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The case study of the Polish fruit and vegetable producers competitive activities

Abstract. This paper analyses the competitiveness of fruit and vegetable producers. Research was carried out as an attempt to identify the variables that determine companies' ability to achieve a competitive advantage. The results of qualitative research are presented in the paper. Interdependence of entrepreneurs' opinions for both domestic and foreign markets was examined by means of ordinal correlation measures. The paper evaluates the different forms of cost-price, quality, innovation and marketing competitiveness.

Key words: fruit and vegetable producers, cost-price competitiveness, quality competitiveness, innovation competitiveness, marketing competitiveness.

Introduction

The convergence of domestic and international markets and equalization of competitive conditions decrease the competitive potential of Polish fruit and vegetable producers and force them to make qualitative and innovative improvements. Quantitative and qualitative research was undertaken to prove this thesis statement. Both the concept of competitiveness and an investigation of official statistics had a crucial influence on the scope of the research. It is based on an inquiry and quantitative and qualitative analysis of the gathered data [Yip 2002].

The competitive strategy is a set of market performances, based on the concept of company competitiveness and activities involving development of existing sources of competitiveness within the enterprise, like specific resources, skills, structures, core competency and capabilities of creating their new collection [Pierścionek 2007]. It is to undertake offensive or defensive activities, intended to maintain position in the sector, to cope effectively with competitive forces and to obtain higher profit rates. Enterprises have developed many different ways of action and, thus, the company's strategy is a unique design, reflecting its specific conditions. Porter [1980] has identified three main types of strategies: cost leadership, differentiation and market segmentation (or focus). In theory and practice, there is a vast number of economic competitive strategies for businesses and conditions of their selection [Pierścionek 2007].

Each of adopted strategies is determined by performances undertaken with respect to price, cost, quality, marketing and innovation competition. Business firms managers assessments of main forms of competition are presented in this paper. The aim of the study is to evaluate the importance of different competitive activities undertaken by fruit and vegetable producers in the domestic and foreign markets.

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Method of research

Managers of ten fruit and vegetable processing plants were subject of an empirical inquiry in 2010. A set of 150 variables regarded as significant for internal and external competitiveness of the studied industry was evaluated. Samples from publications by Gorynia and Łaźniewska, Jankowska [2005], Pierścionek [2007], Porter [1980] and Yip [2002] were used to design a questionnaire. Around 3000 evaluations were obtained. The research tool was intended to base the entrepreneurs' responses on their professional experience, intuition and knowledge about competitiveness. The gathered opinions were subjective and evaluative. The surveyed enterprises operated in domestic and foreign markets. It had been assumed that situation of the enterprises on these markets might vary. Relative values of qualitative variables and relationships between them were tested [Nowak 1970].

To exemplify the studied quality, i.e. competitiveness, non-parametric ordinal scaling was used. The scale of ranks representing intensity of the analysed variables was determined. An ordinal rank was set to estimate the correlation of assessments. Thus, it was possible to estimate the Spearman's rank correlation coefficient (Equation 1). The calculation of rank correlation was tested with Spearman's ρ independence test- t for number of observations $n < 10$ (Equation 2) and test- z for number of observations $n \geq 10$ (Equation 3).

$$\rho = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n(n^2 - 1)} \quad (1)$$

where d_i – rank difference of converted values of variables x_i, y_i ($i = 1, 2, \dots, n$) [Kenkel 1984; Sobczyk 2007].

$$t = \rho \sqrt{\frac{n-2}{1-\rho^2}} \quad (2)$$

and

$$z = \rho \sqrt{n-1} \quad (3)$$

where n – number of observations [Gajek & Kałuszka 2000; Kenkel 1984; Sobczyk 2010].

The multidimensionality of the phenomenon of competitiveness as well as its attributive and proceeding sense, relativity, multi-level nature in the hierarchy of economic systems and cause-and-effect character were the reasons for selection of the research method. In the circumstances where the research subject comprises numerous variables of mutual compound relationships and the researcher has limited control of the object, rationalization of the cause-and-effect relationships on the basis of a wide inquiry or controlled experiment is very difficult or even impossible. The below presented results of the study are based on subjective evaluations by the inquired ten entrepreneurs. They

evaluated the intensity of the measure application in the domestic and foreign market by positioning its importance within the given scale of ranks.

Case study

There were ten reporting entities in the test. Purposive sampling was applied. Units operating within the European Classification of Activity (ECA) 15.3, fruit and vegetable processing and exporting activity, were selected. With regard to the aforementioned qualities, the cases were comparable and heterogeneous as far as the other qualities are concerned. They were enterprises with partial foreign capital ownership and in one case a completely foreign entity.

Private limited liability companies (Ltd.) prevailed among the analysed units; the others were a public limited company (p.l.c.), general partnership and sole trader. They were established mostly in the 1990s (Table 1). The average profit rate in the enterprises was 12% in 2006 through 2008. The gross profit reached between 105.5 and 527.5 thousand dollars yearly and the net revenue was between 1.3 and 7.0 million dollars yearly.

As it was mentioned above, the Polish fruit and vegetable industry has had in the recent years a high export orientation. It was the fourth of the fourteen main branches of the food industry. The share of exports in its total sales reached 38%. The queried enterprises were export-oriented. The average merchandise exports achieved a share of 36% in their sales. Amid the sample entities, two of them showed a higher share of exports than in the whole of food industry. None of them had a lower share of the type than the lowest value for the industry in question, which was 6% in 2008 [Urban, Szczepaniak & Mroczek 2010].

Table 1. Profiles of sampled producers

Description	Respondent's ordinal number									
	1	2	3	4	5	6	7	8	9	10
Legal status of company	Ltd.	Ltd.	Ltd.	Ltd.	Ltd.	G.p.*	P.l.c	S.t.*	Ltd.	Ltd.
Date of establishing	1997	1992	1997	1992	2003	1994	1973	1993	1998	1992
Processed food in sales, %	100	100	45	100	26	73	76	98	97	50
Export in sales, %	17	45	35	15	20	30	12	7	100	25

* G.p. – general partnership, S.t. – sole trader

Source: own study.

The enterprises which employ over 50 people make around 30% of total number of enterprises in the Polish fruit and vegetable industry [Kaczmarek-Piątek 2001]. As far as the employment level is concerned, most of the enterprises in question had a staff of more than 50 workers. The average number of employees in the studied entities was 71. Three of them employed 100 or more (130 and 150). The employment in the other enterprises was 70, 40, 35, 25 and 18 workers respectively. There is no data about two of them.

The research concerned the enterprises which stand out not only in the fruit and vegetable industry but in the entire food industry as well. The financial indicators and economic potential of the entities in question show relatively high values. Those enterprises

built their competitive potential in the period of Poland's economic transformation. Thus, they underwent the process of structural and proprietary changes. They adapted their own resources to compete in the changing economic conditions. At present, they are distinguished by a stable position in the domestic market. Moreover, they are present in foreign markets. Therefore, the conclusions drawn from the analysis should be regarded as those based on opinions by a sample of leaders in the industry. They are enterprises which developed their absolute and relative competitive potential [Potencjał... 2005].

To sum up, the main difficulties encountered during the investigation were how to encourage entrepreneurs to take part in the inquiry and the lack of information concerning competitors. The qualitative and static character of the research ruled out the analysis of changes in the economic potential and the competitive position. Subsequently, the size and content of the tested sample excluded detailed descriptions, generalization or determination of any statistical regularity. It was assumed that the research allowed weak inductive reasoning for a case study [Tellis 2007].

Importance of cost and price competitive activities

The average price index of fruit and vegetable products increased in 2003-2009. The average price index of vegetable products grew faster than this of fruit products, yearly by 3.1% and 2.2% respectively. The first mentioned prices growth was higher than the relevant consumer commodities and services price index. The last amounted on average to 2.8% in the period. Anyway, the respective price increase was slower than the average growth of food and beverages price index. It amounted to 4.0% yearly. The annual price index for fruit and vegetable products increased at a rate of between 2.8% and 4.0% [Rynek... 2010].

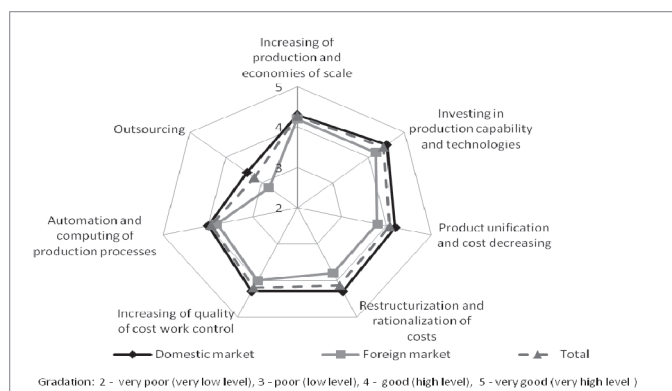


Fig. 1. The evaluation of cost activities

Source: own study.

The Institute of Agricultural and Food Economics (the IAFE) reports show that price advantages of Polish processed food in the common European market were ranked at around 30% before entering the European Union (EU). However, price advantages were not so significant for the fruit and vegetable industry. As the most recent study shows, price

advantages referred in 2008 only to jams and fruit juices, including orange and apple juices. Moreover, a tendency in recent years has been a constantly decreasing price advantage of the Polish fruit and vegetable products [Urban, Szczepaniak & Mroczek 2010].

There were several cost competitiveness determinants considered in the questionnaire. All of them were ranked lower in foreign markets than in the domestic one (Figure 1). The average highest assessment was granted to investing in production capability and technologies as main determinants in the domestic market. It was scored as high as increasing of production and economies of scale in foreign markets. The lowest scored determinant in both domestic and foreign markets were outsourcing as well as automation and computerization of production processes.

Table 2. Interdependence of evaluations of cost activities in domestic and foreign markets

Measure	Average national market assessments (x)	Average foreign market assessments (y)	Rx	Ry	d _i	d _i ²
Increasing production and economies of scale	4.30	4.20	5	6.5	-1.5	2.25
Investing in production capability and technologies	4.50	4.20	7	6.5	0.5	0.25
Product unification and cost decreasing	4.20	3.80	3	3	0	0
Restructuring and rationalization of costs	4.30	3.80	5	3	2	4
Increasing the quality of cost control	4.30	4.00	5	5	0	0
Automation and computerization of production processes	4.00	3.80	2	3	-1	1
Outsourcing	3.40	2.80	1	1	0	0
Sum of squared differences between rank values of variables x _i and y _i						7.5
Spearman's rank correlation coefficient (ρ)						0.866
t statistics						3.874
Border level of significance α						0.01

Source: own study using Free Statistics Software [Wessa 2011].

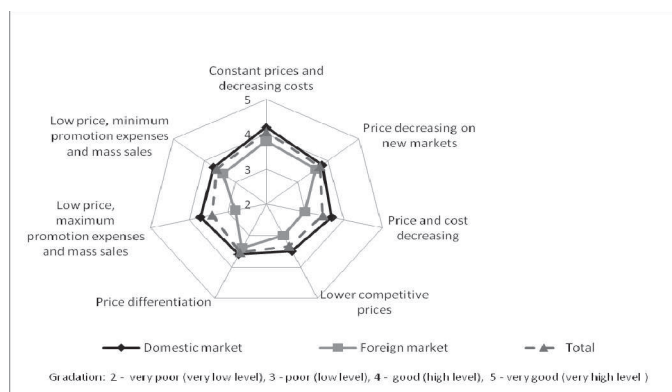


Fig.2. The evaluation of price activities

Source: own study.

To assess the correlation of variables the following scale was used: [0.0-0.3] meant weak, [0.31-0.6] medium, [0.61-1.0] strong correlation [Sobczyk 2007]. In the assessment of cost competitiveness in the domestic and foreign markets the Spearman's coefficient was 0.866 and indicated an existing strong dependence. This was verified at a high level of

significance $\alpha = 0.01$. Therefore, the tested hypothesis of independence can be rejected (Table 2). This proves that the domestic and foreign markets are recognized as comparable when considering cost competitiveness.

Similarly, there were several price competitiveness determinants considered in the questionnaire. All of them were ranked lower in foreign markets than in the domestic one (Figure 2). The average highest assessment was granted to constant prices and decreasing costs as main determinant in the domestic and foreign market. The lowest scored determinant in the domestic market was lower competitive prices and in the foreign market the low price, maximum promotion expenses and mass sales.

In the assessment of price competitiveness in the domestic and foreign markets, the Spearman's coefficient was 0.643 and indicated the existing strong dependence. This was verified at a rather low level of significance $\alpha = 0.1$. Therefore, the tested hypothesis of independence cannot be rejected (Table 3). This proves that the domestic and foreign markets are not recognized as comparable when considering price competitiveness.

Table 3. Interdependence of evaluations of price activities in domestic and foreign markets

Measure	Average national market assessments (x)	Average foreign market assessments (y)	Rx	Ry	d_i	d_i^2
Constant prices and decreasing costs	4.20	3.80	7	7	0	0
Price decreasing in new markets	3.80	3.60	6	6	0	0
Price and cost decreasing	3.70	3.00	4	2.5	1.5	2.25
Lower competitive prices	3.50	3.00	1	2.5	-1.5	2.25
Price differentiation	3.60	3.40	2	4.5	-2.5	6.25
Low price, maximum promotion expenses and mass sales	3.70	2.80	4	1	3	9
Low price, minimum promotion expenses and mass sales	3.70	3.40	4	4.5	-0.5	0.25
Sum of squared differences between rank values of variables x_i and y_i						20
Spearman's rank correlation coefficient (ρ)						0.643
t statistics						1.877
Border level of significance α						0.1

Source: own study using Free Statistics Software [Wessa 2011].

The enquiry proves that the responding entrepreneurs consider costs lowering as the main determinant of cost-price competitiveness. On the average, the most used by the inquired group of companies is a traditional method of cost lowering which is investing in production capability and technologies. Prices are comparatively less important factor of competition and the main strategy is keeping constant prices and decreasing costs. Domestic and foreign markets are recognized as converged when considering costs, otherwise than price competitiveness.

Importance of quality and innovation competitive activities

The entrepreneurs pointed out in their evaluations at quality actions as the most important items in their companies' competition strategies. Innovations were ranked in the last place among the assessed actions. This implies a companies' innovative drawback, which may result in lower competitiveness in the long term. Nowadays pro-innovative potential as well as creation of distinctive, specific and core competence are crucial for rivalry in the competitive European and world markets. The weak innovative position of the investigated companies, which after all represent the most effective enterprises, indicates an existing problem. The entire fruit and vegetable industry has been struck with a decrease in investments in recent years [Rynek... 2010]. In modern developed economies quality and innovation are the main factors of competitiveness.

There are several quality competitiveness determinants considered in the questionnaire. All of them were ranked higher than the cost and price determinants. The entrepreneurs scored them lower for foreign markets than for the domestic one (Figure 3). The average highest assessment was granted to the implementation of quality management systems and certification, as main determinants in the domestic and foreign markets. The lowest scored determinant in the domestic market was benchmarking for best practices.

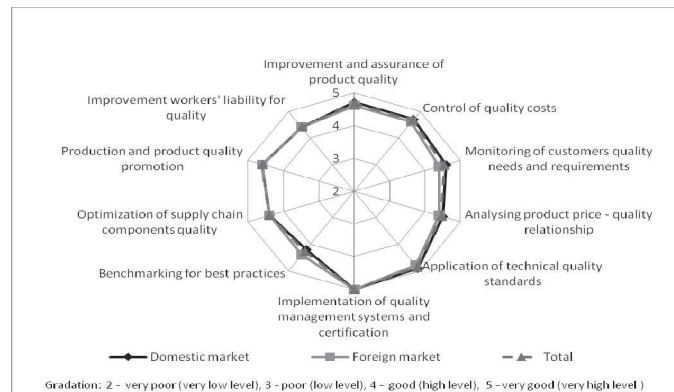


Fig.3. The evaluation of quality activities

Source: own study.

In the assessment of quality competitiveness in the domestic and foreign markets Spearman's coefficient was 0.750 and indicated the existing strong dependence. This was verified at a high level of significance $\alpha = 0.01$. Therefore, the tested hypothesis of independence can be rejected (Table 4). This proves that the domestic and foreign markets are recognized as comparable when considering quality competitiveness.

There were several innovation competitiveness determinants considered in the questionnaire. All of them were ranked lower than the cost, price and quality determinants. The entrepreneurs scored them lower for foreign markets than for the domestic one (Figure 4). The average highest assessment was granted to the modification of products and improvement of R&D staff quality as main determinants in both domestic and foreign markets. The lowest scored determinant in the domestic market was creation of new products.

Table 4. Interdependence of evaluations of quality activities in domestic and foreign markets

Measure	Average national market assessments (x)	Average foreign market assessments (y)	Rx	Ry	d_i	d_i^2
Improvement and assurance of product quality	4.70	4.60	7.5	7	0.5	0.25
Control of quality costs	4.70	4.60	7.5	7	0.5	0.25
Monitoring of customers quality needs and requirements	4.60	4.40	5.5	3	2.5	6.25
Analysing product price/quality relationship	4.50	4.40	4	3	1	1
Application of technical quality standards	4.90	4.80	9	9	0	0
Implementation of quality management systems and certification	5.00	5.00	10	10	0	0
Benchmarking for best practices	4.20	4.40	1	3	-2	4
Optimization of supply chain components quality	4.40	4.40	2.5	3	-0.5	0.25
Production and product quality promotion	4.60	4.60	5.5	7	-1.5	2.25
Improvement of workers' liability for quality	4.40	4.40	2.5	3	-0.5	0.25
Sum of squared differences between rank values of variables x_i and y_i						14
Spearman's rank correlation coefficient (ρ)						0.750
z statistics						2.250
Border level of significance α						0.01

Source: own study using Free Statistics Software [Wessa 2011].

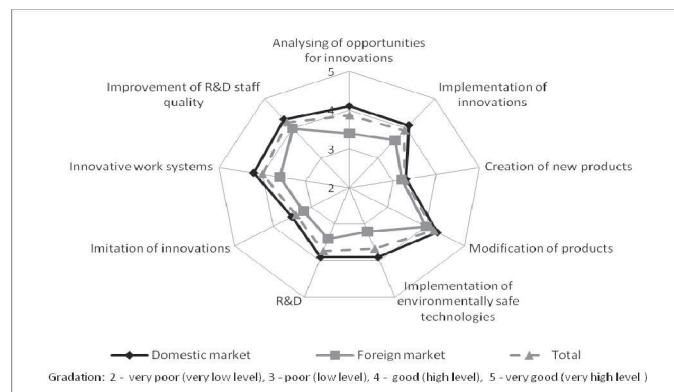


Fig.4. The evaluation of innovation activities

Source: own study.

In the assessment of innovation competitiveness in the domestic and foreign markets, the Spearman's coefficient was 0.946 and indicated the existing strong dependence. This was verified at a high level of significance $\alpha = 0.001$. Therefore, the tested hypothesis of

independence can be rejected (Table 5). This proves that the domestic and foreign markets are recognized as strongly comparable when considering innovation competitiveness.

Table 5. Interdependence of evaluations of innovation activities in domestic and foreign markets

Measure	Average national market assessments (x)	Average foreign market assessments (y)	Rx	Ry	d _i	d _i ²
Analysing opportunities for innovations	4.10	3.40	5.5	4.5	1	1
Implementation of innovations	4.10	3.60	5.5	6.5	-1	1
Creation of new products	3.30	3.20	1	2	-1	1
Modification of products	4.30	4.00	8.5	8.5	0	0
Implementation of environmentally safe technologies	3.90	3.20	3.5	2	1.5	2.25
R&D	3.90	3.40	3.5	4.5	-1	1
Imitation of innovations	3.50	3.20	2	2	0	0
Innovative work systems	4.20	3.60	7	6.5	0.5	0.25
Improvement of R&D staff quality	4.30	4.00	8.5	8.5	0	0
Sum of squared differences between rank values of variables x _i and y _i						6.5
Spearman's rank correlation coefficient (ρ)						0.946
t statistics						7.708
Border level of significance α						0.001

Source: own study using Free Statistics Software [Wessa 2011].

The enquiry proves that the responding entrepreneurs consider technical and management quality standards as the main important determinants of quality competitiveness. It shows the weakness of innovative competitiveness in both domestic and foreign markets. The correlation coefficient proves a convergence of domestic and foreign markets recognized by entrepreneurs when considering rivalry by quality and innovation.

Importance of marketing competitive activities

The entrepreneurs pointed out in their evaluations at quality and marketing actions as the most important items in their companies' competition strategies. According to the theory of competition this attitude is characteristic of highly competitive markets [Porter 1980]. There were several marketing competitiveness determinants asked for in the questionnaire. For the first time in the investigation, the entrepreneurs scored an item higher in the foreign than in the domestic market. It was design and marking improvement and it was also the average highest assessment granted (Figure 5). The lowest scored were the geographic market concentration in the domestic market and the concentration on group buyer in the foreign market.

In the assessment of marketing competitiveness in the domestic and foreign markets, the Spearman's coefficient was 0.796 and indicated the existing strong dependence. This was verified at a high level of significance $\alpha = 0.01$. Therefore, the tested hypothesis of independence can be rejected (Table 6). This proves that the domestic and foreign markets are recognized as comparable when considering marketing actions.

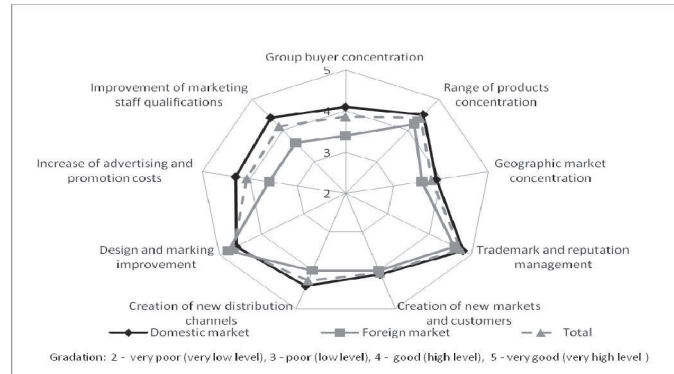


Fig.5. The evaluation of marketing activities

Source: own study.

Table 6. Interdependence of evaluations of marketing activities in domestic and foreign markets

Observations	Average national market assessments (x)	Average foreign market assessments (y)	Rx	Ry	d _i	d _i ²
Concentration on group buyer	4.10	3.40	2.5	1	1.5	2.25
Range of products concentration	4.50	4.20	7	7	0	0
Geographic market concentration	3.90	3.60	1	3	-2	4
Trademark and reputation management	4.80	4.60	9	8	1	1
Creation of new markets and customers	4.10	4.00	2.5	5.5	-3	9
Creation of new distribution channels	4.40	4.00	5.5	5.5	0	0
Design and marking improvement	4.60	4.80	8	9	-1	1
Increase of advertising and promotion costs	4.30	3.60	4	3	1	1
Improvement of marketing staff qualifications	4.40	3.60	5.5	3	2.5	6.25
Sum of squared differences between rank values of variables x _i and y _i						24.5
Spearman's rank correlation coefficient (ρ)						0.796
t statistics						3.477
Border level of significance α						0.01

Source: own study using Free Statistics Software [Wessa 2011].

The enquiry proves that the responding entrepreneurs consider design, marking, trademark and reputation as the main important determinants of marketing competitiveness. It shows the weakness of market specialization, concentration and creation of new markets and customers in both domestic and foreign markets. The correlation coefficient proves convergence of domestic and foreign markets recognized by entrepreneurs when considering marketing rivalry.

Conclusions

In the last decade, the indexes of retail prices of products processed from fruit and vegetable have had an upward trend. There has been a progressive loss of price advantage of Polish fruit and vegetable products. Price competition has no longer been the basic reference point in companies' competitive forms and strategies. The inquired entrepreneurs

recognized that the price conditions in foreign markets differ from those in the domestic one.

It is possible to indicate on the basis of analysis of entrepreneurs' opinions the specificity of competitiveness determinants in the fruit and vegetable processing industry. The basic form of competition and business strategy in the industry in question is the high quality of products and marketing. Polish producers have adapted to a decline in prices and decreasing price advantages by improving quality. But, at the same time, they realize that long-term competitiveness is indispensably linked to the creation and implementation of innovation. In this case the company's innovative potential and its resources is an important issue. These include core and distinctive capabilities and skills.

The applicative importance of the enquiry shows that Polish fruit and vegetable producers should pay more attention to the improvement of processing and product innovations. They should focus more on potential advantages, which are possibilities to enter different niches in international markets.

The study proves also the convergence of the foreign and domestic markets, recognized by Polish producers when considering cost, quality, innovation and marketing but not price competitive activities. Considering the measures, both domestic and foreign markets are equally demanding for processors and the competitive conditions after entering the common European market converged for fruit and vegetable processing industry. The price levels in both markets are recognized as more equal after entering the EU. As a result of that, producers recognize price competition in foreign markets as weaker one.

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