



**SOCIO-ECONOMIC ENVIRONMENT FOR
THE ESTABLISHMENT AND OPERATION OF
REGIONAL FOOD SUPPLY SYSTEMS**

PHD DISSERTATION THESES

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1. WORK HISTORY, OBJECTIVES

The development of Hungarian food economy has been hallmarked by the faith in the omnipotence of efficiency and productivity for a long time. This involved the development of significant, occasionally unparalleled levels of concentrated capacities even in Europe from the 1950s to the end of the 1980s.

Realignments in the world market, collapse of the bipolar world and the advance of developing countries (e.g. Turkey and China) are factors raising an increasingly loud alarm that the aspects of "economies of scale" cannot be enforced without limitations, because it is hopeless to compete with the concentrated mass production of said countries.

It is obvious that it is pointless to challenge such a market momentum... The correlations presented clearly show the increasing importance of small and medium enterprises with regional products and low environmental load, and the distribution organisations of such products.

The legal predecessor of the Department of Food Economy at the Corvinus University of Budapest hosted the research at the beginning of the 1990s focusing on the analysis of regional products in the market. A large number of publications and doctoral dissertations have been written on the topic. The relevant international literature flourishes, one of the key publications giving a comprehensive summary of the latest foreign research results is the Journal of Food Preference.

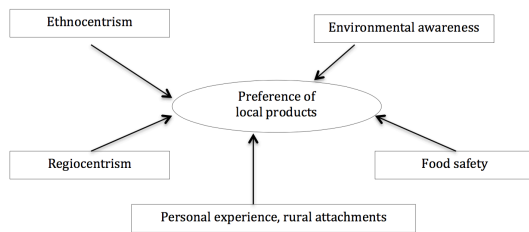
Through perusing and analysing the relevant literature, I seek answers in my dissertation to the following hypotheses:

H₁ : ethnocentrism is on the rise among Hungarian consumers;

- H₂ : in parallel with ethnocentrism, there is a growing interest in regional products;
- H₃: the various consumer groups may also be segmented on the basis of their ethnocentrism / preference of regional products;
- H₄ : there is a correlation between ethnocentrism / preference of regional products and certain properties of consumers' socio-demographic situation;
- H₅ : selling local products is gaining importance for small food stores, and it provides a key chance for survival by implementing focusing strategies;
- H₆: the logistic models can verify that regional food production has less additional costs in terms of systems operation.

I endeavour to combine diverse procedures to underpin my research. The key methods include the complex processing of the relevant technical literature (research in Hungary until now have mainly focused on the analysis of Hungarian publications, therefore, I also undertake to present and carry out the critical analysis of English and German sources) and an online survey series with 1,000 respondents.

Figure 1: The correlations to be parametrised during the research.



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2. RESEARCH OBJECTIVES

The study of the correlations of ethno- and regiocentrism and environmentally conscious consumer behaviour have a long history in both international and Hungarian research activities. Nevertheless, we have no complex and comprehensive concept that could serve as a compass or clue for professionals involved in preparing governmental decision-making in this field, as well as for the specialists of professional and advocacy organisations, and the corporate sector, presenting the opinion and attitude of the Hungarian public towards these matters. The past years have witnessed several factors that affected the theme under review one way or another. Some highlights:

- Hungary has been the member of the European Union for more than ten years. One may have reason to presume that the trends the population and economy of the EU represent have spread among a wide range of the population (Horváth et al. 2012);

- Hungary has had a flat economic performance for a long time: economic growth practically stopped in 2006, followed by a last upswing in 2007, then the economic crisis broke in 2008 with its lingering impacts still perceptible until now; in such an event economic isolation obviously emerges;

- the political force that gained majority in 2010 considers one of its key duties to renew Hungarian agriculture and food industry based on local markets and regional food supply systems.

This dissertation cannot set out to decide the adequacy of that goal, it is nevertheless obvious that the government's intention, together with its associated intensive law-making efforts and communication considerably influence the thinking and attitude of respondents.

In this dissertation, I aim to discuss the practical dimensions of ethnocentrism from three aspects:

- first, how system dynamics studies help to describe cooperation between producer and dealer,
- second, how the price transmission processes of food production and food trade systems between the individual players of the food supply chain can be described, and
- third, the products consumers seek, when it comes to local products.

3. STUDY METHODS

INNOVATIVE METHODS TO STUDY ECONOMIC TIME SERIES

The question of revenue distribution in the various food supply chains, the study focusing on the share different players get from the revenues generated in such supply chains has gained increasing weight both in Hungarian and international literature.

Professionals dealing with the subject were basically aided by regression analysis for a long time, however, the efficiency of regression analysis became questionable in the 80s, because parameter estimates are usually not consistent in nonstationary circumstances.

A time series has weak stationarity if its expected value, variance and autocovariances are subject to the moment in time. Strong stationarity also means that the joint probability distribution of consecutive observations do not change when shifted in time.

The value of a given time series on a specific date is considered a realisation of distribution at the given point in time. If the time series is stationary, observations made in various points in time can just as well be used to predict the distribution of the time series as used, for example, in biometric screenings. On the other hand, nonstationary cases call for other methods.

Granger (1986) proved that conventional statistical-econometric methods may be misleading in the case of nonstationary variables, therefore, if, for instance, applying the conventional methodology provides that a connection seems to exist between two time series, we cannot be certain whether the

data used as input are actually related or only the method produced this, consequently, false result. If the result proves genuine, an appropriately specified model can characterise both the long-term move of the variables in conjunction (cointegration) and their short-term movements, which are affected by any deviation from their long-term relation (error correction), and the model may also be used for forecasting or various simulation tests. Since the majority of economic time series are nonstationary, the methodology developed at the turn of the 1970s and 80s had a smashing impact.

The term “cointegration” may be translated as joint movement, or in essence joint integration. Two time series are cointegrated if the same number of differences must be generated from both to make their linear combination stationary.

If the variables are cointegrated (i.e. display a prolonged joint movement) the short-term dynamic development of the relations between them is influenced by the rate of their deviation from long-term equilibrium. Mathematically, this means that the short-term dynamic equation set up for the differences must be completed by a factor that expresses the correction of the long-term relationship. This leads us to outline the relationship between the vector autoregression (VAR) model and the vector error correction model (VECM) set up for increments.

In Hungary, Fertó and Bakucs (2014) published a comprehensive analysis of the price transmission studies. They establish that asymmetric price transmission prevails in the agro-food sector. They identify multiple causes thereto:

1. Search and price discovery costs
2. Menu costs (practically the costs occurring during re-pricing),

3. Perishable nature of the products
4. Oligopolistic character of the markets
5. Government subsidy of producer prices
6. Other factors (e.g. inaccuracies of the statistical system, dissimilar income-generating capacity of individual producers).

CHARACTERISTICS OF THE RESPONDENTS INVOLVED IN DIRECT QUERIES

I analysed a representative sample of nearly one thousand respondents (N=951) in my research. The primary analysis of the data indicates that the respondents give a statistical representation of Hungarian population.

As a first step in my research work, I used a simple descriptive statistical approach to find the indicators that may best represent respondents' thinking concerning the statements presented to them.

In summary, the descriptive statistical analyses lead to show that this method can reveal numerous trends in the respondent consumers' thinking. The most important of these are:

- a significant level of ethnocentrism
- regiocentrism has clearly decreased compared to previous researches
- environmental awareness has increased, while at the same time
- interest in food security and origin was relatively low in contrast to our expectations.

This stage of the research also underlined several contradictions. The most important of these are:

- although a considerable part of Hungarian consumers accept the majority of statements on national identity when discussing it, however, their motivation level drops remarkably when it comes to specific action,
- the relative strength of national identity is not accompanied by regional attachment; although respondents find Hungarian food important, but they admittedly often fail to check the country of origin on the packaging,
- although they emphasise the importance of buying Hungarian products, but in practice only a few of them opt for shopping in retail chains with Hungarian owners,
- although environmental awareness has appeared among customers, and the concern about the condition of the environment is still present in the public consciousness, it is still not associated with environmentally conscious practices in the vast majority of cases.

In the second part of my research, I aimed to find the wider correlations and trends consumers thinking and values may be arranged and grouped into. For that purpose, I carried out a categorical principal component analysis. It was reasonable to separate altogether three principal components in the study.

Applying variance analysis to the average values the respondents within the individual clusters shows that:

- Respondents in the first cluster are characterised by strong ethno- and regiocentrism. This attitude also manifests in specific behaviour. It is clearly

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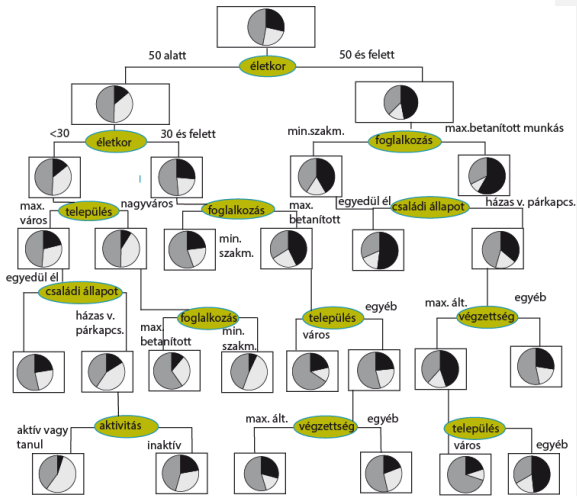
encouraging that these respondents have a positive consumer opinion about Hungarian food products. Commitment to environmental protection in this group shows a high value, however, no active practices are always associated to it. In summary, we can state that this consumer group with its strong ethno- and regiocentric attitude may be one of the key target for regional food supply chains. For the sake of simplicity, I will henceforth refer to the respondents in this group as ethno- and regiocentric respondents.

- Respondents in the second cluster are similar to those in the first group in many respects. A significant difference, however, is that they are less receptive to radical statements, and they are more tolerant and open to the world. Members of this cluster showed a significantly lower level of acceptance of statements on the outstanding quality of Hungarian products, but a higher level of acceptance of and interest in foreign products. This group displayed a lower level of ethno- and regiocentrism in their shopping habits, as expected.
- It is remarkable that respondents in the first and second cluster had approximately the same level of sensitivity to environmental protection matters as respondents in the first cluster. Members of this cluster showed a particularly high readiness to try new products, which may create a favourable opportunity for us to develop further marketing efforts. Actual consumer behaviour in terms of environmental protection was less intensive in this respondent group – save for selective waste collection – than in the first cluster.
- The third group agreed and disagreed with the individual statements to somewhat less extent. There were only two statements where agreement on average

exceeded 4. Consequently, this group will be referred to as uncertain consumers.

The next part of the dissertation seeks to identify the socio-demographic characteristics to describe respondents in the individual clusters. I made contingency tables featuring the composition of the various socio-demographic groups in view of the previously presented cluster system. I basically intended to find out the relation between various socio-demographic characteristics and cluster grouping.

In the following part of the research, I validated the clusters presented above by applying data mining procedures to analyse the role of individual factors in the course of clustering. This clearly shows that the key factor of clustering was age.



Next, I used a multivariate set of equations to reveal a structure among the various attitudes towards regional products. The coefficients of the equations were determined according to the algorithms of the Amos program. This clearly shows that multiple factors influences customers when they select regional products. These factors include national identity, provincialism, pursuit to promote local economy and environmental attitude. It follows from the above that all of the above must get appropriate emphasis in the communications to consumers, presenting the positive properties of domestic produce.

4. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS OF SYSTEM DYNAMICS STUDIES

I ran the model for a dealer and a producer. I used the model created in view of the parameters presented to determine the stock levels of the producer and the dealer.

The so-called “bullwhip” effect, as referred in technical literature is clearly visible here. The effect reflects the fact that the producer accumulates substantially larger stocks than the dealer, which wrecks the system and leads to imbalance. Obviously, any change in the parameters may result in even higher values, which are unrealistic in practice.

In reality, producers and dealers have tried for several decades to cooperate for providing the highest possible service levels to customers so that all stakeholders may benefit from the maximum achievable efficiency. This requires sharing diverse information, cooperation in logistics and the joint application of product placement opportunities. This partnership is coordinated by ECR (Efficient Consumer Response – www.ecr.hu).

CONCLUSIONS ON PRICE TRANSMISSION PROCESSES

I gathered the price - time series of seven product groups in an error correction model (VECM) for my dissertation. My aim was to answer whether the shelf price of finished products can be forecast on the basis of historical raw material price data.

The analysis of the findings lead to show that the “higher” the players are in the supply chain, the less error correction

works between them. This means that earlier prices the suppliers quote (or wish to quote) have much less influence on the price of the players at higher levels of the food supply chain than their own earlier prices, while error correction in the majority of cases affects the players at higher levels of the supply chain.

In the case of the products under review, there is perpetual disparity between the price levels in food trade and producers' prices in the food industry. The reason thereof is that food trade can pass a substantial part of its potential losses on the producers (oligopolistic position), while producers have particularly limited chances to raise prices, because traders can purchase substitute products in large amounts from the liberalised European market.

In other words, this context for my dissertation theme means that the integration that used to exist in the supply chain has disappeared, and for this reason production systems where agricultural producers attend both processing and sales are markedly significant. These solutions fitting the "short supply chain" concept channel as much of the profit in the supply chain to the producers as possible. This, of course, requires production concepts that favour this approach.

This situation poses continuous challenges to the government. The number of people employed in agriculture certainly justifies keeping this topic on the agenda. It is impossible to compete with influx of import goods on the long run, because there are no suitable administrative means in the EU market for that purpose. Producers' alliances or other forms of associations may provide a better direction instead where the members cooperate in brand building, distribution and in other key areas, thereby establishing their competitiveness and retaining the

unique nature of their products. Various markings (e.g. origin marking) can be used as additional tools, which will only be successfully if consumers recognise and seek them consciously.

CONCLUSIONS AND RECOMMENDATIONS ON CONSUMER INTERVIEWS

The greatest lesson in my consumer research is that although many respondents stated to search for local products, their behaviour when facing the store shelves and other sociological attitudes fail to fully confirm this.

Perhaps, the good news for the economic players is that I successfully identified some factors that after all lead to the shopping act:

- strengthening the national identity and national attitude
- environmental friendly message
- efforts to develop local economy

This process must also be boosted on the customer side to increase the leverage and role of local food products and the Hungarian food economy. No matter how good Hungarian regional producers are at production if customers do not see the products, or if they do, they select others. Obviously, further studies could and should be conducted on what makes local products competitive for customers on the shelves or outside the stores. As a matter of fact, if customers are not even aware that the products exist or are available, the support of producers will be of no avail. Major food brands have several decades of development and communication, and a vast amount of invested capital behind them. Small producers can hardly be in the same league, but – in sports terms – one should not play on

the ground that offers no hope to win. The stakeholders must find the alternative opportunities and partnerships that make the benefits and advantages of local products clear to consumers who, in turn, get to know and like them.

5. SUMMARY OF NEW SCIENTIFIC RESULTS

The study of the correlations of ethno- and regiocentrism and environmentally conscious consumer behaviour have a long history in both international and Hungarian research activities. Nevertheless, we have no complex and comprehensive concept that could serve as a compass or clue for professionals involved in preparing governmental decision-making in this field, as well as for the specialists of professional and advocacy organisations, and the corporate sector, and present the opinion and attitude of the Hungarian public towards these matters. The past years have witnessed several factors that affected the theme under review one way or another. Some highlights:

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- Hungary has had a flat economic performance for a long time: economic growth practically stopped in 2006, followed by a last upswing in 2007, then the economic crisis broke in 2008 with its lingering impacts still perceptible until now; in such an event economic isolation obviously emerges;
- the political force that gained majority in 2010 considers one of its key duties to renew Hungarian

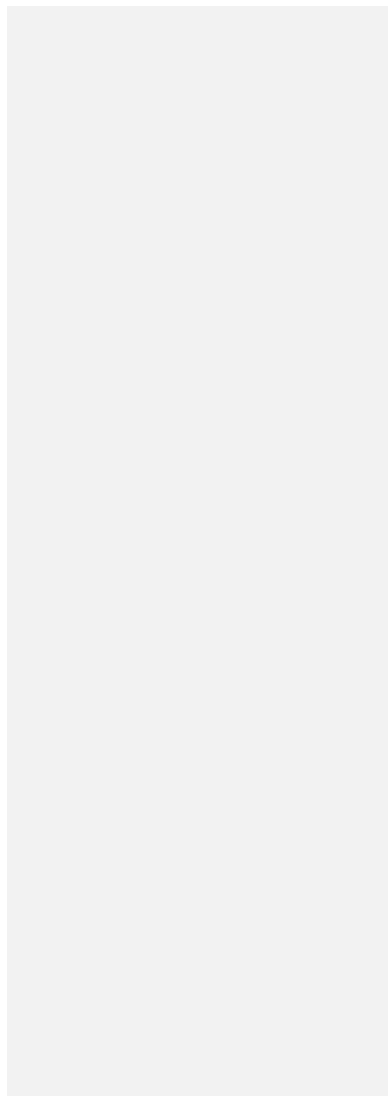
agriculture and food industry based on local markets and regional food supply systems.

In my dissertation, I took a complex approach using ecoscopic and demoscopic tools to examine the place and role of regional production in the European and Hungarian food economy.

Scientific results of my work:

1. I verified that there is no uniform consumer opinion on regional products in the developed states of the European Union, either. Southern European countries have a higher consumption culture of regional products, which they also pursue to maintain and underpin by protected designations of origin (PDO) and protected geographical indication (PGI) schemes. I proved that geographical indications on the EU level communicate value primarily to conservative, senior, rural consumers.
2. I used economic statistics and econometrics tests to verify the permanent and significant income disparity pervading the Hungarian food supply chain, and the lack of long-term integration and mutual interest between the various levels of the supply chain.
3. I verified the ubiquity of the bullwhip effect in today's Hungarian food supply chain using system dynamics modelling. This makes the significance of a short supply chain particularly relevant.
4. I conducted a complex survey to verify that the demand of Hungarian consumers for domestic and regional products is influenced by the collective effect of multiple factors. I incorporated these factors into a complex model that facilitates the

optimisation of arguments in consumer facing communications.



6. PUBLICATIONS

Journal articles Academic journal articles with IF (10 points/article)	Points
O Fehér, Sz Podruzsik, Zs Tóth Bogóné, P Boros (2014): Internet as an innovative tool for the development of food products ACTA ALIMENTARIA 43:(Suppl. 1) pp. 58-63. (2014)	10

Journal articles Academic journal articles WITHOUT IF (4 points/article)	Points
Fehér O.-Hajdu I-né- Boros P. (2010): A válság hatása a kereskedelmi márkás termékek forgalmazására. Táplálkozás-Marketing. Élelmiszer, táplálkozás és marketing. [The impact of the crisis on store brand product sales. Nutrition-Marketing. in: The Hungarian journal of food, nutrition and marketing.] Volume VII, Issue 2010/1., p. 11-15., ISSN 1786-3422	4
Fehér Orsolya - Boros Péter - Hajdu Istvánné (2010): Élelmiszerkereskedelmi tendenciák. Élelmiszer tudomány, technológia. [Trends in food trade. Food science, technology.] Volume LXV, Issue 2, p. 4-8, ISSN 2061-3954	4

<p>Fehér O- Hajdu I-né- Boros P. (2010): Egy hazai élelmiszerkereskedelmi lánc Private Label termékeinek élelmiszerbiztonsági rendszere. Agrár- és Vidékfejlesztési Szemle [Food safety system of the Private Label products of a Hungarian food retail chain. in: Agricultural and Rural Development Review], Issue 5., p. 528-533., ISSN 1788-5345</p>	4
<p>Fehér O- Hajdu I-né- Boros P. (2010): A gazdasági válság hatása a kereskedelmi márkás termékekre Magyarországon. Élelmiszer, táplálkozás és marketing. [The impact of the economic crisis on store brand products in Hungary. in: The Hungarian journal of food, nutrition and marketing.] Volume VII, Issue 1., p. 11-15., ISSN 1786-3422</p>	4
<p>Orsolya Fehér- Péter Boros- Judit Szigeti (2010): Store brand products on the market of health protective foods. Regional and Business Studies. Volume 2. No. 2010, p. 45-52. ISSN 1789-6924</p>	4
<p>Orsolya Fehér - Péter Boros - Istvánné Hajdu (2011): Possibilities and limits for innovation in food trade. Journal of International Scientific: Ecology and Safety. Volume 5/1. p. 345- 353., ISSN 1313-2555</p>	4
<p>Orsolya Fehér - Péter Boros (2011): Network analysis of nutrition marketing communication on food packaging. International Journal of Management Cases. Volume 13, Issue 3, p. 584-591., ISSN 1741-6264</p>	4

Boros P- Bogoné Zs- Fehér O. (2012): The economic and marketing importance of local food products in the business policy of a Hungarian food retail chain. Elsevier, Procedia-Social and Behavioral Sciences, ISSN 1877-0428 (in press, declaration of acceptance)	4
Orsolya Fehér, Péter Boros , Karolina Kajári, Szilárd Podruzsik (2012): Az élelmiszerek és a táplálék kiegészítő termékek reklámjaiban megmutatkozó tendenciák 1960-2010 között [Tendencies in food and nourishment complementaries advertizing from 1960 to 2010] Deturope: The Central European Journal of Tourism and Regional Development 4:(2) pp. 53-70. (2012)	4

CONFERENCE PAPERS AND ELECTRONIC PUBLICATIONS

Hungarian language (full paper) (3 points/publication)	Points
Gyula Kasza – Péter Boros – Dorottya Géher – Edit Hidi (2010): A hazai élelmiszerbiztonsági kockázatkommunikáció rendszere és működése primer kutatási eredmények tükrében. „Mezőgazdaság és vidék a klímaváltozás és a válság szorításában” [The system and operation of Hungarian food safety risk communication in view of primary research findings. “Agriculture and the countryside in the grip of climate change and crisis”],	3

IX. Wellmann Oszkár International Scientific Conference, Hódmezővásárhely, 22 April 2010	
Gyula Kasza – Péter Boros – Dorottya Géher – Edit Hidi (2010): A kereskedelemi és vendéglátó ipari vállalkozásokban előforduló élelmiszerbiztonsági krízis-szituációk kezelése és kommunikálása. [Management and communication of food safety crisis situations in retail and catering enterprises.] - Corporate Contingency Management Conference, Harsányi János College, Budapest, 10 March 2010	3
Orsolya Fehér - Péter Boros - Istvánné Hajdu (2011): Piaci trendek-élelmiszervásárlási szokások. [Market trends - food buying habits.] Erdei Ferenc VI. Scientific Conference. 25-26 August 2011, Kecskemét, Volume III, p. 294-297, ISBN 978-615-5192-01-2	3
Péter Boros – Orsolya Fehér PhD – Karolina Kajári PhD (2012): Élelmiszerfogyasztói attitűdök vizsgálata a funkcionális élelmiszerek és az étrend-kiegészítő termékek kontextusában. [Effects of Health-claims and Product Composition of Food Buying Attitudes] Deturope, Central European Journal of Regional Development and Tourism. Vol.4. Issue 2., p. 64-76., ISSN 1821-2506	3

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International conferences (full paper) (5 points/paper)	Points
O. Fehér - P. Boros – Á. Bóday: Media analysis on health impacts of food in Hungary. 7 th International Conference of Phd Students, University of Miskolc 2010. CD p. 177-184., ISBN 978-963-661-935-0	5

International conferences (abstract) (2 points/paper)	Points
O. Fehér- P. Boros (2010): Coop's strategy on the market of healthcare foods. VI. International Nutrimarketing Conference. Abstract book, p. 29-30, 11 November 2010	2
Orsolya Fehér - Péter Boros (2011): Network analysis of nutrition marketing communication on food packaging. 8 th Circle International Conference, Dubrovnik, 27 th -29 th April 2011, Book of Abstracts, p. 146, ISBN 978-953-6025-40-4	2
O. Fehér - P. Boros (2012): Analysis of food consuming attitudes in the context of functional food products and food supplements. 9 th Circle International Conference for Marketing, Management, Finance, Consumer Behaviour, Tourism and Retailing Research, Book of Abstracts, p.21, ISBN 978-0-9562471-4-8	2

Orsolya Fehér, Péter Boros : Are Hungarian food consumers ethnocentric? In: Foodscapes: Access to food, Excess to food: Abstract Booklet, Conference venue and date: Seggau Castle, Austria, 22-25 September 2013, p. 20	2
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Book - part

Hungarian language book, note, book part (per new sheets) 6/sheet (max. 30/book)	Points
P. Boros - O. Fehér (2012): Food retail chains: Hungary in the EU. Cooperation for a Sustainable Economy, Chapter 13, p. 253-262 (ed: Sz. Podruzsik-S.Kerekes) ISBN 978-963-503-497-0	6