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**Zentrum für internationale Entwicklungs- und Umweltforschung
der Justus-Liebig-Universität Gießen**

**Grocery Retailing in Germany:
Situation, Development and Pricing Strategies***

by

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No. 41

Giessen, February 2009

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1 INTRODUCTION

Like many other industrialised countries Germany has experienced a powerful concentration process in food retailing. There are some issues, however, which make Germany a special case in Europe and among industrialised countries in general. This holds true in terms of market structure and concentration, market development and pricing strategies. The market share of hard discounters like Aldi and Lidl has grown continuously in recent decades and the market share of discounters in general has reached a magnitude that is well above that found in other European countries. This has led to robust price competition in German food retailing. Along with this development, it has been very difficult for inward foreign direct investment (FDI) to gain ground in the German food retailing industry. One example was the market entry by Wal-Mart which, given its initial ambitious goals, was not successful. On the other hand, German hard discounters have strongly affected outward FDI by other German food retailers. In the process of expanding into other markets abroad, these companies have had a positive impact on exporting by the German food industry.

This article describes and analyses these major trends in German food retailing in detail. It is organised as follows. The structure of food retailing is described and explained in Section 2. Section 3 deals with the importance of inward and outward FDI in German food retailing. It is discussed in both sections how increased concentration in food retailing affects the marketing chain. Price competition is intense in Germany, and studies of food pricing strategies have used scanner data. Therefore a special case study in Section 4 is the analysis of food pricing strategies in Germany based on scanner-data evidence. The analysis shows that the pricing behaviour of food retailers is characterised by the every-day-low-pricing (EDLP) strategies of discounters and the high-low-pricing (HiLo) strategies of their major competitors. The main elements of pricing policies are indicative of firms' market power: repeated price discounts for major food brands, frequent changes of loss leaders, the dominant role of psychological pricing, and a strong price rigidity for all other foods which are not on special offer. The results are summarised in Section 5.

2 STRUCTURE AND DEVELOPMENT OF FOOD RETAILING IN GERMANY

What are the characteristics and market structure of food retailing in Germany, and how did these change over time? Which factors affected structural change? These questions are analysed in this section first at the level of store types and then at the industry level.

2.1 Structure and Changes at the Store-type Level

Structural changes at the store-type level are highlighted in this section. First, it is necessary to distinguish between different store types and to define them. **Hypermarkets** constitute the largest store type in Germany. According to A.C. Nielsen (2004), these are stores with a sales area of at least 5,000 square metres¹, which provide a broad assortment of food and non-food goods with self-service. **Consumer markets** are stores that have a sales area between 1,500 and 4,999 square metres. These are followed by **supermarkets**², which are the smallest modern food-retailing stores, with a sales area between 400 and 1,499 square metres. An important development in food retailing is the role played by **discounters**. A discounter is a store where the discount principle is applied irrespective of the size of its sales area. The discount principle is characterised by a low-price strategy associated with a limited assortment of goods (A.C. Nielsen 2004, p. 13). Typically,³ the discounters' range does not only consist of fresh or durable food products³ but also selected non-food goods that are sold on a changing weekly basis. This non-food activity is becoming more and more important in generating discounters' revenues and is a feature distinguishing them from other companies. **Remaining food stores** is a classification covering all food stores that have a sales area below 400 square metres.

German discounters are further divided into hard discounters and soft discounters. **Hard discounters** have a reduced product range, like Aldi, Lidl and Norma. In contrast, **soft discounters** traditionally have a larger product mix

¹ One square metre corresponds to 10.76 square feet.

² Another common version of store classification distinguishes between small consumer markets, ranging between 800 and 1,499 square metres of sales area, and supermarkets, with a sales area between 400 and 799 square metres (A.C. Nielsen 2000).

³ Depending on the company, food products may be sold as private labels or as branded goods, both mostly having lower prices compared with other store types.

and depth (Bundeskartellamt 2005). Therefore, soft discounters are often called brand discounters. Examples are individual stores of Tengelmann (Plus), Rewe (Penny), Spar (Netto) and Edeka (Diska, Kondi, NP, Treff). More recently, the distinction between hard and soft discounters has blurred and it will not be used in the following analysis. Today, an increasing number of branded products are found in the stores of Lidl and Norma (Twardawa 2006).

The changes over time in the number of establishments in the various store types are presented in Table 1. It has to be borne in mind that German data on food retailing include the impacts of German reunification. German reunification took place on October 3, 1990, when the former German Democratic Republic was integrated into the Federal Republic of Germany. As a consequence of reunification, market size had a marked effect on both the supply and demand side from 1990 onward and, as Table 1 demonstrates, this is reflected in the high number of all store types in 1995 compared with 1990.

Table 1: Number of Establishments at the Store-type Level^{a)}

Year	Hypermarkets/ Consumer Markets	Discounters	Supermarkets	Remaining Food Stores
1980	1,314	-	5,190	69,763
1985	1,513	-	9,845	58,015
1990	1,656	-	7,817	50,888
1995	2,038	10,630	9,635	54,100
2000	2,363	12,770	9,230	45,900
2003	2,494	13,750	8,790	39,900
2004	2,558	14,214	8,620	37,350

a) Excludes online shops and non-organised food retailing. After 1991, stores in the former German Democratic Republic are included, and discounters are shown separately. Remaining food stores contain discounters until 1990.

Source: EHI (various years).

There are clear trends in the number and shares of store types before and after reunification. The number of stores in the categories hypermarkets/consumer markets and discounters increased, whereas the proportions of remaining food stores and supermarkets declined. This characterises two major developments in German food retailing: (i) the move towards store types with a bigger sales area, and (ii) the boom in discounters.

With regard to increasing sales area, the number of hypermarkets and consumer markets rose continuously from 1,314 in 1980 to 2,558 in 2004. More supermarkets existed in 2004 (8,620) than in 1980 (5,190), too. Table 1 reveals, however, that their number declined after Germany was reunited, and this trend had already begun in former West Germany between 1985 and 1990. The number of remaining food stores, which are smaller than supermarkets, dropped from a high level of nearly 70,000 stores (1980) to about 37,000 (2004) due to structural change. The downward trend was only interrupted by a peak in 1995 after reunification.

In terms of the number of outlets, discounters are the store type that dominates German food retailing. 14,214 stores of this type existed in 2004; the number of discount stores has grown continuously and their share of all food stores even more so. However, the impressive growth of discounters slowed down at the beginning of the new millennium.

As a study by the Coca-Cola Retailing Research Council Europe (CCRRCE) also points out “the rise of discounters does not, however, herald the end to the supermarket and hypermarket formats. [...] the discount model is optimized for German shopper preferences. In other markets, the model’s advantages are significantly neutralized by a lack of shopper interest” (CCRRCE 2005, p. 12). Particularly in Germany, retailing companies have attracted bargain-pursuing customers (Koch/Friese 2005). German customers are highly focused on price, as an analysis of the Gesellschaft für Konsumforschung (GfK) documented.

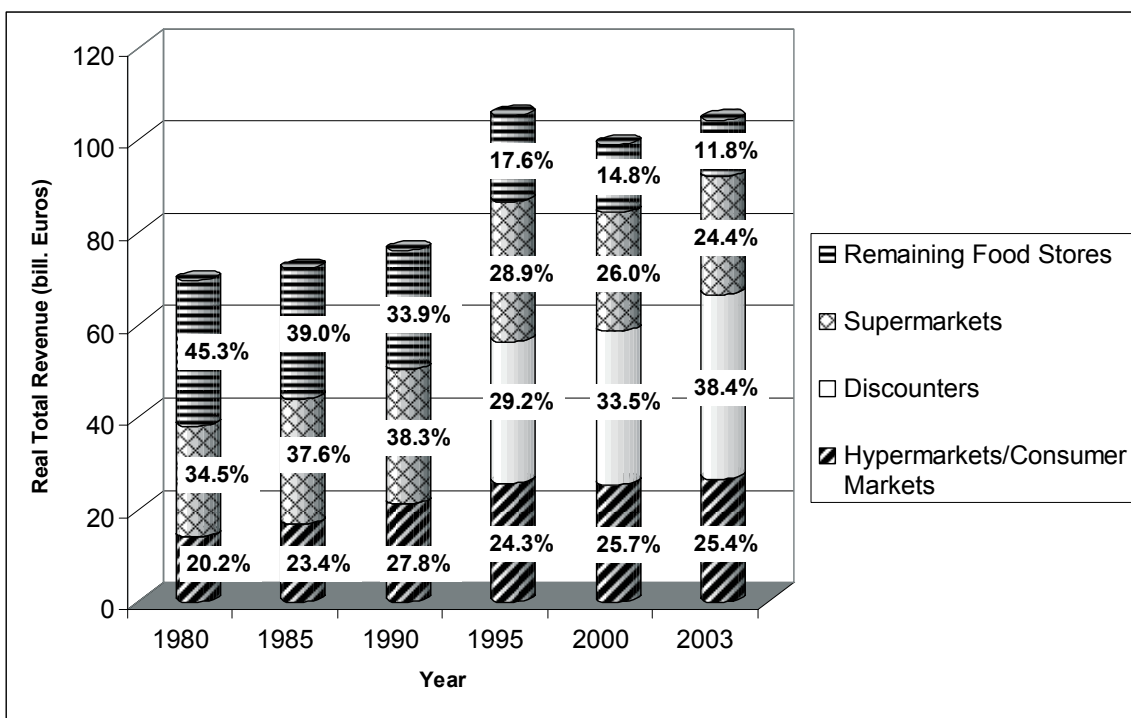
It is interesting to note that the distribution of revenue across store types has changed substantially during the last 25 years. The group of remaining food stores, which have less than 400 square metres of sales area, accounted for nearly half of total revenue in food retailing in 1980. They were followed by supermarkets as well as hypermarkets and consumer markets. Supermarkets accounted for 35% of the industry’s total revenue. The largest store types had a market share of 20%. Over time, supermarkets and the remaining food stores have continuously lost market share to hypermarkets and consumer markets, and certainly to discounters.

Figure 1 illustrates the real total revenue achieved by different store types over time. Supermarkets had been able to increase their total revenues from 27.3 billion euros in 1980 to 32.2 billion euros in 1995. In the following years revenues decreased to 28.3 and 27.0 billion euros in 2000 and 2003 respectively. As a consequence of the steady decline in the number of the remaining food stores, their total revenues also decreased.

In contrast, the hypermarkets and consumer markets displayed an impressive development in revenue terms. Their total revenue nearly doubled in the observation period. Finally, the group of discounters had the highest total revenue, and a positive trend can still be seen. In 2003, this store type accounted for 42.6 billion euros.

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Figure 1: Real Total Revenue and Market Share at Store-type Level^{a)}



a) Excludes online shops and non-organised food retailing. After 1991, stores in the new Federal States of the former German Democratic Republic are included, and discounters are shown separately. Remaining food stores include discounters until 1990.

Source: EHI (various years).

As Figure 1 reveals, even the hypermarkets and consumer markets were not able to keep up with the increasing prominence of discounters in influencing

consumers' buying behaviour in Germany. They have lost ground to discounters since 1990, and their market share has declined from 27.8% to 25.4%

The discounters' market share was nearly 40% in 2005, with Aldi accounting for 42% of this figure, followed by Lidl. The market leader Aldi achieved nearly complete market penetration. It is indicative of discounters' importance that about 87% of all German households, or 70 million of all consumers in Germany, can reach a store of Aldi or Lidl within 15 minutes (Twardawa 2006, p. 381).

In a comparison of the two dominant firms, in 2003 Aldi's revenue was 22 billion euros compared with Lidl's 9.8 billion euros. Lidl, however, is much more aggressive in pursuing international expansion (CCRRCE 2005). As the CCRRCE study shows, it generated 48% of its total revenue from operations outside Germany (CCRRCE 2005, p. 10). The important foreign investment activities of German retailers, not only of discounters, are surveyed in more detail in Section 3.

2.2 Changes at the Industry Level

Four decades ago, German food retailing was dominated by a multitude of small retail outlets. These small stores were mainly service-oriented. The change from service-oriented stores to a self-service system has induced some sustainable changes in the industry. Above all, as Table 2 shows, the total number of retail establishments dropped from about 92,000 in 1980 to 67,000 in 1990. The statistical peak in 1995 captures for the first time the food-retailing sector in the former German Democratic Republic. At that time, quite small stores were characteristic of food retailing in East Germany. After 1995, the number of food-retailing stores declined again sharply and continuously to 55,300 in 2003.

The fall in the number of stores was accompanied by an impressive increase in the total sales area from 16.1 million square metres in 1980 to 26.8 million in 2003. The general rise in sales area was a crucial factor contributing to greater competition in the German food-retailing sector. The two components, i.e. fewer stores and a rising overall sales area, gave rise to even higher expansion of the average sales area per store. Whereas the average shop had a mean sales area of 176 square metres in 1980, this figure changed to 485 square metres in 2003. This increase can be ascribed mainly to the appearance of new retail formats such as hypermarkets.

Table 2: The Development of the German Food-retailing Industry^{a)}

Year	Number of Establishments	Total Revenue (Mill. Euros) ^{b)}		Number of Employees		Sales Area (1,000 m ²)	
		Total	Per Establishment	Total (1,000)	Per Establishment	Total	Per Establishment
1980	91,600	80,005	0.873	408.4	4.5	16,100	0.176
1985	77,000	77,459	1.006	414.0	5.4	17,600	0.228
1990	67,000	85,811	1.281	422.2	6.3	19,400	0.290
1995	74,300	97,800	1.317	425.2	5.7	23,800	0.321
2000	60,025	91,459	1.425	358.0	5.6	25,900	0.404
2003	55,300	90,396	1.636	365.3	6.6	26,800	0.485

a) Excludes Aldi. After 1991, the new Federal States of the former German Democratic Republic are included. – b) Real values are computed with the consumer price index and the base year 1995 (Statistisches Bundesamt 2006a).

Source: A.C. Nielsen (various years).

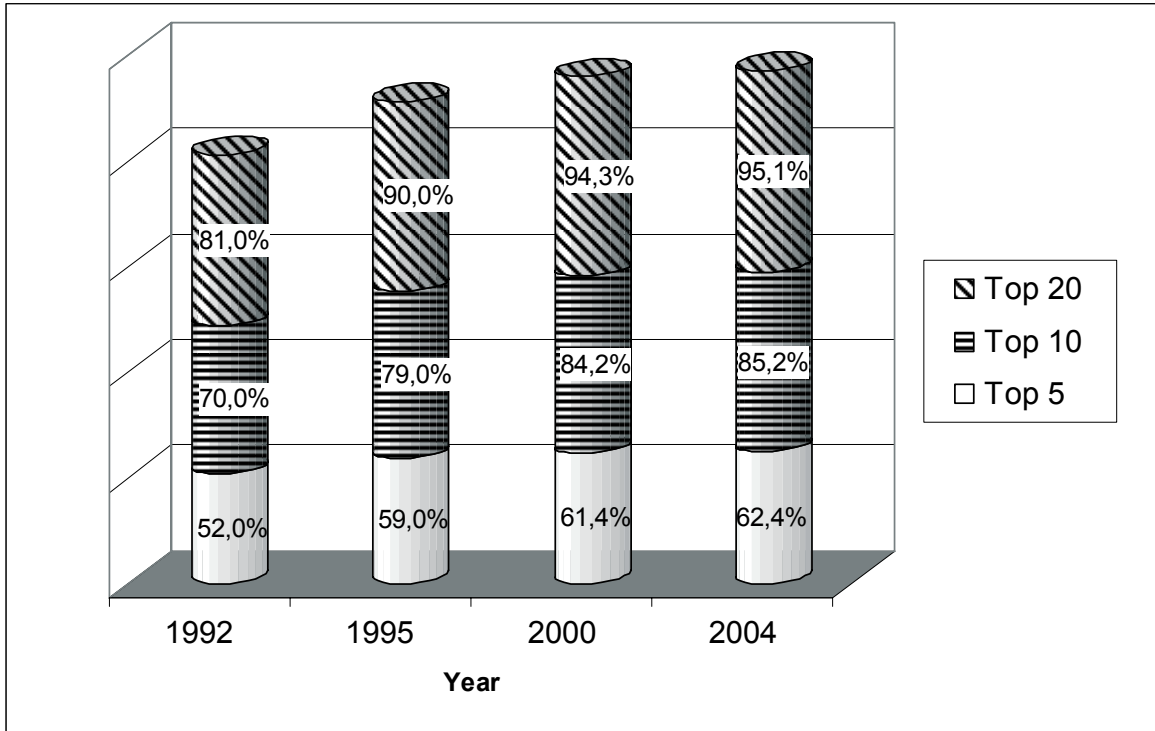
Other changes shown in Table 2 are related to revenue and employment. Neither the trend of total revenue nor the trend of the total number of employees has been uniform over the last 25 years. The decline in total revenue between 1995 and 2003 indicates, however, that a certain level of saturation occurred in the aggregate food-retailing sector. Within this period, the number of employees also dropped. The rising number of employees per store in that period is a consequence of the enormous expansion of average store size. The continuous rise of revenue per store from 0.873 million euros in 1980 to 1.636 million euros in 2003 is striking. It represents stark productivity gains in the German food-retailing sector.

These structural changes induced an intensifying market concentration among the leading food-retailing companies which is illustrated in Figure 2. The share of the top twenty companies in total industry revenue was 81% in 1992. In 2004, the top twenty already accounted for 95.1%. The five leading companies earned half of the industry's total revenue in 1992. They further strengthened their market position in the following twelve years and earned nearly two-thirds of the industry's total revenue in 2004.

As Figure 2 shows, the German retailing industry is characterised not only by a declining number of stores, but by the lower number being distributed over fewer companies. The individual companies' revenue shares are presented in Table 3. The leading company in Germany's food retailing industry is still Metro, which, however, lost some of its market share (-3.7 percentage points) to other

competitors in the observation period. Tengelmann and Tegut lost market share, too, but only by 1.7 and 0.1 percentage points respectively. All other companies were able to maintain or expand their market share.

Figure 2: Market Share of the Leading Companies in German Food Retailing



Source: LZ (various years).

It is striking that most of the companies raised their market share in the period up to 2000 and then some of these gains subsequently vanished. Edeka, Aldi, Schwarz, and Norma were in a position to withstand that negative industry trend. Three of these companies have their main business domain in discounting and Edeka operates some discount stores as well as other store types. In particular Schwarz, the owner of the discounter Lidl, more than doubled its market share in terms of total revenue within ten years and produced the highest growth rate.

Table 3: Companies' Market Share in German Food Retailing (in % of Total Revenue)

	1994	1997	2000	2004
Metro	18.6	19.3	16.2	14.9
Rewe	13.1	13.6	14.6	14.2
Edeka/AVA	11.6	12.7	12.6	13.4
Aldi ^{a)}	9.4	9.9	10.0	10.1
Schwarz ^{a)}	4.6	5.6	6.4	9.8
Tengelmann	7.5	7.6	7.1	6.0
Spar AG ^{a)}	4.3	5.6	4.0	4.0
Globus	1.2	1.7	1.7	1.6
Wal-Mart (Germany) ^{a), b)}	-	0.7	1.5	1.3
Norma ^{a)}	1.0	1.1	1.1	1.2
Coop Schleswig-Holstein	0.6	0.6	0.7	0.6
Tegut	0.6	0.5	0.5	0.5

a) Estimated. – b) Until 1998 Wertkauf Karlsruhe.

Source: LZ (various years).

Nevertheless, Aldi is the leading company among the discounters. In 2005, its industry market share was 16.9%, while the remaining discounters together had only 23.0% of the industry market share (A.C. Nielsen 2005). As Table 3 also indicates, Aldi generates only a small growth rate, and this may be due to the fact that Aldi has already attained almost complete market penetration (see Section 2.1). In contrast, Lidl, as the number two among the leading discounters, still has potential for growth.

A further feature of Germany's food-retailing industry is the relative absence of foreign food-retailing companies. The only companies which operated on the German market or tried to break into it are Wal-Mart, Delhaize⁴ and ITM Enterprises⁵. On entering the German food-retailing market, Wal-Mart absorbed

⁴ Delhaize is a Belgian company which offers its customers high-quality products. Foreign specialities and an innovative ambiance are characteristic of its stores.

⁵ His company is organised as a cooperative, and it joined the German Spar cooperative. After making losses for years, ITM Enterprises withdrew from the German market.

the retailing companies Wertkauf and Eurospar. However, Wal-Mart did not succeed in becoming a major player, as its market share of only 1.3 percent in 2004 indicates. It ranked ninth among the leading food-retailing companies in Germany in that year. Since Wal-Mart was not able to transfer its worldwide successful business concept to the German market, its performance in terms of earnings and market share was disappointing, and well below its own ambitious goals. In the end, Wal-Mart withdrew from the German market after eight and a half years of business. The retailing outlets were taken over by Metro, Germany's leading food-retailing company.

This failure of Wal-Mart to enter the German food-retailing market can be ascribed to imperfect adjustment to the German market and very low margins (Fernie et al. 2006; Hurth 2003). In the German industry, returns on sales in food-retailing typically vary between 0.5% and 2%, whereas in Great Britain, for example, they range from 5% to 7% (Koch/Friese 2005).

3 FOREIGN DIRECT INVESTMENT

As outlined in Section 2, the German food-retailing sector is dominated by a relatively small number of companies, which are facing robust price competition and comparatively low retail margins. This situation is an outcome of excess capacity: in Germany, there are 250 food-retailing stores with a sales area of more than 400 square meters for every one million inhabitants. For comparison, in Great Britain the ratio is only 110 stores and in France 120 shops to one million inhabitants (Koch/Friese 2005).

In order to compensate for this difficult domestic market, German retailing companies have strengthened their international expansion activities. The real foreign direct investment (FDI) of German companies is presented in Table 4 as an indicator of this strategy. The first grey-shaded row describes the real direct and indirect investments of all German industries in the foreign retailing sector. It is apparent that the real outward FDI has increased steadily – from all industries to retailing, from the retailing sector to all industries, and from retailing to retailing.

Table 4: Real German Direct and Indirect Foreign Investment (Bill. Euros)^{a), b), c)}

From Industry	To Industry	1985	1990	1995	2000	2004
All	Retailing	18.84	25.62	29.33	60.34	66.65
	<i>of which (in %)</i>					
	<i>EU (25)</i>	43.4	51.8	57.1	52.4	59.1
	<i>United States</i>	27.5	21.1	18.1	21.7	17.3
Retailing	All	3.80	6.10	6.33	9.52	8.93
	<i>of which (in %)</i>					
	<i>EU (25)</i>	27.9	42.0	59.3	52.1	75.9
	<i>United States</i>	40.8	32.2	16.2	19.0	8.7
Retailing	Retailing	-	4.16	4.89	6.58	6.94
	<i>of which (in %)</i>					
	<i>EU (25)</i>	-	38.8	63.3	57.8	81.1
	<i>United States</i>	-	39.3	25.3	17.7	7.5

a) Including maintenance and repair of vehicles and consumer goods since 1995. – b) In 1993 and 2002 the reporting limit of total assets' investment objects rose from 0.26 to 0.5 mill. euros and from 0.5 to 3 mill. euros respectively. – c) Real values computed with the GDP deflator and the base year 1991 (Statistisches Bundesamt 2006b).

Source: Deutsche Bundesbank (various years) and own computations.

In 1985, German companies invested 18.8 billion euros in retailing abroad and, by 2004, the figure had risen by about 250% to 66.7 billion euros. Although the

growth rates of real outward FDI undertaken by German retailers were lower than for the total of German companies, they were still substantial. Retailers' FDI more than doubled from 1985 to 2004, indicating of course the effect of German unification on market size. Growth rates of intra-retailing FDI were below average, but even these were considerable compared with the growth of the food trade in the same period. It can be shown that the retailing industry had, and still has, an inclination to invest in the same industry. About 68% of the retailing industries' FDI in 1990, and 78% in 2004, went to the retailing sector abroad. In other words, the retailing industry concentrated its foreign activities on its core competence – retailing.

Only two geographical regions are of major interest as destinations of this major increase in outward FDI, namely the European Union and the United States. Investment inside the EU always outperformed FDI to the US, and the latter steadily lost ground. In 2004 (1985), 17.3 (27.5)% of all investments took place in US retailing companies, whereas 59.1 (43.4)% of all FDI flows went to EU retailing companies. The concentration on the EU becomes even more important if only the retailing industry's investment is analysed. The United States' investment share dropped by 31.8 percentage points from 39.3% in 1990 to 7.5% in 2004.

The increasing prominence of European retailing companies as strategic investments can be partly explained by the opening up of Eastern European countries. Former socialist countries like Poland, the Czech Republic and Hungary opened up their markets and they developed a more market-oriented economic policy and thus became more attractive for foreign companies. Lower input prices for labour, real estate and energy, as well as affordable commodity prices, favoured a location in Eastern Europe. The closeness to the home market and a company's headquarters – Germany – will certainly have had a positive impact, too.

Not only do German companies invest in retailing industries in foreign countries but also foreign companies have been attracted by the German market and the retailing industry in Germany. But, as was pointed out in Section 2.2, the German market has its own special characteristics, like market concentration, low retail margins, the prominence of discounters, and discriminating consumers. These characteristics make entrepreneurial activity in German food retailing challenging. Most of the FDI inflows have not resulted in direct control of target companies, as the spectacular and widely discussed failures of foreign companies entering the German market document (see the case of Wal-Mart). FDI inflows steadily increased, as did the FDI outflows. In 1985, foreign companies invested 9.5 billion euros in the German retailing industry, and the

real total FDI increased by nearly 300% to 36.7 billion euros in 2004. This was accompanied by a change in the proportions of FDI inflows from different regions. In 1985, three sources were of importance – the EU, the United States and Japan. Intra-EU investments became more important over time, as the increase by 25 percentage points indicates. This occurred at the expense of Japanese and American companies whose shares of FDI inflows to Germany diminished.

Table 5: Real Foreign Investment in German Food Retailing (Bill. Euros)^{a), b), c)}

From Industry/Country	To Industry Retailing	1985	1990	1995	2000	2004
All		9.458	18.119	23.545	32.790	36.716
<i>of which (in %)</i>						
<i>EU</i>		32.6	38.7	45.2	52.7	57.6
<i>Belgium</i>		-	2.2	1.6	1.9	0.3
<i>Denmark</i>		-	1.4	2.3	2.9	2.2
<i>France</i>		10.5	9.2	8.7	8.2	7.5
<i>Italy</i>		-	3.7	2.6	1.6	1.6
<i>Luxembourg</i>		-	-	0.9	1.6	3.6
<i>Netherlands</i>		7.7	13.5	15.0	22.3	18.9
<i>Austria</i>		-	1.5	2.1	2.2	1.9
<i>Sweden</i>		-	2.1	2.4	1.6	1.0
<i>Spain</i>		-	-	-	-	1.9
<i>United Kingdom</i>		5.8	6.6	6.9	7.9	14.6
<i>Switzerland</i>		10.5	12.6	9.1	7.3	5.3
<i>United States</i>		17.1	16.3	15.4	15.9	12.2
<i>Japan</i>		21.4	21.5	18.8	15.1	15.9

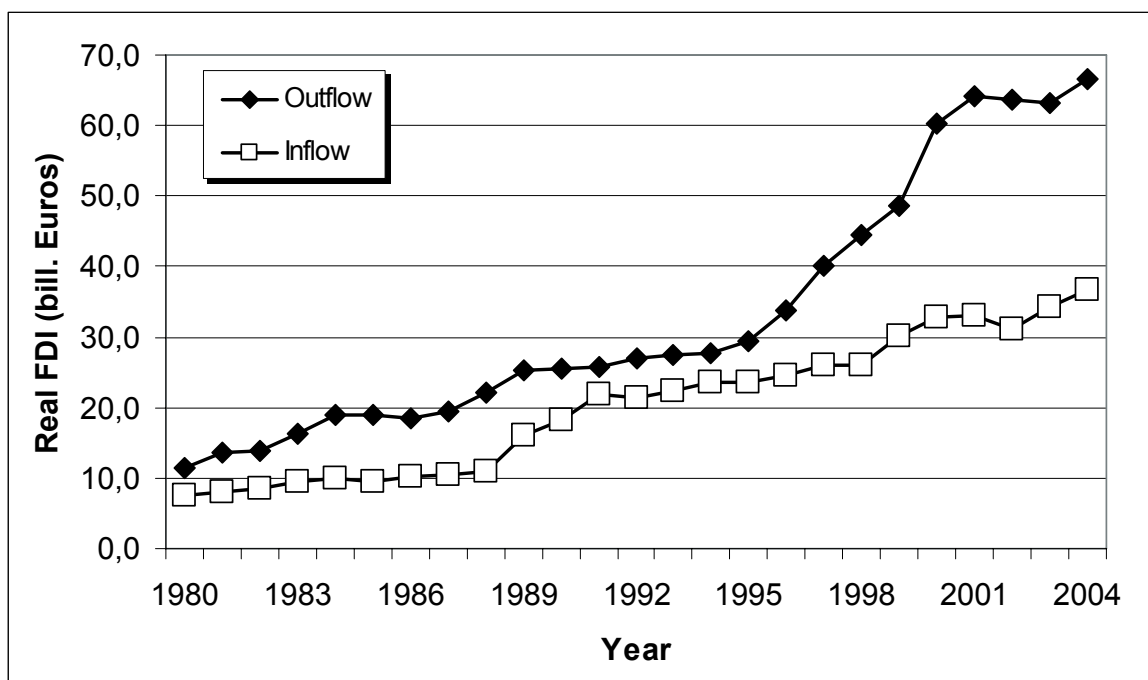
a) Includes maintenance and repair of vehicles and consumer goods since 1995. - b) In 1993 and 2002 the reporting limit of total assets' investment objects rose from 0.26 to 0.5 mill. euros and from 0.5 to 3 mill. euros respectively. - c) Real values computed with the GDP deflator and the base year 1991 (Statistisches Bundesamt 2006b).

Source: Deutsche Bundesbank (various years) and own computations.

Within the EU, the countries of origin's relative importance of inward FDI also changed. Countries like the United Kingdom (+8.8 percentage points), and to a lesser extent Luxembourg, Denmark and Austria, strengthened their share of total investment in German retailing. Dutch companies increased their share of FDI inflows until 2000 by 14.6 percentage points, but their share decreased again after 2000 from a high level of 22.3%. The Netherlands are still the most important single-country investor in German retailing. On the other hand,

countries like Belgium, Italy and Sweden became less significant, and the decline of Switzerland and France in the German FDI market was even greater. A comparison of the real total FDI inflows and outflows of all German industries to the retailing sector is presented in Figure 3. FDI outflows exceeded FDI inflows at all times. Real net FDI outflows grew over time. Three stages of FDI outflows can be identified. The first wave was in the period 1982-1984, with a quite small increase in FDI.

Figure 3: German Real FDI Outflows and Inflows to the Retailing Sector^{a), b), c)}



a) Includes maintenance and repair of vehicles and consumer goods since 1995. - b) In 1993 and 2002, the reporting limit of total assets' investment objects rose from 0.26 to 0.5 mill. euros and from 0.5 to 3 mill. euros respectively. - c) Real values computed with the GDP deflator and the base year 1991 (Statistisches Bundesamt 2006b).

Source: Deutsche Bundesbank (various years).

The second wave (1987-1989) was also small but, in contrast, the third stage (1995-2001) had the highest rate of growth and increased the divergence between FDI inflows and outflows. Only two stages are clearly visible in the development of FDI inflows - one in the period 1988-1991 and the other in the period 1998-2001. Only in the period 1988-1991 did FDI inflows correspond to the expenditure of German industries on foreign retailing companies. Not only did the second stage of FDI inflows begin four years later than the third wave of FDI outflows but its growth rate was also lower.

4 MARKET CONDUCT IN GERMAN FOOD RETAILING: RETAILERS' PRICING STRATEGIES

Strong market concentration has taken place in the German food-retailing sector, as was shown in Section 2. Market structure, however, does not necessarily determine retailers' behaviour and, thus, market conduct. Under an oligopolistic market structure, for example, price formation can be similar to a competitive situation when some powerful retailers choose an aggressive low-price strategy. This may well be the case for Germany where the market share of discounters is higher than in other industrialised countries.

Given this background and the fact that scanner data have been available for at least a decade in Germany, we deal with market conduct in terms of food pricing in this section. In Section 4.1, the overall level of food prices in Germany is analysed and compared with that in other countries. Based on the existing literature and a broad sample of foods, Section 4.2 seeks to determine the pricing behaviour of German grocery retailers. In Section 4.3, we present a case study for coffee which captures empirical evidence of market conduct in German grocery retailing. EDLP and HiLo strategies, retail sales campaigns, price stickiness, psychological pricing points, and the importance of national brands versus private labels are covered. Section 4.4 presents a brief review of studies of market power in the German food economy.

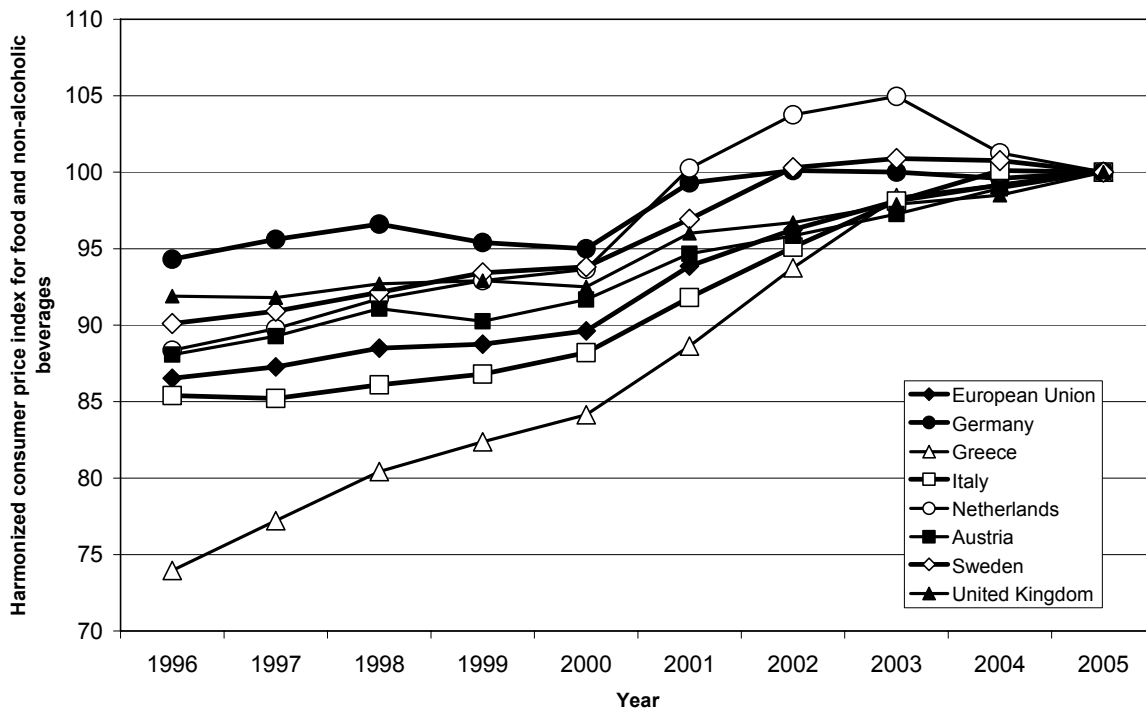
4.1 The Price Level in German Food Retailing

There is ample evidence that the law of one price does not hold in the German food-retailing sector. Buschle (1997) analyses interregional price differences of processed food products with scanner data across several urban areas in Germany. She finds a lower price level in the Northern part of Germany and a higher price level in Berlin, Stuttgart and metropolitan areas along the river Rhine. Price differences between various store types and retailing firms are analysed by Möser (2002), and she finds no evidence of the law of one price, either.

One remarkable result is that food prices grew at a noticeably lower rate in Germany than in other EU countries. Over the last ten years, consumer prices for food and non-alcoholic beverages in Germany increased in real terms, but much less than in many other European countries. This is certainly due to the major role of discounters in German food retailing. Figure 4 shows the

development of the harmonised consumer price index⁶ for food and non-alcoholic beverages as an annual average index for different European countries.

Figure 4: Harmonised Consumer Price Index for Food and Non-alcoholic Beverages for Different European Countries, 1996 – 2005^{a)}



a) European Union: EC12-94, EC15-04, EU25; Germany: after 1991 includes former German Democratic Republic.

Source: Own computations using EUROSTAT-Database (2006).

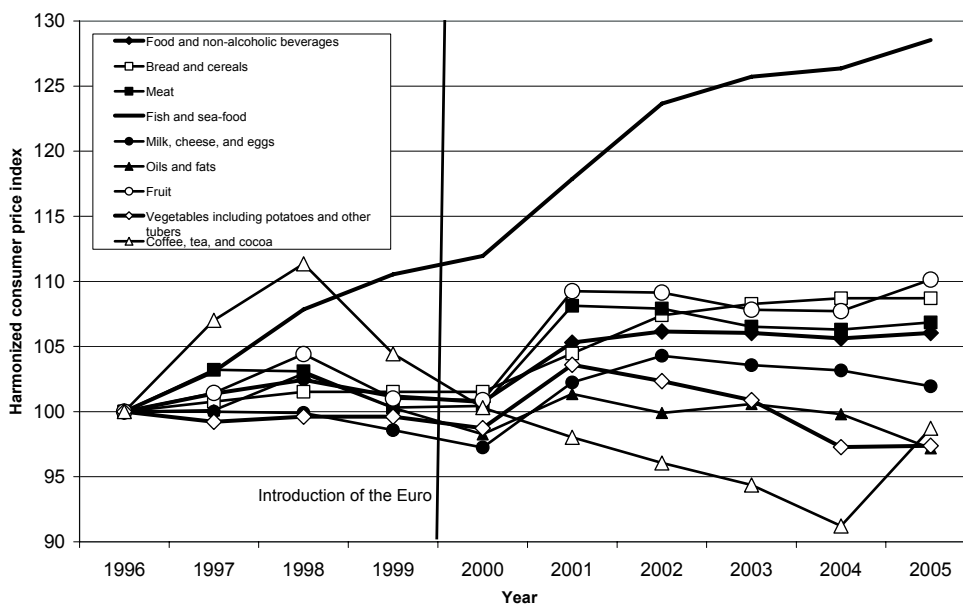
Some evidence has been presented in the last few years to show how special events like the introduction of the euro affected consumer prices in general and food prices in particular. The implementation of a single European currency in January 2002 has been a focus of attention by the public, the media and academics. It has given rise to an important debate about firms' pricing strategies and the measurement of inflation. European statistical offices and central banks argued that the introduction of the euro did not induce an extra degree of inflation. This statement is based on a comparison of consumer price indexes in the periods before and after the introduction of the euro. Compared

⁶ The Harmonised Index of Consumer Prices (HICP) is an indicator of inflation and price stability used by the European Central Bank (ECB). It is a weighted average of price indices of member states in order to show how the consumer price index develops for the entire Euro Zone (Diewert 2002).

with a two-and-a-half year period prior to the implementation of the euro, the rise in German prices for food and non-alcoholic beverages decreased from 4.3% to 3.3% after the introduction of the euro (Brachinger 2005). The number of price adjustments peaked in the first month of the year 2002 due to the new currency but, as Statistisches Bundesamt (2002) argued, this process normalised in the following months. The number of nine-ending prices in retailing declined significantly, because most prices were translated correctly into the new currency (Deutsche Bundesbank 2002; Diller/Brambach 2002).

The low statistical price increase after the introduction of the euro was not consistent with the substantially higher inflation perceived by the population. Consumers realised that retailers had already raised prices in 2001 prior to the introduction of the euro, in particular for goods with a high frequency of purchase like foods. Figure 5 illustrates, too, that the consumer price index rose significantly in 2001 for all categories of food and beverages except coffee, cocoa and tea. Recent studies with a statistical index of perceived inflation indicate that perceived inflation and CPI-based inflation deviated greatly in the years 2001 and 2002 around the time when the euro was introduced (Brachinger 2005). Apparently, retailers had raised prices in advance in order to correct them downwards later to “attractive” euro prices below new pricing points.

Figure 5: Harmonised Consumer Price Index for Different Food Groups in Germany, 1996 – 2005



Source: Own computations with EUROSTAT-Database (2006).

Differently from food prices, the measurement of actual and perceived prices shows uniform results in other sectors of the economy. In the case of restaurants, for example, not only were menu costs attributable to the introduction of the euro passed on but the opportunity was used to raise prices by a substantially higher amount (Hobijn/Ravenna/Tanbalotti 2006; Nierhaus 2002).

4.2 Pricing Strategies of German Food Retailers: General Patterns

The pricing strategies employed by German grocery-retailing firms are characterised by widespread **retail sales campaigns** for branded foods, a substantial degree of **price rigidity** and the existence of **psychological pricing points**. Additionally, **private labels** play an important role in the price-setting behaviour of most retailing firms. In this section, we survey these phenomena in respect of a broader sample of food products and in the next section we add empirical evidence for one product group, namely coffee.

Sales are obviously an essential part of retailers' marketing strategies. Hosken and Reiffen (2001) define a sale as a "temporary reduction in the price of an item that is unrelated to cost changes". Selected national brands are often used for sales promotions in order to attract consumers to relevant stores. With the HiLo strategies of food retailers in particular, brands are put on special offer periodically, and this raises price variability. In the case of quite a large number of national food brands, quantitative studies have revealed that the price elasticity of demand at the point of sale is above unity in absolute terms (Schäfer 1997; Möser 2002). Thus, price campaigns typically lead to an increase in retailers' earnings for the promoted brands (Hansen 2006). It has also been demonstrated that food retailers either have more special offers with lower price discounts or fewer special offers with higher price discounts. In a case study for butter, Hansen (2006) produced evidence that the level of the price discount is time-dependent too and rises, for example, prior to holidays.

Möser (2002) and Herrmann, Möser and Weber (2005) show with a commercially available scanner dataset⁷ that sales promotions for branded foods are widespread in Germany. Using the scanner dataset, the number of

⁷ This scanner dataset captures scanner data from the German food-retailing sector for 144 weeks, i.e. the period from September 30, 1996, to June 28, 1999. Four types of retailing firm were selected for this study (i) large consumer markets (1,500 to 5,000 m² sales area); (ii) small consumer markets (800 to 1,499 m²); (iii) supermarkets (400 to 799 m²) and (iv) discounters. The empirical evidence is provided at the level of six grocery-retailing firms.

price campaigns was counted for 20 national processed food products, which are well-known brands in Germany. A price campaign was defined as a situation in which the brand was priced at least 5% below the normal price.

Table 6 illustrates that, in the case of the six grocery-retailing firms, the number of price campaigns per store varies widely. Firms' promotion activities are very heterogeneous. A crucial factor is whether firms apply an EDLP or a HiLo strategy. Whereas the median number of price campaigns per store is as high as 9.6 for Firm C, the corresponding values are much smaller for Firm E (1.3). Not surprisingly, the brands differ substantially with regard to the frequency they are put into a price campaign. There is a peak value of 31 price campaigns per store within the 144-week period, whereas other brands do not feature in the promotion strategies of individual firms at all.

Table 6: Summary of Pricing Strategies of German Food Retailers, 20 Brands, Weekly Prices, 1996-99^{a)}

Indicators of Pricing Strategy	Statistical Measure	German Food Retailers						Median
		A	B	C	D	E	F	
Sales	Median	1.7	8.9	9.6	2.6	1.3	5.1	3.9 ^{b)}
Price Rigidity	Median	35.8	8.8	7.3	26.3	44.3	11.9	19.1 ^{b)}
Psychological Prices	Median of PSYCH	98.5	95.0	90.9	96.0	99.2	96.6	96.3 ^{b)}
	Median of CR2	91.1	66.1	79.8	83.1	98.3	61.2	81.5 ^{b)}

a) The sample period and the included stores are explained in Footnote 7. The number of observations differs across the grocery-retailing firms and products. – b) Median of the medians, computed across firms.

Source: Herrmann/Möser/Weber (2005).

A further finding is that the importance of the sale phenomenon is strongly dependent on the store type and, as illustrated by Table 7, it is most important in large consumer markets, small consumer markets and supermarkets. The median value of price campaigns per store is 7.5 for large consumer markets, but only 1.0 for discounters.

Table 7: Summary of Pricing Strategies of Four German Store Types, 20 Brands, Weekly Prices, 1996-99^{a)}

Indicators of Pricing Strategy	Statistical Measure	German Store Types				Median
		Dis-counters	Super-markets	Small Consumer Markets	Large Consumer Markets	
Sales	Median	1.0	5.1	6.0	7.5	5.6 ^{b)}
Price Rigidity	Median	37.5	13.2	11.1	9.0	12.2 ^{b)}
Psycho-logical Prices	Median of PSYCH	96.4	92.6	93.2	91.2	92.9
	Median of CR2	85.3	66.1	68.3	69.4	68.9

a) The sample period and the included stores are explained in Footnote 7. The number of observations differs across the store types and products. – b) Median of the medians, computed across store types.

Source: Herrmann/Möser/Weber (2005).

It can be seen that promotional campaigns influence the dynamic pricing pattern, which is characterised by price instability or price rigidity. **Price rigidity (PRIG)** is measured as the mean duration of unchanged prices, following Powers and Powers (2001):

$$PRIG = w/w_{PCH}, \quad (1)$$

where w stands for the number of weeks with price observations, and w_{PCH} is the number of weeks with price changes. Besides indicators of cost or demand transmission, the mean duration of unchanged prices is typically regarded as one major element of price stickiness.

The data on the price rigidity implemented by grocery-retailing firms in Germany are summarised in Table 6. The results reveal that firms' strategies again play an important role. Whereas median price rigidity is as high as 44.3 weeks in Firm E, median price rigidity in Firm C reaches "only" 7.3 weeks. In Firm E, peak values between 139 and 134 weeks for three brands indicate that prices are adjusted in some cases only very rarely, i.e. less than every two years. On the other hand, the median of unchanged prices for major brands like Dallmayr Prodomo, Rama and Nutella ranges between 2.7 and 3.9 weeks in Firm B. It is

apparent that prices are adjusted much more actively for some brands and in some firms.

Price rigidity also varies widely across store types. Discounters, a store type with a very clear every-day-low-price (EDLP) strategy, have by far the highest price rigidity: the median of periods of unchanged prices is as high as 37.5 weeks, well above supermarkets (13.2 weeks), small consumer markets (11.1 weeks) and large consumer markets (9.0 weeks). The differences between store types are very interesting, as they suggest that discounters in Germany tend to stabilise consumer prices, an effect that is getting stronger due to discounters' rising market share. It is striking that the ranking of store types according to price rigidity is exactly opposite to the ranking in respect of price campaigns: discounters practised the highest level of price rigidity and had the lowest level of price campaigns per store. Large consumer markets practised the lowest price rigidity, but had the highest number of price campaigns per store. They are at the upper and lower end of a scale characterising EDLP versus HiLo pricing strategies.

With the help of monthly price records from national statistical offices, Dhyne et al. (2006) show that, compared with other European countries and the United States, price changes in Germany for processed and unprocessed foods are less frequent. They point out that the structure of the distribution sector plays an important role in many countries and suggest that the frequency of price changes is higher in countries where large outlets are predominant. However, Germany is characterised by a high proportion of large outlets and by relatively high price rigidity, again suggesting that discounters are largely responsible for the price stickiness measured.

Loy and Weiss (2004) refer to price rigidities and synchronisation of prices in German retail stores and demonstrate that very often prices were synchronised between the different stores of German food retailers and between products. They find that only some cases of synchronisation can be explained by common shocks, such as a shift in world commodity prices, suggesting that strategic goals and chain-specific menu costs are important.

Psychological pricing points have been suggested by economists as well as psychologists as a rationale for sticky prices (see for example Blinder et al. 1998, Stiving/Winter 1997). However, psychological reasons for “odd pricing”, “just-below-the-round-figure pricing” or “psychological pricing” have been stressed as being important more in the marketing than in the economics literature. In the overview in Tables 6 and 7, we use two different measures for psychological pricing strategies: PSYCH refers to the percentage share of important psychological prices, i.e. those which are set in at least 5% of all

cases, in all observed prices. Additionally, concentration ratios for the two most important psychological prices CR2 are provided for the six grocery-retailing firms and for the store types.

PSYCH can be interpreted as a measure of the overall importance of psychological prices. A high value of PSYCH may be compatible with the economic and the psychological hypotheses of psychological pricing. We argue that CR2 yields valuable additional information. It is CR2 rather than PSYCH which measures the economic presumption that psychological price barriers are valid. If CR2 is large, this suggests that retailers will expect a strong reaction by consumers if a psychological price barrier is exceeded. Therefore, they will only rarely move beyond that barrier.

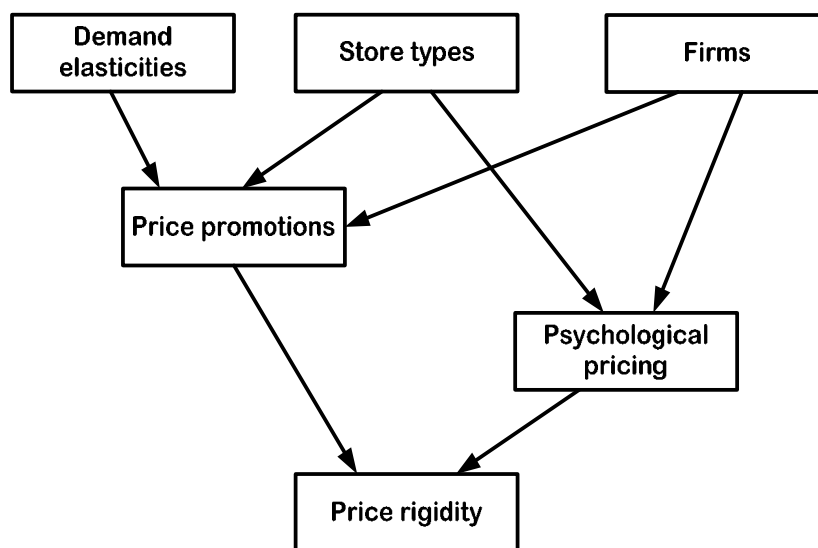
Also, PSYCH is likely to be much higher than CR2. More prices, in some cases many more psychological prices, are then set by retailers. In this case, retailers' pricing strategies are likely to be quite flexible and not limited by major psychological pricing points and, despite relatively frequent price changes, 9-ending or 99-ending effects do occur since customers either round down prices or apply a left-to-right comparison. This constellation implies that psychological prices are then part of a pricing strategy in which firms move from one psychological price to the next. Major price barriers, as indicated by Sweezy's kinked demand function, cannot explain this kind of pricing strategy. It is rather the level effects explained in cognitive psychology that seem to be crucial for this type of observed behaviour.

We deduce from Table 6 and Table 7 that psychological prices are the rule rather than the exception in German grocery retailing and that the two most important psychological prices cover a large proportion of the prices investigated. Median values across brands are for all firms above 90%, with Firm E being extreme: in Firm E, the median of PSYCH is 99.2%. Almost all prices are psychological prices. According to Table 6, the concentration ratios for the two most important psychological prices are also high for all grocery-retailing firms. Medians range between 61.2% and 98.3%.

Table 7 shows that across stores PSYCH is higher than 90% for all individual store types, when medians across the brands are calculated. Psychological pricing is even more widespread in discounters than in the other three store types, with an impressive median value of 96.4%. The variation of CR2, however, across store types is much higher than for PSYCH. Median values for CR2 across brands are in the range between 66.1% and 69.4% for supermarkets, small consumer markets and large consumer markets, and clearly higher for discounters at 85.3%.

How the variables discussed are interrelated has been analysed within structural econometric models by Herrmann, Möser and Weber (2005). The general result is illustrated in Figure 6. It has been shown that store types and firms choose their individual price promotion and psychological pricing strategies. Price promotions are planned as a function of the price elasticity of demand for food brands, i.e. the number of promotions rises with the absolute value of the price elasticity. Psychological-pricing strategies are driven by the number of price promotions, too. Price rigidity in German grocery retailing is then a function of psychological-pricing and price-promotion strategies.

Figure 6: Determinants of Price Rigidity in German Grocery Retailing



Source: Own illustration.

Private labels are widespread in the German retailing sector. These products are introduced as alternatives to national brands. Thus, they represent a crucial element in food retailers' marketing and pricing strategies. Möser (2002) analyses the price levels of different private labels and national brands with scanner data and finds private labels in different price segments. Ecological private label products in particular are located in the high price segment. Jonas and Roosen (2006) use consumer panel scanner data for estimating price elasticities of ecological and conventional private labels and national brands of milk. Consistent with the marketing of ecological private label milk as a premium product, the price elasticity is very high, namely -2.502.

4.3 Pricing Strategies of German Food Retailers: A Case Study for Coffee

After this more general overview of pricing strategies in the German retailing sector, a case study for coffee follows. In Germany, coffee is a typical loss-leader product for different retailing firms which is intensively advertised and frequently sold on special offer. Furthermore, the high variation in coffee input prices leads to frequent price adjustments by the retailing sector (Möser 2002). In her detailed study of the German coffee market, Körner (2004) identifies intensive price competition for coffee in the retailing sector.

The pricing strategies of six grocery-retailing firms were analysed in the case of five national coffee brands, which are well-known in Germany, and a private label coffee brand that is distributed only by two grocery-retailing firms. Highly aggregated indicators of price rigidity (PRIG) and of the importance of psychological prices are given in Table 8 for the six grocery-retailing firms. The following main results can be derived:

The data reveal that firms' strategies play a significant role. Whereas median price rigidity is as high as 7.9 weeks in Firm D and 7.5 weeks in Firm E, median price rigidity in Firm B reaches "only" 2.6 weeks. Median price rigidity varies greatly across products, too. If we compute the median of the medians across brands, the mean duration of unchanged prices is 5.2 weeks. Price rigidity is much higher than 5.2 weeks for some brands (brands 1 and 6), but for other brands it is considerably lower: 2.0 weeks for brand 4, 3.5 weeks for brand 2, and 4.1 weeks for brand 3.

A comparison with price rigidity for the 20 nationally distributed brands covered in Table 6 reveals that price instability is much higher in the coffee sector. The mean duration of unchanged prices across the six coffee brands is only 5.2 weeks, but the mean duration for 20 processed products (which include also one coffee brand) is nearly 19 weeks.

It can be deduced from Table 8 that psychological prices are the rule rather than the exception in German grocery retailing. Median values across brands are above 70% for all firms, with Firm E being extreme: in Firm E, the median of PSYCH is 93.4%. Almost all prices are psychological prices. Almost all prices are important psychological prices, too, because they cover 5% or more of all observed prices. Across the six grocery-retailing firms, PSYCH ranges between 71.2% (brand 4) and 92.4% (brand 6). The median across the six brands is 85.4%.

Table 8: Price Rigidity in Six German Grocery-Retailing Firms, Six Coffee Brands, Weekly Prices, 1996-99^{a)}

Brands	PRIG ^{b)}						Median
	A	B	C	D	E	F	
1	16.3	2.7	7.2	11.1	18.0	9.3	10.2
2	2.9	2.1	2.9	5.6	6.3	4	3.5
3	3.7	2.6	2.7	7.1	8.6	4.5	4.1
4	1.7	2	2.6	1.9	2.1	1.9	2.0
5	5.9	2.6	6.1	8.6	7.5	6.6	6.4
6	- ^{c)}	- ^{c)}	13.3	12.9	- ^{c)}	- ^{c)}	13.1
Median	3.7	2.6	4.5	7.9	7.5	4.5	4.5^{d)}/5.2^{e)}
Brands	PSYCH ^{b)}						Median
	A	B	C	D	E	F	
1	94.6	77.4	83.1	86.5	93.7	85.6	86.1
2	73.7	70.6	74.3	85.9	84.4	81.9	78.1
3	83.4	82.6	74.3	85.9	93.4	89.7	84.7
4	64.7	70.4	95.0	67.3	71.9	72.7	71.2
5	90.3	83.8	86.2	92.7	94.7	92.6	91.5
6	- ^{c)}	- ^{c)}	97.5	87.2	- ^{c)}	- ^{c)}	92.4
Median	83.4	77.4	84.7	86.2	93.4	85.6	85.4^{d)}/85.4^{e)}

a) The sample period and the included stores are explained Footnote 7. The number of observations differs across the grocery-retailing firms and products. – b) PRIG and PSYCH are defined in the text. – c) Not distributed in this grocery-retailing firm. – d) Median of the medians, computed across firms. – e) Median of the medians, computed across brands.

Source: Möser/Herrmann (2006) and authors' computations.

It is interesting to note that it was not possible to confirm for the coffee sector taken in isolation the structural relationships detected in Figure 6 between price rigidity, price promotions, psychological prices and firms' strategies. Most likely, this is due to the fact that price promotions affect the price rigidity of **all** major coffee brands. Offer prices for major coffee brands seem to be a crucial element in the promotional activities of all firms. Thus, there is not much variation of price rigidity across coffee brands whereas differences are substantial across food categories.

Differential pricing strategies do exist, however, for private labels as opposed to national coffee brands. Möser (2002) shows that private labels are typically characterised by lower prices than national coffee brands, and also by a lower absolute and a higher relative marketing margin. But private labels differ in terms of price rigidity, too.

Based on our scanner dataset, it can be shown that nearly 90% of the variation of price rigidity across coffee brands can be explained with a few major variables, namely psychological prices (PSYCH), the mean price level (PRICE),

whether a product is a private label (*PRILABEL*) and dummy variables for selected national brands (e.g. *BRAND3*, *BRAND5*). The following equation for the estimated price rigidity (*EPRIG*) includes only statistically significant coefficients:

$$\begin{aligned}
 EPRIG = & -81.2905^{***} + 0.1477^{**} PSYCH + 8.1444^{***} PRICE \\
 & (-9.57) \quad (2.98) \quad (7.19) \\
 & + 25.5353^{***} PRILABEL + 4.4233^{**} BRAND3 + 5.0918^{**} BRAND5 \\
 & (7.43) \quad (3.47) \quad (3.50) \quad (2)
 \end{aligned}$$

($\bar{R}^2 = 0.86$; $F = 37.98^{***}$; $n = 32$)

*** stands for the 99.9% level, ** for the 99% level of statistical significance, *t*-values are in parentheses.

We can conclude from equation (2) that grocery retailers' coffee prices are more rigid

- the more psychological prices are set,
- the higher the average coffee price,
- for private labels than for the reference products of national brands,
- for some national brands than for others, depending on their attractiveness for retail sales campaigns.

Apart from these variables, the number of price promotions does not play a significant role.

4.4 Market Power in the German Retailing Sector and Consequential Impacts

Changes in market structure suggest increasing potential market power: as described in Section 2, concentration in the German retailing sector has increased sharply. Unfortunately, there are very few studies which have tested in structural models whether food retailers actually exerted oligopolistic or oligopsonistic market power on either consumers or the food-processing sector in Germany. Exceptions are analyses for the coffee, meat and banana sectors.

Körner (2004) analyses the German coffee market with various methodological approaches, for example, by testing for market behaviour within a conjectural-variation approach. One general result is that price and quality competition is strong, and there is no evidence of collusive behaviour. Thus, strong concentration at the retail level is combined with competitive market behaviour.

In the case of the German banana market, Herrmann and Sexton (2002) test different hypotheses regarding the competitiveness of the market and analyse

how welfare implications of the European Banana Market Organization are affected by those hypotheses. They conclude that, despite the high concentration in the banana economy, the imperfect-competition hypothesis is not supported by the econometric results. Market conduct at the consumer level was most supportive of a small-country, perfect-competition model.

Anders (2005) tests for market power in the retailing sector by analysing the meat marketing channel in Germany. Here, primary agricultural products – e.g. beef and pork - are produced by farmers and sold to meat processors. After processing and packaging, the meat products are sold by the retailing sector to consumers. The estimates⁸ of oligopsony and oligopoly retail market power reveal that perfect competition and price-taking behaviour can be rejected in the beef and pork market. As a result, the beef prices per kg decreased at farm level by nearly 0.40 euros from a hypothetical price of 3.34 euros under perfect competition to the actual price of 2.94 euros due to imperfect competition at the retail level.

When we combine the empirical results in Section 4 with these results from market-power models, we can conclude that increasing concentration in German food retailing has not negatively affected consumers. The law of one price certainly does not hold, and retailers apply their own pricing strategies. But the increasing role of discounters, with their EDLP strategies, puts pressure on food prices and limits the oligopoly power that the large food retailers can exert over consumers. There is, however, a clear indication that some oligopsony market power by food retailers affects producers and processors, at least for individual product categories like meat.

8

For more details regarding the database and estimation procedures consult Anders (2005).

5 CONCLUSIONS

Over the last four decades, the German food-retailing sector has been subject to continuous structural change. Most important has been the combination of increasing concentration with rising store size and the growing role of discounters implementing an aggressive EDLP pricing strategy. Thus, consumers have benefited from intensive price competition, despite the higher market share of leading food retailers. The analysis of market conduct, in terms of price formation and pricing strategies, reveals a typical situation of imperfect competition. The law of one price certainly does not hold for individual foods. Price levels and pricing strategies diverge substantially across firms and store types. There are successful retailers with an EDLP strategy, as well as others with a HiLo strategy. A major lesson to be learned from the German experience is that increasing concentration in food retailing does not necessarily imply that more market power is exerted at the expense of consumers. Competitive markets are compatible with a high level of concentration as long as a strong competitive fringe, for example discounters, challenges the large chains in food retailing.

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