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PRICE DEVELOPMENT OF DAIRY PRODUCTS IN RETAIL OUTLETS IN OLSZTYN PART 1: PRICE DIFFERENTIATION ON THE DAIRY PRODUCTS MARKET

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Key words: dairy products, price diversification, traditional and modern forms of retail channels.

Abstract

The paper presents the results of research on price diversification of dairy products in retail trade network in Olsztyn. Prices of chosen products and theirs substitutes were recorded in November 2005 in 194 trading outlets such as hypermarkets, supermarkets, discount stores, grocery stores, freestanding kiosks, kiosks located on the markets and convince stores at petrol stations. The analyses conducted indicate significant price diversification depending on type of the product offered and category of retailers used as outlets.

KSZTAŁTOWANIE SIĘ CEN PRODUKTÓW MLECZARSKICH W OLSZTYŃSKIEJ SIECI HANDLU DETALICZNEGO CZĘŚĆ 1: ZRÓŻNICOWANIE CEN NA RYNKU PRODUKTÓW MLECZARSKICH

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Słowa kluczowe: produkty mleczarskie, zróżnicowanie cen, nowoczesne i tradycyjne formy handlu detalicznego.

Abstrakt

W opracowaniu przedstawiono rezultaty badań nad zróżnicowaniem cen wybranych produktów mleczarskich w olsztyńskiej sieci handlu detalicznego. Rejestrację cen tych towarów i ich substytutów przeprowadzono w listopadzie 2004 r. w reprezentatywnej grupie 194 podmiotów handlowych, którą tworzyły: hipermarkety, supermarkety, sklepy dyskontowe, sklepy powszechne, kioski wolno stojące, kioski na targowiskach oraz sklepy na stacjach benzynowych. Przeprowadzone analizy wskazują na znaczne zróżnicowanie cen rozpatrywanych towarów ze względu na rodzaj oferowanego produktu oraz wykorzystywane w ich dystrybucji kategorie detalistów.

Introduction

Since mid 1990s important changes have occurred in the marketing chain of consumer goods in Poland that have been to a large extent a consequence of quantitative and qualitative changes in retail trade. The process of trade transformation manifests in the changes in ownership, organization and technical operation of entities and their number, size and specialization. They have been linked mainly to the processes of transformation and globalization occurring in the economy, increased importance of information technology, development of increasingly complex relations between the suppliers and the retailers, development of network brands and changing attitudes of consumers towards convenient and comprehensive shopping. In the foods market the supply chain participants integration processes are also observed coupled with the increasing role as well as bargaining and negotiating power of large area trade entities (GRZYBOWSKA 2005, *Coraz mniej sklepów.* 2005, KŁOSIEWICZ-GÓRECKA 2002, MALESZYK 2001, KŁOSIEWICZ 1997).

The assumption that there are many market segments for a given product that differ in price sensitivity, which causes that prices are adjusted to the characteristics and size of individual segments, forms the basis for differentiation of prices. The price can be differentiated according to time and conditions of purchase, place of purchase, volume of single purchase, intended use of the product and used distribution channels. The manufacturers give the primary shape to prices while the secondary price level depends on the applied products sale channels thanks to which they reach the final buyers. Assessment of price differentiation in trade can be done by appropriate comparison of trade margin rates or through comparison of actual prices applied at different retail outlets.

The traditional approach to pricing policy in trade is linked to the vertical development of prices in the marketing chain where the role of trade margin as the parameter determining the final product price is highlighted. That margin is determined by the standard of service provided by retailers, their product range specialization and location. However, as highlighted by Szumilak, in the environment of gradual resignation from vertical pricing, the influence of manufacturer on the final price and price creating role of margins in sales of products are decreasing. As a consequence, analysis of differentiation of prices in distribution channels through comparison of final prices of products sold is more reasonable than analyses based on trade margin levels (SZUMILAK 2003). Studies conducted in Olsztyn by the authors of this paper represent an attempt at approaching the issue of price development initiated by Szumilak from the perspective of a different product and geographic market. They are also justified because so far few studies on the Polish market have been presented that would allow clear identification of the influence of structural changes occurring in retail trade on the level and differentiation of prices for products offered[1].

Methodological assumptions for the study

This paper aims at presenting the results of own studies on assessment of the differentiation of retail prices throughout the analyzed market of dairy products considering the variety of categories of retailers forming the retail trade network in Olsztyn. To achieve that goal the thesis that differentiation of prices on dairy products is not identical and depends on the products offered as well as the distribution channel was verified. Studies on development of prices[2] covered selected "standard" dairy products[3] representing the market of liquid milk for consumption, yogurt, dairy drinks, cream, dairy deserts, cottage cheese and spreads, ripening cheeses, processed and blue cheeses and butter (tab. 1).

Recording o prices for 11 products selected for studies as well as the lowest and highest prices for their close substitutes[4] was done by inventory taking during several days in November 2004 at 194 outlets[5] representing large area trade as well as small retail outlets. The population of outlets covered by the study consisted of: 3 hypermarkets (H), 15 supermarkets (S), 5 discount stores (D), 10 shops at petrol stations (SB), 14 kiosks at markets (KT) as well as 78 grocery shops (SP) and 69 freestanding kiosks (KS). For estimating the representative number of grocery shops and freestanding kiosks the double stage method by Stein was applied (SOBCZAK 2000), while in case of the other outlets the selection on purpose was made and the

[1] Studies on differentiation of prices as a consequence of products distribution channels used for sales and the influence of modern distribution systems on the level of market prices are widely conducted in highly developed countries, particularly the USA. It is enough to mention studies by Volp and Lavoie who showed the influence of Wal-Mart on development of food prices in New England (VOLP, LAVOIE 2005).

[2] The methodology of studies and empirical price analysis is based on the methodology proposed by Szumilak of Kraków School of Economies (SZUMILAK 2004). The studies considered only the price differentiation resulting from pricing strategies applied by different categories of retail outlets without considering the influence of other factors on levels of prices of products offered (e.g. social-economic structure of Olsztyn population).

[3] The term standard products is understood as goods that are clearly identified at the level of manufacturer's brand, intended use and weight.

[4] Close substitutes are products that differ from the studied ones by brand only and not the units of measure or weight. For example Łowickie UHT milk in 1-liter cardboard pack is the substitute for "Łaciate" UHT milk also in 1-liter cardboard pack.

[5] Further in the paper terms trade entities, trade facilities, categories of retailers, forms of retail trade and retail outlets are used as equivalent.

exhaustive studies covering their entire populations were carried out. The empirical analysis of the recorded prices used the measures of central trend (arithmetic and modal averages) and measures of differentiation (standard deviation, relation between the highest and the lowest price, variance coefficient, variance according to 3 sigma).

Table 1

Dairy products selected for the study

No.	Product Category	Product Brand	Product Attributes
1	Milk	ŁACIATE	2% fat, cardboard pack 1 liter
2	Yogurt	JOGOBELLA	fruity, cup, 150 ml
3	Kefir	SOKÓLSKI	natural, cup, 450 ml
4	Cream	PIĄTNICA	18% fat, cup, 200 g
5	Homogenized cheese	BAKUŚ	fruity, cup,100 g
6	Cream cheese	RAMA CREME BONJOUR	box, 200 g
7	Cottage cheese	ŁUKTA	full fat, cube, foil, 1 kg
8	Ripening cheese	GOUDA	full fat, loose, 1 kg
9	Processed cheese	HOCHLAND	slices, hermetic foil, 150 g
10	Blue cheese Camembert	TUREK	natural, foil, 120 g
11	Butter	MASMAK	cube, 200 g

Source: Own studies.

Results of studies

Differentiation of prices on studied products

The space for pricing the considered dairy products is large although its size is not identical and depends on the type of product offered. In November 2004 the relation between the highest and the lowest price in the analyzed city market of Olsztyn ranged between 1,32 (yogurt "Jogobella") and 1,78 (homogenized cheese "Bakuś") and in case of 9 out of 11 products it did not exceed the lowest recorded prices by 1,5 times (tab. 2). It was also interesting that the differentiation of dairy products' prices in Olsztyn market was lower than the differentiation of FMCG products prices observed in Kraków market. In the retail network of Kraków the recorded maximum prices of products investigated there were in most cases higher by more than 50% than their minimum prices while in case of some products they were more than double (Szumilak 2003). As can be assumed, the smaller space for dairy products pricing results from the importance of that products category in the nutrition model of consumers and price sensitivity of demand as well as the economies of Olsztyn market reflected in the size and density of outlets network and lower income of Olsztyn compared to Kraków residents.

Table 2

Price parameters and differentiation for dairy products in Olsztyn city market

Products studies	Price Parameters				Price Differentiation				
	Cmin (PLN)	Average price (PLN)	Cmax (PLN)	M (PLN)	S	R	Cmax / Cmin	Variance according to 3 sigma min.	Variance according to 3 sigma max.
ŁACIATE milk	1.95	2.51	2.85	2.60	0.14	0.90	1.46	2.10	2.92
JOGOBELLA yogurt	0.95	1.09	1.25	1.09	0.05	0.30	1.32	0.95	1.23
SOKÓLSKI kefir	1.30	1.50	1.75	1.50	0.08	0.45	1.35	1.26	1.73
PIĄTNICA cream	1.19	1.44	1.60	1.50	0.07	0.41	1.34	1.23	1.66
BAKUŚ homogenized cheese	0.90	1.15	1.60	1.20	0.09	0.70	1.78	0.87	1.43
Rama CREME BONJOUR	2.99	3.53	4.20	3.39	0.23	1.21	1.40	2.83	4.24
ŁUKTA cottage cheese	8.60	10.13	12.90	9.80	1.07	4.30	1.50	6.92	13.34
GOUDA ripening cheese	13.99	17.01	19.90	17.50	1.52	5.91	1.42	12.46	21.57
HOCHLAND processed cheese	2.49	3.18	4.10	3.20	0.22	1.61	1.65	2.53	3.83
TUREK blue cheese	2.78	3.60	3.96	3.65	0.21	1.18	1.42	2.95	4.24
MASMAK butter	2.69	3.09	3.55	3.20	0.15	0.86	1.32	2.63	3.54

* Cmin – minimum price, Cmax – maximum price, M – modal price, S – standard deviation, R – empirical variance area

Source: Own studies.

The high differentiation of dairy products' prices is also indicated by values of variance coefficient that allows defining the area of price for a given product as a consequence of price sensitivity of buyers and level of price control by manufacturer. In the retail network of Olsztyn the marginal values for price variance range were 4,2 and 10,6% and in case of products representing a widely understood market of cheese the differentiation of prices is the largest exceeding 6% (fig. 1). The highest dispersion was characteristic for prices of cottage cheese "Łukta" and ripening cheese "Gouda", which can be explained by low level of price control by manufacturers and the fact that they are among the major products in the basket of frequent food products purchases. As the price of yogurt "Jogobella" is under particular control by the manufacturer (suggested price), as a consequence of high price flexibility of demand and fierce price competition existing in the market of yogurt, the price variance in case of that product is low.

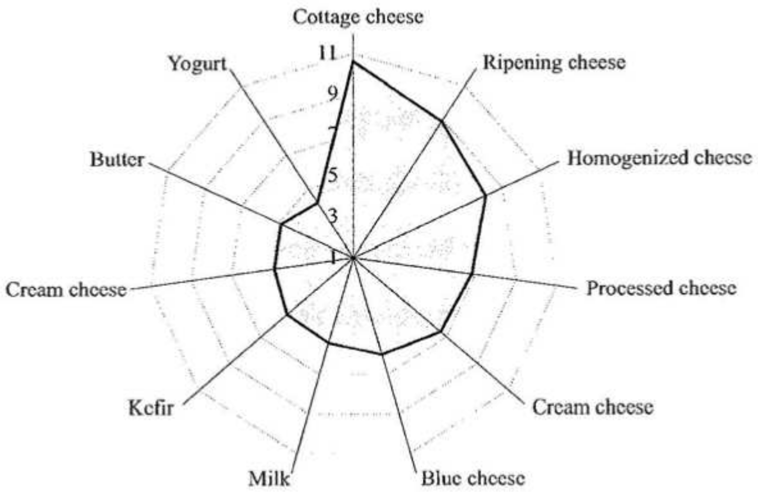

Fig. 1. Price variance coefficients for studied dairy products in Olsztyn city market (%)
Source: Own studies.

Comparison of prices differentiation measures according to the category of trade entities shows that the space determined by the level of prices in the market depends not only by the type of product offered but also by the place of sale, which, as can be assumed, results from location and number of trade outlets in a given category. In relation to the average 1,18 spread of prices for Olsztyn market, it is higher for grocery shops and freestanding kiosks. That can be explained by the influence of convenient location of those outlets, which frequently is the source of competitive advantage. In case of grocery shops the average ratio between the highest and the lowest

Table 3

Differentiation parameters of prices for studied products in distribution channels*

Products studies	$\frac{Cmax}{Cmin}$ relation							Variance coefficient (%)						
	H	S	D	SB	SP	KS	KT	H	S	D	SB	SP	KS	KT
ŁACIATE milk	1.13	1.09	–	1.13	1.24	1.24	1.14	6.7	2.5	–	5.5	4.4	4.2	3.5
JOGOBELLA yogurt	1.07	1.22	–	1.00	1.21	1.19	1.09	3.8	7.4	–	0.0	2.9	3.6	2.5
SOKÓLSKI kefir	1.03	1.20	–	1.00	1.30	1.30	1.12	1.5	5.4	–	0.0	4.9	5.1	3.4
PIĄTNICA cream	1.18	1.22	–	–	1.34	1.23	1.15	8.9	4.4	–	–	4.3	3.9	3.9
BAKUŚ homogenized cheese	1.21	1.16	1.00	1.00	1.36	1.25	1.14	9.6	4.7	0.0	0.0	6.9	4.9	5.4
Rama CREME BONJOUR	1.09	1.07	1.00	–	1.28	1.24	1.11	4.9	1.4	0.0	–	6.0	6.0	3.5
ŁUKTA cottage cheese	1.31	1.20	–	–	1.44	1.42	1.05	13.4	5.3	–	–	10.8	11.9	2.0
GOUDA ripening cheese	1.21	1.21	1.00	–	1.42	1.40	1.20	10.1	7.4	0.0	–	8.5	7.3	7.0
HOCHLAND processed cheese	1.14	1.15	1.00	1.10	1.33	1.44	1.09	6.5	4.4	0.0	5.2	4.9	6.9	3.2
TUREK blue cheese	1.22	1.15	–	–	1.28	1.18	1.09	10.0	3.7	–	–	5.2	4.2	3.0
MASMAK butter	1.10	1.12	–	–	1.32	1.21	1.07	4.8	2.6	–	–	4.7	4.4	2.8

* Cmax – highest recorded product price, Cmin – lowest recorded product price; H – hypermarkets, S – supermarkets, D – discount shops, SB – convenience shops at patrol stations, SP – grocery shops, KS – freestanding kiosks, KT – kiosks at markets.

Source: Own studies.

price was 1.32 and for freestanding kiosks 1,28; at the same time prices of all products in those types of retail outlets are characterized by the largest differentiation within the entire retail network. Assessed variance coefficients' values additionally indicate that in case of 8 out of 11 products investigated the largest variance can be found in hypermarkets. The variance of yogurt and kefir prices is at the highest in supermarkets while that of cream cheese in grocery shops and freestanding kiosks (tab. 3).

Major differentiation in prices of products offered at hypermarkets can indicate that the prices offered influence not only the price image of those outlets but that they are also used as an active instrument of competition among hypermarkets. That is particularly well visible in Olsztyn market where only three concise space hypermarkets are present. In difference from that type of outlets, the level of prices differentiation at grocery shops and freestanding kiosks indicates that in those cases prices are rather adjusted to the market and not used in competitive struggle among outlets of these categories. Relatively low diversification of prices is, in turn, characteristic for products sold at markets, which can be explained mainly by close vicinity of outlets of that type.

Price differentiation of substitutes for the investigated products

Spread of prices of close substitutes is one of the premises for appropriate price positioning of brands of the investigated products. The numbers characterizing substitutes price differentiation in Olsztyn retail network are presented in table 4. The smallest area for development of prices of substitutes in the city market is characteristic in the segments of liquid milk for consumption, cottage cheese, blue cheeses and ripening cheeses while the largest exists in the segment of cream cheeses. In case of cream cheese "Rama Creme Bonjour", a product representing one of the most dynamically developing segments in the market of white cheeses, the price of the most expensive substitute was almost twice higher than the cheapest substitute. It should be highlighted in particular that in the entire city market, in case of seven investigated products, the pricing area for their close substitutes was smaller than that for the main products.

Analysis of differentiation of substitutes price depending on the type of retail outlets used for their sales also showed that purchasing of goods in hypermarkets and supermarkets was the most attractive for buyers, which, as can be assumed, is linked to their product and price positioning strategy in the market. In those outlets both the number of substitutes available to buyers and the price relations are not only significantly higher than the average values for the entire city market but also clearly higher as compared to the other categories of retail outlets. In difference from other forms of retail trade, large area retail outlets offer the buyers a wide range of products in each group that at the same time is distinctly differentiated in price.

Table 4

Relation of maximum to minimum prices for substitutes
of studied dairy products and saturation with substitutes in Olsztyn retail network

Product markets	$\frac{Cmax}{Cmin}$ relation							Average Number of Substitutes							
	RM	H	S	D	SP	KS	KT	RM	H	S	D	SB	SP	KWS	KT
Milk	1.16	1.63	1.31	1.24	1.14	1.11	1.16	1.5	3.3	2.1	1.4	1.5	1.2	1.2	1.8
Yogurt	1.57	2.71	1.89	1.93	1.54	1.38	1.75	2.8	9.3	5.8	3.2	1.0	1.1	2.2	1.9
Kefir	1.54	2.05	1.52	2.02	1.49	1.58	1.01	1.1	1.0	1.0	1.6	–	1.2	1.0	1.0
Cream	1.26	2.40	1.47	1.85	1.18	1.06	1.21	1.5	2.3	1.8	2.0	–	1.4	1.6	1.3
Homogenized cheese	1.27	1.75	1.63	1.35	1.24	1.21	1.26	2.3	5.0	5.7	2.2	–	2.1	1.7	1.6
Cream cheese	1.92	2.37	2.19	2.03	2.00	1.86	2.01	3.4	11.7	7.7	1.4	1.0	1.2	1.0	3.4
Cottage cheese	1.16	1.48	1.25	1.11	1.12	1.10	1.22	1.7	3.7	2.1	2.8	–	1.7	1.4	1.3
Ripening cheese	1.24	3.85	1.62	1.17	1.15	1.09	1.16	3.6	16.0	12.1	5.4	–	2.2	1.7	4.2
Processed cheese	1.28	1.28	1.40	1.01	1.29	1.14	–	1.3	3.7	1.9	1.4	–	1.2	1.0	1.0
Blue cheese	1.21	2.60	1.36	1.04	1.10	1.07	1.26	2.3	13.3	3.7	2.0	–	1.5	1.0	1.0
Butter	1.40	2.88	2.17	1.97	1.34	1.20	1.31	1.8	4.3	1.9	3.6	–	1.9	1.5	1.5

* Cmax – highest recorded product price, Cmin – lowest recorded product price, RM – total Olsztyn Market
Source: Own studies.

Analysis of price positioning of investigated dairy products in relation to minimum prices of their substitutes in the entire Olsztyn market also shows that 5 products covered offered by the retailers should be classified as more expensive because their price levels clearly exceed the center of the range formed by the lowest and highest values of prices for their substitutes while two products were the most expensive. The average prices of "Łaciate" UHT milk and "Hochland" processed cheese were at the level of their most expensive substitutes while in case of homogenized cheese "Bakuś" and "Piątnica" cream their prices were significantly higher then their substitutes. The substitutes of "Gouda" ripening cheese, "Rama Creme Bonjour" cream cheese and "Turek" blue cheese were the least attractive for buyers as concerns their price. The price positioning of the covered products in individual forms of retail outlets also confirms that hyper and supermarkets offer substitutes much more expensive than entities forming the traditional retail trade network (tab. 5).

Table 5

Positioning of the average studied product price in relation to minimum price for its substitute in Olsztyn retail network

Studied products	City market	Categories of retail outlets					
		H	S	D	SP	KS	KT
ŁACIATE milk	0.97	0.61	0.99	–	0.91	0.97	0.76
JOGOBELLA yogurt	0.70	0.41	0.56	–	0.69	0.83	0.56
SOKÓLSKI kefir	0.55	0.55	0.54	–	0.55	0.50	2.19
PIĄTNICA cream	1.06	0.54	0.69	–	0.97	2.42	1.60
BAKUŚ homogenized cheese	1.15	0.36	0.81	1.45	1.18	1.38	1.24
Rama CREME BONJOUR	0.33	0.27	0.34	0.70	0.32	0.31	0.42
ŁUKTA cottage cheese	0.89	0.52	0.40	–	1.07	1.24	0.76
GOUDA ripening cheese	0.15	0.08	0.02	0.79	0.06	0.44	0.39
HOCHLAND processed cheese	0.97	0.85	0.72	10.50	0.93	1.21	–
TUREK blue cheese	0.37	0.06	0.31	–	0.57	0.32	0.24
MASMAK butter	0.47	0.61	0.67	–	0.38	0.23	0.23

Source: Own studies.

Conclusion

Results of studies presented in the paper confirm the relation existing in the dairy market between product and outlet categories and differentiation of prices for products offered. Despite geographic limitation of studies to the local market, it can be assumed that the regularities observed in that market are also characteristic for other spatial markets in Poland. Verification of that assumption requires nevertheless extended studies in markets of other urban aglomerations. Additionally, verification of results obtained so far would require empirical studies of prices in Olsztyn retail market of dairy products.

References

Coraz mniej sklepów. 2005. Supermarket News, 6: 22.

GRZYBOWSKA B. 2005. *Tendencje w handlu detalicznym w Polsce w latach 1997-2003.* Roczniki Naukowe SERIA, tom VII (zeszyt 7), s. 101-107.

KŁOSIEWICZ-GÓRECKA U. 2002. *Jakościowe przemiany handlu w Polsce.* Marketing i Rynek, 1: 26-27.

KŁOSIEWICZ U. 1997. *Zintegrowane kanały dystrybucji artykułów żywnościowych.* Przemysł Spożywczy, 9: 32, 35.

MALESZYK E. 2001. *Wpływ rozwoju sieci zagranicznych na handel w Polsce,* Handel Wewnętrzny, 1: 51, 54.

SZUMILAK J. 2004. *Poziom i zróżnicowanie cen w powszechnej sieci handlu detalicznego (na przykładzie sklepów krakowskich).* Maszynopis. s. 1-14.

SZUMILAK J. 2003. *Zróżnicowanie cen detalicznych w kanałach dystrybucji towarów powszechnego spożycia (na przykładzie krakowskiego handlu towarami FMCG).* Handel Wewnętrzny, 1: 35-38, 44-47.

VOLPE R. J., LAVOIE. 2005. *The effect of Wal-Mart Supercenters on Grocery Prices in New England.* AAEA, Annual Meeting, Providence. http://agecon.lib.umn.edu/cgi-bin/view.pl (pp. 26-28).