Pakes (2000) claim that innovations are a deviation from cartel behavior.

Draganska et al. (2010) and Bonnet & Bouamra-Mechemache (2016) respectively. Next, we find that manufacturers with larger variety do not generally have higher bargaining power as the variable $Variety$ is positively associated with retailer buyer power, although this is an average value and the economic significance is rather low. More interestingly, new products seem to be a device to leverage bargaining power in favor of the innovating firm. This result is in line with Inderst & Wey (2007) and Inderst & Wey (2011) who show that buyer power may stimulate suppliers to choose strategies of process or product innovation in order to improve their products.
However, we observe a general increase in the level of retail buyer power. There are two reasons for this: First, firms do not act collusively in that period. Second, Inderst et al. (2015) show that retailers might undertake innovation activities via their private labels due to buyer power, as supplier innovation could be crowded out. Those problems are of relevance in the innovation games provided here since it is possible that a retailer with full bargaining power might give incentives to suppliers to innovate through a commitment to let the supplier receive a decent slice of the pie. Since there is the fear of a hold up—that is, retailers reaping the benefits of innovations—incentives to innovate can be inefficiently low ex-ante. Thus, it may be that retailers commit to ensuring some benefits to suppliers for a short period after their innovation has taken place. This may explain the pattern of general increasing buyer, but higher manufacturer bargaining power for new products.
To get an idea of the consequences of misspecification, Table 5.16 shows how estimates are biased when the researcher uses the wrong model. The preferred model for 2004 is model 5, which is the model for collusive behavior on the common ground coffee segment and brand bundling. Specifying the wrong model leads to non-trivial deviations in the estimated bargaining parameters, and thus in marginal costs and channel margin estimates of up to 100%. For instance, the model of separate bargaining used by Draganska et al. (2010) overestimates the degree of retail buyer power by 46%—and thus underestimates manufacturer bargaining power—in the ground coffee cartel segment. This directly translates into an under-assessment of manufacturer margins (and thus channel margins), leading to an upwards bias of marginal cost. Retail buyer power for the two remaining segments are underestimated by 35% and 27%. The reason for this is that model 5 assumes collusive behavior for segment 2 and brand bundling for all segments. Thus, we have the same bargaining weight for all brand bundles for cartel members in segment 2 and another bargaining weight for manufacturers serving products in segments 1 and 3.

The Draganska et al. (2010) model estimates, on average, lower retailer bargaining weights for non-cartel products in case of cartel and bundling compared to the case of separate bargaining. This result is mainly driven by the bargaining power estimates for private label products, which are estimated to be close to 100% for all private labels, whereas we find estimates varying between 33.50% and 99.50% for separate bargaining. Thus, the bargaining power of private label producers is overstated.

All models overestimate retail buyer power for coffee segment 2—the common ground coffee—as they neglect bundling, collusive behavior or both. Models 4 and 6 overestimate retail buyer power for the espresso segment, whereas models 2, 3 and 7 underestimate retail power. All models—with the exception of model 2—underestimate retail buyer power for the pad segment. Finally, we also report the percentage deviation of all models with respect to model 2 in 2005. All models overestimate retail bargaining power in the pad segment and all models—with the exception of models 3 and 4—overestimate the degree of retail buyer power.

The results are relevant for policymakers who are interested in the degree of retail buyer power, which would be overestimated by most models, in particular, when either collusive practices or bundling strategies are not explicitly modeled, which may leverage manufacturer buyer power. The difference of bargaining power directly translates into biases for estimates of channel margins and marginal costs. Since most structural models conduct counterfactual policy experiments, erroneously assuming the wrong market structure directly impacts policy advice.

5.5 Conclusion

This paper explores the relationship between bargaining power, firm strategies, and market structure in the German retail coffee market using a unique household-level data set. Our study is based on an empirical structural model of bargaining between suppliers and retailers, which explicitly accounts for collusive behavior and product bundling. Subsequently, we test this model against other bargaining setups. We find two major results. First, the bargaining structure may be subject to dynamic changes, since we find collusive behavior in 2004, but not in 2005. Second, collusion did not take place throughout the whole coffee market, but on the common ground coffee segment.

Furthermore, we open the black box with our approach and provide new insights

into the relationship between innovations and the vertical distribution of bargaining power. The results of our bargaining estimations are the foundation for a detailed analysis of the effects of such innovations—in particular, coffee capsules—in the German retail coffee market on the distribution of bargaining power between suppliers and retailers. We show that, in general the introduction of innovative products shifts bargaining power and, as a consequence, rents from retailers back to suppliers.
The results are relevant for policymakers and practitioners. First, we provide a structural framework which allows us to test for collusive behavior in different product segments and between different years. Second, we further argue that recent sectoral investigations and merger decisions have assumed a high degree of buyer power as they were explicitly relating size to buyer power. The major motive behind these decisions, besides consumer protection, lies in the view that retailers exert market power vis--vis their suppliers with long-term effects on product variety and innovation incentives. However, this view has not been uniquely approved by the literature, which finds contradicting effects on supplier strategies. Given the consequences of recent decisions and the fact that the literature has not reached a consensus on the direction of the effects on consumer and supplier welfare, it is important to understand the interdependencies of buyer power and supplier strategies, which we empirically investigate in this paper.

5.6 Appendix

Table 5.1: Cost Information

Variable	Mean	Std. Dev.	Min.	Max.
Arabica Coffee	252.671	47.855	160.34	346.76
Robusta Coffee	152.539	57.411	69.820	268.79
Energy Price	29.304	13.057	1.64	64.59
Observations		60		

Table 5.2: Market Share, Sorted by Retailer

Common Ground Coffee	2004	2005
DISCOUNTER A	16.74	19.83
	(1.24)	(1.75)
OTHER DISCOUNT	11.39	12.28
	(0.85)	(1.18)
DRUGSTORE	6.58	3.31
	(1.31)	(0.65)
FULL-LINE A	15.99	12.56
	(0.72)	(0.81)
OTHER FULL-LINE	9.53	6.83
	(0.93)	(0.68)
FULL-LINE B	12.03	11.63
	(1.37)	(0.99)
DISCOUNTER B	9.87	11.41
	(0.79)	(1.08)
FULL-LINE C	8.62	6.73
	(1.01)	(1.5)
FULL-LINE D	4.91	4.72
	(0.4)	(0.33)
SHIPPING SERVICES	.	0.08
	.	(0.04)
Espresso		
DISCOUNTER A	0.3	0.67
	(0.38)	(0.24)
OTHER DISCOUNT	0.31	0.36
	(0.05)	(0.1)
FULL-LINE A	0.42	0.57
	(0.09)	(0.12)
OTHER FULL-LINE	0.29	0.24
	(0.05)	(0.06)
FULL-LINE B	0.16	0.15
	(0.05)	(0.04)
DISCOUNTER B	0.53	0.76
	(0.07)	(0.15)
FULL-LINE C	0.09	0.12
	(0.03)	(0.05)
FULL-LINE D	0.23	0.26
	(0.03)	(0.08)
Caps and Pads		
DISCOUNTER A	.	1.24
	.	(0.95)
OTHER DISCOUNT	.	0.71
	.	(0.42)
DRUGSTORE	.	0.24
	.	(0.11)
FULL-LINE A	0.59	1.44
	(0.17)	(0.18)
OTHER FULL-LINE	0.53	1.1
	(0.13)	(0.2)
FULL-LINE B	0.3	0.72
	(0.1)	(0.2)
DISCOUNTER B	.	0.36
	.	(0.48)
FULL-LINE C	0.38	1.18
	(0.13)	(0.38)
FULL-LINE D	0.21	0.53
	(0.07)	(0.15)

Standard deviations in parentheses.

Table 5.3: Market Share, Sorted by Brand

Common Ground Coffee	2004	2005
BRAND A	8.19	5.74
	(1.65)	(1.02)
BRAND B	11.62	8.57
	(1.43)	(1.74)
BRAND C	22.35	16.32
	(2.58)	(2.27)
BRAND D	14.08	9.58
	(1.36)	(1.00)
PL	26.56	36.82
	(1.76)	(4.02)
BRAND F	2.02	2.9
	(0.3)	(0.73)
BRAND G	10.84	9.43
	(0.7)	(1.11)
Espresso		
BRAND A	.	0.11
	.	(0.06)
BRAND C	.	0.09
	.	(0.05)
BRAND ESP	1.16	0.94
	(0.1)	(0.14)
PL	1.07	1.65
	(0.36)	(0.31)
BRAND G	0.11	0.33
	(0.06)	(0.07)
Caps and Pads		
BRAND A	.	0.28
	.	(0.1)
PAD/CAP A	1.38	3.14
	(0.3)	(0.57)
BRAND C	0.63	1.77
	(0.12)	(0.42)
BRAND D	.	0.1
	.	(0.05)
PL	.	2.12
	.	(1.55)
BRAND G	.	0.1
	.	(0.06)

Standard deviations in parentheses.

Table 5.4: Prices per Gram, Sorted by Retailer

Common Ground Coffee	2004	2005
DISCOUNTER A	0.47	0.55
	(0.01)	(0.06)
OTHER DISCOUNT	0.55	0.68
	(0.09)	(0.12)
DRUGSTORE	0.57	0.71
	(0.1)	(0.1)
FULL-LINE A	0.53	0.68
	(0.09)	(0.12)
OTHER FULL-LINE	0.53	0.67
	(0.08)	(0.12)
FULL-LINE B	0.53	0.66
	(0.08)	(0.12)
DISCOUNTER B	0.54	0.66
	(0.05)	(0.1)
FULL-LINE C	0.54	0.67
	(0.09)	(0.12)
FULL-LINE D	0.58	0.69
	(0.09)	(0.11)
SHIPPING SERVICES	.	0.66
	.	(0.05)
Espresso		
DISCOUNTER A	0.95	0.92
	(0.04)	(0.02)
OTHER DISCOUNT	1.2	1.12
	(0.06)	(0.15)
FULL-LINE A	1.36	1.25
	(0.09)	(0.12)
OTHER FULL-LINE	1.34	1.31
	(0.06)	(0.06)
FULL-LINE B	1.39	1.37
	(0.05)	(0.1)
DISCOUNTER B	1	1.07
	(0.00)	(0.11)
FULL-LINE C	1.5	1.35
	(0.1)	(0.08)
FULL-LINE D	1.35	1.23
	(0.16)	(0.09)
Caps and Pads		
DISCOUNTER A	.	1.22
	.	(0.03)
OTHER DISCOUNT	.	1.52
	.	(0.34)
DRUGSTORE	.	1.94
	.	(0.24)
FULL-LINE A	2.08	2.24
	(0.09)	(0.49)
OTHER FULL-LINE	2.04	1.66
	(0.1)	(0.22)
FULL-LINE B	1.99	1.84
	(0.11)	(0.19)
DISCOUNTER B	.	1.45
	.	(0.18)
FULL-LINE C	2.07	1.76
	(0.16)	(0.25)
FULL-LINE D	2.15	1.9
	(0.06)	(0.12)

Standard deviations in parentheses.

Table 5.5: Prices per Gram, Sorted by Brand

Common Ground Coffee	2004	2005
BRAND A	0.62	0.76
	(0.06)	(0.07)
BRAND B	0.54	0.7
	(0.02)	(0.07)
BRAND C	0.5	0.67
	(0.06)	(0.08)
BRAND D	0.49	0.66
	(0.04)	(0.07)
PL	0.46	0.54
	(0.02)	(0.07)
BRAND F	0.52	0.58
	(0.04)	(0.06)
BRAND G	0.71	0.85
	(0.03)	(0.06)
Espresso		
BRAND A	.	1.16
	.	(0.07)
BRAND C	.	1.15
	-	(0.09)
BRAND ESP	1.39	1.32
	(0.12)	(0.11)
PL	1.08	1.03
	(0.11)	(0.11)
BRAND G	1.33	1.27
	(0.09)	(0.11)
Caps and Pads		
BRAND A	.	1.87
	.	(0.18)
PAD/CAP A	2.09	1.89
	(0.14)	(0.18)
BRAND C	2.02	1.76
	(0.07)	(0.16)
BRAND D	.	2.55
	.	(0.01)
PL	.	1.33
	.	(0.14)
BRAND G	.	3.04
	.	(0.13)

Standard deviations in parentheses.

Table 5.6: Control Function Estimates

Variable	2004	2005
EnergyPrice	0.0066***	0.0034***
	(0.0012)	(0.0008)
EnergyPrice*PAD/CAP	0.0000	-0.0020
	(0.0038)	(0.0015)
ArabicaPrice	0.0016***	0.0017***
	(0.0002)	(0.0002)
ArabicaPrice*PAD/CAP	-0.0023***	0.0017***
	(0.0008)	(0.0005)
Cap	2.3260***	1.2411***
	(0.1716)	(0.1473)
Retailer Fixed Effects	YES	YES
Brand Fixed Effects	YES	YES
R^2	0.9761	0.9668

Standard errors in parentheses.

*Significant at 1% ***, significant at 5 % ** , significant at 10% **

Table 5.7: Demand Estimation

	2004	2005
Price	-14.8094***	-8.5180***
	(0.3549)	(0.2036)
SD Price	4.4476***	3.0275***
	(0.0982)	(0.0340)
Caps	9.600***	3.2896***
	(0.0536)	(0.2040)
SD Caps	0.6133**	0.0027
	(0.3012)	(0.0793)
Control Function	5.7249	1.9167***
	(0.2902)	(0.1880)
Retailer Fixed Effects	YES	YES
Brand Fixed Effects	YES	YES
LL	-364240.32	-370316.68
N	8000000	9800000

Standard errors in parentheses.

*Significant at 1% ***, significant at 5 % ** , significant at 10% **

Table 5.8: Own-Price Elasticities, Sorted by Retailer

		2004		2005	
Type	Retailer	Mean	SD	Mean	SD
1	DISCOUNTER A	-8.978	0.1103	-6.0606	0.2194
	OTHER DISCOUNTERS	-9.4096	0.1801	-6.3973	0.2632
	FULL-LINE A	-9.4646	0.182	-6.4626	0.2918
	OTHER FULL-LINES	-9.5322	0.1791	-6.495	0.2905
	FULL-LINE B	-9.5474	0.2132	-6.4464	0.2709
	DISCOUNTER B	-9.1861	0.0683	-6.3833	0.2837
	FULL-LINE C	-9.6516	0.1976	-6.4719	0.2944
	FULL-LINE D	-9.5797	0.2076	-6.2351	0.4168
2	DISCOUNTER A	-5.8733	0.0925	-4.0284	0.4766
	OTHER DISCOUNTERS	-7.3797	0.6357	-5.3098	0.608
	DRUGSTORES	-7.5342	0.6541	-5.5246	0.5163
	FULL-LINE A	-7.2083	0.5974	-5.3222	0.5899
	OTHER FULL-LINES	-7.2834	0.606	-5.3014	0.5986
	FULL-LINE B	-7.2356	0.6159	-5.2392	0.606
	DISCOUNTER B	-7.3394	0.3875	-5.2254	0.5647
	FULL-LINE C	-7.3047	0.632	-5.3459	0.6053
	FULL-LINE D	-7.6318	0.5547	-5.5025	0.6404
	SHIPPING			-5.3758	0.3725
3	DISCOUNTER A			-6.2937	0.2638
	OTHER DISCOUNTERS			-6.0984	0.5038
	DRUGSTORES			-5.6299	0.4694
	FULL-LINE A	-9.5652	0.2534	-5.2855	0.6286
	OTHER FULL-LINES	-9.8383	0.2264	-6.0827	0.4426
	FULL-LINE B	-9.7646	0.2274	-5.7686	0.388
	DISCOUNTER B			-6.3372	0.3845
	FULL-LINE C	-9.9054	0.2288	-5.9397	0.5245
	FULL-LINE D	-9.8779	0.1535	-5.716	0.3633

Table 5.9: Own-price Elasticities, Sorted by Brand

		2004		**2005**	
Type	Retailer	Mean	SD	Mean	SD
1	BRAND A			-6.4703	0.304
	BRAND C			-6.4619	0.3154
	BRAND ESP	-9.5481	0.2316	-6.4638	0.277
	PL	-9.2673	0.223	-6.2367	0.2637
	BRAND G	-9.4457	0.1229	-6.3106	0.3909
2	BRAND A	-7.897	0.3851	-5.7339	0.4069
	BRAND B	-7.3891	0.2038	-5.4739	0.4313
	BRAND C	-7.0834	0.4971	-5.3272	0.4904
	BRAND D	-6.9377	0.4128	-5.2994	0.4481
	PL	-6.6479	0.3783	-4.7745	0.7697
	BRAND F	-7.3177	0.3888	-4.9462	0.4022
	BRAND G	-8.3005	0.1355	-5.9563	0.3617
3	BRAND A			-5.7922	0.4539
	PAD/CAP A	-9.7032	0.2644	-5.64	0.3535
	BRAND C	-9.8772	0.2094	-5.9806	0.4221
	BRAND D			-4.6296	0.1155
	PL			-6.4063	0.3102
	BRAND G			-4.5892	0.0826

Table 5.10: Model Overview

	Description	Bargaining Weight λ
Model 1:	No Bundling / No Cartel	$\lambda = \lambda_{rms}$
Model 2:	Bundling / No Cartel	$\lambda = \lambda_{rm}$
Model 3:	No Bundling / Cartel on all segments	$\lambda = \lambda_{rcs}$
Model 4:	Bundling / Cartel on all segments	$\lambda = \lambda_{rc}$
Model 5:	Bundling / Cartel on Ground Coffee	$\lambda = \lambda_{rm/cs2}$
Model 6:	Bundling / Cartel on Ground Coffee and Espresso	$\lambda = \lambda_{rm/cs2+3}$
Model 7:	Bundling & Cartel on Ground Coffee / no Bundling for others	$\lambda = \lambda_{rms/cs2}$

Table 5.11: Rivers-Vuong Test for 2004 and 2005

	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Results for the year 2004					
Model 1	4.796	2.853	6.260	7.191	5.744	5.508
Model 2		-3.44	3.148	6.015	2.751	-1.352
Model 3			5.690	7.140	5.278	1.302
Model 4				3.593	-1.080	-3.529
Model 5					-5.320	-4.910
Model 6						-3.167
	Results for the year 2005					
Model 1	6.847	5.342	6.516	5.695	4.474	-0.758
Model 2		-4.323	-1.217	-5.434	-6.173	-7.126
Model 3			4.225	-0.095	-1.755	-5.479
Model 4				-3.969	-4.707	-6.873
Model 5					-3.714	-5.790
Model 6						-4.670

Table 5.12: Bargaining Power Estimation Table (λ omitted)

	2004	2005
Espresso-Category x ArabicaPrice	-0.0032***	-0.0027***
	(0.0001)	0.0002
Ground Coffee X ArabicaPrice	-7.29e-06*	-0.0002***
	(4.35e-06)	0.0001
CAP/PAD * ArabicaPrice	-0.0084***	-0.0055***
	(0.0001)	0.0001111
RobustaPrice	-0.0031***	0.0009***
	(0.0001)	(0.0001)
Month	0.0006***	-0.0076***
	(0.0002)	(0.0010)
Bargaining Power Estimates	*Not displayed here*	
adj. R^2	89.29	74.47
Observations	948	1164

Standard errors in parentheses.

*Significant at 1% ***, significant at 5 % ** , significant at 10% **

Table 5.13: Supply Side Results and λ Values, Sorted by Retailer

		2004				2005			
Type	Retailer	Price	Cost	Channel Margin	Lambda	Price	Cost	Channel Margin	Lambda
1	DISCOUNTER A	0.952	0.899	0.054	0.997	0.915	0.841	0.074	0.998
	OTHER DISCOUNTERS	1.205	0.916	0.289	0.728	1.118	0.957	0.161	0.848
	FULL-LINE A	1.351	1.093	0.259	0.679	1.255	0.95	0.305	0.609
	OTHER FULL-LINES	1.344	0.78	0.564	0.459	1.308	0.707	0.601	0.698
	FULL-LINE B	1.388	1.113	0.275	0.459	1.375	1.067	0.308	0.698
	DISCOUNTER B	0.995	0.343	0.652	0.997	1.069	0.802	0.266	0.758
	FULL-LINE C	1.497	1.204	0.292	0.459	1.354	0.984	0.37	0.698
	FULL-LINE D	1.348	0.712	0.636	0.728	1.048	0.531	0.516	0.416
2	DISCOUNTER A	0.467	0.38	0.087	0.945	0.549	0.39	0.158	0.998
	OTHER DISCOUNTERS	0.55	0.405	0.145	0.522	0.676	0.508	0.168	0.755
	DRUGSTORES	0.572	0.431	0.141	0.463	0.711	0.552	0.159	0.724
	FULL-LINE A	0.53	0.345	0.185	0.522	0.678	0.426	0.251	0.755
	OTHER FULL-LINES	0.532	0.373	0.16	0.522	0.666	0.46	0.207	0.755
	FULL-LINE B	0.528	0.317	0.211	0.522	0.657	0.425	0.233	0.755
	DISCOUNTER B	0.537	0.417	0.12	0.542	0.657	0.512	0.145	0.779
	FULL-LINE C	0.536	0.372	0.164	0.522	0.675	0.474	0.201	0.755
	FULL-LINE D	0.576	0.425	0.151	0.532	0.738	0.545	0.193	0.827
3	SHIPPING					0.662	0.534	0.128	0.948
	DISCOUNTER A					1.221	1.08	0.141	0.998
	OTHER DISCOUNTERS					1.515	1.258	0.257	0.789
	DRUGSTORES					1.937	1.272	0.665	0.58
	FULL-LINE A	2.08	1.827	0.253	0.965	2.242	1.294	0.948	0.635
	OTHER FULL-LINES	2.042	1.73	0.312	0.965	1.664	0.874	0.79	0.763
	FULL-LINE B	1.99	1.814	0.176	0.965	1.836	1.133	0.703	0.646
	DISCOUNTER B					1.451	1.306	0.146	0.855
	FULL-LINE C	2.071	1.823	0.248	0.965	1.759	0.742	1.017	0.702
	FULL-LINE D	2.148	1.887	0.261	0.985	1.903	0.949	0.954	0.646

Table 5.14: Supply Side Results and λ Values, Sorted by Brand

		2004				**2005**			
Type	Retailer	Price	Cost	Channel Margin	Lambda	Price	Cost	Channel Margin	Lambda
1	BRAND A					1.157	0.945	0.212	0.518
	BRAND C					1.15	1.028	0.122	0.712
	BRAND ESP	1.389	1.036	0.353	0.459	1.316	0.953	0.363	0.698
	PL	1.081	0.583	0.498	0.997	0.971	0.774	0.197	0.998
	BRAND G	1.322	1.231	0.091	0.9	1.128	0.657	0.471	0.416
2	BRAND A	0.617	0.448	0.168	0.463	0.763	0.505	0.258	0.518
	BRAND B	0.538	0.36	0.179	0.463	0.697	0.511	0.185	0.75
	BRAND C	0.504	0.339	0.165	0.463	0.666	0.474	0.192	0.712
	BRAND D	0.488	0.327	0.161	0.463	0.658	0.507	0.151	0.948
	PL	0.463	0.393	0.07	0.945	0.607	0.456	0.152	0.998
	BRAND F	0.521	0.334	0.187	0.459	0.58	0.447	0.132	0.984
	BRAND G	0.705	0.504	0.201	0.463	0.846	0.504	0.343	0.416
3	BRAND A					1.874	0.714	1.16	0.518
	PAD/CAP A	2.088	1.836	0.252	0.985	1.891	1.226	0.665	0.58
	BRAND C	2.019	1.774	0.245	0.945	1.762	0.791	0.971	0.712
	BRAND D					2.552	1.582	0.97	0.948
	PL					1.333	1.079	0.254	0.998
	BRAND G					3.037	1.974	1.062	0.416

Table 5.15: Regression of Firm Characteristics on Bargaining Power

	Specification 1	Specification 2
New Products	-0.1274***	-0.1686***
	(0.0219)	(0.0238)
Assortment	0.0057***	0.0102***
	(0.0011)	(0.0011)
Variety	0.0041***	0.0076***
	(0.0012)	(0.0012)
Private Labels	0.2351***	
	(0.0117)	
Private Label Share	0.0782***	
	(0.0148)	
Hard Discounter		0.1730***
		(0.0254)
Fixed Effects for Coffee Type and Year not reported		
R^2	92.43%	90.97%
Observations	2112	2112

Standard errors in parentheses.
*Significant at 1% ***,*
*significant at 5 % **,*
*significant at 10% **

Table 5.16: Comparison of Alternative Models

2004: Model 5 as Reference Model

	Cost Difference			**Channel Margin Difference**			**Lambda Difference**		
Coffee Segment:	1	2	3	1	2	3	1	2	3
Model 1	-21.101	16.149	-5.392	103.103	-6.697	44.204	-35.424	46.068	-26.759
Model 2	-3.571	17.343	0.207	18.912	-28.976	-1.466	-12.442	65.782	1.528
Model 3	-6.511	12.997	-0.713	42.498	-23.325	4.984	-15.734	34.737	-4.745
Model 4	4.094	5.378	-5.941	-4.076	-9.291	41.933	11.174	15.782	-21.136
Model 6	5.542	3.452	-0.344	-2.322	-5.348	2.38	10.673	11.578	-2.286
Model 7	-21.162	6.549	-3.654	114.965	-11.361	30.784	-39.261	18.273	-20.192

2005: Model 2 as Reference Model

	Cost Difference			**Channel Margin Difference**			**Lambda Difference**		
Coffee Segment:	1	2	3	1	2	3	1	2	3
Model 1	-22.915	2.549	19.464	35.688	8.552	-4.58	-7.306	5.211	16.152
Model 3	-6.872	-5.675	29.001	-16.912	12.109	-25.031	26.152	-6.08	41.214
Model 4	-2.452	-0.31	-1.079	-21.359	1.531	-3.944	32.125	3.382	6.759
Model 5	-1.227	2.382	23.154	3.791	5.016	-13.065	-1.219	3.002	17.541
Model 6	-3.75	1.067	22.989	-20.606	-1.254	-13.306	30.647	6.329	18.531
Model 7	-22.984	9.465	19.358	34.089	-17.045	-4.498	-6.321	31.88	16.162

Model 1 is the standard model of Draganska et al. 2011, Model 2 is the model of Bonnet et al. 2016

Chapter 6

Consumer Switching Costs, Dynamic Pricing, and Antitrust Analysis. Evidence from the Market for Diapers.

6.1 Introduction

Competition policy increasingly focuses on consumer inertia as a source of market frictions.[1] Psychological switching costs have been identified as an important driver for the lack of consumer switching, or, to put it differently, for the positive relationship between past and current purchases.[2] The mere consumption may alter consumer preferences in order to reduce cognitive dissonance (Brehm 1956) or because consumers face psychological costs of investing time and effort in familiarizing themselves with new products (Klemperer 1995). Consumer switching costs create two countervailing incentives on firm prices, often referred to as "invest-and-harvest" behavior (Klemperer 1995). First, firms that are aware of their consumers' switching costs will have an incentive to set low prices for new consumers in the form of penetration pricing or introductory offers. Second, once consumers are locked-in, there is an upward pressure on prices so as to take advantage of the inert consumer base. Such pricing patterns may create market power over the locked-in consumers, naturally raising concerns about the (mal-)functioning of markets (Farrell & Klemperer 2007).

While manifold marketing studies have been devoted to investigating the effect of (psychological) switching costs on consumer demand and marketing variables (e.g., Erdem & Sun 2001, Seetharaman 2004), the industrial organization literature has focused on understanding how firms can restrain consumers from switching[3] (e.g., Wilson 2012, Shcherbakov 2016) or on the competitiveness of markets (see e.g., Viard 2007, Dubé et al. 2008, Pavlidis & Ellickson 2015). However, despite the well-documented existence of psychological switching costs in manifold consumer goods markets, there is no study investigating the consequences of neglecting consumer switching on the calculation of supply-side profits and (counterfactual) policy experiments.

The correct assessment of consumer behavior is becoming increasingly important for understanding the functioning of markets and to draw lessons for competition policy analysis. A growing literature strand uses structural econometric demand models in the fashion of Berry et al. (1995) or Revelt & Train (1998) in conjunction with (vertical) equilibrium supply-side models (e.g., Villas-Boas 2007a, Draganska

[1] See e.g., Waterson (2003) and Price & Zhu (2016).

[2] See e.g., Erdem (1996) and Keane (1997).

[3] Prominent examples are telecommunication, retail energy, and financial sectors, where the U.K. Competition and Markets Authority and the European Commission have declared consumer inertia as a potential threat to competition (Price & Zhu 2016).

et al. 2010, Bonnet & Dubois 2010a) to infer on unobserved supply-side profits. Estimated substitution patterns and firm profits are then used to investigate a variety of competition policy questions, such as price competition and product differentiation (see e.g., Berry et al. 1995, Goldberg 1995), mergers and market power (e.g., Nevo 2000b, 2001), informational asymmetries (Sovinsky-Goeree 2008) or product introduction (Petrin 2002). However, the omission of consumer switching costs directly affects implications for optimal antitrust policy if switching costs are present and are not recognized by the researcher. Traditional random coefficient discrete choice models erroneously neglecting switching costs may overestimate consumer price sensitivity (see e.g., Erdem 1996, Che et al. 2007), which affects price elasticities as well as supply-side profits and counterfactual results. Thus, policy advice for optimal antitrust policies can be biased in a variety of settings.[4]

This paper studies switching costs in the diaper market which exhibits two distinct characteristics: (i) a finite time horizon, that is, babies "retire" from diapers, and (ii) customer recognition, that is, firms offer age-specific diapers with which they can identify new consumer groups and discriminate prices. Detailed household-level data from a representative sample documenting revealed preferences and actual substitution patterns across brands and retail formats enable me to estimate the magnitude and significance of switching costs for the specific market structure. It is important to test for switching costs and add control variables for switching inertia or other types of household behavior if necessary. This paper shows the consequences of misspecification on demand elasticities, supply-side profits, and counterfactual policy experiments. The objectives of this paper are threefold. The first objective is to quantify the degree of switching costs for a market with finite time periods and identifiable consumer groups. This is done by explicitly controlling for unobserved household heterogeneity—tackling the initial condition problem—and the endogeneity of prices. Second, given an identified demand model, we develop a supply model that is consistent with the "invest-and-harvest" structure in order to calculate profits in a dynamic setup. Third, we conduct several counterfactual analyses to show the direction and magnitude of the bias in demand elasticities, supply-side profits, and counterfactual experiments, for the cases when researchers neglect switching costs, unobserved household heterogeneity or both.

The general mechanisms are not constrained to the diaper market, but can be ap-

[4]For illustration purposes, consider the two prominent examples of merger analysis and SSNIP test, which are both conducted based on cross-price elasticities.

plied to any similar setup with finitely living, identifiable consumers. Some of the manifold examples of market structures consistent with this "invest-and-harvest" motive (Farrell & Klemperer 2007) include the broad sector of infant products—e.g., baby food or children's clothes—or similar sectors where product (or service) purchase is related to the consumer's age, such as temporary doctoral services, rehabilitation facilities, and nursing homes. The logic is also transferable to setups where firms want to attract new consumers. For instance, banks offer higher interest rates on savings for new customers, service providers—such as insurers, consultancies, and accounting companies—charge less than the full amount of man-hours for initial projects and firms offer introductory discounts or free samples.[5]

To answer the research questions, we define the following empirical strategy. In the first step, we utilize the Wooldridge (2005) approach to disentangle switching costs shaped by brand loyalty or consumer inertia from unobserved household heterogeneity. To this extent, we choose a flexible functional form for household heterogeneity including control variables for brand preferences, search costs, and inventory stock (package size preferences). Notably, we further account for the problem of endogenous prices. In the second step, we investigate the impact of switching costs on supply-side profits by using a dynamic supply model for a finite time horizon. The dynamic supply model incorporates the strategic behavior of retailers and manufacturers in a differentiated goods setup with multi-product firms. Our model describes well the market for diapers because consumer groups are identifiable in terms of new and old consumers by different segments for the age/weight of the baby. Thus, the structure is similar to two-period models with different observable consumer segments and explicit end-game effects following a clear "invest-and-harvest" structure as described by Klemperer (1995) and Farrell & Klemperer (2007).[6] Third, we calculate the bias of elasticities and supply-side profits if the researchers erroneously neglect the switching cost control and/or an adequate control for unobserved household heterogeneity. Finally, we conduct a market definition test to illustrate how misspecification directly impacts policy advice.

The results in this study support the existence of a significant degree of structural

[5]For instance, firms give away free diaper samples in hospitals and software companies provide cheap student versions. This pricing scheme can be found on durable goods markets accompanied by after-markets service (e.g., spare parts and repair services), the market for printers and cartridges, or camera and camera films.

[6]This assumption of market share-driven dynamics is quite reasonable as corporate planning models often rest on the assumption that current sales affect future demand (Klemperer 1995).

state dependence in the form of switching costs, which remains after controlling for household heterogeneity. Results show that both own-price and cross-price elasticities are substantially biased when switching costs are present but are not included in the model. Furthermore, we find that it is equally important to control for household heterogeneity since the switching costs parameter otherwise picks up unobserved brand or retail preferences. The magnitude of the bias in own-elasticities when switching costs are not controlled for is minor for new consumers groups (0.13%) but substantial (12%) for locked-in consumers. Thus, the static demand model is not able to completely account for the reduced price sensitivity of locked-in consumers and overreports price sensitivity measures. A similar pattern can be found for cross-price elasticities, with a bias of 4.7% and 4% respectively. Moreover, we show that if switching costs are introduced, but there is no adequate control for household heterogeneity, the average partial derivative with respect to switching is biased by up to 60%, where the magnitude depends on the specification of the functional form and the consumer state. Own- and cross-price elasticities are biased by up to 37%. Since structural supply models require own- and cross-price elasticities as input for the calculation of profit margins, the bias from the demand function translates into biased estimates for price-cost markups and marginal costs. The magnitude of the bias in profit margins ranges from -17% to 13% and in marginal costs from -24% to 19% depending on the model specification and consumer state. Finally, we show that misspecification has direct consequences for competition policy measures. A market definition test with an adequate control for switching costs and household heterogeneity predicts that the relevant market for diapers consists solely of private brands solely while almost all other models suggest that private labels are in competition with manufacturer brands.

The remainder of this study is organized as follows. Section 2 reviews the relevant literature. Section 3 describes the data and the market for diapers. Section 4 develops the econometric model of consumer demand and supply-side behavior. Section 5 presents demand-side estimates, supply-side results, and the counterfactual policy experiment. Section 6 concludes the study.

6.2 Literature

Researchers have documented the psychological switching costs in purchasing decisions for many markets, such as ketchup, peanut butter, liquid detergents, tissue,

tuna (Erdem & Sun 2001), orange juice, margarine (Dubé et al. 2008), and cereals (Che et al. 2007). However, modeling state dependence on retail markets is complex. First of all, the researcher has to deal with the econometric problem of disentangling unobserved household heterogeneity from structural state dependence. From an empirical viewpoint, it is difficult to relate a pattern of repeated purchases to a structural behavioral explanation, which is labeled as "structural" state dependence (Heckman 1981a). A series of repeated purchases may stem from underlying household preferences which are often not observed. A household purchases the same product repeatedly because of the limited assortment of a retailer close to a focal point (search costs) or because it has a preference for certain product characteristics, such as package size. If these drivers are present in the considered market—and are not adequately accounted for—then state dependence can be "spurious" (Heckman 1981a). An econometric model should be capable of disentangling structural from observed state dependence by controlling for unobserved household heterogeneity, such as search costs, inventory or learning.

Disentangling switching costs from unobserved heterogeneity is crucial for the inference on the switching cost parameter (see e.g., Keane 1997, Seetharaman et al. 1999), and further affects the magnitude of other structural parameters in non-linear demand models (Seetharaman 2004). However, most studies assume that the first purchase observation is non-random and uncorrelated with household heterogeneity (e.g., Erdem 1996, Che et al. 2007, Dubé et al. 2008), which is a strong assumption. One of the few exceptions is Erdem & Sun (2001) who follow Wooldridge (2005) to allow for correlation between the initial condition and unobservable household heterogeneity. This study will utilize the Wooldridge (2005) approach by including several initial conditions (for brand-, retail-, and package size choice) as proxy variables for unobserved household preferences. Thus, the existence of switching costs needs to be tested in conjunction with the careful definition of household heterogeneity, taking care of the initial condition problem. Otherwise, demand parameters and partial derivatives are biased.

Since many structural supply-side models require the estimation of price elasticities, switching costs in demand also affects the researchers' ability to estimate supply margins and to conduct counterfactual policy experiments for a product category. Still, there are only a few studies analyzing the effect of neglecting switching costs in demand on supply-side profits. To the best of our knowledge, there is no study investigating the effect on policy advice. As previously argued in the introduc-

tion, neglecting state dependence can lead to erroneous policy results, since price elasticities are biased. Price elasticities are the crucial ingredient for many policy experiments and a misspecification in demand may lead to the wrong inference on firm behavior. The reason is simple: Elasticities measure consumer price sensitivity and switching behavior, and thus determine the magnitude of firm profits. Firm profits, in turn, are the basis for policy experiments. Dubé et al. (2008) show that ignoring loyalty leads to lower long-run total category profits, but they also find that margins for high quality goods can be lower in scenarios with switching costs. Erdem (1996) finds that not accounting for state dependence may yield erroneous results regarding the market structure with wrong implications on the competitive relationships between brands. In her setup, models neglecting state dependence overestimate the distance between brands, which leads to wrong advice on marketing policy experiments. Che et al. (2007) find that consumers appear to be more price-sensitive when not accounting for state dependence. In addition, when observed prices are high, they show that one could falsely attribute high prices and low elasticity to tacit collusion, when in fact competitive behavior is non-cooperative.

Yet, there is no study investigating the effect of switching costs on supply-side behavior in markets where consumers live a finite amount of time periods and firms can discriminate between consumer groups. The few studies concerned with the effect of switching costs on equilibrium prices, such as Dubé et al. (2008), and Pavlidis & Ellickson (2015), study consumable goods markets modeling firm profits in an infinite horizon single-agent dynamic decision framework. They all find negative effects of switching costs on equilibrium prices. However, as outlined in the introduction, the type of dynamics present in the market impacts the magnitude and significance of switching costs. It is important to distinguish between the dynamic problems of finite and infinite horizons because the profit-maximization problem for firms is different. Authors studying infinite time horizons explicitly attempt to avoid end-game effects in firms' profit-maximization problem (Dubé et al. 2008). That is not the aim of this paper. Notably, the developed supply model can be used to investigate the effect of switching costs on prices for a market where consumers are active in the market for a limited time period and firms are able to set different prices for new and old consumer groups.

Despite the popularity of theoretical switching costs models with finite time horizons and segmentable consumer groups,[7] the number of empirical studies with this setup

[7]For extensive overviews see Klemperer (1995) and Farrell & Klemperer (2007).

are scarce. Borenstein (1991) and Elzinga & Mills (1999) study markets with structures, where firms can actually price discriminate between new and old consumer groups in the markets for gasoline and wholesale cigarettes, respectively. Borenstein (1991) uses a reduced form approach and Elzinga & Mills (1999) consider markets with homogeneous goods. None of the studies set up a structural model of heterogeneous goods and multi-product firms, which are helpful to construct counterfactual policy scenarios in the absence of natural experiments (Reiss & Wolak 2007). This study uses a structural model to investigate the effect of switching costs on markets with a finite period game structure in the presence of differentiated products and multi-product firms.

Besides an adequate specification of a demand model and accounting for the type of dynamics present in the market, there exist three more important market mechanisms which interact with switching costs. First, there might also be state dependence with respect to the optimal retail choice. In this case, choice dynamics are different because retailers may face strategic consumers who plan the number of optimal stops given a particular distribution of search costs (e.g., Chen & Rey 2012, Dubois & Perrone 2015). Thus, it is important to control for this behavioral pattern. Second, manufacturers typically interact with retailers who again have strategic incentives to react to manufacturer strategies. In many markets, manufacturers offer a set of differentiated products in monopolistic or oligopolistic environments where they are able to exert market power (Berry et al. 1995, Nevo 2001). When manufacturers sell their products through retailers then retailers are non-neutral intermediaries who also act strategically (Sudhir 2001, Villas-Boas 2007a). The contracts between manufacturers and retailers are complex and can be specified either as linear contracts (e.g., Villas-Boas 2007a, Brenkers & Verboven 2006) or non-linear contracts, e.g., as two-part tariff contracts (e.g., Bonnet & Dubois 2010a, Bonnet & Dubois 2015). If the strategic role of the retailer is not adequately modeled, retailer strategies are captured in the marginal cost estimate of the brand choice model, which may bias results.

To summarize, our study adds to the literature as it provides new insights for competition and marketing policymakers by examining the effect of switching costs on firm behavior, accounting for a vertical structure in a setup with multi-product firms with differentiated goods for a given market structure. The results will help us to understand market mechanisms and highlight the importance of using unbiased elasticities for conducting policy experiments, such as calculating counterfactual profits,

applying market delineation tests, and the full equilibrium merger analyses whose major ingredient are price elasticities.

6.3 Data Set and the Market for Diapers

This section describes the data and the market for diapers based on information from a representative household panel. First, the data set is described before presenting summary statistics on the market structure. Based on this data set, we will assess the quantitative effect of and switching costs on consumer demand, prices, and supply-side profits in the subsequent sections.

6.3.1 Data Set

We use data from a German distinct representative household panel collected by the GfK Panel Services. The GfK Panel Services monitors the purchasing behavior of panel members whose characteristics are representative of the German population.[8] These households are equipped with a home scanner device for tracking each retail sale. In contrast to scanners at checkout counters, which can only track purchases within one store, this particular data set enables us to analyze switching behavior more precisely because each purchase at each retailer is recorded. The data set contains information on the name of the brand, product, retailer as well as the number and time of the shopping trips. Additionally, there is information on the transaction price including discounts and coupons, the package size, and type of label (manufacturer brand or private label). We use the sample for the time period 2006–2008 for customers who purchased diapers, which equals the consumer lifecycle in the market.[9]

To describe the quality of the panel in terms of representativeness, tables 6.1 and 6.2 show the descriptive statistics of the total consumer panel and of the panel members purchasing diaper products. The latter is a natural subset of the total panel since not all households are in urgent need of diaper consumption. Diaper

[8] http://www.gfk.com/de/loesungen/verbraucherpanel/

[9] Although, we have data from 2003 to 2010, it makes sense to restrict the analysis to a three-year cycle. This ensures that we exclude effects from the panel adjustment in 2009. Furthermore, there was an essential structural change when a major brand manufacturer exited the market in 2005. To abstract from strategic exit effects and panel sampling issues, we use a subsample.

consumers constitute 16.9% of the total panel. There are some slight differences between both panels, though. Consumers who buy diapers, presumably parents or future parents, have, on average, higher (net) household income, are of lower age, and are less unemployed. These numbers accompany the intuition that households are more willing to have children at a low age, with a sufficiently high income, and with employment contracts. Interestingly, there are not many singles in the panel (share of 8% in contrast to 26% in the total panel). A surprising statistic may be the share of females: 77%, respectively 91%. This can be explained by the fact that we observe a household panel where the variable female represents the share of females as the head of the household, not the share of females in the panel. Qualitatively, that does not have any influence on the analysis since 92% do not live alone, and it is just a matter of definition that females are assigned as the head of the household.

6.3.2 The Market for Diapers

This subsection presents summary statistics on consumer shopping behavior, products, and firms for the relevant diaper market to gain insights into the market structure and the underlying behavioral patterns. The evaluation of switching costs on consumer demand and firm profits within a structural model first requires the definition of consumer choices. We then describe the market structure for the products in consumer choice sets.

Choice Sets

We assume that consumers can only choose from the choice set of disposable diapers which constitute more than 95% of all purchased diapers.[10] All other product types—that is, cotton, mull, fleece swimming diapers, and training pants—are excluded from the sample. Furthermore, we exclude specialized retailers such as, for instance, cash-and-carry stores, pharmacies as well as Internet purchasing, which represent minor shares in the sample period. Next, to handle the number of observations, we only keep the 11 retail chains with a nationwide spread of stores, which implies that retail competition is at a national level. This is a common assumption in the literature for selected food categories such as coffee (Draganska et al. 2010) or soda water (Bonnet & Dubois 2010a), and it is also reasonable to apply this assumption to the diaper market. Second, we assume that consumers decide whether to

[10]https://www.test.de/Babywindeln-Pampers-machen-das-Rennen-1230140-0/

buy diapers on a monthly basis, which is a reasonable assumption as households buy an average of approximately 1.2 diaper packages per month (Haucap, Heimeshoff, Klein, Rickert & Wey 2013). All excluded choice options are gathered in the so-called outside option. A purchasing decision of the outside good is observed when none of the inside goods are chosen. That is the case when consumers buy non-disposable diapers, diapers from a specialized or regional retailer, or decide not to purchase at all.

The inside goods and the single outside option define consumers' choice set when facing the purchasing decision. Inside goods are defined as bundles or combinations of brands, retailers, package size, and diaper class. These bundles are the alternatives a consumer can choose from. To build this identifier, we first look at retailers and brands. Most national retailers offer two different labels, a manufacturer brand label and a private label, whereas one discounter restricts its assortment to private labels. Manufacturer brands and private labels are shown in tests to be of comparable quality, thus indicating that both product types are substitutes.[11] There is one manufacturer producing for the manufacturer label and 11 manufacturers producing for the private label. In the following we use the term labels if we mean the manufacturer brand (label) or the private label. As there are several manufacturers for the private labels, we use the term brands when describing the collection of all products from a manufacturer. Thus, there are 12 brands in total with roughly 50% of the market shares held by the leading manufacturer brand label and the remainder is held by private label producers for the various retail formats—drugstore, discounter, and supermarket—with the highest market shares for discounters, and drugstores (Haucap, Heimeshoff, Klein, Rickert & Wey 2013).

Each brand offers different package sizes. Based on the package size we build six different package size types. The smallest category ("Very Small") are packages with two diapers. The second smallest category ("Small") contains all alternatives with a package size of less than 18. The remaining package types are categorized according to the label of the leading manufacturer brand (Normal, Big, Jumbo, Mega, Giga). To define the package type, we take the package size-type label of the brand manufacturer and assign the same label to all private label products if they have the same package size. Since in some cases package sizes may differ among brands, we apply the rule that two alternatives are of the same package size-type if the difference in the size is less than 10 diapers.

[11] http://www.oekotest.de/cgi/index.cgi?action=heft&heftnr=M1401

To complete the definition of the choice alternatives, let us turn to some specific product characteristics which help to determine whether consumers are classified as new or old. As illustrated by tables 6.3 and 6.4 retailers may offer a particular package size of a brand for different ages or weight of the baby. This is the so-called diaper class, which indicates at which point of the life-cycle the consumer is. In total, there are five different indicators for the infant age, which are grouped into three classes: class 0 (2–5kg, 4–10kg), class 1 (7–18kg, 9–20kg) and class 2 (13–27kg). In class 0, we collect the initial diaper classes which are not considered in the analysis for several reason outlined in the following subsection.
Finally, we build a unique identifier for the choices above and drop all niche products which are sold less than 28 times per year. This identifier defines households' choice sets, which are in total 192 different $Retailer \times Brand \times Size \times Class$ combinations. In other words, the same brand may be offered in different package sizes or at different retail outlets, which represents different choice options. Furthermore, in each diaper class, there are 91 $Retailer \times Brand \times Size$ combinations. This diaper class can be considered as the state of the household or the stage at the life-cycle.[12]

Summary Statistics

An overview on the market structure is given by table 6.3. There are two different diaper classes—abstracting from choices in class 0—in the market, where the new consumer category is defined as class 1 and the old consumer category is class 2. These classes determine the state of the household by the weight (or age) of the infants or the stage of the life-cycle. Table 6.3 shows descriptive statistics per diaper class. In general, prices increase over the diaper classes, a pattern which is confirmed by the descriptive statistics conditional on the brand label and package size in table 6.4. There is heterogeneity in consumer behavior. In the very beginning (class 0), some consumers experiment with products, which can be seen by the continuation shares. The probability of repurchasing the same brand is, on average, lower in class 0 than in the other two classes (41% vs 57% for MBs and 59% vs 74% for PLs), but standard deviation is rather high. This suggests that for some consumers, there is a learning process, but not for all. However, even for experimenting consumers,

[12] A more exact definition of the product bundle would include the distinction between regular diapers and diaper pants, which could not be implemented here because of insufficient information on this distinction.

learning is not the major driver for the consumer inertia. Learning as an explanation for inertia would suggest that consumer do not switch due to knowing the best product after an experimentation period. This is not the case for diapers, where consumers do not try out all different products and thus do not know the quality of all products. Furthermore, retailers change prices over time which leads to changes in price-quality ratios, where the ordering of product rankings change frequently (Dubois & Perrone 2015).

There are several reasons for restricting the analysis to classes 1 and 2. First, forces other than switching costs play a role. Consumers may face higher opportunity costs of time or be under pressure immediately after delivery and may thus be less informed since they cannot acquire the sufficient amount of information (Calzolari et al. 2012). As a consequence, they are less price elastic than standard more experienced consumers. Second, some consumers experience a learning process at the beginning which we do not explicitly model. Instead, we take the choices of the very beginning as given, which seems to be a reasonable assumption when retailers change price ranking regularly. Third, these are niche categories with low number of purchases.[13] In that sense, we do not model the origin of switching costs. Neither do we differentiate between different sources of switching costs, which might occur due to search costs, learning, inertia, inattention or brand loyalty (Klemperer 1995). However, classes 1 and 2 still give firms the ability to identify (relatively) new and old consumer groups. When purchasing a product from class 1 category, the consumer is thus classified as a new consumer.[14] In this dynamic structure firms have incentives to attract new consumers in order to establish a loyal consumer base. This decision problem vanishes in class 2 as consumers will leave the market soon.

Tables 6.3 and 6.4 already provide strong evidence that dynamic price setting—according to the "invest-and-harvest-motive"—may play a role where firms set higher prices over the life-cycle of the consumer. Nonetheless, there may be several explanations for this pricing pattern, such as the differences in costs, demand or competition in each class. However, we can rule out competition effects as the number of products is constant over classes. Differences in demand may explain why prices in the second class are higher than in the first class, but it does not explain why prices in class 1 are higher than in class 0. Another explanation might be that the price differences are driven by lower unit costs. Older children need

[13]For the same latter reason, the class 16–30 kg is not considered.

[14]This is done for simplicity, but it does not change results qualitatively. See section 4.2.2 for an intuition on that assumption.

larger diapers, which can be produced at lower per-diaper costs. While this is undoubtedly true, the major determinant of costs are not material costs, but costs for R&D expenditures and for advertising. Diapers are high-tech products which contain up to 30 different components. The leading manufacturer brand invests two billion Euros each year into product development at various laboratories from which there are three in Germany.[15] These investments are common costs for both classes and determine a major share of the costs. Differences in input materials due to different sizes of diapers thus represent a minor share.
Furthermore, table 6.4 highlights the heterogeneity in retail pricing strategies (retail price distribution presented as standard deviation of prices over retailers), which underlines the necessity to assign a strategic role to the retailers. Finally, private label brands have lower prices on average and we find lower prices with increasing package sizes.

6.4 The Econometric Model

This section sets up the model of demand and supply. The econometric model is a standard discrete-choice demand model (see e.g., Berry et al. 1995) in conjunction with a model of vertical supply relations between retailers and manufacturers. At the horizontal level, we specify competition as a Bertrand-Nash linear pricing model between multiple manufacturers at the upstream level and multiple retail chains at the downstream level (see e.g., Villas-Boas 2007a). To derive profit margins, it is assumed that prices and market shares are the equilibrium outcomes of demand and supply conditions. The demand equation relates market shares to prices and unobserved demand determinants, whereas the supply equation relates retail and wholesale prices to markups and costs (Villas-Boas & Hellerstein 2006). The magnitude of the markups and costs in static models depend on the estimated consumer price sensitivity as well as the type of horizontal interaction between retailers, respectively manufacturers, and the type of horizontal interaction. In the dynamic model, profit margins will also depend on the switching cost parameter which shapes the profit function for new consumer products.
This section presents first the demand model which provides substitution patterns

[15] see http://www.welt.de/wirtschaft/article117203610/Das-lukrative-Geschaeft-mit-Babys-Po.html

for the computation of price-cost margins, which are functions of demand substitution patterns. Then it presents the static and dynamic model with corresponding wholesale and retail margins again as functions of demand substitution patterns.

6.4.1 Demand Model

We begin by defining the household decision. Let us first define the (latent) utility U_{njt} for household n from purchasing product j at time t as:

$$U_{njt} = \rho_n y_{nb(j),t-1} + \alpha_n p_{jt} + X_{jt}\beta_n + h_{nj} + \epsilon_{njt}, \tag{6.1}$$

Utility depends on an endogenous price variable p_{jt} with coefficient α_n varying over n households and a vector of exogenous observable variables X_{njt}, which includes retailer fixed effects as well as a random brand intercept and random diaper class intercept.[16] Let $y_{nb(j),t-1}$ define a lagged variable taking value one if the current brand choice is equal to the previous brand choice with a corresponding coefficient ρ_n randomly varying among n households. The indicator for whether the product had also been previously purchased generates simple dynamics and measures the effect of past choices on current purchasing decisions. Letting this form of indicator variable enter into the utility model is a common approach since it delivers sufficient information on the purchasing history (Dubé et al. 2008). The parameters for prices and lagged brand choice are the structural parameters of interest which determine price sensitivity and the magnitude of switching costs, respectively.

There are two challenges to the identification strategy, which is the identification of prices and of switching costs. Utility is shaped by two unobserved determinants: (i) household heterogeneity defined by h_{nj} and (ii) product characteristics ξ_{jt}—such as promotion and quality, which are not observed by the researcher and thus captured by the error term ϵ_{njt}. The presence of these unobserved demand shifters poses a challenge to the identification strategy because unobserved household heterogeneity is correlated with the lagged brand choice variable and the price is correlated with unobserved product characteristics. To tackle the challenges to the identification strategy, we apply the control function approach by Petrin & Train (2010) for the identification of prices and the Wooldridge (2005) approach to disentangle the effect of switching costs from unobserved heterogeneity.[17]

[16] For all random coefficients, we assume a normal distribution.

[17] The control function approach shares similarities with instrument variable techniques and has been applied in a variety of settings (see e.g., **?**, **?**, Pereira et al. 2013). Combining the control

Let us turn to the control function approach first. Assume there is a first stage, where prices are regressed on observed characteristics affecting prices and demand X_{jt} as well as on exogenous instruments Z_{jt} that are affecting prices but not demand. Then we get a reduced form equation for the endogenous variable of the following form:

$$p_{jt} = X_{jt}\delta_1 + Z_{jt}\delta_2 + u_{jt} \tag{6.2}$$

where u_{jt} is a serially uncorrelated idiosyncratic error with constant variance. Furthermore, it has to hold that ($E[Z_{jt}u_{jt}] = 0$). Defining ϵ_{njt} as the error term of the structural equation of interest—given by equation 6.1—and assuming that the exclusion restriction holds ($E[Z_{jt}\epsilon_{njt}] = 0$), the linear projection of ϵ_{njt} on u_{jt} is $\epsilon_{njt} = \lambda u_{jt} + \tilde{\epsilon}_{njt}$, which is the error from the first stage scaled by the coefficient λ and an unobservable leftover. By construction $E[u_{jt}\tilde{\epsilon}_{njt}] = 0$ because of the linear projection. $\tilde{\epsilon}_{njt}$ is a linear combination of ϵ_{njt} and u_{jt}, and thus uncorrelated with Z_{jt} and X_{jt}. $\tilde{\epsilon}_{njt}$ is further uncorrelated with p_{jt} because p_{jt} is a linear function of Z_{jt} and u_{jt}. As the control function is uncorrelated with observable variables, instruments, household heterogeneity, and the new iid error term, ϵ_{njt} from the structural estimation equation is replaced by the linear projection: in other words, u_{jt} enters as an additional explanatory variable to control for endogeneity.

Next, we tackle the challenge of disentangling switching costs from unobserved heterogeneity. An intuitive solution to this problem is to assume a functional form for the unobserved household heterogeneity and to condition on this heterogeneity (Train 2009), e.g., by assuming random coefficients. The random coefficients determine the degree of household heterogeneity and switching costs are exogenous conditional on the household heterogeneity. However, even if a functional form for unobserved household heterogeneity is specified, another major problem remains, which is often referred to as the initial condition problem. If household choices are not observed from the beginning then the first choice depends on previous unobserved choices. Most of the literature assumes that the initial conditions are exogenous non-random variables, which implies that the first purchase is independent of household heterogeneity—a rather unrealistic assumption. To introduce correlation between initial conditions and household heterogeneity, we follow Wooldridge (2005) to specify a distribution of heterogeneity conditional on the initial conditions. Dealing with the initial condition problem within a parametric framework

function approach for the random coefficient logit model with the Wooldridge (2005) approach is similar to the method of Papke & Wooldridge (2008) and Giles & Murtazashvili (2013).

has the convenient advantage that partial derivatives—and thus marginal effects and elasticities—are identified.[18] The Wooldridge (2005) model requires us to form the joint distribution of the purchasing sequence given the initial condition of the brand choice and the observed variables. Then, the density for unobserved household heterogeneity is specified conditional on the initial condition and observed explanatory variables. Having specified this distribution, h_{nj} can be integrated out of the joint density.

Similar to Wooldridge (2005) and Erdem & Sun (2001) the functional form of unobserved household heterogeneity is assumed to be:

$$\begin{aligned} h_{nj}|y_{nb(j)0}, X_{jt} &= \gamma_n y_{nb(j)0} + Y_{n0}^c \gamma^c + a_{nj} \\ a_{nj}|y_{n0}, X_{jt}, Y^c &\sim Normal(0, \sigma_a^2), \end{aligned} \tag{6.3}$$

where $y_{nb(j)0}$ is the initial condition for the brand choice and α_{nj} is assumed to be independent of y_{nj0}. By definition, the initial brand choice—scaled by a coefficient varying over n—is part of the household heterogeneity. This variable acts as a proxy for unobserved brand preferences for heterogeneous consumers. Since this functional form is arguably restrictive, household heterogeneity is further determined by additional household-specific control variables captured by Y_{n0}^c to introduce more flexibility. In particular, we want to capture household heterogeneity by adding proxies for preferences and search costs. Thus, we include the initial retail choice and the initial package size choice to further shape the household equation. In particular, the initial retail choice is assumed to be a good proxy variable for search costs since the retail market structure may be different for households. If consumers face search costs, they do not consider brands other than the brand most recently purchased. Because of high search costs consumers prefer not to exert effort on looking for other products. Thus, we introduce variables capturing unobserved factors such as proximity of the retailer to the household location.[19] In the same manner, the first package size choice can be interpreted as a proxy variable for package size preferences.

Evidently, equation 6.3 is a restrictive assumption as the functional form for unobserved household heterogeneity is explicitly assumed, but it does allow for correlation

[18] Another way would be to a) approximate the initial distribution conditional on unobserved heterogeneity and exogenous variables (Heckman 1981b, Heckman 1981a). However, Wooldridge (2005) points out that this is computationally more difficult than necessary.

[19] This initial condition could also capture that consumers have preferences for retailers with large assortment decisions and to conduct one-stop shopping.

between the initial conditions and the unobserved household heterogeneity, which is a more realistic assumption than non-randomness (Wooldridge 2005). Thus, the initial conditions flexibly enter the demand equation with different weights for households and impacts decisions not only in the initial period, but also in subsequent periods.[20]

By assuming a functional form of the relationship between price and unobserved marketing variables, and of unobserved household heterogeneity, the causal effect of p_{jt} and $y_{njt_{-1}}$ on the response variable y_{njt} can be inferred while holding fixed the unobserved factors. Thus, equation 6.3 and the residuals of equation 6.2 enter equation 6.1:

$$U_{njt} = \rho_n y_{nb(j),t-1} + \alpha_n p_{jt} + X_{jt}\beta_n + \gamma_n y_{nb(j)0} + Y_{n0}^c \gamma^c + a_{nj} + \lambda u_{jt} + \tilde{\epsilon}_{njt}, \quad (6.4)$$

which is the estimation equation. As explained above, $\epsilon_{njt} = \lambda u_{jt} + \tilde{\epsilon}_{njt}$, and thus u_{jt} is an additional explanatory variable with coefficient λ. Since $\tilde{\epsilon}_{njt}$ is assumed to be an iid generalized extreme value, the choice probabilities follow the typical logit distribution. By definition, the first brand choice, the first retail choice, and the first package size choice purchases enter the demand equation by introduction of the household equation h_{nj}. In total, the full model has five random coefficients: for price, lag brand choice, initial brand choice, as well as for random intercepts for brand and for the diaper class. In addition, we allow the distributions of the random coefficients to be correlated.

Choice Probabilities and Likelihood Function

Households choose their utility-maximizing product and purchase j if the utility is higher than from purchasing other products k, i.e., $U_{njt}(\cdot) \geq U_{nkt}(\cdot)$. Following Nevo (2001) indirect utility can be decomposed into a portion of utility which is iid and a remainder: $U_{njt} = V_{njt}(\theta, \eta_n) + \tilde{\epsilon}_{njt}$, where $V_{njt}(\theta, \eta_n)$ is the deterministic portion of the utility, which depends on observed variables and unobserved household effects. Then, choice probabilities (conditional on the control function) can be derived as

$$Pr_{njt}(\theta, \eta_n) = \frac{e^{V_{njt}(\theta,\eta_n)}}{1 + \sum_{k=1}^{J} e^{V_{nkt}(\theta,\eta_n)}}, \quad (6.5)$$

where θ is a vector collecting all estimated parameters (means and their standard deviations), and η_n is the vector of household-specific random effects. These are

[20]The idea is similar to Papke & Wooldridge (2008) and Giles & Murtazashvili (2013) who propose specifying the distribution for unobserved heterogeneity given the initial condition, observed variables, and the control function, but in their approach the endogenous variable is also a function of household heterogeneity.

known to the consumer, but not to the researcher, and it is assumed that they randomly vary over consumers.

Denoting I as an indicator of the sequence of decisions, the probability that a household makes a sequence of decisions is

$$Pr_n(\theta, \eta_n) \;=\; \prod_{t=1}^{T} \prod_{j=1}^{J} Pr_{njt}(\theta, \eta_n)^{I_{njt}}. \tag{6.6}$$

The unconditional probability is found by taking the integral over the household random effects η_n:

$$Pr_n(\theta) = \int_{\eta_n} Pr_{njt}(\theta, \eta_n) f(\eta_n|\theta_s) d(\eta_n), \tag{6.7}$$

where $f(\eta_n|\theta_s)$ is the multinomial probability distribution function for η_n conditional on the subset of the parameter vector θ_s, which is a subset of θ containing household variances. The log-likelihood function is the summation of the individual choice probabilities $LL(\theta) = \sum_n \ln(Pr_n(\theta))$. Since the integral cannot be solved analytically, we use simulation techniques and maximize the simulated log-likelihood function. For a given value of the parameters θ, we draw values for θ_n from its distribution. For each draw, the product of the individual logit choice probabilities is computed (see 6.6). As suggested by Train (2009) this is done $H = 100$ times and the results are the average of the 100 Halton draws:

$$SPr_n(\theta) = \left\{ H^{-1} \sum_{h=1}^{H} Pr_n(\eta_n^{h|\theta}) \right\}, \tag{6.8}$$

The parameters of θ can be found by maximizing the simulated log-likelihood function, which is constructed as $SLL(\theta) = \sum_n \ln(SPr_n(\theta))$

Market Shares, Marginal Effects, and Elasticities

Individual choice probabilities are calculated conditional on a distribution of household heterogeneity and unobserved demand factors. The per-product average of these individual choice probabilities yields product-level market shares s_j:

$$s_{jt} \;=\; N^{-1} \sum_{n=1}^{N} \frac{e^{\hat{V}_{njt}(\theta,\eta_n)}}{1 + \sum_{k=1}^{J} \; e^{\hat{V}_{nkt}(\theta,\eta_n)}}, \tag{6.9}$$

where the superscript on indirect utility $\hat{V}$ denotes that the estimated coefficients are scaled by $(1+\sigma_s^2)^{-1/2}$, with σ_s^2 as the maximum likelihood estimate for the household

variance. Given a consistent price coefficient, we can calculate the derivative of market shares with respect to prices to obtain the average partial effects averaged across the population distribution of the unobserved heterogeneity (Wooldridge 2005):

$$\frac{\partial s_k}{\partial p_j} = \begin{cases} N^{-1} \sum_{n=1}^{N} \hat{\alpha}_n (Pr_{njt}(1 - Pr_{njt})), & if \quad j = k \\ N^{-1} \sum_{n=1}^{N} -\hat{\alpha}_n Pr_{njt} Pr_{nkt}, & if \quad j \neq k \end{cases} \tag{6.10}$$

To determine the economic effect of switching costs y_{t-1} on market shares, we can compute how market shares change after a change in switching costs. To this end, we compute the difference in choice probabilities when $y_{nb(j)t} = 1$ and when $y_{nb(j)t} = 0$. Subsequently, we average this difference over all households to get average marginal effects of switching:

$$\Delta s_{b(j)t-1,b(j)t} = N^{-1} \sum_{n=1}^{N} \left(Pr_{njt} \left[y_{nb(j)t} = 1 | y_{nb(j)t-1} = 1 \right] - Pr_{njt} \left[y_{nb(j)t} = 1 | y_{nb(j)t-1} = 0 \right] \right) \tag{6.11}$$

6.4.2 Supply Model

This section first outlines the static model of supply before turning to the dynamic model with switching costs. For both supply models, let us assume a vertical Bertrand-Nash supply-side model in which M manufacturers and R retailers set wholesale prices w and retail prices p simultaneously, with Bertrand-Nash competition both at the retailer and the manufacturer level. Retailers bear marginal costs c for products j and manufacturers' marginal cost are given by μ. Retailers and manufacturers make profits for each diaper class $d = 1, 2$, where $d = 1$ is the class indicator for new consumer groups and $d = 2$ indicates old consumer groups. Products within a diaper class, that are combinations of $retailer \times brand \times size$, are indicated with the subscript i. Both diaper classes contain each of the i products. In total, there are $j = 1, ..., J$ products on the market, $J/2$ in each class, where j indicates the unique combination of $class \times retailer \times brand \times size$.

Static Supply Model

In the static version of the game, absent a dynamic link, firms set optimal prices for both classes independently. Thus, the two classes can be interpreted as different product categories for which firms optimize profits, as it would be in the case of

product differentiation or price discrimination. The total profits for each firm are defined as the sum of profits for each offered product in class d and the sum of both classes.

Each retailer r maximizes its profit function given by

$$\pi^r = \sum_{d=1}^{2} \pi_d^r = \sum_{d=1}^{2} \sum_{i \in \theta_d^r} [p_{di} - w_{di} - c_{di}] \; s_{di}(p) = \sum_{j \in \theta^r} [p_j - w_j - c_j] \; s_j(p), \tag{6.12}$$

where the retail profits of diaper class d are defined as the sum of the per-product margin over all products i in retail diaper class portfolio θ_d^r, and total profits are defined as the sum over both diaper classes. The margin for any product j from the total retail portfolio is given by retail price p_j, the wholesale price w_j, the retail costs c_j, and the market share s_j, which is a function of all retail prices. In total, there are N observations given by the product of the total amount of differentiated products J and time periods T.[21]

Optimal retail prices are the outcome of a Bertrand-Nash equilibrium in pure price strategies. Thus, the first-order conditions with respect to prices are given by:

$$\frac{\partial \pi^r}{\partial p_j} = \sum_{k \in \theta^r} \frac{\partial s_k(p)}{\partial p_j} [p_k - w_k - c_k] + s_j(p) = 0 \; \forall \; j = 1, ..., J. \tag{6.13}$$

The equation shows that retailers are product category profit-maximizers, where they optimize prices over all the products in their product category portfolio. Profits depend not only on market shares and the number of products in the category stock, but also on the derivatives $\frac{\partial s_k}{\partial p_j}$, which measure market shares change with product j's price changes. Since products are substitutes, the cross-price marginal effects are positive, which leads to higher optimal prices in the case of multi-product firms compared to single-product firms given that the number of products is fixed. Since the two diaper classes are overlapping consumers can substitute between both. Multi-product retailers internalize that a price increase in class 1 could lead to an earlier transition from class 1 to class 2 through the internalization of all cross-effects within the retail portfolio.

The equation for the price-cost margin of product j can be solved to get

$$p_j - w_j - c_j = -\frac{s_j(p)}{\sum_{k \in \theta_r} \frac{\partial s_k(p)}{\partial p_j}} \; \forall \; j = 1, ..., J. \tag{6.14}$$

[21] Please note that for actual total profits, one has to multiply equation 6.12 with the market size, which is normalized to $MS = 1$ for convenience. Then, the profit equation can be interpreted as the sum of the per-product margins.

To better understand the profit-maximization problem of multi-product firms, let us gather all price derivatives in a matrix, which we label as the market share response matrix:

$$\frac{\partial s_k(p)}{\partial p_j} = \begin{pmatrix} \frac{\partial s_{k=1}(p)}{\partial p_{j=1}} & \dots & \frac{\partial s_{k=J}(p)}{\partial p_{j=1}} \\ \vdots & \ddots & \vdots \\ \frac{\partial s_{k=1}(p)}{\partial p_{j=J}} & \dots & \frac{\partial s_{k=J}(p)}{\partial p_{j=J}} \end{pmatrix} \tag{6.15}$$

The market share response matrix is a $J \times J$ matrix collecting the first derivatives of product i's market share with respect to all $j = 1, ..., J$ prices. The derivatives given by the demand specification, which is assumed to be a random coefficient logit model, are straightforward to obtain (see Train 2009, Wooldridge 2005). Given the matrix of derivatives and defining two $J \times 1$ vectors, in which all market shares and price cost margins are collected respectively:

$$\begin{pmatrix} m_{j=1} \\ \vdots \\ m_{j=J} \end{pmatrix} = \begin{pmatrix} p_{j=1} - w_{j=1} - c_{j=1} \\ \vdots \\ p_{j=J} - w_{j=J} - c_{j=J} \end{pmatrix} = -\Omega_r \star \begin{pmatrix} \frac{\partial s_{k=1}(p)}{\partial p_{j=1}} & \dots & \frac{\partial s_{k=J}(p)}{\partial p_{j=1}} \\ \vdots & \ddots & \vdots \\ \frac{\partial s_{k=1}(p)}{\partial p_{j=J}} & \dots & \frac{\partial s_{k=J}(p)}{\partial p_{j=J}} \end{pmatrix}^{-1} \begin{pmatrix} s_{j=1}(p) \\ \vdots \\ s_{j=J}(p) \end{pmatrix}$$

Since retailers internalize substitution within their own retail portfolios, $\Omega_r\star$ is introduced to select rows and columns with products of the same retailers. Ω_r is a $J \times J$ matrix with the general element (i, j) equal to 1 if products are stocked by the retailer and 0 otherwise. The symbol $\star$ is used to express the Hadamard product of two matrices, which is the element-wise multiplication of the cell entries of matrices. Now the price-cost margin of the retailer can be expressed in matrix and vector notation:

$$m_r \;=\; p - w - c \;=\; -\left[\Omega_r \star \Delta^{sp}\right]^{-1} s(p). \tag{6.16}$$

$p - w - c$ is a $J \times 1$ vector containing retail margins for each product, $s(p)$ a $J \times 1$ vector of market shares, Δ^{sp} is a $J \times J$ matrix of first-order price derivatives.

Manufacturers set their prices given the decision of retailers, which leads to the so-called vertical Bertrand-Nash model. Thus, manufacturer margins are independent of the retailer decision. This structure may be interpreted either as a timing where manufacturers and retailers set prices simultaneously or a setup where manufacturers set prices first and the pass-through of wholesale prices to retail prices is equal to one. The M manufacturers in the market are either brand label manufacturers or private label manufacturers, who offer a set of differentiated products θ_d^m in a given

diaper class:

$$\pi^m = \sum_{d=1}^{2} \pi_d^r = \sum_{d=1}^{2} \sum_{i \in \theta_d^m} [w_{di} - \mu_{di}] \; s_{di}(p) = \sum_{j \in \theta^m} [w_j - \mu_j] \; s_j(p), \qquad (6.17)$$

where μ_j is the wholesale cost, w_j is the wholesale price and the remainder is defined as above. Taking the first-order conditions with respect to w_j results in:

$$\frac{\partial \pi^m}{\partial w_j} = \sum_{k \in \Theta_m} \frac{\partial s_k(p)}{\partial p_j} [w_k - \mu_k] + s_j(p) = 0 \; \forall \; j = 1, ..., J.$$

Using matrix and vector notation, the margins are then given by

$$m_m = w - \mu = -[\Omega_m \star \Delta^{sp}]^{-1} s(p), \qquad (6.18)$$

where everything except Ω_m is defined above, which is a $J \times J$ matrix with the general element (i, j) equal to 1 if products are stocked by the manufacturer and 0 otherwise.

Dynamic Supply Model

In case consumers have switching costs, firms have incentives to apply profit-maximizing strategies with respect to this particular behavioral pattern. To model the dynamic supply-side decision, we exploit a special characteristic of the diaper market. Consumers enter the market once they have a newborn child, remain in the market for a limited time span, and then exit the market when the child is old enough to retire from diapers.[22] Although manufacturers do not have complete information on consumer characteristics, they can identify the consumer stage through the lifecycle. Firms offer different products for the changing age/weight of the baby within the two diaper classes. Thus, firms are able to control the stock of consumers by their dynamic pricing decisions in a finite horizon. When new consumer groups enter the market—that is, they buy from a newborn category—firms have incentives to lower prices to invest in market shares. As consumer behavior follows a life-cycle—that is, the infant ages and consumers buy from a product category for older children—the incentives to invest decrease and the incentives to harvest increase. For simplicity, we assume that the consumers in class 1 are new consumers, although there is a class

[22]The implicit assumption is that (i) state dependence does not differ with respect to the number of children, and (ii) firms do not set prices in order to discriminate between the first and the second child.

0.[23] Thus, firms—as Klemperer (1995) argues—are likely to engage in price wars since "a new group of consumers enter the market and can be sold to separately from others." At the end of the consumer lifecycle in class 2, there is no incentive to further invest since firms know that consumers will leave the market and thus firms charge the highest prices. The general method for solving such a two-period model is to derive second-period profits first given the profits from the first periods (see e.g., Tirole 1988, Che et al. 2007).

Retailer Profits

The retailers' dynamic objective function for the initial diaper class is to set prices in order to maximize category profits from the first class and the second class discounted by δ (Tirole 1988, Klemperer 1995, Che et al. 2007):

$$V_t^r = \pi_{1t}^r(p) + \delta\pi_{2t}^r(p, \omega).$$

Thus, we can write the retailers' value function in period t as the sum of its current profits from class 1 and its expected future profits from the future state. Future profits are a function of the transition probability ω of choosing the same brand again after switching from state 1 to state 2, which reflects that market shares are a valuable instrument for retailers in order to build up a loyal consumer base in the first class. Retailers can control the stock of consumers by setting low prices for new consumers. Since consumers leave the market after the second class, retailers set prices as in the static model as the incentive to lock in consumers disappears in favor of taking advantage of the inert consumer base by raising prices. However, to anticipate profits in the future class, retailers build expectations of future prices and consumer behavior. We assume that future prices for consumers in class 1 are the same in $t + x$ as in t. Analogously, we assume that the transition probability of buying the same brand is the same for consumers in $t + x$ as for consumers in t. In the final stage $d = 2$ profit-maximizing prices are found by taking the derivative of the profit function in class 2 with respect to product prices in class 2:

$$\frac{\partial \pi_{2t}^r(p)}{\partial p_{2it}} = 0,$$

with a FOC which is equivalent to the static optimization problem in equation 6.14. Retailers know that consumers will leave the market and have no incentives to keep

[23]Indeed, in class 1, firms have the same trade-off as in the case where consumer groups are not identifiable, between lowering prices to gain market shares and raising the price to exploit existing consumers. However, we abstract from this complexity as it does not change results qualitatively, but rather lowers the magnitude of switching costs as firms internalize the degree of cross-brand substitution.

them for future periods.
In stage $d = 1$ the derivative of the objective function is:

$$\frac{\partial V_t^r}{\partial p_{1it}} = \frac{\partial \pi_{1t}^r(p)}{\partial p_{1it}} + \delta \sum_{k \in \Theta^r} \frac{\partial \pi_{2t}^r(p)}{\partial s_{2kt}(p)} \frac{\partial s_{2kt}(p)}{\partial s_{1kt-1}(p)} \frac{\partial s_{1kt}(p)}{\partial p_{1it}} = 0.$$

At this stage, optimal profits depend on expected future profits. The second part of the equation basically determines the degree to which retailers will lower the price in anticipation of higher future gains from higher market shares when consumers are inert. Future profits depend on future market shares $\frac{\partial \pi_2^r(p)}{\partial s_{2kt}(p)}$, and future market shares depend on current market shares $\frac{\partial s_{2kt}(p)}{\partial s_{1kt-1}(p)}$, which is the transition probability of continuing to buy the same brand after the transition from class 1 in $t-1$ to class 2 in t. Finally, current market shares depend on current prices $\frac{\partial s_{1kt}(p)}{\partial p_{1kt}}$. The latter is the market share response matrix which accounts for future profits, depending on current market shares, where current market shares depend on current prices.
As in the static model, we can solve the expression for the price cost margins since we observe market shares and prices. The market share response matrix $\frac{\partial s_{1kt}(p)}{\partial p_{1it}}$ is given by 6.15 and the derivatives of profits with respect to retail prices $(\frac{\partial \Pi_d^r}{\partial p_{id}})$ by equation 6.13. However, we need to specify expressions for the additional derivatives entering the first-order conditions. The derivative of profits with respect to market shares are:

$$\frac{\partial \Pi_{2t}^r}{\partial s_{2i}(p)} = (p_{2i} - w_{2i} - c_{2i}), \tag{6.19}$$

which is the price-cost margin of product i in class 2. Furthermore, we assume that the probability of choosing the same brand after the transition from class 1 to class 2 is the same as the probability after the transition from $t-1$ to t and define the derivative of market share changes in class 2 after transition as the probability to repurchase the same brand after transition:

$$\omega = \frac{\partial s_{2kt}(p)}{\partial s_{1kt-1}(p)} = \frac{\partial s_{jt}(p)}{\partial s_{jt-1}(p)} = s_{bt-1} + \Delta s_{bt-1,bt} \tag{6.20}$$

which is the market share of brand b in $t-1$ plus the consumers substituting from brand a to b from $t-1$ to t. The market share increase after the transition from one period to another for brand b induced by consumption is given by equation 6.11.
Having gathered all the necessary information, we can express the first-order conditions in matrix and vector notation. For the last class $D = 2$, the margins can be expressed as:

$$m_2^r \;=\; -\left[\Omega_2^r \star \Delta_2^{sp}\right]^{-1} s_2(p) = \; p_2 - w_2 - c_2, \tag{6.21}$$

which is exactly the margin derived from the static maximization problem in 6.18. The margins captured from consumers that are currently purchasing in class 1 can be written as:

$$\begin{aligned} m_1^r &= -\left[\Omega_1^r \star \Delta_1^{sp}\right]^{-1} s_1(p) - \delta \left[\Omega_2^r \star \Delta_2^{sp}\right]^{-1} s_2(p)\omega \\ &= (p_1 - w_1 - c_1) - \delta\omega(p_2 - w_2 - c_2) \end{aligned} \tag{6.22}$$

Manufacturer Profits

Analogous to the retail case, dynamic manufacturer profits are given by

$$V_t^m = \pi_{1t}^m(w) + \delta\pi_{2t}^m(w, \omega).$$

In the final class, the derivative of the objective function is

$$\frac{\partial \pi_{2t}^m(w)}{\partial w_{2it}} = 0,$$

which is equivalent to the static optimization problem. Manufacturers know that consumers will leave the market after the last class and will have no incentives to keep them for future periods.

In the first stage, the derivative of the objective function is:

$$\frac{\partial V_t^m}{\partial w_{1it}} = \frac{\partial \pi_{1t}^m(w)}{\partial w_{1it}} + \delta \sum_{k \in \Theta^m} \frac{\partial \pi_{2t}^r(w)}{\partial s_{2kt}(w)} \frac{\partial s_{2kt}(w)}{\partial s_{1kt-1}(w)} \frac{\partial s_{1kt}(w)}{\partial p_{1it}} = 0.$$

Hence, for the last stage the manufacturer margins in matrix notation are

$$m_2^m = -\left[\Omega_2^m \star \Delta_2^{sp}\right]^{-1} s_2(p) = w_2 - \mu_2, \tag{6.23}$$

which is exactly the margin derived from the static maximization problem in 6.18. The manufacturer margin in class 1 can be written as:

$$\begin{aligned} m_1^m &= -\left[\Omega_1^m \star \Delta_1^{sp}\right]^{-1} s_1(p) - \delta \left[\Omega_2^m \star \Delta_2^{sp}\right]^{-1} s_2(p)\omega, \\ &= (w_1 - \mu_1) - \delta\omega(w_2 - \mu_2) \end{aligned} \tag{6.24}$$

6.5 Empirical Analysis

In this section, we first present the results of the random coefficient logit demand model for the baseline model: with switching costs and with control for unobserved household heterogeneity, and we compare the results to specifications without switching costs and/or household heterogeneity control. Given the results of

the demand model—and thus consumer substitution patterns—we are able to recover channel margins. The subsequent section reports the results of the supply-side model for different specifications and documents biases from misspecification in demand. Finally, we apply a market definition exercise to reveal the consequences of demand misspecification on policy advice.

6.5.1 Demand-Side Results

The demand model is estimated using the simulated maximum likelihood method as in Revelt & Train (1998) adapted to account for the initial condition problem as in Wooldridge (2005). Both approaches rely on the exogeneity assumption of observed variables and the error term. Since prices are correlated with unobserved factors such as quality, promotions, and retail shelf space, the independence assumption does not hold. To account for the omitted variable bias, we use the two-stage control function approach as in Petrin & Train (2010).

Results of the first-stage regression are reported in table 6.5. The price parameter is identified since demand estimation is conditional on a control function, which is the residual of the pricing regression. To construct the control function, additional data on cost shifters are obtained. We use two cost shifters, a plastic and a paper price index. Polyethylen spot prices from the Thomson Reuters ICIS pricing database are used as a proxy variable for plastic prices and the FOEX-PIX paper index from the Thomson Reuters FOEX Indexes is used as a proxy for paper costs. As additional instruments, we use a package size variable, which varies per product, and a categorical variable for the package type, which ranges from 1 to 5, which is also interacted with the plastic index. The estimation table 6.5 shows the results from the first stage and all cost shifters are significant. The explanatory power is quite high as the R^2 is around 97%. The F-Statistic of $14,229$ indicates that all included instruments are not weak.

The parameter estimates of the demand models are reported in table 6.6. The table presents six models, each with mean coefficients and the standard deviations of the distributions of the coefficients. The log likelihood values suggest that the proposed full model of switching costs outperforms the five nested versions of the model, which are estimated without switching costs, without household heterogeneity or without both. All models are estimated with prices—defined as the price paid at the checkout counter, less the monetary amount of any promotion activity (i.e., discounts or coupons)—whose coefficients can be disentangled in a population mean α and

a standard deviation of the price coefficient σ_α. The estimated standard deviation is significant for all specifications, indicating that there is a significant amount of heterogeneity in price preferences. The control function, which is the error term from the first stage, enters all demand specifications with a positive and significant coefficient, indicating that the price is indeed endogenous. Hence, the control function captures unobservable characteristics which are positively correlated with prices. Furthermore, all models include control variables X_j, which are a number of fixed effects for brand, retailer, package size, and diaper class. These serve as proxies for unobserved characteristics which are constant over time, such as the number of products in a given diaper class, product quality, and retail store size.

Model 1 is the full baseline model with switching costs—with a coefficient varying over n households—and with household heterogeneity, which is defined as the first retail choice, package size choice, and brand choice. The switching cost parameter is positive and significant even after including controls for household heterogeneity. The corresponding estimated distribution parameters for switching costs and for the distribution of household heterogeneity are also significant, which highlights the degree of heterogeneity and suggests that the omission of these variables would be wrong. The positive sign of the brand choice variable indicates that consumers are subject to some kind of behavioral dynamic process which is shaped by psychological switching costs rather than variety-seeking behavior.[24] In the case of variety-seeking behavior, the sign of the coefficient would be negative because purchasing the same brand repeatedly negatively impacts utility. As we find a positive relationship, we find switching inertia. The existence of switching inertia and the corresponding pricing pattern is consistent with anecdotal evidence that the brand manufacturers give away free samples to the parents of newborns in hospitals. Additionally, they offer welcome gifts—including discounts for diapers or free samples—for new parents when they register online. Firms are aware of the behavioral switching bias and compete for consumer groups at a very early stage in order to build up a base of loyal consumers.

Model 2—the model without the switching cost parameter, but with an estimated

[24]Recall that we exclude the initial shopping sequence of households during which households might experience a learning curve regarding brand preferences and price distributions over retailers. However, since we exclude this, we might argue that switching costs appear ***given*** given the choices in the very beginning. The switching cost parameter thus represents all types of psychological costs, such as the effort needed to invest in learning how to use a new product, brand loyalty or consumer inertia.

parameter for the household distribution—indicates that neglecting switching costs also affects the estimates of other structural parameters, such as prices. The price coefficient is biased upwards indicating an over-assessment of the degree of price sensitivity, which is in line with previous studies (see e.g., Seetharaman 2004). Model 3 is the same as model 2 but without the estimated parameter of unobserved household distribution, thus without the Wooldridge (2005) specification. The bias in the price coefficient is even larger in magnitude. Model 4 includes switching costs, but neglects unobserved household heterogeneity. While the bias in the estimated price coefficient is smaller than in the case of neglecting switching costs, the magnitude of switching costs is substantially overestimated. Thus, the switching cost parameter captures unobserved household heterogeneity, in which case the state dependence would be spurious, a result generally confirmed by the marketing literature (see e.g., Erdem & Sun 2001, Dubé et al. 2008). Models 1 and 2 include the initial conditions and a parameter of the household distribution which improves the flexibility of the household heterogeneity. A model neglecting the initial conditions would erroneously assume that the initial purchase is independent of household heterogeneity. As the initial conditions in the full model are part of the household equation, correlation between household heterogeneity and the first purchase of households is introduced, which has a different impact on utility in every period. It is conditioned not only on the first brand choice, but also on the first choice of retailer and package size. These two variables also determine the degree of household heterogeneity since they control for household preferences for retailers and package size. The former thus picks the consumer behavior related to search costs and the latter acts as a control for inventory behavior. Thus, the inclusion of variables for the lagged retailer choice and lagged package size choice captures the positive effects of unobserved household preferences which would be erroneously attributed to brand loyalty or switching costs. Finally, model 6 is the same specification as model 1, but without correlation in the random coefficients. The estimated price sensitivity is lower than compared to the full model and the estimated switching costs parameter is slightly higher.

The magnitude of the coefficients in discrete choice models, in contrast to the sign, are not interpretable, and thus the above comparison may be inappropriate without reporting the partial derivatives. Demand parameters are additionally reported in terms of marginal effects (for switching costs) and elasticities (for prices) to better understand the influence on consumer behavior. Table 6.7 shows the difference in the price elasticities over the six demand specifications. Evidently, compared to

the full model, all models produce different price elasticities, where the direction of deviation depends on the functional form assumptions and on the consumer state. The misspecification bias of own-price elasticities—stated in terms of percentage deviation to the full model—for the new consumer group (class 1) ranges from 0.13% for model 2 and 26% for model 3. The major reason for the deviation is the overassessment of the price sensitivity parameter α_n, which is higher in magnitude in models 2–5. Notably, the smallest bias can be found for the model with the correct specification of household heterogeneity. In the old consumer group (class 2) all models—except model 4—significantly overestimate the degree of price sensitivity, neglecting that firms have a higher degree of market power over the locked-in consumers who are less willing to substitute. The reason that model 4 estimates a lower degree of price sensitivity is the random coefficient on the diaper class intercept: Compared to the other models more positive (or less negative) random draws are assigned to class 2, which yields to reduced price sensitivity. The magnitude of deviation for the remaining models ranges from 6.61% for the model without switching costs and without heterogeneity (model 5) to 37% for the full model without correlated random coefficients (model 6). Notably, the latter model cannot adequately capture consumer behavior where the locked-in consumers are less price-sensitive.

The importance of including both switching costs and household controls can also be seen in the difference in magnitudes of the cross-price elasticities. Nearly all models overestimate the degree of cross-substitution (measured as mean response per brand) with deviations ranging from 0.71% and 0.30% for model 5 to 13.68% and 12.88% for model 6. Thus, if switching costs are present and are not recognized by the researcher then most demand models overestimate cross-price elasticities. The sole model underestimating the degree of cross-substitution is model 4–despite a price parameter indicating a higher degree of sensitivity. This is explained by the fact that the cross-price effect also depends on the level of predicted market shares (see formula 6.15), which are substantially underestimated by model 4.[25] Thus, it seems that consumers hardly substitute between two brands. But the absence of substitution is due to unobserved household heterogeneity (such as retail location or household size) and not to dissimilarities of the brands.

Finally, we see that both the own partial derivatives of switching are biased in magnitudes of roughly 30% when the researcher does not adequately control for household heterogeneity, which confirms the above-mentioned presumption that a

[25]Results of the predicted market shares are not reported, but are available upon request.

substantial degree of the magnitude of switching costs can be explained by spurious state dependence (Heckman 1981a, Wooldridge 2005). The bias of the cross effects is even larger in magnitude, i.e., 38% for model 4 and 60% for model 6.
From the above analysis, we can conclude first that with switching costs consumers are less price elastic, and second that cross-substitution is also over-reported. Evidently, misspecification leads to a non-trivial bias in price elasticities, which translates into the calculation of supply-side profits and counterfactual analyses. Thus, simulated policy changes predict false outcomes with potentially severe consequences for market definition and merger analysis. Second, when including a control for switching costs, it is important to include an adequate control for household heterogeneity to disentangle spurious from structural effects.

6.5.2 Supply-Side Results

Using estimated substitution patterns from demand model 1, we are able to compute static and dynamic profit margins for retailers and manufacturers. Profit margins from the dynamic supply model can be obtained by using equations 6.21 and 6.23 for products in class 2, respectively by 6.22 and 6.24 for products in class 1. Table 6.8 reports results regarding the retail margins, manufacturer margins, markups, and marginal costs. The channel margin can be defined as the sum of retail and manufacturer margins. Total marginal costs can be recovered by the price minus the estimated channel margins. Dynamic margins depend on price elasticities, which are lower for the locked-in consumers, on the market share increase after transition from class 1 to class 2, and on the absolute level of market shares. Thus, one implication of the dynamic model is that the incentive to lower prices with the intention of investing in market shares is higher for firms that offer a full set of differentiated products, since the incentive to lower prices depends on the absolute level of market shares. The brand manufacturer offers a higher variety of products within a stage, and thus the probability that consumers will switch to another product of the same manufacturer portfolio is higher.
As expected, marginal costs are lower for discounters than for other retail formats. We also see differences in the marginal costs for private labels and manufacturer brands. Supermarkets have lower marginal costs for their private label products than for the manufacturer brands in the assortment, whereas drugstores have quite comparable costs for both label types. In general, channel margins of private labels

are lower than for manufacturer brands, which can be explained by lower margins for private label producers. Discounters have the highest markups in both classes, which matches evidence on the high level of discounters' buyer power (Haucap, Klein, Heimeshoff, Rickert & Wey 2013). For all formats and for both label types, we find that profit margins are higher for the locked-in consumers in class 2. In absolute terms the difference of the channel margin ranges from 2.5 cents for manufacturer brands at discounters to 4 cents for drugstores. The price-cost markup ranges from 49% for private labels at supermarkets and drugstores in class 1 to 69% for discounters in class 2. However, the difference between markups in class 1 and class 2 is lower for discounters compared to other formats.

The demand estimates of model 1 can also be used to calculate static supply profits, when firms are not forward-looking. Profit margins of the static model are obtained by applying equations 6.16 and 6.18. The results of the static model are presented in table 6.9 as a percentage difference to the dynamic model. Absent any dynamic decision, the magnitude of the static margins depends on the estimated own and cross-price elasticities of demand as well as the number of products offered by retailers and manufacturers. These ownership matrices have an influence on the prices because firms internalize the cross-effects of products within the own portfolio. The more products within this set are owned by the same firm, the more the cross effects are internalized and the higher the price and the margin. However, firms lack dynamic strategies and do not face a downward pressure on prices for new consumers. The profit margins in class 1 are overestimated (by 4.2%) and marginal costs are underestimated (by 5.5%). As marginal costs are obtained as price minus the markup, marginal cost estimates are upwards biased whenever profitability is underestimated. As the first-order conditions for old consumers in the dynamic model equal the ones from the static model, estimated profit margins and marginal costs are the same.

Table 6.9 further reports the % change of model specifications 2–6 compared to the full baseline model. The middle panel of the table shows that the bias in estimates of profitability ranges between -17% to 13% and of marginal costs between 23% and 31% depending on the assumptions of the functional form and on the consumer state. Model 2 slightly overstates the margins in class 1 since own elasticities are quite comparable, but cross-price effects are overestimated which means—in a Bertrand-Nash pricing game—that cross-substitution within the own product portfolio is higher compared to the baseline model. Model 3 understates profit margins

and overstates marginal costs in both classes since the estimated price sensitivity is higher compared to the baseline model. For the same reason as in model 2, model 4 predicts lower margins for class 1 and higher margins for class 2. Accordingly, we are able to explain why margins for model 5 are lower in class 1 (higher own-price effect), but are slightly higher for class 2 (due to the cross-price effect). For class 2, the estimated price sensitivity is higher compared to the baseline model and this effect dominates the effect of higher cross-price elasticities, which produces lower margins. Finally, the deviation in model 6 can be explained by lower price sensitivity in class 1 and higher sensitivity in class 2.

The lower panel of the table reports the biases of two additional models: models 4 and 6 with static supply-side functions. Both models do not incorporate the downward pressure on prices to attract new consumers,[26] which drives results further away from the base model. Thus, we see that not only misspecification in demand but also choosing an incorrect supply model produces errors in markup and marginal cost estimates which directly affects policy advice.

6.5.3 Impact on Market Definition

Finally, table 6.10 demonstrates the consequences, i.e., how the misspecification in demand can translate to erroneous policy implications based on the example of a SSNIP market definition test. The SSNIP test asks whether a 1%, 5%, or 10% price increase is profitable for a given set of products in a candidate market. If the price increase is profitable for the hypothetical monopolist in the candidate market, products constitute the same relevant market. Otherwise, the algorithm asks to add products to the relevant market until the price increase is profitable. For demonstration purposes, we ask whether all private label brands constitute the same relevant market, which is the case if the joint price increase is profitable for all private labels. Table 6.10 lists the results of the market definition exercise. The bias stemming from misspecification in consumer demand translates into different results for the market definition test. Whereas the SSNIP test with results from model 1 yields that all private label brands constitute a joint market. We find that the joint price increase for the candidate relevant market is profitable, and the SSNIP algorithm suggests stopping the market definition exercise. However, models 2–5 predict unprofitable price increases for the candidate market, which implies adding

[26] Again, the first-order conditions of static and dynamic supply models are equivalent for products in class 2.

more products to the candidate market and repeating the exercise. Thus, the market would be defined too widely, and market power would be underestimated.[27]
The results are quite relevant. Although the use of market definition is frequently contested in the academic literature (see e.g., Kaplow 2015), it is an important tool for antitrust authorities who define markets in order to assess the competitive effect of mergers, horizontal/vertical agreements or abuse of dominance.[28] Since antitrust authorities base their analyses on the grounds of market shares—either as a prerequisite first step for market power assessment or as a screening device—market definition tests will continue to play a major role in antitrust analyses. Accordingly, particular caution is recommended for decision-makers who need to define markets. This paper shows that a misspecification in demand can translate into biased markups and policy exercises leading to erroneous conclusions regarding the degree of market power. In our case the omission of switching costs in consumer demand leads to an under-assessment of firm market power, which unduly impacts firm behavior vis-à-vis consumers, competitors, and business partners.

6.6 Conclusion

This study examines the degree of switching costs for a market where firms can discriminate between new and old consumer groups. Firms are forward-looking in the sense that they set dynamic prices for the different groups in a setup with finite time periods. Switching costs stem from state dependence in demand, where consumers are noted to experience utility gains when purchasing the same brand repeatedly. This type of state dependence is often referred to as demand inertia, brand loyalty or habit persistence, which creates psychological switching costs. When consumers have switching costs, firms have incentives to build up a loyal/inert consumer base by investing in market shares via reducing prices for new consumer groups compared to a scenario of no switching costs. Once consumers are locked-in, firms are able to exploit their market power and set prices which are above the level of the

[27]The results seem surprising for model 4 since we find lower cross-price effects compared to the baseline model. However, predicted market shares are substantially lower for model 4, which yields lower total profits, implying that a price increase is less profitable.

[28]According to the EU merger guidelines (2004/C 31/03) and the horizontal merger guidelines from the US Department of Justice & the Federal Trade Commission (08/19/2010), market share thresholds play an important role in defining "safe harbor" regions and are regularly used to shift the burden of proof in antitrust investigations.

no-switching costs regime.

Given the switching costs in consumer demand, the effect on supply-side profits is evaluated. To this extent an equilibrium model of demand and supply is developed. The demand model explicitly disentangles structural state dependence from unobserved household behavior. The supply model accounts for the strategic behavior of retailers and manufacturers in a differentiated goods set-up with multi-product firms. Results show that there is a significant degree of structural state dependence in the form of brand loyalty or consumer inertia, even after controlling for household heterogeneity.

Neglecting switching costs has several important implications. If switching costs are present and are not recognized by the researcher then static demand models will overestimate price coefficients, which affects the calculation of price elasticities and supply-side profits. Thus, policy experiments will predict false outcomes with potentially severe consequences. We illustrate these consequences based on the example of a market definition test, which finds that markets would be defined too widely if switching costs are neglected. The results can be extended to tests with similar assumptions, such as the full equilibrium merger analysis or the prediction of pricing power and price discrimination ability, which are analogously conducted based on cross-price elasticities.

The results apply not only to the market for diapers, but also to a range of markets with similar market structures with finite amount of time periods and segmentable consumer groups. Applications include the market for banks that offer higher interest rates on savings for new customers, service agencies such as consultancies and accounting companies that charge less than the full amount of man-hours for the initial projects, and markets which offer introductory discounts. Further applications can be the market for automotive insurances where new customers pay lower contract fees than old consumers, service providers targeting students at universities with cheap access to their services, and automotive full-line producers offering cheap small or compact cars targeted at young adolescents in expectation of raising prices for higher class cars.

Given the complexity of the market structure and the interaction of behavioral patterns in consumer demand, several tasks are left for future research. First, there may be two other important behavioral patterns in consumer demand: consumer learning and inventory stockpiling. Second, the type of vertical structure imposed by the equilibrium model in this paper is assumed to be a linear pricing contract.

However, the vertical relationship may be of a non-linear type. Furthermore, retailers offer multiple categories, where they optimize prices for multiple categories subject to consumer search costs and one-stop behavior.

The model can be applied to manifold setups. For instance, the model is capable of assessing which of the countervailing forces is the dominant effect on equilibrium prices, profits, and market power. A basic tool to analyze the effect of switching costs on market outcomes is the finite two period setup with new and old consumer groups, which is used in manifold studies.[29] However, even in a simple two-period model with clear beginning-game and end-game effects, it is unclear whether the upward or the downward pressure on prices and profits prevails. Klemperer (1995) and Farrell & Klemperer (2007) note that there is a strong presumption that switching costs make markets less competitive as the incentive to raise prices in later periods is more likely to dominate the incentive to lower prices in early periods. Yet, there is no clear prediction and the question boils down to an empirical matter.

Despite the popularity of theoretical switching costs models with finite time horizons and segmentable consumer groups, the number of empirical studies with this setup are scarce. The empirical literature has just recently started to tackle the question of how switching costs affect market competitiveness. Despite a vast marketing literature on the interaction of state dependence and consumer demand, there are only a few studies which investigate how equilibrium prices depend on switching costs. However, most empirical studies are concerned with markets where firms cannot discriminate between old and new consumer groups. Furthermore, they impose a game structure with an infinite time horizon. These assumptions may be suitable for market structures with steady flows of consumers, such as the markets for most retail food products, but they are unrealistic for markets where consumers remain active for a limited time period. To the best of our knowledge, there is no empirical study that investigates the hypothesis of market competitiveness in a finite setup of a structural model, where firms can discriminate between new and old consumer groups. This model can be applied to answer this question.

[29] See Klemperer (1995) and Farrell & Klemperer (2007) for extensive overviews.

6.7 Appendix

Table 6.1: **Summary Statistics Total Panel**

Variable	**Mean**	**Median**	**SD**	**Min.**	**Max.**
Income	2224.34	2125.00	937.74	400.00	4250
Age	44.95	42.00	14.93	18.00	79.00
Female	0.77	1.00	0.41	0.00	1.00
Unemployed	0.05	0.00	0.21	0.00	1.00
Single	0.26	0.00	0.43	0.00	1.00
Size	2.49	2.00	1.22	1.00	8.00
Children	0.59	0.00	0.91	0.00	6.00

Table 6.2: **Summary Statistics Diaper Panel**

Variable	**Mean**	**Median**	**SD**	**Min.**	**Max.**
Income	2367.36	2375.00	845.00	400.00	4250.00
Age	35.69	32.00	11.19	18.00	79.00
Female	0.91	1.00	0.28	0.00	1.00
Unemployed	0.04	0.00	0.20	0.00	1.00
Single	0.08	0.00	0.27	0.00	1.00
Size	3.28	3.00	1.13	1.00	8.00
Children	1.28	1.00	1.03	0.00	6.00

Table 6.3: Descriptive Statistics

		Class 0		Class 1		Class 2	
Label		Mean	SD	Mean	SD	Mean	SD
Manufacturer Brand (MB)	Continuation	0.41	0.49	0.57	0.49	0.57	0.50
	Prices	17.12	2.69	19.28	3.09	23.48	3.76
	Frequency	3,197		5,759		2,373	
Private Label (PL)	Continuation	0.59	0.49	0.73	0.44	0.76	0.43
	Prices	14.21	1.79	16.16	3.35	20.57	5.62
	Frequency	4,152		10,050		6,806	

Notes: Class 0: 2-5kg, 4-10kg, Class 1: 7-18kg, 9-20kg, Class 2: 13-27kg. SD denotes the standard deviation,

Table 6.4: Price Average per Package Size, Diaper Class, Brand, and Retailer

		Class 1		Class 2	
		Mean	SD	Mean	SD
Manufacturer Brand (MB)	NORMAL	22.41	1.15	28.77	2.35
	BIG	19.16	0.56	22.94	0.76
	MEGA	18.68	0.56	23.38	0.94
	GIGA	18.18	0.69	20.67	0.75
Private Label (PL)	VERY SMALL	29.76	1.77	33.8	1.32
	SMALL	27.21	0.98	30.15	1.20
	NORMAL	16.25	1.50	19.16	2.69
	BIG	15.05	0.36	17.38	0.49
	MEGA	14.89	1.07	17.16	0.74

Notes: SD denotes standard deviation over retailers. In each product category, discounters have lowest prices.

Table 6.5: Control Function

Dependent Variable:	Price
Paper	0.0295***
	(0.0016)
Package Size	-0.1082***
	(0.0020)
Plastic	5.6383***
	(0.9023)
Package Type	2.3125***
	(0.2796)
Plastic × Package Type	-1.0284***
	(0.2370)
Private Label	-6.7686***
	(0.1327)
Retailer Fixed Effects not reported.	
R^2	97.24%
F-Statistic	14229
Observations	6480

*Notes: ***(**,*) denotes the significance at the 1% (5%, 10%) level. Standard errors are reported in parentheses.*

Table 6.6: Demand Estimation Results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Full Model	No Switching Cost With Heterogeneity I	No Switching Cost With Heterogeneity II	With Switching Cost No Heterogeneity	No Switching Cost No Heterogeneity	Full Model No Correlation
Price	-0.2195***	-0.2206***	-0.2669***	-0.2342***	-0.2577***	-0.2018***
	(0.0061)	(0.0057)	(0.0070)	(0.0069)	(0.0069)	(0.0046)
SD Price	0.0778***	0.0739***	0.0804***	0.0954***	0.1003***	0.0597***
	(0.0015)	(0.0012)	(0.0016)	(0.0020)	(0.0018)	(0.0010)
Switching Cost	3.2764***			3.7789***		3.5955***
	(0.0464)			(0.0489)		(0.0578)
SD Switching Cost	0.6226***			0.5863***		1.8027***
	(0.0506)			(0.0540)		(0.0621)
Initial Conditions						
Brand	1.3334***	1.7801***	1.8178***			1.4391***
	(0.0383)	(0.0361)	(0.0372)			(0.0291)
Retailer	1.9252***	1.8642***	2.3059***			1.5071***
	(0.0112)	(0.0108)	(0.0134)			(0.0088)
Package Size	0.8909***	0.8577***	1.0609***			0.6934***
	(0.0108)	(0.0104)	(0.0128)			(0.0084)
Household Variance	0.4207***	0.5300***				0.6269
	(0.0425)	(0.0396)				(0.0465)
Control Function	0.0937***	0.0930***	0.1185***	0.0773***	0.0820***	0.0752***
	(0.0066)	(0.0063)	(0.0077)	(0.0075)	(0.0074)	(0.0051)
Correlated Random Coefficients	YES	YES	YES	YES	YES	NO
ll	-123267.3318	-136856.715	-137211.9935	-143591.0843	-157891.9135	-125004.013
aic	246614.6636	273781.43	274483.987	287246.1686	315837.8269	250068.0265
N	9593000	9593000	9593000	9593000	9593000	9593000

*Notes: ***(**,*) denotes the significance at the 1% (5%, 10%) level. Standard errors are reported in parentheses. All regressions include random brand and class intercepts as well as retailer fixed effects.*

Table 6.7: Partial Effects of Prices and Switching Costs

		Class 1		Class 2			
		Price	% Difference	Price	% Difference	Switching	% Difference
Own-Partial Effect	Model 1	-4.347		-3.410		0.086	
	Model 2	-4.356	0.13	-3.830	12.15		
	Model 3	-5.485	25.93	-4.463	30.52		
	Model 4	-4.410	2.17	-3.004	-11.83	0.105	28.97
	Model 5	-4.882	13.03	-3.641	6.61		
	Model 6	-4.333	-1.04	-4.695	37.17	0.108	29.91
Cross-Partial Effect	Model 1	0.747		0.758		-0.094	
	Model 2	0.786	4.73	0.789	3.95		
	Model 3	0.844	12.99	0.849	12.52		
	Model 4	0.681	-9.14	0.683	-9.69	-0.1145	38.32
	Model 5	0.754	0.71	0.759	0.30		
	Model 6	0.854	13.68	0.856	12.88	-0.1136	59.91

Notes: Partial derivatives are reported as elasticities for prices and as marginal effects for switching. Partial effects are averaged across the unobserved household distribution h_n.

Table 6.8: Distribution of Marginal Costs, Margins, and Markups

	Marginal Cost		Retail Margin		Supply Margin		Channel Margin		Markup	
	Class 1	Class 2	Class 1	Class2	Class 1	Class 2	Class 1	Class 2	Class 1	Class 2
Manufacturer Brand (MB)										
Discounters	6.06	7.00	4.07	5.95	8.89	9.61	12.97	15.56	68.81	69.93
Drugstores	10.63	10.14	4.42	6.83	8.87	10.95	13.29	17.78	57.95	65.12
Supermarkets	10.66	9.96	4.39	6.81	8.88	10.95	13.27	17.76	58.44	65.45
Private Label (PL)										
Discounters	7.22	7.47	4.34	5.93	5.47	6.81	9.81	12.73	59.93	65.14
Drugstores	11.02	10.46	4.47	6.3	4.99	6.94	9.45	13.24	49.12	57.94
Supermarkets	9.59	8.27	4.27	5.65	4.36	5.79	8.63	11.44	49.11	59.59

Notes: Supply estimates are reported for baseline model 1. Margins and marginal costs are reported in price per diaper in Euro cents. Markups (measured as price minus cost over price) are reported as percentages.

Table 6.9: % Change of different specification compared to baseline model

	Class 1		Class 2	
	Profit Margins	Marginal Cost	Profit Margins	Marginal Cost
Model 1 (Static Supply)	4.18	-5.55	0	0
Model 2 (Static Supply)	1.41	-1.88	-11.34	20.80
Model 3 (Static Supply)	-14.07	18.70	-17.02	31.22
Model 4 (Dynamic Supply)	-1.31	1.74	12.92	-23.71
Model 5 (Static Supply)	-6.71	8.92	3.96	-7.26
Model 6 (Dynamic Supply)	1.30	-1.73	-12.24	22.45
Model 4 (Static Supply)	3.12	-4.14	12.92	-23.71
Model 6 (Static Supply)	4.07	-5.40	-12.24	22.45

Notes: Baseline Model is demand model 1 with dynamic supply. The table reports the deviation to the baseline model in %.

Table 6.10: Results of the SSNIP test

	% profit change after price increase of		
	1%	5%	10%
Model 1	0.09	0.34	0.36
Model 2	-0.35	-2.01	-4.55
Model 3	-0.66	-3.52	-7.52
Model 4	-0.17	-0.95	-2.14
Model 5	-2.42	-4.76	-10.05
Model 6	0.05	0.19	0.14

Notes: Reports the percentage change of profits for all private labels as a first candidate market. If the sign of profit change is positive, products are in the same relevant market.

Chapter 7

Conclusion

This thesis provides an in-depth analysis of grocery retailing markets—which has drawn major attention in the last decade—in the light of recent developments and the decisions of national antitrust authorities. The focus lies on the analysis of existing and the development of new methods to shed light on the underlying market mechanisms, the nature of competition, and strategic firm behavior. This is of particular importance since the process of ongoing concentration in retail markets has led to a discussion on the degree of retailers' buyer power and the potential impact on consumers and manufacturers. Consequently, researchers and antitrust authorities have concentrated on determining the degree of buyer power, identifying its sources, and analyzing the associated welfare effects on retail markets. For this purpose, the adequate use of empirical methods is inevitable since, for instance, the overestimation of firm market power unduly restrains firm behavior vis-à-vis consumers, competitors, and business partners.

Policy analysis has to be carried out case-by-case, carefully designing models which incorporate the specific market characteristics. Thus, this thesis first characterizes competition problems in retail markets (chapter 2) and provides an overview of existing empirical methods in bargaining power assessment before turning to an empirical analysis of some of the most crucial questions in antitrust policy: (i) market definition (chapter 4), (ii) bargaining power distribution between retailers and manufacturers (chapter 5), and (iii) inertia in consumer demand (chapter 6). Notably, each chapter contributes to the relevant literature by enriching existing state-of-the art methodologies. In particular, chapter 4 proposes to account for the vertical relationships between retailers and manufacturers when conducting market definition exercises. Chapter 5 uses insights from the current literature on the empirical estimation of bargaining power and develops a model for collusive markets. Chapter 6 demonstrates the consequences for market power assessment (by the estimation of profit margins) and for policy experiments when the functional form of the demand function is misspecified by erroneously neglecting psychological switching costs. The subsequent paragraphs recapitulate the distinct contributions in detail.

The second chapter summarizes recent discussions in light of the scientific literature on buyer power. It highlights that the (German) antitrust authority's explicit assumption of buyer power negatively affecting total welfare is ambiguous from a scientific perspective. Aspects such as the spiral or the waterbed effect can only be derived in theoretical models under very specific conditions, and have not yet been empirically proven. Moreover, we show that the buyer power cannot be analyzed

within a unified general framework. Instead, it has to be seen as a dynamic process that must be examined in each individual case. The second focus is a careful and sound application of market definition tools. In particular, we highlight the importance of demand-side substitution patterns in the process of market definition since products which seem to be different a-priori from the researchers' viewpoint, may still be substitutes for consumers. We further question the common view that size is a reliable indicator of market power and argue that small suppliers can exert market power vis-à-vis large retailers if they pursue a consequent (local) differentiation strategy.

Chapter 3 further elaborates the empirical tools for assessing buyer power with a particular focus on consequences of misspecifying the analytical framework. The enforcement and jurisdiction of antitrust authorities crucially depend on a sound (empirical) framework for the analysis. One of the main goals of this chapter is to highlight that the use of structural models can allow an effects-based analysis within a framework of the More-Economic Approach to enrich existing methods of antitrust authorities. For that purpose, we first present a theoretical framework to qualify and quantify bargaining power, before we review selected decisions of the German Cartel Office and the UK Competition Commission in the light of the theoretical framework. Furthermore, we present current approaches of the econometric research field and explain how structural econometric models can be used to estimate bargaining power. The main focus here is on the exact quantification of the degree of bargaining power. The article concludes with recommendations on how these state-of-the-art models can be included to enrich the toolbox of authorities for sectoral investigations and merger controls.

Chapter 4 addresses recent antitrust concerns regarding the functioning of retailing markets by investigating the competitive relationships in the market for disposable diapers using rich and detailed consumer panel data. This empirical study provides a market definition test based on consumer substitution patterns for a market with heterogeneous retailers and differentiated goods (e.g., private labels and manufacturer brands) and accounting for vertical structure between retailers and manufacturers. We apply the test to the disposable diaper market to (i) uncover the degree of competition between brand labels (inter-brand competition) and across retail formats (inter-format competition), and (ii) show the importance of accounting for the vertical market structure. We find strong evidence of inter-brand and inter-format competition. Given this finding, we conclude that competition

is not limited to particular classes of retail formats, but takes place among them. Thus, a simple segmentation of markets by retail formats is misleading and can easily lead to erroneous decisions. For instance, the German Bundeskartellamt and the British competition commission excluded discounters from their investigations without testing whether discounters' products are substitutes from the consumer point of view. Likewise, the German Bundeskartellamt and the Portuguese competition commission excluded private label products from their investigations without considering consumer substitution behavior. This may lead to a market definition which is too narrow, where market power is overestimated. Moreover, it is shown that erroneously assuming the wrong market structure strongly biases results for the market definition.

Chapter 5 explores the relationship between bargaining power and innovations in the German retail coffee market using a unique household-level data set. The study is based on an empirical structural model of bargaining between manufacturers and retailers, but we propose explicitly considering collusion and bundling practices in vertical bargaining. This model is tested against other bargaining models of separate bargaining, brand bundling, and collusion. We use the model to show (i) that collusive behavior was not taking place within the whole coffee market, but instead solely covered the homogeneous segment, and we show (ii) that collusive behavior was not stable over time. Another finding is that misspecification leads to substantial biases in the bargaining power estimates—and thus in the inference of channel margins and marginal costs. Furthermore, we open the black box and provide new insights into the relationship between innovations and the vertical distribution of bargaining power. In particular, we correlate the uncovered bargaining power with variety and show that variety offered (either by the retailer or manufacturer) highly correlates with bargaining power. The results of our estimations are the foundation for a detailed analysis of the effects of product innovations on the distribution of bargaining power between suppliers and retailers. We show that the introduction of innovative products shifts bargaining power and, as a consequence, rents from retailers back to suppliers.

Chapter 6 studies consumer switching costs, which have emerged as one of the key concerns in competition policy. Although the consequences of these costs on consumer demand and firm pricing behavior have been well-documented in the literature, empirical research on the impact on policy analysis remains limited. The chapter thus seeks to address this issue by estimating a dynamic discrete choice

model and developing a dynamic supply model for the disposable diaper market. Switching costs stem from state dependence in demand, where consumers are observed to experience utility gains when purchasing the same brand repeatedly. This type of state dependence is often referred to as demand inertia, brand loyalty or habit persistence, which creates psychological switching costs to purchase a different brand to the one most recently purchased. Given the existence of switching costs in consumer demand, the effect on supply-side profits is evaluated. Firms are forward-looking in the sense that they set dynamic prices for the different groups in a setup with finite time periods. When consumers have switching costs, firms have incentives to build up a loyal/inert consumer base by investing in market shares and thus face a downward pressure on prices for new consumer groups. Once consumers are locked-in, firms are able to exploit their market power and set prices which are above the level of the no-switching costs regime. The model is used to demonstrate how neglecting switching costs in demand and/or supply biases price elasticities, supply profits, and counterfactual policy experiments. Our findings support the existence of switching costs in consumer demand, even after controlling for unobserved household heterogeneity. Moreover, we find that neglecting switching costs in demand has substantial consequences for antitrust analysis.

Bibliography

Ailawadi, K. L., Pauwels, K. & Steenkamp, J.-B. E. M. (2008). Private-Label Use and Store Loyalty, *Journal of Marketing* **72**: 19–30.

Allain, M.-L., Chambolle, C., Turolla, S. & Villas-Boas, S. B. (2013). The Impact of Retail Mergers on Food Prices: Evidence from France, **Mimeo**.

Australian Competition and Consumer Commission (2008). *Report of the ACCC Inquiry into the Competitiveness of Retail Prices for Standard Groceries*, Canberra: ACCC.

Baker, J. B. & Bresnahan, T. F. (1985). The Gains from Merger or Collusion in Product-differentiated Industries, *Journal of Industrial Economics* **33**: 427–444.

Beck, J., Grajek, M. & Wey, C. (2011). Estimating Level Effects in Diffusion of a New Technology: Barcode Scanning at the Checkout Counter, *Applied Economics* **43**(14): 1737–1748.

Beckert, W. (2011). Empirical Analysis of Countervailing Power in Business-to-Business Bargaining, *Cemmap Working Paper* **CWP32/11**.

Berges-Sennou, F., Bontems, P. & Requillart, V. (2004). Economics of Private Labels: A Survey of Literature, *Journal of Agricultural & Food Industrial Organization* **2**(1): 1–24.

Berry, S. T. (1994). Estimating Discrete-Choice Models of Product Differentiation, *RAND Journal of Economics* **25**: 242–262.

Berry, S. T., Levinsohn, J. & Pakes, A. (1995). Automobile Prices in Market Equilibrium, *Econometrica* **63 (4)**: 841–890.

Bester, H. (2011). *Theorie der Industrieökonomik*, Berlin: Springer-Verlag.

Bonnet, C. & Bouamra-Mechemache, Z. (2016). Organic Label, Bargaining Power, and Profit-sharing in the French Fluid Milk Market, *American Journal of Agricultural Economics* **98**(1): 113–133.

Bonnet, C., Bouamra-Mechemache, Z. & Molina, H. (2016). Brand Portfolio as a Source of Bargaining Leverage: An Empirical Analysis, **Mimeo**.

Bonnet, C. & Dubois, P. (2010a). Inference on Vertical Contracts between Manufacturers and Retailers Allowing for Nonlinear Pricing and Resale Price Maintenance, *RAND Journal of Economics* **41 (1)**: 139–164.

Bonnet, C. & Dubois, P. (2010b). Non Linear Contracting and Endogenous Buyer Power between Manufacturers and Retailers: Empirical Evidence on Food Retailing in France, *IDEI Working Paper* **638**.

Bonnet, C. & Dubois, P. (2015). Identifying Two Part Tariff Contracts with Buyer Power: Empirical Estimation on Food Retailing, *CEPR Discussion Paper* **DP10623**.

Bonnet, C., Dubois, P., Villas-Boas, S. B. & Klapper, D. (2013). Empirical Evidence on the Role of Non Linear Wholesale Pricing and Vertical Restraints on Cost Pass-Through, *Review of Economics and Statistics* **95**: 500–515.

Bontemps, C., Orozco, V. & Réquillart, V. (2005). Confirming the Price Effects of Private Labels Development, *IDEI Working Paper* **367**.

Borenstein, S. (1991). Selling Costs and Switching Costs: Explaining Retail Gasoline Margins, *RAND Journal of Economics* **22**: 354–369.

Brehm, J. W. (1956). Postdecision Changes in the Desirability of Alternatives, *Journal of Abnormal and Social Psychology* **52**(3): 384.

Brenkers, R. & Verboven, F. (2006). Liberalizing a Distribution System: The European Car Market, *Journal of the European Economic Association* **4**(1): 216–251.

Brenkers, R. & Verboven, F. (2007). Market Definition with Differentiated Products: Lessons from the Car Market, *in* J. P. Choi (Hrsg.), *Recent Developments in Antitrust: Theory and Evidence*, Cambridge: MIT Press.

Bresnahan, T. F. (1982). The Oligopoly Solution Concept is Identified, *Economics Letters* **10**(1): 87–92.

Bundeskartellamt (2003a). *Beschluss B2-15130-FA-129/03, Fusion: Bonduelle Frais Investissements S.A., Sd-Kapitalbeteiligungs-Gesellschaft mbH, Vita Holding GmbH*, Bonn: Bundeskartellamt.

Bundeskartellamt (2003b). *Beschluss B2-15610-FA-58/03, Fusion: Herba Germany GmbH, Kraft Foods Produktion GmbH*, Bonn: Bundeskartellamt.

Bundeskartellamt (2004). *Beschluss B2-15130-FA-160/03, Fusion: Agrana Zucker und Stärke AG, Financiére Atys SA, Butler Capital Partners, Rudolf Wild GmbH & Co. KG, Franz Zentis GmbH & Co. KG*, Bonn: Bundeskartellamt.

Bundeskartellamt (2005). *Beschluss: B9-52111-FA-27/05, Fusion: EDEKA/Spar*, Bonn: Bundeskartellamt.

Bundeskartellamt (2008). *Beschluss: B2-333/07, Fusion: Edeka/Plus*, Bundeskartellamt, 2. Beschlussabteilung.

Bundeskartellamt (2009). *Beschluss: B11-18/08, Bugeldverfahren gegen Kaffeeröster wegen Preisabsprachen*, Bonn: Bundeskartellamt.

Bundeskartellamt (2010a). *Beschluss B247250Fa52/10, Fusion: Edeka/Trinkgut*, Bonn: Bundeskartellamt.

Bundeskartellamt (2010b). *Fallbericht des Bundeskartellamtes vom 20. April 2010, Aktenzeichen B2-125/10, Rücknahme der Anmeldung im Zusammenschlussverfahren EDEKA/RATIO*, Bonn: Bundeskartellamt.

Bundeskartellamt (2010c). *Pressemeldung des Bundeskartellamtes vom 14.01.2010: Bundeskartellamt bestätigt Durchsuchung von Einzelhandelsunternehmen und Markenartikelherstellern wegen des Verdachts abgestimmter Endverbraucherpreise*, Bonn: Bundeskartellamt.

Bundeskartellamt (2010d). *Vorläufige Bewertung von Verhaltensweisen in Verhandlungen zwischen Herstellern von Markenartikeln, Großhändlern und Einzelhandelsunternehmen zum Zwecke der Konkretisierung der Kooperationspflichten*, Bonn: Bundeskartellamt.

Bundeskartellamt (2011). Bundeskartellamt startet Marktermittlungen im Rahmen der Sektoruntersuchung Lebensmitteleinzelhandel, *Press Release,* `http://www.bundeskartellamt.de/SharedDocs/Meldung/DE/Pressemitteilungen/2011/16_09_2011_SU-LEH.html` .

Bundeskartellamt (2014). *Sektoruntersuchung Lebensmitteleinzelhandel. Darstellung und Analyse der Strukturen und des Beschaffungsverhaltens auf den Märkten des Lebensmitteleinzelhandels in Deutschland*, Bonn: Bundeskartellamt.

Calzolari, G., Ichino, A., Manaresi, F. & Nellas, V. (2012). When the Baby Cries at Night: Uninformed and Hurried Buyers in Non-Competitive Markets, *CEPR Discussion Paper* **DP8856**.

Caprice, S. & von Schlippenbach, V. (2013). One-Stop Shopping as a Cause of Slotting Fees: A Rent-Shifting Mechanism, *Journal of Economics & Management Strategy* **22**(3): 468–487.

Chaudhuri, S. (2015). Aldi Details U.S. Expansion Plan, *Wall Street Jounral, June 11 2015, http://www.wsj.com/articles/aldi-details-u-s-expansion-plan-1434033903* [**downloaded 01.01.2016**].

Che, H., Sudhir, K. & Seetharaman, P. B. (2007). Bounded Rationality in Pricing under State-Dependent Demand: Do Firms Look Ahead, and if so, How Far?, *Journal of Marketing Research* **44**(3): 434–449.

Chen, Z. (2004). Monopoly and Product Diversity: The Role of Retailer Countervailing Power, *Carlton Economic Papers* **04-19**.

Chen, Z. & Rey, P. (2012). Loss Leading as an Exploitative Practice, *American Economic Review* **107 (2)**: 3462–3482.

Chintagunta, P. K., Bonfrer, A. & Song, I. (2002). Investigating the Effects of Store-Brand Introduction on Retailer Demand and Pricing Behavior, *Management Science* **48**: 1242–1267.

Clark, R., Davies, S., Dobson, P. & Waterson, M. (2002). *Buyer Power and Competition in European Food Retailing*, Cheltenham: Edward Elgar.

Cleeren, K., Verboven, F., Dekimpe, M. G. & Gielens, K. (2010). Intra- and Inter-Format Competition Among Discounters and Supermarkets, *Marketing Science* **29 (3)**: 456–473.

Cohen, W. M. & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation, *Administrative Science Quarterly* **25**: 128–152.

Comandor, W. S. (1990). Vertical Price-Fixing, Vertical Market Restrictions, and the New Antitrust Policy, *J. Reprints Antitrust L. & Econ.* **20**: 205.

Competition Commission (2000). *Supermarkets: A Report on the Supply of Groceries from Multiple Stores in the United Kingdom*, London: Stationery Office.

Competition Commission (2008). *The Supply of Groceries in the UK Market Investigation*, London: Stationery Office.

Cotterill, R. W. (2006). Australian Grocery Industry: A Competition Perspective, *The Australian Journal of Agricultural and Resource Economics* **50**: 33–50.

Cotterill, R. W. (2010). Antitrust Economic Analysis in Food Marketing Channels: A Global Perspective, *Agricultural Economics* **41**: 83–91.

Cotterill, R. W., Putsis, Jr., W. P. & Dhar, R. (2000). Assessing the Competitive Interaction between Private Labels and National Brands, *Journal of Business* **73**(1): 109–137.

Daskalova, V. (2012). Private Labels (Own Brands) in the Grocery Sector: Competition Concerns and Treatment in EU Competition Law, *TILEC Discussion Paper* **2012**.

Davidson, R. & MacKinnon, J. G. (2004). *Econometric Theory and Methods*, Vol. 5, New York: Oxford University Press.

Davis, P. & Garces, E. (2009). *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton: Princeton University Press.

Dhar, S. K. & Hoch, S. J. (1997). Why Store Brand Penetration Varies by Retailer, *Marketing Science* **16**: 208–227.

Dobson, P. W. (2005). Exploiting Buyer Power: Lessons From the British Grocery Trade, *Antitrust Law Journal* **72**(2): 529–562.

Dobson, P. W. & Waterson, M. (1997). Countervailing Power and Consumer Prices, *Economic Journal* **107**(441): 418–430.

Draganska, M., Klapper, D. & Villas-Boas, S. B. (2010). A Larger Slice or a Larger Pie? An Empirical Investigation of Bargaining Power in the Distribution Channel, *Marketing Science* **29**: 57–74.

Dubé, J.-P., Hitsch, G. J., Rossi, P. E. & Vitorino, M. A. (2008). Category Pricing with State-Dependent Utility, *Marketing Science* **27**(3): 417–429.

Dubois, P. & Perrone, H. (2015). Price Dispersion and Informational Frictions: Evidence from Supermarket Purchases, **Mimeo**.

Eichberger, J. (1993). *Game Theory for Economists*, New York: Academic Press.

Ellison, G. (1994). Theories of Cartel Stability and the Joint Executive Committee, *The Rand Journal of Economics* **25**: 37–57.

Elzinga, K. G. & Mills, D. E. (1999). Price Wars Triggered by Entry, *International Journal of Industrial Organization* **17**(2): 179–198.

Erdem, T. (1996). A Dynamic Analysis of Market Structure Based on Panel Data, *Marketing Science* **15**(4): 359–378.

Erdem, T. & Sun, B. (2001). Testing for Choice Dynamics in Panel Data, *Journal of Business & Economic Statistics* **19**(2): 142–152.

European Commission (1998). *Decision: IV/M.1225, Enso/Stora*, Brussels: European Commission.

European Commission (1999). *Decision: IV/M.1221, Rewe/Meinl*, Brussels: European Commission.

European Commission (2000). *Beschluss: COMP/M.1684, Fusion: Carrefour/Promodès*, Brussels: European Commission.

European Commission (2013). Grünbuch über unlautere Handelspraktiken in der B2B- Lieferkette für Lebensmittel und Nicht-Lebensmittel in Europa, **COM(2013)37**.

European Commission (2014). *The Economic Impact of Modern Retail on Choice and Innovation in the EU Food Sector*, Luxembourg: Publications Office of the European Union.

European Competition Network (2012). *ECN Activities in the Food Sector - Report on Competition Law Enforcement and Market Monitoring Activities by European Competition Authorities in the Food Sector*, Brussels: ECN.

Farrell, J. & Klemperer, P. (2007). Coordination and Lock-in: Competition with Switching Costs and Network Effects, *Handbook of Industrial Organization* **3**: 1967–2072.

Farrell, J. & Shapiro, C. (2010). Antitrust Evaluation of Horizontal Mergers: An Economic Alternative to Market Definition, *B.E. Journal of Theoretical Economics* **10**.

Fershtman, C. & Pakes, A. (2000). A Dynamic Oligopoly with Collusion and Price Wars, *RAND Journal of Economics* **31**(2): 207–236.

Fox, E., Montgomery, A. & Lodish, L. (2004). Consumer Shopping and Spending Across Retail Formats, *Journal of Business* **77**(S2): 25–60.

Galbraith, J. K. (1954). Countervailing Power, *American Economic Review* **44**(2): 1–6.

Giles, J. & Murtazashvili, I. (2013). A Control Function Approach to Estimating Dynamic Probit Models with Endogenous Regressors, *Journal of Econometric Methods* **2**(1): 69–87.

Goldberg, P. K. (1995). Product Differentiation and Oligopoly in International Markets: The Case of the US Automobile Industry, *Econometrica* **63**(4): 891–951.

Gonzalez-Benito, O., Munoz-Gallego, P. & Kopalle, P. (2005). Asymmetric Competition in Retail Store Formats: Evaluating Inter-and Intra-Format Spatial Effects, *Journal of Retailing* **81**(1): 59–73.

Green, E. & Porter, R. (1984). Noncooperative Collusion under Imperfect Price Information, *Econometrica* **52**: 87–100.

Griffith, G. (2004). The Impact of Supermarkets on Farm Suppliers, *Australian Economic Review* **37**: 329–336.

Harris, B. C. & Simons, J. J. (1991). Focusing Market Definition: How Much Substitution is Necessary, *J. Reprints Antitrust L. & Econ.* **21**: 151.

Hastings, J. S. & Gilbert, R. J. (2005). Market Power, Vertical Integration and the Wholesale Price of Gasoline, *The Journal of Industrial Economics* **53**(4): 469–492.

Haucap, J., Coenen, M., Herr, A. & Kuchinke, B. A. (2012). *Der deutsche Apothekenmarkt: Reformoptionen für eine effiziente und nachhaltige Versorgung*, Baden-Baden: Nomos.

Haucap, J., Heimeshoff, U., Klein, G. J., Rickert, D. & Wey, C. (2013). Inter-format competition among retailers: The role of private label products in market delineation., *DICE Discussion Paper* **101**.

Haucap, J. & Klein, G. J. (2012). Einschränkungen der Preisgestaltung im Einzelhandel aus wettbewerbsökonomischer Perspektive, *Vertikale Preis- und Markenpflege im Kreuzfeuer des Kartellrechts*, Ahlert, D., Kenning, P., Olbrich, R. and Schröder, H., Berlin: Springer.

Haucap, J., Klein, G. J., Heimeshoff, U., Rickert, D. & Wey, C. (2013). Bargaining Power in Manufacturer-Retailer Relationships, *DICE Discussion Paper* **107**.

Heckman, J. J. (1981a). Heterogeneity and State Dependence, *Studies in Labor Markets*, University of Chicago Press, S. 91–140.

Heckman, J. J. (1981b). The Incidental Parameters Problem and the Problem of Initial Conditions in Estimating a Discrete Time-Discrete Data Stochastic Process, *in* M. D. Manski C.F. (Hrsg.), *Structural Analysis of Discrete Data with Econometric Applications*, Cambridge: MIT Press, S. 179–195.

Heimeshoff, U. & Klein, G. J. (2013). Bargaining Power and Local Heros, *DICE Discussion Paper* **87**.

Hole, A. R. (2007). Fitting Mixed Logit Models by Using Maximum Simulated Likelihood, *Stata Journal* **7**: 388–401.

Hosken, D., Olson, L. & Smith, L. K. (2012). Do Retail Mergers Affect Competition? Evidence from Grocery Retailing, *FTC Working Paper* **313**.

Inderst, R. (2013). Implications of Buyer Power and Private Labels on Vertical Competitionand Innovation, *Research and Consulting Services* **(RCS)**.

Inderst, R., Jakubovic, Z. & Jovanovic, D. (2015). Buyer Power and Functional Competition for Innovation, *MPRA Paper* **61214**.

Inderst, R. & Mazzarotto, N. (2008). Buyer Power in Distribution, *in* W. D. Collins (Hrsg.), *ABA Antitrust Section Handbook*, ABA Book Publishing, Chicago, S. 1611–1637.

Inderst, R. & Shaffer, G. (2007). Retail Mergers, Buyer Power, and Product Variety, *Economic Journal* **117**(516): 45–67.

Inderst, R. & Wey, C. (2007). Buyer Power and Supplier Incentives, *European Economic Review* **51**(3): 647 – 667.

Inderst, R. & Wey, C. (2008). Die Wettbewerbsanalyse von Nachfragemacht aus verhandlungstheoretischer Sicht, *Perspektiven der Wirtschaftspolitik* **9**(4): 465–485.

Inderst, R. & Wey, C. (2011). Countervailing Power and Dynamic Efficiency, *Journal of the European Economic Association* **9**(4): 702–720.

Ivaldi, M. & Verboven, F. (2005). Quantifying the Effects from Horizontal Mergers in European Competition Policy, *International Journal of Industrial Organization* **23**: 669–691.

Jullien, B. & Rey, P. (2007). Resale Price Maintenance and Collusion, *RAND Journal of Economics* **38**(4): 983–1001.

Kaplow, L. (2010). Why (Ever) Define Markets?, *Harvard Law Review* **124**: 437–517.

Kaplow, L. (2015). Market Definition, Market Power, *International Journal of Industrial Organization* **43**: 148–161.

Katz, M. L. (1987). The Welfare Effects of Third-Degree Price Discrimination in Intermediate Good Markets, *American Economic Review* **77**: 154–167.

Katz, M. L. & Shapiro, C. (2003). Critical Loss: Let's Tell the Whole Story, *Antitrust Magazine* **17**.

Keane, M. P. (1997). Modeling Heterogeneity and State Dependence in Consumer Choice Behavior, *Journal of Business and Economic Statistics* **15**(3): 310–327.

Klemperer, P. (1995). Competition When Consumers Have Switching Costs: An Overview with Applications to Industrial Organization, Macroeconomics, and International Trade, *Review of Economic Studies* **62**(4): 515–539.

Lademann, R. (2012). *Marktstrategien und Wettbewerb im Lebensmittelhandel: Wettbewerbsökonomische Analysen von Marktstrukturen, Marktverhalten und Marktergebnissen*, Göttingen: GHS.

Lafontaine, F. & Slade, M. (2008). Exclusive Contracts and Vertical Restraints: Empirical Evidence and Public Policy, *in* P. Buccirossi (Hrsg.), *Handbook of Antitrust Economics*, Cambridge: MIT Press, S. 391–415.

Levenstein, M. & Suslow, V. (2006). What Determines Cartel Success?, *Journal of Economic Literature* **44**(1): 43–95.

Lloyd, T., McCorriston, S., Morgan, W., Rayner, A. & Weldegebriel, H. (2009). Buyer Power in UK Food Retailing: A'First-Pass' Test, *Journal of Agricultural & Food Industrial Organization* **7**(1).

Loeb, W. (2015). Aldi and Lidl Are Ready To Invade the U.S. Beware Walmart and Target!, *Forbes, July 8 2015, http://www.forbes.com/sites/walterloeb/2015/07/08/aldi-and-lidl-are-ready-to-invade-the-u-s-beware-walmart-and-target* [**downloaded 01.01.2016**].

Lustgarten, S. H. (1975). The Impact of Buyer Concentration in Manufacturing Industries, *Review of Economics and Statistics* **57**: 125–132.

Martin, S. (1983). Vertical Relationships and Industrial-Performance, *Quarterly Review of Economics and Business* **23**(1): 6–18.

Marvel, H. P. & McCafferty, S. (1984). Resale Price Maintenance and Quality Certification, *RAND Journal of Economics* **15**: 346–359.

Mathewson, G. F. & Winter, R. (1994). Territorial Restrictions in Franchise Contracts, *Economic Inquiry* **32**(2): 181–192.

Mathewson, G. F. & Winter, R. A. (1984). An Economic Theory of Vertical Restraints, *RAND Journal of Economics* **15**: 27–38.

Meza, S. & Sudhir, K. (2010). Do Private Labels Increase Retailer Bargaining Power?, *Quantitative Marketing and Economics* **8**: 333–363.

Mills, D. E. (1995). Why Retailers Sell Private Labels, *Journal of Economics & Management Strategy* **4**: 509–528.

Monopolkommission (2007). *Preiskontrollen in Energiewirtschaft und Handel*, Bonn: Monopolkommission.

Monopolkommission (2012). *19. Hauptgutachten: Stärkung des Wettbewerbs bei Handel und Dienstleistungen*, Bonn: Monopolkommission.

Montez, J. V. (2007). Downstream Mergers and Producer's Capacity Choice: Why Bake a Larger Pie when Getting a Smaller Slice?, *Rand Journal of Economics* **38**(4): 948–966.

Moresi, S. (2010). The Use of Upward Price Pressure Indices in Merger Analysis, *http://crai.com/uploadedFiles/Publications/the-use-of-UPPIs-in-merger-analysis.pdf* .

Motta, M. (2004). *Competition Policy: Theory and Practice*, Cambridge: Cambridge University Press.

Muthoo, A. (2004). *Bargaining Theory with Applications*, Cambridge: Cambridge University Press.

Nevo, A. (2000a). A Practitioners' Guide to Estimation of Random-Coefficients Logit Models of Demand, *Journal of Economics & Management Strategy* **9**: 513–548.

Nevo, A. (2000b). Mergers with Differentiated Products: The Case of the Ready-to-Eat Cercal Industry, *RAND Journal of Economics* **31**: 395–421.

Nevo, A. (2001). Measuring Market Power in the Ready-to-Eat Cereal Industry, *Econometrica* **69**: 307–342.

O'Brien, D. P. & Wickelgren, A. L. (2003). A Critical Analysis of Critical Loss Analysis, *Antitrust Law Journal* **71**.

OECD (2009). Monopsony and Buyer Power, *Policy Roundtables* **DAF/COMP(2008) 38**.

Papke, L. E. & Wooldridge, J. M. (2008). Panel Data Methods for Fractional Response Variables with an Application to Test Pass Rates, *Journal of Econometrics* **145**(1): 121–133.

Pavlidis, P. & Ellickson, P. B. (2015). Switching Costs and Market Power Under Umbrella Branding, *Simon School Working Paper* .

Pereira, P., Ribeiro, T. & Vareda, J. (2013). Delineating Markets for Bundles with Consumer Level Data: The Case of Triple-Play, *International Journal of Industrial Organization* **31**(6): 760–773.

Petrin, A. (2002). Quantifying the Benefits of New Products: The Case of the Minivan, *Journal of Political Economy* **110**(4): 705–729.

Petrin, A. & Train, K. (2010). A Control Function Approach to Endogeneity in Consumer Choice Models, *Journal of Marketing Research* **47**: 1–11.

Porter, R. (1983). A Study of Cartel Stability: The Joint Executive Committee, 1880-1886, *The Bell Journal of Economics* **14**: 301–314.

Portuguese Competition Authority (2010). *Final Report on Commercial Relations Between the Large Retail Groups and their Suppliers*, Lissabon: Portuguese Competition Authority.

Price, C. W. & Zhu, M. (2016). Empirical Evidence of Consumer Response in Regulated Markets, *Journal of Competition Law and Economics* **12**(1): 113–149.

Raju, J. S., Sethuraman, R. & Dhar, S. K. (1995). The Introduction and Performance of Store Brands, *Management Science* **41**: 957–978.

Raskovich, A. (2003). Pivotal Buyers and Bargaining Position, *Journal of Industrial Economics* **51**(4): 405–426.

Reiss, P. C. & Wolak, F. A. (2007). Structural Econometric Modeling: Rationales and Examples from Industrial Organization, *Handbook of Econometrics* **6 (A)**: 4277–4415.

Revelt, D. & Train, K. (1998). Mixed Logit with Repeated Choices: Households' Choices of Appliance Efficiency Level, *Review of Economics and Statistics* **80**(4): 647–657.

Rey, P. & Tirole, J. (1986). The Logic of Vertical Restraints, *The American Economic Review* **76**: 921–939.

Rey, P. & Vergé, T. (2004). Resale Price Maintenance and Horizontal Cartel, *CMPO Working Paper Series* **02/047**.

Rey, P. & Verge, T. (2008). Economics of Vertical Restraints, *in* P. Buccirossi (Hrsg.), *Handbook of Antitrust Economics*, Vol. 9, S. 353–390.

Rey, P. & Vergé, T. (2010). Resale Price Maintenance and Interlocking Relationships, *Journal of Industrial Economics* **58**(4): 928–961.

Rickert, D. (2016). Consumer Switching Costs, Dynamic Prices, and Antitrust Analysis. Evidence from the Market for Diapers, **Mimeo**.

Rivers, D. & Vuong, Q. (2002). Model Selection Tests for Nonlinear Dynamic Models, *Econometrics Journal* **5**(1): 1–39.

Rodrigues, J. (2006). *Buyer Power and Pass-Through of Large Retailing Groups in the Portuguese Food Sector*, Lisbon: Autoridade da Concorrencia.

Roux, C. & Thöni, C. (2015). Collusion among many Firms: The Disciplinary Power of Targeted Punishment, *Journal of Economic Behavior & Organization* **116**: 83–93.

Schmidt, I. & Haucap, J. (2013). *Wettbewerbspolitik und Kartellrecht: eine interdisziplinäre Einführung*, Berlin: Walter de Gruyter.

Schröder, H. (2012a). Die Eignung der Begriffsdefinitionen von Erscheinungsformen im Handel zur Abgrenzung von sachlich relevanten MärktenDargestellt an Beispielen des Großhandels und des Einzelhandels mit Lebensmitteln, *Betriebswirtschaftliche Forschung und Praxis* (6): 643.

Schröder, H. (2012b). Is Cash & Carry Wholesale a Separate Market? Results from an Empirical Study, *Applied Economics Quarterly (formerly: Konjunkturpolitik)* **58**(1): 71–89.

Schröder, H. & Mennenöh, J. (2013). Zur Abgrenzung von sachlich relevanten Märkten im Einzelhandel mit Lebensmitteln: Eine empirische Analyse von Drogerieartikeln und Getränken, *Wirtschaft und Wettbewerb* **63**(6): 575–590.

Schumacher, U. (1991). Buyer Structure and Seller Performance in US Manufacturing Industries, *Review of Economics and Statistics* **73**: 277–284.

Schwalbe, U. (2011). Preisgestaltung in vertikalen Strukturen: Preisbindung und Preisempfehlung aus ökonomischer Sicht, *Wirtschaft und Wettbewerb* **61**(12): 1197–1215.

Seetharaman, P. (2004). Modeling Multiple Sources of State Dependence in Random Utility Models: A Distributed Lag Approach, *Marketing Science* **23**(2): 263–271.

Seetharaman, P. B., Ainslie, A. & Chintagunta, P. K. (1999). Investigating Household State Dependence Effects across Categories, *Journal of Marketing Research* **36**: 488–500.

Seidel, H. (2011). Kartellamt eröffnet Jagd auf Lebensmittelhändler, *http://www.welt.de/wirtschaft/article12501900/Kartellamt-eroeffnet-Jagd-auf-Lebensmittelhaendler.html* .

Sethuraman, R. (1995). A Meta-Analysis of National Brand and Store Brand Cross-Promotional Price Elasticities, *Marketing Letters* **6**: 275–286.

Shcherbakov, O. (2016). Measuring Consumer Switching Costs in the Television Industry, *RAND Journal of Economics* **47**(2): 366–393.

Sovinsky-Goeree, M. (2008). Limited Information and Advertising in the US Personal Computer Industry, *Econometrica* **76**(5): 1017–1074.

Spengler, J. J. (1950). Vertical Integration and Antitrust Policy, *Journal of Political Economy* **58**: 347–352.

Sudhir, K. (2001). Structural Analysis of Manufacturer Pricing in the Presence of a Strategic Retailer, *Marketing Science* **20**(3): 244–264.

Telser, L. G. (1960). Why Should Manufacturers Want Fair Trade?, *Journal of Law and Economics* **3**: 86–105.

Tirole, J. (1988). *The Theory of Industrial Organization*, Cambridge: MIT press.

Tirole, J. (2015). Market Failures and Public Policy, *American Economic Review* **105**(6): 1665–1682.

Train, K. (2009). *Discrete Choice Methods with Simulation*, Cambridge: Cambridge University Press.

Van Ark, B., O'Mahony, M. & Timmer, M. (2008). The Productivity Gap Between Europe and the United States: Trends and Causes, *Journal of Economic Perspectives* **22**(1): 25–44.

Varian, H. R. (2011). *Grundzüge der Mikroökonomik*, Berlin: Walter de Gruyter.

Viard, V. B. (2007). Do Switching Costs Make Markets More or Less Competitive? The Case of 800-Number Portability, *RAND Journal of Economics* **38**(1): 146–163.

Villas-Boas, S. B. (2007a). Using Retail Data for Upstream Merger Analysis, *Journal of Competition Law and Economics* **3**: 689–715.

Villas-Boas, S. B. (2007b). Vertical Relationships between Manufacturers and Retailers: Inference with Limited Data, *Review of Economic Studies* **74**: 625–652.

Villas-Boas, S. B. & Hellerstein, R. (2006). Identification of Supply Models of Retailer and Manufacturer Oligopoly Pricing, *Economics Letters* **90**(1): 132–140.

Ward, M. B., Shimshack, J. P., Perloff, J. M. & Harris, J. M. (2002). Effects of the Private-Label Invasion in Food Industries, *American Journal of Agricultural Economics* **84**: 961–973.

Waterson, M. (2003). The Role of Consumers in Competition and Competition Policy, *International Journal of Industrial Organization* **21**(2): 129–150.

Wenzel, T. (2011). Deregulation of Shopping Hours: The Impact on Independent Retailers and Chain Stores, *The Scandinavian Journal of Economics* **113**(1): 145–166.

Werden, G. J. (2002). Market Delineation Algorithms Based on the Hypothetical Monopolist Paradigm, *US DOJ Antitrust Division Economic Analysis Group Discussion Paper* **02-8**.

Wey, C. (2011). Nachfragemacht im Handel, *DICE Discussion Paper* **21**.

Wilson, C. M. (2012). Market Frictions: A Unified Model of Search Costs and Switching Costs, *European Economic Review* **56**(6): 1070–1086.

Winter, R. A. (1993). Vertical Control and Price Versus Nonprice Competition, *Quarterly Journal of Economics* **108**: 61–76.

Wooldridge, J. M. (2005). Simple Solutions to the Initial Conditions Problem in Dynamic, Nonlinear Panel Data Models with Unobserved Heterogeneity, *Journal of Applied Econometrics* **20**(1): 39–54.

Eidesstattliche Versicherung

Ich, Dennis Rickert, versichere an Eides statt, dass die vorliegende Dissertation von mir selbstständig, und ohne unzulässige fremde Hilfe, unter Beachtung der "Grundsätze zur Sicherung guter wissenschaftlicher Praxis an der Heinrich-Heine-Universität Düsseldorf" erstellt worden ist.

Düsseldorf, 2016

Unterschrift