

## PROCESSES OF CONCENTRATION IN SUGAR INDUSTRY

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### Abstract

The paper presents the progress and the consequences of concentration processes in sugar industry. The studies encompassed both market and production concentration processes. The current structure of entities in the sugar market is the effect of statutory regulations and several years of ownership-capital transformations that lead to development of five owner groups. Within those groups concentration of production occurred as a consequence of which a significant improvement of production-technological results of sugar industry and its raw materials base took place.

The situation in the sugar market is determined to a high extent by its specifics and the market conditions that encompass statutory regulations, demand factors and the global market situation. The currently taking place sugar market reform is to result in a decrease in prices and production volumes, which requires termination of production in consecutive sugar refineries and taking up other types of production by such plants. This forces further restructuring and concentration processes. Only the most productive and modern refineries will be able to continue production.

## PROCESY KONCENTRACJI W PRZEMYSŁE CUKROWNICZYM

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Słowa kluczowe: koncentracja, przemysł cukrowniczy, udział w rynku.

### Abstract

W artykule przedstawiono przebieg i skutki procesów koncentracji w przemyśle cukrowniczym. Badaniami objęto procesy koncentracji rynku i koncentracji produkcji. Aktualna struktura podmiotowa rynku cukru jest efektem regulacji ustawowych i trwających kilkanaście lat przekształceń własnościowo-kapitałowych, które doprowadziły do powstania pięciu grup właścicielskich. W obrębie tych grup doszło do koncentracji produkcji, w efekcie której nastąpiła istotna poprawa wyników produkcyjno-technologicznych przemysłu cukrowniczego i jego bazy surowcowej.

Sytuację przemysłu cukrowniczego w dużej mierze determinuje jego specyfika oraz uwarunkowania rynkowe, na które składają się ustawowe regulacje, czynniki popytowe i sytuacja na rynku światowym. Przeprowadzana obecnie reforma rynku cukru ma doprowadzić do spadku cen i zmniejszenia rozmiarów produkcji, co wymaga zaprzestania produkcji w kolejnych cukrowniach i podjęcia przez nie innych rodzajów działalności. Wymusza to dalsze procesy restrukturyzacji i koncentracji. Produkcję będą mogły kontynuować tylko najbardziej wydajne i nowoczesne cukrownie.

## **Introduction**

Sugar industry has a long tradition and it is an important branch of agricultural-food processing and the entire economy in Poland. Sugar is considered a strategic product and its consumption increases systematically. It is a product that is used not only for direct consumption in households but also as a semi-finished product in other sectors of agricultural-food industry, i.e. in the fruit and vegetables, spirits, sweet bakery and confectionery industries. Side products from sugar beet processing (molasses, beet pulp and liming lime) are raw materials for spirits, chemical, pharmaceutical, cosmetic and fodder industries. The side production of sugar industry played a particularly important role during mid 20<sup>th</sup> c. (WYKRĘTOWICZ 1997, pp. 284–286). It is probable that in the near future its importance will increase again as a consequence of the need for management of sugar production surplus and the situation in the fuels market.

Because of tight links to the raw materials base, sugar industry is one of the industries that are scattered territorially. At the same time, however, for many years, and in particular after the division of multi-plant State owned enterprises in 1990, it was dispersed excessively (See: GIERSZEWSKI 2001, p. 30). Production was carried by some tens of plants of relatively small size. Excessively short sugar production campaigns, excess of production capacity and high fixed costs influenced financial results of sugar refineries unfavourably. In the environment of intensifying competition and increasing market surplus, those factors represented a threat for further existence of many plants and forced undertaking of improvement activities. The statutory sugar market regulation introduced in mid 1990s changed the operation principles of that market and outlined the direction of ownership transformations and organizational changes in sugar industry. It was expected that newly established sugar holdings would accelerate the sector modernization and restructuring processes. The initial years when those regulations were in force did not bring the expected results, although a clear improvement of production as well as technical-productivity indicators occurred (KONDRAKIEWICZ 2000, pp. 223–227). During the consecutive years significant structural transformations in entities present in the sugar market took place

and gradual decommissioning of some plants started. Those processes resulted in the increased level of concentration in sugar industry.

Concentration is a process leading to increasing the economic power of business entities. That phenomenon can be generally defined as increase of the quantitative advantage of a given entity in relation to the entire community. In case of processes occurring in the industry market concentration and production concentration are most frequently identified. Market concentration means the situation where a given market is dominated by the largest entities. Production concentration is the process of increasing the size of the individual industrial units, i.e. the increase in scale of production in specific companies (SOSNOWSKA 1998, pp. 11–12). Production concentration is achieved frequently through concentration of enterprises, i.e. mergers, strategic alliances and purchase of shares in other entities (WAWRZY尼亚K 2000, p. 29).

For years studies on concentration processes have been the subject of interest for economists and practice of management, mainly in the context of competition policy development. Assessment of those processes, and in particular their economic consequences has not always been straightforward and it happens to be the subject of numerous controversies. On one hand, concentration leads to monopolization, which is generally considered a negative phenomenon while on the other it allows achievement of the effects of scale and improvement of operational effectiveness. In the environment of globalisation and increasing competition it can be considered a natural and inevitable element of development. In view of the above, determining the premises for, development and consequences of competition in sugar industry is an important issue.

Synthetic presentation and assessment of the development of concentration processes in sugar industry considering its two basic areas, i.e. market concentration and production concentration was the main goal of the paper. The specific objectives of the studies were: determination of basic premises for and importance of concentration from the perspective of sugar industry specificity, determination of the current market position of the main producers, analysis of the methods and rate of production concentration and assessment of economic consequences of the phenomena observed in the sugar market.

### **Methodology of studies**

Processes of concentration in sugar industry are the subject of the paper. The timeframe of the analysis covered the period from early 1990s until the production campaign of 2007/2008. The latest four production campaigns

during which Polish sugar market was entirely subject to the Common Agricultural Policy of the European Union was subject to detailed studies. Materials of the Institute of Sugar Industry (IPC) and the Association of Sugar Industry Technicians (STC) as well as information from the major sugar manufacturers in Poland were the source data for analysis.

Determining the specificity of sugar industry, which to a significant extent governs its functioning was the starting point for conducting the studies. In that context it was impossible to disregard pointing at the issues concerning the statutory regulation of sugar market that, to a significant extent, determines the situation of the sector and in Poland has also become the main impulse for structural transformations. Several years of continual ownership and organizational transformations in sugar industry, which as a consequence have led to significant structural transformations and major market concentration were also subject to observation. As their consequence concentration of all Polish sugar refineries into five ownership groups, that is: Krajowa Spółka Cukrowa (National Sugar Company), Südzucker, Pfeifer und Langen, British Sugar Overseas and Nordzucker has taken place. The studies encompassed all those groups. The percentage share in the domestic sugar market was assumed as the main indicator of market concentration.

Next, the scope and development of production concentration in individual ownership groups was analysed. Those processes occurred through gradual decommissioning of smaller refineries, which allowed increasing the average production capacity and making a better use of the production potential in the operating plants. SOSNOWSKA (1998, p. 13) indicates that the value is the most often applied measure of production. In sectors with uniform production (and that is the nature of sugar industry) natural measures that are more convenient in case of comparisons can be used. That is why the analysis is based on the volume of production and not on production value.

The diagnose of production-economic standing as well as major weaknesses and problems of sugar industry at the beginning of 1990s was the reference point for assessment of the development and consequences of concentration processes. The comparisons were made by matching the major parameters from that period with the current production-economic standing of sugar industry. The majority of parameters characterizing the sector are subject to frequent changes and seasonal fluctuations. This hinders assessment of the direction and consequences of transformations taking place because, depending on the base period assumed the results may differ significantly. For those reasons the average values for the years 1990–1994 were assumed as the base values for comparisons and assessments. The studies conducted allowed indicating the major directions of changes and assessment of the development of concentration processes in sugar industry as well as formulating conclusions concerning

their effects. The final part of the paper deals with the prospects for development and challenges facing sugar industry.

### **Premises for statutory sugar market regulation**

Currently, Poland produces ca. 2 million tons of sugar per year and is the third largest producer of sugar in the European Union after Germany and France. Sugar industry is a typical agricultural industry linked directly to sugar beet cultivation. That cultivation has positive influence on technological progress in agriculture and represents an important source of income and support for numerous farms. Even during the period of global decline in profitability of production in entire agriculture sugar beet cultivation allowed achievement of income higher than in other types of production. Up to now sugar beet remains one of the most profitable agricultural products and it is projected that this situation will continue in the future (SZAJNER 2006, p. 15).

Sugar industry has positive influence not only on agriculture and its environment but also on developments in other sectors of economy it cooperates with. It is also not insignificant from the perspective of unemployment that sugar industry creates jobs linked to it directly and indirectly. It can be concluded, as a consequence, that it stimulates development in many sectors of national economy.

As a consequence of high dependence of sugar industry on agriculture, it is also influenced by specific characteristics of agricultural production such as production seasonality and campaign type of work. Significant fluctuations in the yields resulting from climatic factors result in the situation where relatively frequently the production capacities of sugar industry are not used fully. The above conditions and the phenomenon of market unreliability were the main premises for subjecting that sector to intervention. There are continual arguments concerning the reasons for, the scope and the instruments of that intervention (MAKARSKI 1998, pp. 302–315) Generally, however, there are no major doubts as concerns the need for that intervention; what is more there are indications of increasing character and expansion in scope of agricultural policies in the majority of highly developed countries (WILKIN 2003, pp. 42–48).

In the European Union, statutory regulation of sugar market took place already during 1960s, i.e. at the beginning of implementation of the Common Agricultural Policy. The scope of the regulation is wide; intervention encompasses sugar, sugar beet, sugar cane, molasses, pulp, sugar refining products and industrial substitute of sugar in the form of isoglucose obtained from maize (so-called cereal sugar) while some other sugars have been covered by other market regulations (CZYŻEWSKI, HENISZ-MATUSZCZAK 2006, pp. 179–180).

The sugar market in Poland has been subjected to statutory regulation in mid-1990s. The difficult and unstable situation of the industry was the basic premise for implementation of regulation. The crisis in food industry that started in 1990 covered also the sugar industry and led to drastic deterioration of economic-financial standing of that industry. The technical status of Polish sugar refineries deteriorated; their size structure was unfavourable. Significant capital outlays were necessary for investments and modernization in all areas of operation starting with the raw materials base, through production processes and management up to sales and distribution policies. Both productivity parameters and production capacity changed too slowly for the Polish sugar industry to be able to meet the international market requirements. Supporters of statutory sugar market regulation assumed that it would improve the situation of sugar industry, accelerate restructuring processes and facilitate preparation for integration with the European Union. Demanding statutory market regulation they referred to pre-war traditions and legal regulations in force at that time (*Dzieje cukrownictwa*. 1981, pp. 172–174). In 1994, the Act regulating sugar market was enacted. Its imperfections as well as increasing market imbalance and absence of satisfactory effects in the form of improvement in the economic-financial situation of sugar producers caused that the Act was amended several times.

Integration with the European Union resulted in immediate applicability of European regulations to the Polish sugar market. At the same time the issue of necessity to conduct further reforms in the sugar market regulation appeared as the system in operation was criticized for high prices in the internal market and low competitiveness in the global market. As a consequence, the European Commission approved the draft reform that has been implemented as of the 2006/07 season. The major changes include decreasing the prices and lowering the production limits that are to be eliminated ultimately, and introduction of a system of compensations for farmers and special subsidizing for those sugar producers who resign producing it (CHUDOBA 2006, pp. 10–11).

### **Market concentration**

Market concentration processes in sugar industry have taken place, to a significant extent, thanks to organizational-ownership transformations initiated by the Act of the 26<sup>th</sup> of August 1994 “On sugar market regulation and ownership transformations in sugar industry”. In 1995, in implementation of its provisions, 4 holding companies were established (Lubelsko-Małopolska Spółka Cukrowa, Mazowiecko-Kujawska Spółka Cukrowa, Poznańsko-Pomorska Spółka Cukrowa and Śląska Spółka Cukrowa). Their major goals were to accelerate restructuring and privatisation of sugar industry.

Entry of foreign strategic investors and resulting inflow of capital allowed commencement of the processes of restructuring and modernization of Polish sugar refineries. At the same time the process of establishing strong regional groups with involvement of foreign – German, British and French capital started (KONDRAKIEWICZ 2006, pp. 129–134).

The next transformation in the structure of entities in Polish sugar market occurred a few years later. On the 25<sup>th</sup> of August 2001 the Act “On sugar market regulation” specifying, among others that some of not yet privatised sugar refineries would be consolidated into the National Sugar Company became effective. The National Sugar Company was established as a result of merger of two holding companies, i.e. Lubelsko-Małopolska Spółka Cukrowa and Poznańsko-Pomorska Spółka Cukrowa with Mazowiecko-Kujawska Spółka Cukrowa Following registration of the merger (30<sup>th</sup> of September 2003) the process of consolidation of subsidiary companies started leading to formation of a structure with characteristics of a consortium. Currently the National Sugar Company consists of 27 plants and producing over 37% of the national production it is the dominating entity in the Polish sugar market (see fig. 1).

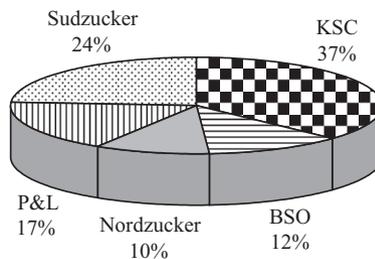


Fig. 1. Share of owner groups in sugar production in Poland during 2007/08 campaign  
Source: Own work based on STC data.

Südzucker Polska Group consisting of 22 refineries is the second largest in size and importance in the domestic sugar market. Südzucker started its expansion into the Polish market in 1997 when it became the strategic investor of Ropczyce refinery belonging at the time to Lubelsko-Małopolska Spółka Cukrowa. The company built its current market position through consecutive acquisitions. The most important of them was the acquisition of Saint Louis Sucre, which meant simultaneous purchase of Silesian refineries belonging at the time to that French company. In addition to the Silesian refineries the group encompasses refineries Ropczyce and Strzyżów as well as the company Cukier Małopolski S.A. with three refineries. The current structure of the group was built through consecutive organizational changes. In 1999 the company Cukier Królewski working for the Group and dealing with sales of

sugar was established. During the campaign of 2003/2004 Przeworsk refinery was acquired by Cukier Małopolski S.A. company, which completed the process of mergers of the eastern refineries. In 2004, a company managing all the companies in which the Group possesses majority interest was established. After its merger with the company Cukier Królewski in March 2005 the company was formed that became the new trade bureau of Sudzucker Polska group.

Pfeifer und Langen Group encompasses 11 refineries located in Wielkopolska and it is the third producer of sugar in Poland. At the first stage of group building 6 refineries were merged and next other 5 from Kalisz-Konin group were acquired. The current group structure was formed in 2004. All the refineries are concentrated in the production group; in addition the group has a separate distribution company.

British Sugar Overseas (BSO), consisting of 10 refineries is another group in the Polish sugar market. It achieved its market share in September 2000 after acquisition of 4 refineries belonging to Rolimpex, Danisco Sugar and consortium of those companies. As of 2003, BSO Polska is the majority shareholder of the company SugarPol and it still aims at strengthening its market position. BSO sells its products in Poland under the brand name of Srebrna Łyzeczka.

Nordzucker, which currently has 6 refineries, developed its market position in a similar way as the BSO. The refineries are located in two areas distant from one another, in the vicinity of Poznań and Toruń. This resulted in the situation that within that group independent companies of local character, i.e. Wielkopolski Cukier S.A. in Poznań area and Pomorski Cukier S.A. in Toruń area operated initially. The current group structure was formed in 2005 after completing the merger of the regional companies. The refineries in Opalenica and Chełmża carry out production while sales of products are carried out under the brand name of Promyk.

The volumes of sugar production in individual owner groups are determined to a significant extent by production quotas obtained by them. As a consequence of progressing sugar market reform those quotas decrease systematically. The total production limit awarded to Polish producers for the campaign of 2004/2005 was 1580 K tons of sugar in quota A (i.e. allocated for the domestic market needs) and 91,9 K tons of sugar in quota B (for export with subsidies). For the next season the reduced quotas were awarded, i.e. in case of quota A to 1495,3 K tons and quota B to 86,9 K tons. During the season of 2006/07 and the following the quotas A and B were merged and reduced again. Poland was awarded the limit of 1498 K tons and did not use the possibility of selling a part of it to the restructuring fund but to the contrary it purchased additional quotas. As a consequence the production quotas for the

season of 2007/2008 and following is 1533 K tons. The white sugar production level during the covered period by individual producers is presented in Table 1.

Table 1  
Production of white sugar (in K tons) and share of owner groups in sugar market (in %) in Poland during the years 2004–2008

Producer	Campaign							
	2004/05		2005/06		2006/07		2007/08	
	K tons	%	K tons	%	K tons	%	K tons	%
National Sugar Company	798.7	39.89	794.7	38.42	637.5	37.06	722.4	37.35
Südzucker	517.9	25.88	537.3	25.97	447.1	25.99	462.3	23.90
British Sugar Overseas	206.9	15.96	208.2	16.98	208.1	16.61	227.2	17.44
Nordzucker	159.0	10.33	177.0	10.07	142.0	12.09	184.9	11.75
Pfeifer & Langen	319.6	7.94	351.1	8.56	285.7	8.25	337.2	9.56
Total	2002.1	100.0	2068.3	100.0	1720.4	100.0	1934.0	100.0

Source: Own computations based on the STC data.

The actual production level during each year exceeds the awarded production quotas. This results from the fact that for economic reasons only large scale production of sugar is profitable. During the past years all producers produced a part of their production within the co-called quota C (for export without subsidies) the share of which in the total production was in average ca. 20%. Under the current conditions the existing production capacities cannot be used fully because of the problems with disposal of production surplus exceeding the awarded limits. The effective regulations do not allow export of surplus sugar. The surplus can be transferred for the consecutive campaign or sold to the industry.

Data presented in Table 1 indicates relatively large level of variability in sugar production during consecutive years. This results mainly from climatic factors and consequential differences in quality of raw material produced. It should be mentioned, however, that during the earlier years even larger fluctuations in the production levels than currently were observed.

The variable level of production during consecutive years is accompanied by a relatively constant market structure. The market position of individual owner groups developed at the time of integration of Poland with the European Union has not changed significantly during the last few years. In the vast majority of cases their shares in the market changed from year to year by within one percent point only. The general trend is a small decrease in importance of the largest groups, including the leader, the National Sugar Company and a slight improvement in the position of the smallest producer, Nordzucker.

## **Production concentration**

Ownership-organizational changes that have led to establishment of a few groups of sugar producers in Poland were accompanied by restructuring processes. Aiming at increasing their competitiveness, all owner groups present in the Polish market have undertaken different activities that encompassed almost all aspects of operation of sugar refineries – starting from raw materials management and purchasing of other raw materials, through organization of production processes and management, modernization of production capacity, restructuring of plants up to the sales policies. From the perspective of specificity of sugar industry and the situation that existed during early 1990s, decommissioning of some plants seems the most important activity. Such actions were expected when sugar holding companies were established as it was assumed that this would accelerate production concentration processes and lead to decommissioning of small, unprofitable refineries. However, during the period of their operation such processes occurred only occasionally (KONDRAKIEWICZ 2000, pp. 212–214). In general, holding companies established companies did not fulfil the hopes related to them as they did not contribute either to regulating the market or to accelerating the processes of restructuring and privatisation of sugar industry. That is why we should agree with the negative opinion concerning the Sugar Act (BAŁTOWSKI 2002, p. 226).

The processes of production concentration and decommissioning of refineries were undertaken at a wider scale only after 2000, and they intensified in 2004 when as many as 14 plants were decommissioned. During the consecutive years those processes were continued but with lower intensity. As the consequence, during the campaign of 2007/2008, only 29 refineries, i.e. only 40% of all refineries existing in Poland worked. Which is important, those processes involved all owner groups; currently the number of refineries working in each of them is lower than the number of refineries that were decommissioned. It should also be pointed out that groups with participation of foreign capital started decommissioning processes earlier and conducted them faster than the National Sugar Company. The detailed data concerning working refineries by individual groups is presented in Table 2.

Decommissioning of sugar refineries does not mean their absolute liquidation. Some plants deal with warehousing of sugar and organization of raw materials contracting; attempts are also taken at entire change of the profile of their business. Sugar production limits and the raw material base of decommissioned plants are taken over by economically stronger refineries with higher production capacities. This allows development of their potential and leads to clear improvement in the structure of refineries as concerns day processing capacities. Nationally, the percentage share of small plants

Table 2

Number of sugar refineries in Poland by owner group

Owner group	Number of refineries				
	total	in operation			
		2004/2005	2005/2006	2006/2007	2007/2008
National Sugar Company	27	20	18	13	11
Südzucker	22	12	11	10	10
Pfeifer & Langen	11	5	5	4	4
British Sugar Overseas	10	4	4	2	2
Nordzucker	6	2	2	2	2
Total	76	43	40	31	29

Source: Own computations based on the IPC data.

decreases systematically to the benefit of the medium and large ones. During the last campaign refineries with processing capacity of under 2 K tons per day represented just a few percent of the total operating plants while during the early 1990s the majority of refineries had such production capacities. Glinojek refinery belonging to BSO is the largest in Poland and it processes in excess of 7,5 K tons of beets per day producing over 100 K tons of sugar per year corresponding in size to an average refinery in the European Union.

Decommissioning of some sugar refineries resulted also in increasing the distance of some sugar beet plantation from working refineries. It should be reminded here that a characteristic of sugar industry is that its basic raw material is unsuitable for extended storage and long distance transport is expensive and results in quality deterioration. As a consequence sugar industry is more scattered than the industries suitable for any location as sugar refineries should be located in sugar beet production centres. Poor location of the refinery (an example here could be Łapy and Ropczyce) causes problems with full use of production capacity resulting from absence of adequate raw materials base and excessive costs of importing sugar beets from distant plantations (SMOLEŃSKI, URBAN 1993, p. 21).

### Consequences of concentration in sugar industry

Processes of market concentration and production concentration resulted in significant changes in sugar market structure and the entire sugar industry. All technical and yield parameters characterizing that sector were subject to systematic improvement during the recent years while as compared to the situation of early 1990s a significant progress has been achieved. Table 3

presents the basic data concerning production and technological indicators of sugar industry during its operation in the environment of the European Union as compared to the situation during the years 1990–1994.

Production and technology results of sugar industry

Table 3

Indicator	Campaign				
	average 1990–1994	2004/05	2005/06	2006/07	2007/08
Sugar production per 1 refinery [t]	30,2	46,7	51,7	56,1	66,7
Sugar crop [t/ha <sup>-1</sup> ]	5,15	6,86	7,23	8,2	9,5
Sugar yield [%]	12,82	16,22	17,29	15,02	15,05
Average day processing volume [t]	209,8	144,8	141,9	131,7	132,8
Average day processing volume per 1 refinery [t]	2,76	3,37	3,55	4,25	4,58
Campaign length [days]	86	87	84	87	96

Source: Own computations based on the IPC and STC data.

Decommissioning of smaller plants evidently increased the volume of production per refinery. During several years it more than doubled. The average production of sugar in Poland per one refinery is currently in excess of 66 K tons while several years ago it was at the level of around 30 K tons per year. The spread of production volumes at that time was immense – the smallest Polish refineries supplied only 12 k tons of sugar per year while the largest one almost 70 K tons. It is assumed that to achieve satisfactory profitability one plant should produce over 100 K tons of sugar per year. From that perspective the situation is still unsatisfactory, particularly as compared to the other European Union countries.

Decreasing the number of operating refineries resulted in the situation that although the volume of sugar beets processed per day decreased, the volume processed by a single refinery increased significantly (by ca. 65%). Also the yield of sugar per 1 ha improved clearly; it increases systematically from year to year and currently is ca. 9,5 t while during the early 1990s it was just over 5 tons.

From the perspective of the financial results and production effectiveness of sugar industry the length of sugar beets processing period is of major importance. For economic reasons many large European sugar companies undertake attempts at extending the campaign up to even 100 days. In some countries production process modernization involving production of semi-finished products only during the campaign (thick juice) and storing it in appropriate tanks is undertaken. The final stage of production can take place much later (even in April or May) without harm to quality and the total

production costs are lower. In Poland such solutions had not been applied for many years and very short campaigns, frequently carried out just to retain the production limits were a significant weak point of that industry. Decommissioning of some plants allowed extending the campaign in the remaining ones as a result of which, during the recent years, the average time during which sugar beets are processed was extended significantly. During the campaign of 2007/2008 it was 96 days while one of the groups (Pfeifer & Langen) worked for almost 124 days. Also in the BSO group the period of processing is relatively long. The shortest campaigns take place in the National Sugar Company where during the last campaign the average length was over 83 days.

Processes of market concentration and production concentration that took place in individual owner groups have also brought positive changes as concerns the status and organization of raw materials base of sugar industry. The basic data concerning the major indicators of its status during the analysed period is presented in Table 4.

Table 4  
Raw materials base of Polish sugar industry

Indicator	Campaign				
	average 1990–1994	2004/05	2005/06	2006/07	2007/08
Area under sugar beet [ha]	392	292	286	237	229
Area under sugar beat per 1 refinery [ha]	5.16	6.79	7.15	7.65	7.90
Sugar beet production [t]	13.1	13.3	12.5	11.5	12.7
Sugar beet yield [t/ha <sup>-1</sup> ]	33.72	42.7	41.0	48.3	55.7
Number of planters [K]	306.3	77.9	70.7	61.7	60.8
Planters per 1 refinery [K]	4.03	1.81	1.77	1.99	2.10
Average plantation area [ha]	1.15	3.75	4.05	3.68	3.80

Source: Own computations based on IPC and STC data.

The area under sugar beet was subject to significant fluctuations during the consecutive years; analysed in a long perspective it has been decreasing systematically and it currently is over 220 K ha. It is just 60% of the level of early 1990s. At the same time, mainly thanks to cultivation technology development, the yield of sugar beet per 1 ha increased significantly while the total harvest remains at the level only slightly lower than several years ago. The decrease in area under sugar beet is accompanied by evident decrease in the number of planters and increase in the average plantation area. That trend is very clearly noticeable over a longer period of time. All those values indicate a significant progress in development and modernization of raw material base of Polish sugar industry. Unfortunately, in comparison to other countries

Poland still has a lot to do to catch up, particularly as concerns the yields of sugar beets achieved.

Decommissioning of some plans brought not only positive results. Some problems also appeared as, for example, the earlier mentioned problem of the radius of cultivation around individual refineries. At the same time all owner groups have undertaken actions eliminating inconveniences of transport for extended distance and resulting losses in raw material quality. In individual owner groups organizational units have been established that have taken over from the refineries the majority of tasks in raw materials management and they have developed new principles of collaboration with planters. Clear decrease in their number facilitated progress in widely understood quality of raw material supplies (including such characteristics of supply as batch size, regularity, quality uniformity in each batch, extending the time of harvest). Agricultural producers cannot undertake such activities on their own; they also cannot be forced by agricultural policy or administration. Only economically strong processing entities and their groups can initiate qualitative progress in production and supplies of sugar beet (GRABOWSKI 1998, p. 208, URBAN 1996, p. 20). The owner groups currently fulfil that role. As a result of activities undertaken by them an increase in the area of average plantation and partly area concentration represented by increased density of cultivation in the areas around operating plants were achieved. Significant changes occurred in sugar beet reception and its quality assessment, which considers sugar content. Purchasing at factory yard (so-called reception in the field-refinery system) was expanded; some refineries introduced initial cleaning of beets at the field and covering of piles. All those activities improved the quality of raw material significantly and as a consequence facilitated obtaining sugar, increased its yield and decreased production costs. Increase of sugar beet yields and their larger stability were also recorded, which means progress in cultivation technology and less dependence on climatic conditions.

Considering continual surplus in sugar market the sales policy as well as introduction of new products and products quality development are important. In sugar industry direct sales can apply to a small part of the buyers only (URBAN 1998, p. 241), that is why organization of distribution channels gains special importance. Currently, sales policies are dealt with by specialist companies working for large groups, which has eliminated internal competition between individual refineries within them. The situation in production diversification looks less favourable. The range of products remains relatively narrow although some refineries have introduced new products or changed the structure of products manufactured. Only a few refineries switched almost their entire production to new types of sugar (coloured sugar – golden crystal or liquid sugar).

It should be pointed out here that although decommissioning of plants should be considered rational and inevitable for economic reasons it causes serious social problem. So far each decision on decommissioning of a sugar refinery caused numerous protests of the employees and local community. This is understandable when the major importance of that sector and the fact that during early 1990s the sector employed almost 2 million people (including sugar beet producers) are considered. As a result of transformation processes in sugar industry major reductions of employment took place and currently it is twice smaller than several years ago. For some sugar producers the reform means the necessity of terminating production and undertaking other types of business activity. Only the most productive and modern refineries will be able to continue production.

Technology development and good production results of sugar industry do not translate directly into its financial-economic standing, which is unstable and subject to frequent changes. Generally, sugar industry, as compared to other sectors of agricultural-food processing, is characterized by one of the highest levels of diversity in economic-financial indicators (see: DROŹDŹ 2005, p. 19 and *Analiza...* 2007, p. 311).

The economic-financial standing of sugar industry is influenced significantly by sales prices of sugar and sugar beet purchase prices. That later factor develops more favourably for agricultural producers than for the refineries. Covering Poland with Common Agricultural Policy resulted in an increase of the basic purchase prices for sugar beet from PLN 131 to Euro 47,67 per ton (*Podstawowe rynki...* 2005, p. 193). During the period immediately preceding the accession of Poland to the European Union and immediately after it, a rapid increase in domestic demand for sugar and resulting significant increase in its price occurred. However, it was short lasting and as of June 2004 a moderate decrease in sugar prices took place; currently the prices are stabilized. The initial increase of prices contributed to radical improvement of sugar industry financial results, which, however, was short lived. Sugar produced already after the integration was sold at prices lower than immediately before integration while the prices for sugar beet increased significantly. That is why already in 2005 the situation of the sector deteriorated again and it recorded the loss of PLN 18 million (that is 0,33% of its revenues). The following year was better as sugar industry generated over PLN 420 million in profits representing over 8% of its net income (*Analiza...* 2007, pp. 311–312).

Frequent changes in financial standing and price-income situation of sugar and sugar beet producers give rise to two basic questions. First, which factors determine the standing of sugar industry and second, what are the prospects and possibilities for development of the sector. It seems that factors conditioning the current and the future situation of sugar industry and prospects for its

further development can be divided into two main groups. One is the demand factors and the situation in the global sugar market. The second group encompasses statutory regulations, and in particular the changes that must occur as a result of the sugar market reform.

As concerns the demand conditions the situation in global markets seems quite favourable and for the nearest future an increase in demand for sugar is expected, particularly from the developing countries and as a consequence of biofuels production. On the other hand, however, in the global sugar market there is a continual surplus of sugar, competition from manufacturers of isoglucose and cane sugar (mainly Brazil) increases. On the other hand it is difficult to expect a significant increase in demand in the domestic market. The internal consumption of sugar in Poland increases very insignificantly and currently is at the level of around 1600 K tons per year (i.e. ca. 40 kg per capita) that is at the level lower than the level of production.

Statutory regulations are the second, next to the market-demand factors, important element determining the situation in sugar industry and influencing its development potential. Sugar market reform currently in progress in the European Union means a decrease in its price, reduction in size of the production quotas and changes in foreign trade principles (SMOLIŃSKI 2006, pp. 26–40). The assumptions for the reform project sugar production concentration in the regions with the best natural conditions for sugar beet cultivation coupled with its limitation in the other regions. The special restructuring fund from which disbursement of compensations for sugar producers, planters and suppliers of specialized machinery are planned forms the incentive for decommissioning of plants. As a consequence there was a major concern that instead of modernization of Polish refineries they will be closed, as this would be more profitable. However, none of the sugar companies operating in Poland wants to limit production voluntarily. What is more, all producers purchased additional quotas within the pool available to them. It is probable that Poland will remain in the group of countries with high level of production but further restructuring that threatens with loss of many jobs will be necessary.

Termination of sugar production in some European regions may improve the situation and create better development prospects for other producers. Ultimately, the market price of sugar in the European Union is to drop to around EUR 450 per ton, which probably is close to the equilibrium price. As a consequence, only the lowest cost producers will be able to continue sugar production. This is a threat to less productive plants and their employees and planters-suppliers. Consequently, despite the immense progress achieved in sugar industry there is still need for further investments and modernizations including the range of products and production quality to adjust it better to market demands and to match competition.

## Summary and conclusions

During several recent years important changes occurred in the Polish sugar market. They encompassed the principles of its organization and operation (including statutory market regulation), ownership transformations and changes in technology and organization in sugar industry. From the perspective of sector effectiveness and its economic-financial standing, the processes of concentration that involved both market concentration and production concentration seem of particular importance.

Market concentration occurred as a result of structural-organizational changes initiated by statutory regulations that promoted grouping of sugar refineries belonging to one owner. They resulted in the division of the market among a few major sugar producers. Currently there are five sugar producing owner groups in the Polish market, the majority of them are groups with foreign capital present also in the markets of other European Union countries. The exception here is the National Sugar Company belonging to Polish capital, which has over 37% share in the sugar market and is the dominating entity in that market. Sudzucker, Pfeifer und Langen, British Sugar Overseas and Nordzucker, holds the consecutive positions and their market shares are 24%, 17%, 12% and 10% respectively. For a few years the market structure has remained at the similar level, which results mainly from the effective production limits. They are much lower than the processing capacities of Polish sugar refineries, which was the main premise for decommissioning of some plants and resulted in the increase of production concentration level.

Processes of production concentration in sugar industry were inseparably linked to market concentration. For economic reasons some of the plants had to be decommissioned. This allowed increasing production capacities in the largest plants and extending the campaign duration but also required major employment reductions. Decommissioned refineries are used as sugar warehouses, they deal with organization of sugar beet contracting and substitute production was organized in some of them.

In assessing the technical-production effects of concentration a visible progress should be noted. As compared to the situation from early 1990s, all technical-production indicators improved clearly, progress was achieved in raw materials management, particularly as concerns concentration of cultivation and increase and stabilization of the yields. Raw material quality improvement contributed to improvement of indicators influencing sugar quality and final economic results, i.e. polarization, sugar yield and sugar yield per hectare. As a consequence, capital concentration processes and development of strong owner groups and production concentration in the largest plants contributed to improvement in the status of raw materials base and economic as well as production situation in sugar industry.

Concentration processes in sugar industry occurred in all owner groups. Analysis of their progress and rate of the changes shows that in the groups with foreign capital participation those processes started earlier and progressed with higher intensity. Foreign investors made significant investment outlays and started comprehensive modernization of production potential and raw material base faster than the National Sugar Company. Currently, it is hard to show clearly the advantages of some groups over the others although there are differences between them in the levels of detailed parameters and individual indicators.

As already mentioned, processes of market and production concentration in sugar industry were tightly linked. The processes of market concentration, however, should be considered primary as production concentration processes at a wider scale occurred only after formation of strong owner groups. Contrary to the initial assumptions, sugar holding companies operating during the second half of 1990s did not terminate production in small and technologically obsolete refineries. Decommissioning intensified only after 2004 that is only when 2004 sugar industry started operating within the European Union Single Market.

Significant changes in the operational environment of sugar industry enterprises and sugar beet planters were brought by integration of Poland with the European Union. Polish producers were subjected to all sugar market regulations effective in the Community. The first year following the accession was exceptionally favourable for them, mainly because of the significant increase in sugar prices and sugar beet purchase prices. Nevertheless, gradually, the situation of sugar producers started deteriorating; the situation of farmers during two consecutive seasons was significantly better. During that entire period processes of restructuring and modernization of sugar refineries were continued aiming at maintaining their competitiveness and closing the gap between Polish producers and producers from other countries. Increase in sugar beet purchase prices forced optimisation of production processes and reduction of non-raw material production costs, which offered the only option for obtaining positive profitability.

Continuing sugar market reform creates new challenges and forces consecutive decreases in production costs and improvement of technological processes productivity. It is probable that further concentration in sugar production will occur, which will involve the necessity of decommissioning additional production plants. In the near future further changes in the production profile of some plants will have to take place coupled with implementation of social mitigation programmes for the current employees. Continuation of restructuring and sugar production concentration processes while maintaining its size at the level of around 2 million tons per year will allow

## Poland maintaining one of the leading positions in the sugar market of the European Union.

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