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Strategic Preferences of Farm Supply and Grain Elevator Businesses: Empirical Evidence from Germany

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ABSTRACT

Against the background of profound structural changes of the agricultural sector during the last decades, the current paper examines an often neglected area in agricultural economics, namely the local farm supply and grain elevator (FSG) business. By using a discrete choice experiment, we examine strategic preferences of agricultural traders in Germany. For this purpose, we employ a Hierarchical Bayes Model and simulate shares of preferences for different strategic options. Since our study also reveals strategic subgroups, the paper at hand helps on the one hand to better understand the ongoing structural changes within this industry and on the other hand to forecast the manner of competition between the farmers' market intermediaries in the future.

Keywords: farm supply and grain elevator business; reference points; strategic decision making; discrete choice experiment.

1 Introduction

During the last years, agricultural economists have intensely explored the effects of many different strategic risks (e.g. the deregulation of agricultural policy or the increased price volatility) on agricultural value chains (e.g. Vanclay, 2003; von Davier et al., 2010; Luhmann et al., 2016; Sidhoum and Serra, 2016). A widely neglected issue to date, however, is the question of how the farm supply and grain elevator (FSG) industry which is located at an important interface, namely between the farmers and their upstream and downstream supply chain partners, reacts to new strategic challenges. Since these local traders serve as a "link between agriculture and the other parts of the economy" (Spinne, 2013, p. 71, translated by the authors), they traditionally have been strongly affected by structural changes of the farming sector (Franz et al., 1960). As suppliers for fertilizers, mixed feed, seeds and pesticides and buyers of commodities (Wiese, 1968), FSG businesses face the proceeding structural consolidation process in agriculture today (Fuhrmann, 2012) as well as an ongoing trend towards disintermediation of parts of their traditionally offered services like storing or drying grain (Hollstein, 2000). Furthermore, new information technologies boost market transparency which in turn affects local traders (Schulze, 2012) who had long benefitted from the farmers' bounded information gathering behavior (Kühl, 1982). Along with the fundamental challenges on the demand side, the FSG businesses' income situation has continuously deteriorated. In many countries decreasing margins and a high intensity of competition (Strecker et al., 2010) have led to a concentration process during the last decades (Kühl, 1985); in Germany, for instance, a 65 % decrease of the number of FSG firms could be observed between 1975 and 2010 (Spinne, 2013).

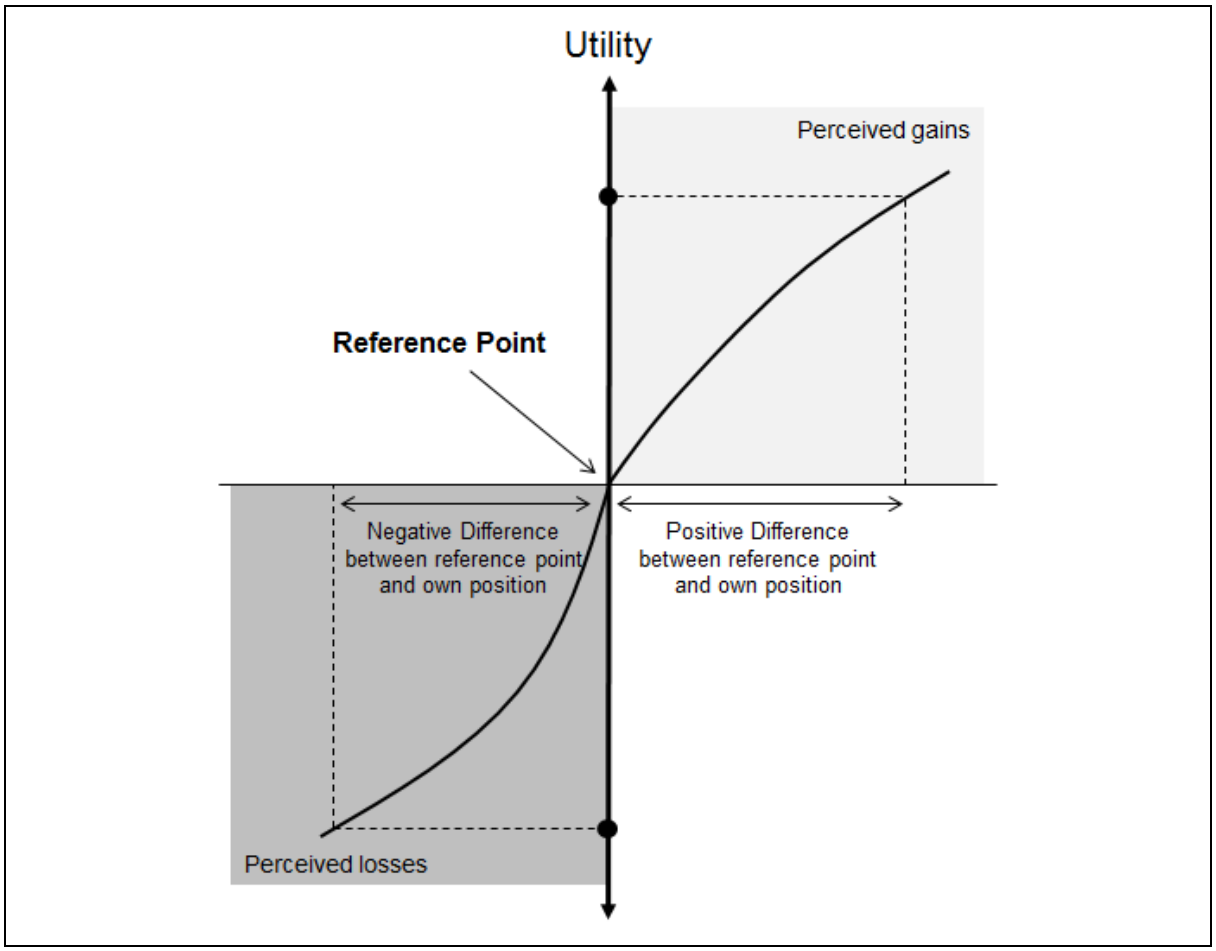
The multiple changes of the business environment imply the necessity of strategic shifts within the whole

FSG industry. While some decades ago, FSG firms were still characterized by an extraordinary close relationship with their customers (Abel, 1960) and employed almost identical strategies (Harling and Funk, 1987), the personal relationship between farmers and traders has lost its traditional high intensity (Schulze, 2012). Subsequently, a tight price competition has emerged (Strecker et al., 2010) and the remaining traders have been forced to realize economies of scale and to lower unit costs by extending their trading areas in order to increase sales volumes (Spinne, 2013). This process, however, has not simply taken place as a smooth development but rather resulted in a regional concentration of trading firms (Hollstein, 2000) and structural differences in countries like Germany where FSG businesses traditionally have played an important role in the agricultural value chain (Riessen, 2008). Against this background, the question arises how FSG firms strategize today and to which extent differences have emerged within the population that traditionally had been quite homogeneous. For examining these issues, we build on Mintzberg's view of strategies being an organization's "ingrained way of perceiving the world" (Mintzberg, 1987, p. 16). More precisely, the study at hand rests upon a comparatively new stream of research in strategic management which centers the decision makers' cognitive properties (e.g. perception and attention) when strategic issues are explored (e.g. Hodgkinson and Healey, 2011; Helfat and Peteraf, 2015). We therefore consider the executives' strategic perceptions by using a discrete choice experiment. On the basis of our data we derive strategic subgroups and conduct a strategic choice simulation. This will help academics as well as practitioners to better understand the further development of the FSG business and the rules of competition within that industry.

The remainder of the paper is organized as follows. In the first step, the article provides the theoretical background about individual decision making behavior and the great influence of the executives' reference points which affect their strategic decision making significantly. Then the methodology is motivated and explained. In the results section we reveal strategic preferences on the basis of a choice simulation for both the whole population and different subgroups of the traders examined. The paper closes with some conclusions.

2 Theoretical Background

Since the early days of Adam Smith, thinking about individual decision making has been a fundamental part of economic research. In strategic management, however, there can be observed a widespread orientation towards analyzing the organization level; to a lesser extent towards the underlying individual decision processes so far (Molina-Azorín, 2014). For exploring strategic changes within the FSG industry, we therefore rely on the hints of Helfat and Peteraf (2015, p. 845) who state that the firm managers' cognitive properties „function as mediators of the relationship between changes in organizational context and strategic change, which in turn can affect firm performance." This approach follows the aforementioned perspectivistic view on the nature of strategies (compare Mintzberg, 1987) and is moreover consistent with previous studies (e.g. Hambrick and Mason, 1984; Adner and Helfat, 2003) which state that an organization's strategic alignment is strongly linked to the properties of its executives facing the decisions. An important theoretical milestone which we consult for operationalizing these properties was established by Kahneman and Tversky (1979) who found that decision situations are not perceived as equal, but rather as dependent on an individual's (strategic) reference point (see figure 1). They called their framework "Prospect Theory" since it postulates that an individual's utility function is s-shaped around this reference point and that a decision situation is always reflected by individual prospects which are benchmarked against it (Fiegenbaum, 1997). In the last years, the arguments of the "Prospect Theory" were scientifically substantiated by many empirical studies; with regard to strategic decisions for instance by Hodgkinson et al. (1999). Furthermore, its theoretical framework was extended and transformed to the management field. Instead of explaining organizational changes only with performance gaps (like the well-known and widespread "Behavioral Theory of The Firm"; Cyert and March, 1963), the "Strategic Reference Point Theory" (Fiegenbaum et al., 1996; Fiegenbaum, 1997; Shoham and Fiegenbaum, 2002) states that a firm's strategic conduct is rather dependent on a set of *different* benchmarks. More precisely, the theory argues that executives use more than one "strategic reference point" simultaneously for assessing their firms' strategic position (Shoham and Fiegenbaum, 2002) which in turn determines their strategic goals and – at the end of the day – their firms' future strategic alignment (Fiegenbaum et al., 1996). As this approach links economic with psychological perspectives within one theoretical framework (Fiegenbaum et al., 1996), it promises a great potential for the applied sciences, not least since it provides an operationalizable concept for empirically examining strategic management issues.



Source: Own Illustration; Basis: Kahneman and Tversky, 1979.

Figure 1. Behavioral Foundations of the "Prospect Theory"

In a nutshell, the "Strategic Reference Point Theory" postulates that strategists use different reference points when they decide. In a recent study Gollisch et al. (2016) analyzed the motivations and flashpoints of former strategic decisions in FSG businesses and found out that the traders' decision making behavior is basically determined by the following four reference points today (another two reference points, namely "work-life-balance" and "ensuring survival", play only a minor role and, thus, are skipped from further analysis): future gross margin, customer retention, capacity utilization, and ensuring equity. Yet, the question arises how these reference points actually affect strategic decision making in FSG firms. For analyzing this issue, we employ a discrete choice experiment which is especially convenient for exploring prospective decision contexts like strategy development issues (Louviere et al., 2010). This methodology has been applied in various research areas, like business administration (e.g. Klein, 2011) agricultural economics (e.g. Breustedt et al., 2007) or landscape ecology (e.g. Rid, 2008). In the context of strategic decisions, however, only few studies employed a discrete choice method so far, e.g. for modeling store location decisions of retail discounts (Zhu and Singh, 2009) or managers' preferences in wildfire risk management (Wibbenmeyer et al., 2013). To the best of the authors' knowledge, there are no applications of the choice method to any issue concerning the FSG industry.

3 Methodology

3.1 Empirical Study Design

Discrete choice models are a convenient tool for the valuation of non-market goods (Alpizar et al., 2001). The main challenge, however, is the determination of design parameters (Ben-Akiva and Lerman, 1987), i.e. the attributes and their levels. It is generally accepted that attributes must be relevant for the respondents which means that they should have a major impact on their utility (Backhaus et al., 2003). Furthermore, attribute levels should be plausible and reflect a realistic range of possible variations (Street and Burgess, 2007). Our concept is therefore based on the aforementioned qualitative case study results

of Gollisch et al. (2016) and additional interviews with traders. Regarding the reference point "future gross margin" which represents the „[orientation] on augmenting income or profitability" (Gollisch et al., 2016, p. 12), we selected the merchandising margin because it is „a true measure of merchandising performance (...) [and] represents the gross margin on grain merchandising as well as the price of merchandising services" (Thompson and Dziura, 1987, p. 113). Based on two traders' statements[*] we decided for attribute levels of 3.00 €, 3.25 € and 3.50 € per 100 kilos merchandised grain or animal feed. The reference point "customer retention" expresses in contrast the traders' desire for a close relationship to their customers (Gollisch et al., 2016). As above mentioned, however, the traditional close tie between FSG firms and "their" farmers has been continuously deteriorating during the last decades on the side of the farmers (Schulze, 2012). The customers' purchase behavior is therefore operationalized on three levels: mainly price aware, both price aware and traditional, mainly traditional. For the reference point "capacity utilization" which reflects the traders' aspirations towards their own performance (Gollisch et al., 2016) we define the average farm size within a trading area (mainly small, mixed and mainly large) as the corresponding attribute. Finally, the fourth choice attribute was developed on the basis of the reference point "ensuring equity". Since FSG businesses are characterized by a combination of a comparatively high capital intensity and decreasing margins (Gollisch and Theuvsen, 2015), one empirical study found that an overall strategic goal within this industry is to reduce capital commitment (Schulze-Düllo, 1995). For this reason, traders often seek to co-operate with farmers and competitors (Schulze, 2012), as in doing so synergetic potentials can be realized (Strecker et al., 2010). We therefore name the attribute "possibilities for co-operation with farmers or competitors (e.g. storing grain, transport)" and codify the two levels "given" and "not given".

To achieve now a trade-off situation between different strategic choice attributes, the choice set, i.e. the number and type of alternatives presented at once, has to be arranged. Besides four generic choice alternatives we decided for employing a no-choice alternative which makes predictions of real choices afterwards more realistic (Enneking et al., 2007). The empirical study was carried out in summer 2016 as an online survey. Supported by two German agricultural trade associations, we received 167 completely answered and analyzable questionnaires which is a high number against the background of approximately still 600 active FSG firms in Germany today (Spinne, 2013). The respondents were introduced with the following statement at the outset of our experiment: "*Please imagine the following hypothetical circumstances: As a young agricultural trader before career entry you are able to independently choose your trading area. You are offered four different areas. Which one would you choose? Please check the alternative which you would prefer most likely.*" To avoid the cognitive "overkill" (Pfarr and Ulrich, 2011), each respondent was faced with 10 choice sets according to the following example:

	Area 1	**Area 2**	**Area 3**	**Area 4**	
Average merchandising margin (before subtracting expenses) which can be earned by trade with grain and animal feed	3.00 €/100 kg	3.25 €/100 kg	3.50 €/100 kg	3.50 €/100 kg	
Customers' Size	Mainly large farmers	Both large and small farmers	Mainly small farmers	Both large and small farmers	No alternative is more attractive
Customers' Purchase Behavior	Both price aware shoppers and traditional customers who want to be personally addressed	Mainly traditional customers who want to be personally addressed	Mainly price aware shoppers	Mainly price aware shoppers	
Possibilities for co-operation with farmers or competitors (e.g. storing grain, transport)	Not given	Not given	Given	Not given	
Your choice:	O	O	O	O	O

Source: Own Illustration.

Figure 2. Exemplary choice set (translated by authors)

We used a fractional factorial design which was generated by using the "balanced overlap" method, provided by the Sawtooth Software package. Unlike alternative design strategies, this method shows statistical advantages since both main effects and interaction effects can be estimated nearly efficiently (Sawtooth Software, 2013).

[*] One trader called an average merchandising margin of 2.80 € per 100 kilos, the other one gave us a range between 1.50 € and 3.50 € per 100 kilos. We decided for values at the head of the range since we wanted to avoid a disproportionately high bias resulting from too small margins.

Compared to completely efficient designs, the D-efficiency (Kuhfeld et al., 1994) of our choice design amounts to an almost optimal level of 95%.

3.2 Econometric Model

Discrete choice experiments are frequently analyzed with a "simple" logit model which assumes iid extreme value type 1 distributed error terms. The probability P that an individual n chooses alternative i over alternative j can therefore be expressed as

$$P_{ni} = \frac{e^{\beta X_{ni}}}{\sum_j e^{\beta X_{nj}}}, \quad (1)$$

where X denotes a vector of explanatory variables with a vector of weighting factors β. The latter can now be estimated, e.g. by using the maximum-likelihood-method (Train, 2009). Since its estimates, however, represent only average utility scores above all respondents, the model above cannot be used for revealing any behavioral differences within the population (Klein, 2011). For this reason, we conduct a Hierarchical Bayes (HB) estimation which enables us to model a continuous preference structure (Paetz, 2013). In doing so, individual utility parameters for each respondent are estimated iteratively (for this and what follows, see Allenby et al., 1995; Hillig, 2006) by considering two model levels. On the one hand, the higher level contains prior information about the parameter values θ of the whole sample (the "prior" distribution $P(\theta)$). It is assumed that individual utility parameters β_n are distributed normal with the expectation value α and a variance/covariance matrix V:

$$\beta_n \sim Normal(\alpha, V). \quad (2)$$

On the other hand, the lower level contains the above mentioned (multinomial) logit model for all choices of each respondent:

$$P_{ni}(Y_n|\beta_n) = \prod_{c=1}^{C} \left(\frac{e^{\beta X_{ni}}}{\sum_j e^{\beta X_{nj}}} \right), \quad (3)$$

where $P(Y|\beta)$ represents the distribution of the empirical data (conditional on the estimated utility parameters β). According to Bayes' theorem, the two levels can now be linked in a common "posteriori" distribution $P(\theta|Y)$:

$$P(\alpha, V, \beta_n \; \forall n \; |Y) \propto \prod_{n=1}^{N} P_n(Y_n|\beta_n) \emptyset(\beta_n|\alpha, V) P(\alpha, V). \quad (4)$$

For estimating individual parameter values β_n, the HB model uses the Gibbs sampler (Geman and Geman, 1984; Gelfand and Smith, 1990) which alternately computes each parameter of the common distribution by holding the other values constant (Allenby et al., 1995). After a number of replications (we used 10,000) the parameter values converge to draws from $P(\alpha, V, \beta_n \; \forall n \; |Y)$ and further replications (again we used 10,000) can be used for computing the individual parameter estimates (Train, 2009).

As we also strive for detecting strategic subgroups within the population, we additionally employ a finite mixture model which presumes that the distribution of a population can be seen as a mixture of segment-specific probability distributions (Clement and Boßow-Thies, 2007). From a statistical point of view, finite mixture models estimate segment sizes and their utility parameters simultaneously (DeSarbo et al., 1995), rather than classifying respondents a priori in a binary manner (Horenburger, 2007). In doing so, these models „assume that the unconditional choice probabilities can be decomposed into a weighted average of underlying (or 'latent') choice probabilities" (Kamakura and Russell, 1989, p. 380),

$$P_{ni} = \sum_{s=1}^{S} \omega_s P_{si}, \quad (5)$$

where ω_s is the relative segment size and P_{si} is the choice probability of alternative i in segment s. After

maximizing the likelihood-function (see for details Hillig, 2006), each respondent can be assigned individual segment membership probabilities. As our model results show a high discrimination between the segments (the average maximum segment membership probability is 93.4%), we follow DeSarbo et al. (1995, pp. 144–145) and „[form] discrete partitions of the sample […] by assigning each respondent to the segment with the highest posterior probability", which enables us to compare the groups later.

3.3 Choice Simulation

Although estimated values from discrete choice models are highly valuable for exploring preference structures, the results give us only little „managerially useful" (Orme, 2010, p. 89) information. Hence, we employ a choice simulator which uses utility parameters for predicting choices between hypothetical concepts (Orme, 2010). Before running simulations, these concepts (in our case generic market strategies) have therefore to be specified by compiling different attribute levels (see figure 3). Based on individual utility parameters which we receive from the HB estimation, each respondent's preference values for the predefined strategies are simulated by using the "randomized first choice method". This algorithm samples each respondent's most preferred decision many times and includes the errors of the parameter values when shares of preferences are computed. This in turn is done by taking the antilog of the summed concept utilities and normalizing shares to sum 100% (Sawtooth Software, 2006). As „a good (…) simulator is like having all (…) respondents gathered in one room for the sole purpose of voting on (…) concepts" (Orme, 2010, p. 89), the great benefit of simulation models is that hypothetical decisions can be modeled without explicitly asking the decision makers. Thus, we are able to transform individual utility values to a "strategy demand curve" which enables us to characterize the traders in terms of their preferences towards different strategies. On the basis of a literature review and the support of two traders, we define the following three strategic alternatives:

Attributes	Price Leadership	Service Differentiation	Hybrid Strategy
Merchandising Margin	3.00 €/100 kg	3.50 €/100 kg	3.25 €/100 kg
Customers' Size	Mainly large farms	Both large and small farms	Both large and small farms
Customers' Purchase Behavior	Mainly price aware shoppers	Mainly traditional customers who want to be personally addressed	Both price aware shoppers and traditional customers who want to be personally addressed
Co-operation	Given/Non-given	Given/Non-given	Given/Non-given

Source: Own Results.

Figure 3. Simulation concepts

Against the background of the structural changes in agriculture, the strategic opportunities for FSG businesses are very limited today. According to Strecker et al. (2010), the remaining possibilities are on the one hand tight cost reductions which enable the trader to lower his or her market prices and on the other hand a differentiation of his or her service portfolio. Regarding these two strategic approaches, the empirical study of Schulze (2012) confirmed that the farmers' satisfaction with a local trader is notably high, when the latter offers either a good service or good prices. Hence, we specify a price leadership strategy, a service differentiation strategy and a reference strategy which we call "hybrid strategy". As FSG businesses who follow the price leadership strategy are mainly oriented towards price aware shoppers, they will, on the one hand, earn smaller margins but, on the other hand, they will strive for addressing "key accounts" (Voss and Spiller, 2008, p. 20) to realize economies of scale. In contrast, those firms who follow a differentiation by service strategy especially focus relationship-oriented customers (of all farm sizes) who are willing to pay higher margins for a good service (Strecker et al., 2010): „I must achieve that customers – even if my products are more expensive sometimes [than those of my competitors] – give me the opportunity to make a deal. If I always have to be the cheapest, my business will not succeed [without accentuation]" (from an interview with a trader, cited from Gollisch et al., 2016, p. 15). A mix, at last, is reflected by the hybrid strategy. This alternative allows for the fact that instead of following a consequent strategic plan, many firms in agribusiness (especially small and medium sized ones) are still situationally managed (Weber, 2002). For this reason, the customers' size and purchase behavior attributes are mixed specified and a value of 3.25 € (which also represents an average income structure) is chosen for the margin attribute.

As co-operations are an overall trend in FSG business today – rather than specific for one particular strategy (Strecker et al., 2010; Spinne, 2013) – we consider for each aforementioned strategy one scenario with and one without given possibilities for co-operations, respectively.

4 Results and Discussion

Our study aimed for revealing strategic decision preferences within the FSG industry in Germany. Concerning the target group, we met the objective of catching mainly executives (90 respondents are managing partners, 39 are members of the management and 27 are authorized officers or division managers). The respondents' age structure is balanced (18 are less than 30 years old and 12 are more than 60 years old) and the sample represents the small and medium-sized business structure in Germany (approximately 65% of the respondents work for companies with sales less than 25 million € p.a.) (Suhren, 1999). With the aforementioned regional concentration of trading companies in mind, our sample represents the comparatively high number of FSG firms in Bavaria (23.4% of the respondents) and Lower Saxony (16.8% of the respondents) (Hollstein, 2000).

As aforementioned, we apply a finite mixture model for detecting "strategic subgroups" within the whole group of respondents. This method, however, challenges the analyst to specify the number of latent segments first. For solving this issue, we follow the recommendation of DeSarbo et al. (1995) and Sawtooth Software (2004) and use the CAIC ("Consistent Akaike Information Criterion") which „is decreased by larger log likelihoods, and is increased by larger sample sizes and larger numbers of parameters being estimated" (Sawtooth Software, 2004, p. 10). With a model log-likelihood of -1,942, the CAIC is minimal for three segments with a roughly equal number of respondents ($n_1 = 68$; $n_2 = 51$; $n_3 = 48$). Even though a contingency analysis revealed no significant dependence from the nominal scaled variables "respondent's job position", "respondent's highest education", "firm location" and "firm size", the simulation results (see figure 4) obviously differ between the groups. Our findings are discussed below.

Strategy	**Average shares of preference**				**p Kruskal Wallis-H**
	Segment 1	Segment 2	Segment 3	**Total**	
Hybrid with Co-operation	34.3%	27.1%	26.4%	**29.8%**	.107
Hybrid without Co-operation	15.2%	0.1%	10.3%	**9.2%**	.000
Price leadership with Co-operation	5.6%	0.5%	1.5%	**2.8%**	.000
Price leadership without Co-operation	1.9%	0.0%	1.7%	**1.2%**	.000
Service with Co-operation	20.4%	69.9%	47.7%	**43.4%**	.000
Service without Co-operation	22.6%	2.3%	12.5%	**13.5%**	.000

Source: Own results.

Figure 4. Simulated shares of preference

Our simulation reveals significant differences between the segments regarding all competitive strategies[†], except the hybrid strategy when possibilities for co-operations are available. Concerning the overall high values for this strategy in all latent segments, this finding denotes the traders' high preference against a particular strategic focusing, but only in the event of given co-operations. The presence or absence of co-operation possibilities must therefore generally be seen as an important determinant for strategic decisions in FSG businesses. Another distinctive feature is the respondents' very low preference for the price leadership strategy combined with a comparatively high preference for the service strategy. Though Strecker et al. (2010) characterize the strategic landscape in FSG firms as a permanent "battle" between oligopolists who would mainly be oriented towards lowering their product prices, there is, however, a low share of respondents who actually strive for this way of "cut throat" competition. Rather, it seems that the traders either prefer a hybrid strategy or follow a differentiation by service strategy. The latter conforms with the assumption of Gollisch and Theuvsen (2015) who state that a pronounced service orientation is still an important characteristic of the FSG industry today. On the other hand, however, we found a significant difference between traders whose company's succession is arranged (62% of the respondents answered "yes") and those who do not still have a successor. In particular, the former prefer to a significant higher extent both the price leadership strategy with and without given possibilities for co-

[†] At first, each criterion variable was tested with the Kolmogorov-Smirnov test. As we detected no normal distributed variables, we applied the Kruskal Wallis-H test which is a nonparametric alternative for the ANOVA; see for details Janssen and Laatz (2013).

operations (Kruskal Wallis-H p-values: .029/.020). As the willingness for a price competition is therefore more pronounced in those firms which are strategically prepared for the future, we hypothesize that there will be still an increase of the tight price competition between the remaining traders in the next years.

Concerning the differences between the latent segments, the respondents in segment 1 tend to prefer on the one hand strategies without any given possibilities for co-operations in general and on the other hand – to a comparatively high extent – the price leadership strategy in particular. In contrast, traders who are clustered in segment 2 mainly prefer the service strategy with co-operations and clearly neglect strategic alternatives when there are no possibilities for co-operations available. The third segment seems to be a mixed group with no specific features, compared to the preference structure of the total group. For a better characterization of the segments, we consult an elasticity measure, namely the "income elasticity of strategy demand"[‡], as well as two sensitivity measures[§]. The results reveal to some extent substantial differences between the groups. While, for instance, the income elasticities (see appendix 1, first table) in segment 2 are similar to the average of the total group, the elasticity values in segment 1 are very low. In contrast, the elasticities in segment 3 denote an income sensitiveness which is for all strategic alternatives nearly twice as high as the average. Regarding the sensitivity to a growing farm structure (see appendix 1, second table), segment 1 exhibits a distinctive feature since it is the single group in which strategic preferences for the "service" and the "hybrid" alternative decrease when the farm size increases. The remaining two segments possess, on the other hand, increasing preferences for these alternatives with the highest values in segment 3. In segment 2, however, there are nearly no preference reactions to farm size changes when possibilities for co-operations are not available. Looking now at the sensitivity to the farmers' purchasing behavior (see appendix 1, third table), we assert that there is an overall negative reaction of the preferences towards the "service" and the "hybrid" alternatives when farmers become more price aware; the most negative reaction is identified in segment 2 when possibilities for co-operations are given. Concerning the "price leadership" alternative, however, there is a (low) positive reaction in segment 1 if possibilities for co-operations are given as well as in segment 3 if not.

All things considered, we name the traders in segment 1 the "conservatives", the traders in segment 2 the "service providers" and the traders in segment 3 the "scale-driven traders". Since the "conservatives" are averse to increasing farm sizes, we reason that these firms still focus on intense business relationships with primarily smaller customers (instead of larger ones who have, for instance, to some extent the possibility for realizing third-party-deals with producers already; Strecker et al., 2010). The fact that they tend to prefer strategic alternatives without co-operations can be explained with a widespread fear of dependences from other market players (Osterholzer, 1981). As these traders possess increasing preferences for the price leadership strategy when the farmers become more price aware as well as decreasing preferences for the service and the hybrid alternatives, when farm sizes increase, we hypothesize that this will be the group with a rise of the price competition in the future.

In contrast, the "service providers" target large farms by offering a high service level. According to Schulze (2012), the pronounced preference for co-operations within this group can be explained with the fact that co-operations are per se one part of many FSG firms' customer service strategies today. By using for instance grain storage co-operations with farmers or competitors, FSG businesses offer their customers a local place of delivery even in those areas where there is no own subsidiary anymore. Since "service providers" exhibit the most negative reactions on the farmers' increasing price sensitivity, we hypothesize that this will be the trader group with a strong adaption of their product and/or service portfolio in the future. One possibility may be the enlargement of the value chain (Strecker et al., 2010), namely a diversification towards financial or information broking.

Finally, the "scale-driven traders" can be characterized as the strategic group with a pronounced pursuit of growing. Against the background that FSG firms are traditionally characterized by a high share of fixed costs and a comparatively high capital commitment (Gollisch and Theuvsen, 2015), firm growth must generally be seen as an important objective which enables traders to realize economies of scale. As the "scale-driven traders", however, exhibit both the highest positive preference reactions on increasing farm sizes and the highest income elasticities of strategy demand, we hypothesize that particularly these ones are cost-conscious and favor growth for reaching a "critical size [translated by the authors]" (Spinne, 2013, p. 111). This enables them to take up a better market position in the future.

[‡] This measure is computed by dividing the percentage change of the relative preference toward a specific strategy over the percentage change of the margin while all other parameters are held constant; compare for details Orme (2010).

[§] The sensitivity towards farm size changes (farmers' purchase behavior changes) is computed by subtracting the relative preference for a strategy when the attribute level "mainly small farms" ("mainly traditional customers who want to be personally addressed") is used from the relative preference for a strategy when the attribute level "mainly large farms" ("mainly price aware shoppers") is used. All other parameters are held constant; compare for details Orme (2010).

5 Conclusions

Inspired by the high popularity of the strategic risk research in agricultural economics, the current paper intends to explore the FSG industry which is a neglected area in pertinent literature today. Even though FSG firms play an important role within the agricultural value chain, there has been done little research on impacts of and strategic reactions to the multiple new challenges so far. Furthermore, the underlying decision processes and the cognitive properties of strategic decision makers generally have been disregarded issues in strategic management for a long time which is why there is a continuing trend towards the microfoundations of strategic changes today (Molina-Azorín, 2014). Against this background, we examined the decision makers' strategic preferences empirically with a discrete choice experiment. The results allow us on the one hand to reveal the preferences for different strategic alternatives and on the other hand to identify differences between strategic subgroups which we characterized on the basis of some elasticity and sensitivity measures. All in all, we are now not only able to forecast the strategic preferences of the FSG industry as a whole, but also to discriminate groups of traders with regard to their strategic preferences. This enables on the one hand traders to arrange a "strategic landscape" of their trading area which they can use for assessing and reflecting their own strategic position. On the other hand, our results are helpful for animal feed and seed producers, fertilizer companies, grain mills and farmers who can use this information for a more selective choice and promotion of their business partners in the FSG industry. With the increasing importance of intercorporate value creation networks in mind (Wille, 2006), upstream and downstream actors can, for instance, target especially those trader groups who are strategically open for co-operations. All in all, our results may therefore not only be a help for FSG businesses who have to continually supervise the strategic development of their competitive environment, but also for the other stages of the value chain who are linked by the traders with the agriculture.

The aforementioned findings offer not least some implications for future research. Besides a more precise examination of the strategic groups which we have identified here (e.g. with the aid of further experiments or qualitative case studies), an interesting issue could be the "exit factors" and the question whether there is a link to the strategies preferred by the executives surveyed. Against the background that we detected a significant higher preference towards the price leadership strategy in companies where the succession is arranged, an examination of former traders could promise valuable further insights. In this regard, another important research direction could be to look at the impact of the traders' changing strategic behavior on the upstream and downstream stages of the agricultural value chain. In particular, the question arises, how the food processing industry on the one hand and the animal feed industry on the other hand react to the strategic shift within the FSG business. As the structural change in agriculture will almost certainly proceed, the traders' bundling and "gate keeper" function will continue to change in the future as well. The paper at hand offers a base for further studies on these topics.

References

Abel, W. (1960). Der Landwarenhandel in der deutschen Volkswirtschaft. In Franz, G., Abel, W., Cascorbi, G. (Eds.), *Der deutsche Landwarenhandel. Hannover, Strothe*: 111–221.

Adner, R., Helfat, C. (2003). Corporate Effects and Dynamic Managerial Capabilities. *Strategic Management Journal*, **24** (10): 1011–1025.

Allenby, G., Arora, N., Ginter, J. (1995). Incorporating Prior Knowledge into the Analysis of Conjoint Studies. *Journal of Marketing Research*, **32** (2): 152–162.

Alpizar, F., Carlsson, F., Martinsson, P. (2001). Using Choice Experiments for Non-Market Valuation. Working Papers in Economics No. 52, Göteborg University, Department of Economics.

Backhaus, K., Erichson, B., Plinke, W., and Weiber, R. (2003). Multivariate Analysemethoden: Eine anwendungsorientierte Einführung. Berlin et al., Springer.

Ben-Akiva, M., Lerman, S. (1987). Discrete Choice Analysis: Theory and application to travel demand. Cambridge, MIT Press.

Breustedt, G., Müller-Scheeßel, J., and Meyer-Schatz, H.M. (2007). Unter welchen Umständen würden deutsche Landwirte gentechnisch veränderten Raps anbauen? Ein Discrete Choice Experiment. Freising/Weihenstephan, 26 September 2007.

Clement, M., Boßow-Thies, S. (2007). Fuzzy Clustering mit Hilfe von Mixture Models. In Albers, S., Klapper, D., Konradt, U., Walter, A., Wolf, J. (Eds.), Methodik der empirischen Forschung. Wiesbaden, Betriebswirtschaftlicher Verlag Dr. Th. Gabler: 167–182.

Cyert, R., March, J. (1963). A behavioral theory of the firm. Englewood Cliffs, Prentice-Hall.

DeSarbo, W., Ramaswamy, V., Cohen, S. (1995). Market Segmentation with Choice-Based Conjoint Analysis. *Marketing Letters*, **6** (2): 137–147.

Enneking, U., Neumann, C., and Henneberg, S. (2007). How important intrinsic and extrinsic product attributes affect purchase decision. *Food Quality and Preference*, **18** (1): 133–138.

Fiegenbaum, A. (1997). Competitive Strategy and Attitude Toward Risk Taking: Integration and Modeling. Academy of Management Proceedings, Best Paper Proceedings: 12–15.

Fiegenbaum, A., Hart, S., and Schendel, D. (1996). Strategic Reference Point Theory. Strategic Management Journal, 17 (3), 219–235.

Franz, G., Abel, W., and Cascorbi, G. (Eds.) (1960). Der deutsche Landwarenhandel. Hannover, Strothe.

Fuhrmann, R. (2012). Risikomanagement im Handel mit Agrarrohstoffen aus Bankensicht. In Frentrup, M., Theuvsen, L., Emmann, C.H. (Eds.), Risikomanagement in Agrarhandel und Lebensmittelindustrie. Clenze, Agrimedia: 117–125.

Gelfand, A., Smith, A. (1990). Sampling-Based Approaches to Calculating Marginal Densities. *Journal of the American Statistical Association*, **85** (410): 398–409.

Geman, S., Geman, D. (1984). Stochastic Relaxation, Gibbs Distributions, and the Bayesian Restoration of Images. *IEEE Transactions on Pattern Analysis on Machine Intelligence, PAMI*-**6** (6): 721–741.

Gollisch, S., Hedderich, B., and Theuvsen, L. (2016). Reference points and risky decision-making in agricultural trade firms: A case study in Germany. Discussion Paper 1609. University of Goettingen.

Gollisch, S., Theuvsen, L. (2015). Risikomanagement im Landhandel: Charakteristika, Herausforderungen, Implikationen. *Berichte über Landwirtschaft*, Band **93** (1): 1–16.

Hambrick, D., Mason, P. (1984). Upper Echelons: The Organization as a Reflection of Its Top Managers. *Academy of Management Review*, **9** (2): 193–206.

Harling, K.F., Funk, T.F. (1987). Competitive Strategy for Farm Supply and Grain Elevator Business. American *Journal of Agricultural Economics*, **69** (5): 1047–1055.

Helfat, C., Peteraf, M. (2015). Managerial Cognitive Capabilities and the Microfoundations of Dynamic Capabilities. *Strategic Management Journal,* **36** (6): 831–850.

Hillig, T. (2006). Verfahrensvarianten der Conjoint-Analyse zur Prognose von Kaufentscheidungen. Wiesbaden, DUV Deutscher Universitäts-Verlag.

Hodgkinson, G., Bown, N., Maule, J., Glaister, K., and Pearman, A. (1999). Breaking the Frame: An Analysis of Strategic Cognition and Decision Making under Uncertainty. *Strategic Management Journal*, **20** (10): 977–985.

Hodgkinson, G., Healey, M. (2011). Psychological Foundations of Dynamic Capabilities: Reflexion and Reflection in Strategic Management. *Strategic Management Journal*, **32** (13): 1500–1516.

Hollstein, A. (2000). Wertschöpfungsketten der deutschen Getreidewirtschaft: Eine Analyse der Mengen- und Werteströme. Diss. Gießen.

Horenburger, M. (2007). Simultane Schätzung von Choice-Modellen und Segmentierung. In Albers, S., Klapper, D., Konradt, U., Walter, A., and Wolf, J. (Eds.), Methodik der empirischen Forschung. Wiesbaden, Betriebswirtschaftlicher Verlag Dr. Th. Gabler: 343–358.

Janssen, J., Laatz, W. (2013). Statistische Datenanalyse mit SPSS: Eine anwendungsorientierte Einführung in das Basissystem und das Modul Exakte Tests. Berlin, et al., Springer.

Kahneman, D., Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, **47** (2): 263–292.

Kamakura, W., Russell, G. (1989). A Probabilistic Choice Model for Market Segmentation and Elasticity Structure. *Journal of Marketing Research,* **26** (4): 379–390.

Klein, A. (2011). Kaufbereitschaft für regional-fair erzeugte Lebensmittel - Eine Analyse am Beispiel Konsummilch. Diss. TU München.

Kuhfeld, W., Tobias, R., Garratt, M. (1994). Efficient Experimental Design with Marketing Research Applications. *Journal of Marketing Research*, **31** (4): 545–557.

Kühl, R. (1982). Marktstrukturelle Entwicklungen im Landwarenhandel Schleswig-Holsteins im Zusammenwirken mit dem derzeitigen Marktverhalten landwirtschaftlicher Betriebe. Working Paper 1982/1 of the "Institut für Landwirtschaftliche Betriebs- und Arbeitslehre". University of Kiel.

Kühl, R. (1985). Struktur und Entwicklung des Landwarenhandels in der Bundesrepublik Deutschland. In Kühl, R., Hanf, C.-H. (Eds.), Der Landwarenhandel in der Bundesrepublik Deutschland. Struktur, Entwicklung, Analyse. Kiel, Vauk: 7–95.

Louviere, J., Hensher, D., Swait, J. (2010). Stated choice methods: Analysis and applications. New York, Cambridge Univ. Press.

Luhmann, H., Schaper, C., and Theuvsen, L. (2016). Future-Oriented Dairy Farmers' Willingness to Participate in a Sustainability Standard: Evidence from an Empirical Study in Germany. *International Journal on Foodsystem Dynamics*, **7** (3): 243–257.

Mintzberg, H. (1987). The Strategy Concept I: Five Ps for Strategy. *California Management Review*, **30** (1): 11–24.

Molina-Azorín, J. (2014). Microfoundations of strategic management: Toward micro-macro research in the resource-based theory. *BRQ Business Research Quarterly*, **17** (2): 102–114.

Orme, B. (2010). Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research. Madison, Research Publishers LLC.

Osterholzer, M. (1981). Strukturelle Entwicklungen und Veränderungsmöglichkeiten durch zwischenbetriebliche Kooperation im privaten Landhandel Bayerns. Diss. München.

Paetz, F. (2013). Finite Mixture Multinomiales Probitmodell: Konzeption und Umsetzung. Diss. University of Clausthal.

Pfarr, C., Ulrich, V. (2011). Discrete-Choice-Experimente zur Ermittlung der Präferenzen für Umverteilung. Economic Discussion Papers No. 03-11. University of Bayreuth.

Rid, W. (2008). Analyse von Präferenzstrukturen privater Bauleute im Hinblick auf nachhaltige Siedlungskonzepte unter Verwendung eines discrete choice experiment. Diss. University of Munich.

Riessen, C. (2008). Strukturwandelsprozesse in der Handelskette für Getreide: Chancen und Risiken für die landwirtschaftliche Getreideerzeugung. Saarbrücken, VDM.

Sawtooth Software (2004). The CBC Latent Class Technical Paper. Sequim.

Sawtooth Software (2006). The Sawtooth Software Market Simulator: A Supplement to the CBC v2.6 Manual. Sequim.

Sawtooth Software (2013). The CBC System for Choice-Based Conjoint Analysis: Technical Paper Series. Orem.

Schulze, B. (2012). Herausforderungen des Landhandels unter veränderten Marktbedingungen: Theoretische Überlegungen und empirische Evidenz: Vortrag anlässlich der 52. Jahrestagung der GEWISOLA "Herausforderungen des globalen Wandels für Agrarentwicklung und Welternährung" vom 26.-28. September 2012. University of Hohenheim, 2012.

Schulze-Düllo, M. (1995). Ergebnisse einer empirischen Untersuchung zur Logistik im Landhandel. Working Paper 95/1 of the "Institut für Landwirtschaftliche Betriebslehre, Unternehmensführung, Organisation und Management in Agrar- und Ernährungswirtschaft". University of Bonn.

Shoham, A., Fiegenbaum, A. (2002). Competitive determinants of organizational risk-taking attitude: the role of strategic reference points. *Management Decision*, **40** (2): 127–141.

Sidhoum, A., Serra, T. (2016). Volatility Spillovers in the Spanish Food Marketing Chain: The Case of Tomato. *Agribusiness: An International Journal*, **32** (1): 45–63.

Spinne, P. (2013). Veränderte Rahmenbedingungen im landwirtschaftlichen Warenhandel: Anforderungsgerechtes Kompetenzmanagement für Führungskräfte. Hamburg, Kovac.

Strecker, O., Strecker, O.A., Elles, A., Weschke, H.-D., and Kliebisch, C. (2010). Marketing für Lebensmittel und Agrarprodukte. Frankfurt am Main, DLG-Verlag.

Street, D.J., Burgess, L. (2007). The construction of optimal stated choice experiments: Theory and methods. Hoboken, NJ, Wiley-Interscience.

Suhren, V. (1999). Führungsinformation für den Mittelstand: Ein Executive Information System für den Landhandel. Diss. Bonn.

Thompson, S., Dziura, S. (1987). Factors Associated with Merchandising Margins at Illinois Grain Elevators, 1982-83: A Performance Analysis. *North Central Journal of Agricultural Economics,* **9** (1): 113–121.

Train, K. (2009). Discrete choice methods with simulation. Cambridge, New York, Cambridge University Press.

Vanclay, F. (2003). The Impacts of Deregulation and Agricultural Restructuring for Rural Australia. Australian *Journal of Social Issues*, **38** (1): 81–94.

von Davier, Z., Heyder, M., and Theuvsen, L. (2010). Media Analysis on Volatile Markets' Dynamics and Adaptive Behavior for the Agri-Food System. *International Journal on Foodsystem Dynamics*, **1** (3): 212–223.

Voss, J., Spiller, A. (2008). Die Wahl des richtigen Vertriebswegs in den Vorleistungsindustrien der Landwirtschaft - konzeptionelle Überlegungen und empirische Ergebnisse. Discussion Paper No. 0804. Göttingen.

Weber, M. (2002). Strategisches Management in kleinen und mittleren Unternehmungen im schweizerischen Agribusiness. Diss. Zürich.

Wibbenmeyer, M., Hand, M., Calkin, D., Venn, T., and Thompson, M. (2013). Risk Preferences in Strategic Wildfire Decision Making: A Choice Experiment with U.S. Wildfire Managers. *Risk Analysis*, **33** (6): 1021–1037.

Wiese, O. (1968). Genossenschaftlicher und privater Landwarenhandel in der Bundesrepublik Deutschland: Darstellung und Erklärung der Markt-und Wettbewerbsstruktur. Karlsruhe, C. F. Müller.

Wille, O. (2006). Interaktionsmanagement im landwirtschaftlichen Wertschöpfungsnetzwerk: Dargestellt am Beispiel der Zuckerrüben-Saatgutdistribution. Göttingen, Cuvillier.

Zhu, T., Singh, V. (2009). Spatial competition with endogenous location choices: An application to discount retailing. *Quantitative Marketing and Economics*, **7** (1): 1–35.

Appendix 1. Income elasticities and sensitivities of simulated strategies

	Income elasticity of strategy demand (2.5/97.5 percentile)			
Strategy	**Segment 1**	**Segment 2**	**Segment 3**	**Total**
Hybrid with Co-operation	1.34 (0.03/2.65)	7.01 (5.54/8.48)	8.59 (7.39/9.80)	5.16 (4.25/6.07)
Hybrid without Co-operation	3.72 (2.14/5.29)	7.51 (5.52/9.51)	10.33 (8.90/11.76)	6.78 (5.73/7.82)
Price leadership with Co-operation	-0.03 (-1.40/1.34)	1.76 (-0.07/3.60)	3.99 (2.35/5.63)	1.67 (0.74/2.61)
Price leadership without Co-operation	2.82 (1.21/4.42)	0.25 (-0.26/0.77)	5.01 (3.20/6.82)	2.66 (1.79/3.54)
Service with Co-operation	0.60 (-1.05/2.25)	5.49 (4.22/6.76)	8.45 (7.19/9.71)	4.35 (3.37/5.33)
Service without Co-operation	3.76 (2.11/5.41)	4.09 (1.41/6.77)	9.35 (7.40/11.29)	5.47 (4.24/6.70)

	Sensitivity to farm size changes from mainly small to mainly large (2.5/97.5 percentile)			
Strategy	**Segment 1**	**Segment 2**	**Segment 3**	**Total**
Hybrid with Co-operation	-6.59 (-11.56/-2.13)	6.24 (1.75/10.73)	13.57 (9.92/17.21)	3.12 (0.34/5.90)
Hybrid without Co-operation	-2.56 (-5.59/0.47)	0.10 (-0.02/0.23)	4.90 (2.26/7.53)	0.40 (-1.10/1.89)
Price leadership with Co-operation	2.29 (0.97/5.55)	0.48 (-0.08/1.04)	1.45 (0.22/2.68)	1.50 (0.13/2.86)
Price leadership without Co-operation	0.48 (-0.20/1.17)	-	1.68 (-1.09/4.46)	0.68 (-0.15/1.51)
Service with Co-operation	-6.58 (-10.72/-2.45)	14.12 (5.78/22.47)	30.30 (22.33/38.27)	10.34 (5.93/14.75)
Service without Co-operation	-6.86 (-10.99/-2.73)	0.58 (-0.22/1.38)	9.19 (4.46/13.92)	0.02 (-2.34/2.39)

	Sensitivity to farmers' purchase behavior changes from traditional to price aware (2.5/97.5 percentile)			
Strategy	**Segment 1**	**Segment 2**	**Segment 3**	**Total**
Hybrid with Co-operation	-17.80 (-22.67/-12.93)	-26.23 (-31.43/-21.03)	-12.59 (-16.90/-8.28)	-18.88 (-21.76/-15.99)
Hybrid without Co-operation	-5.63 (-8.42/-2.85)	-0.47 (-0.79/-0.14)	-2.76 (-5.40/-0.13)	-3.23 (-4.61/-1.85)
Price leadership with Co-operation	0.46 (-2.42/3.33)	-5.37 (-8.46/-2.27)	-1.74 (-3.75/0.27)	-1.95 (-3.58/-0.33)
Price leadership without Co-operation	-0.75 (-1.63/0.14)	-0.32 (-0.72/0.08)	1.11 (-1.25/3.47)	-0.08 (-0.85/0.69)
Service with Co-operation	-15.20 (-19.20/-10.44)	-66.70 (-73.53/-59.89)	-42.25 (-51.06/-33.43)	-38.70 (-43.69/-33.72)
Service without Co-operation	-17.17 (-22.29/-12.05)	-2.33 (-3.79/-0.87)	-10.99 (-16.16/-5.82)	-10.86 (-13.58/-8.14)

Source: Own results.