Department of Agricultural Economics and Rural Development
Georg-August-Universität Göttingen

September
2013

Discussion Papers

Analysing farmers' use of price hedging instruments: an experimental approach

Discussion Paper No. 1306

Friederieke Anastassiadis, Jan-Henning Feil, Oliver Musshoff, Philipp Schilling[1]

Department of Agricultural Economics and Rural Development
Georg-August-Universität Göttingen
D 37073 Göttingen
ISSN 1865-2697

[1] All authors are members of the Agricultural Science Faculty of the Georg-August-Universität Göttingen
Contact address: Jan-Henning Feil, Department of Agricultural Economics and Rural Development, Platz der Göttinger Sieben 5, D-37073 Göttingen, email: Jan-Henning.Feil@agr.uni-goettingen.de

Abstract

This paper analyses the influencing factors of farmers' use of price hedging instruments (PHIs) based upon a discrete choice experiment with German grain farmers. A mixed logit model is used to determine whether farmers' choices of PHIs against cash sales are influenced by their price expectation, their risk attitude and their available storage capacities. The results show that farmers with a price expectation below the actual price level have a higher preference for using PHIs against cash sales in general and that the individual degree of risk aversion can have a significant impact on farmers' choices of a specific PHI. A generally lower preference of farmers with available storage capacities for using PHIs as assumed in many theoretical contributions in the literature, however, cannot be confirmed.

1. Introduction

European farmers are increasingly exposed to substantial price risks that were formerly absorbed by politically induced price supports (e.g. European Commission, 2005). Currently, farmers need to manage these risks on their own, which emphasises the need for PHIs. In order to design and offer need-based PHIs to farmers, it is important to analyse what factors influence their hedging decisions (e.g. Garcia and Leuthold, 2004).

During the past two and a half decades, there have been numerous studies analysing farmers' use of PHIs in North America. Shapiro and Brorsen (1988), as well as Musser et al. (1996) used tobit models to examine the factors that determine whether or not grain farmers from Indiana decided to use pre-harvest marketing techniques. These factors included personal and farm characteristics such as age, education, risk attitude, debt-to-asset ratio and acreage. Goodwin and Schroeder (1994) surveyed Kansas farmers to investigate similar factors influencing the adoption of futures and/or forward contracts by using probit and tobit models. Sartwelle et al. (2000) investigated Kansas, Texas and Iowa grain producers' use of cash sales, forward contracts, futures and options and analysed the influencing characteristics by means of tobit and multinominal logit models. Further research conducted by Katchova and Miranda (2004) examined how farm characteristics affect marketing contract decisions by separating these decisions into the adoption decision itself, quantity, frequency and contract type. This was done by using the USDA's Agricultural Resource Management Study data on grain farmers and a two-step econometric model. Finally, Franken et al. (2012) extended the

previous studies by analysing the proportion in which different contract types are used by grain producers, instead of looking at just one contract type in isolation.

The described literature reveals two research gaps: First, the aforementioned studies focus on the marketing decisions of North American farmers only. These operate under fundamentally different conditions then, for example, European farmers with regard to farm structures, climate, agricultural market structures and agricultural policy. For Europe, there are only a few studies analysing the use of PHIs. However, these mainly look into optimising the use of available tools (e.g. Mahul, 2003; Loy and Pieniadz, 2009), but do not investigate the influencing factors on farmers' hedging decisions. Second, existing contributions to the use of PHIs are mainly empirical studies based on past marketing decisions of farmers. Therefore, it is challenging to clearly distinguish the influencing factors of these marketing decisions. For instance, it is difficult to say in retrospect whether hedging a wheat price by means of a futures contract prior to the harvest was due more to the farmers' price expectation, risk attitude or completely different, unknown reasons. Experiments can provide a solution for this issue as they collect data under controlled conditions. In particular, discrete choice experiments (DCEs) allow for the determination of preferences for decision alternatives without explicitly asking for them and by including hypothetical action alternatives (e.g. Train, 2009: 152). By relating the participants' choice behavior to the features of the action alternatives and individual characteristics of the participants, complex structures of the decision-making process can be revealed (e.g. Louviere, 2001). In agriculture, DCEs have typically been used to analyse farmers' technology choices (e.g. Breustedt et al., 2008), farmers' preferences for agri-environmental schemes (e.g. Espinosa-Goded et al., 2010) or consumer choices for agricultural products (e.g. Lusk et al., 2003). To the authors' knowledge, DCEs with respect to farmers' use of risk management instruments have not yet been conducted.

Against the background of these research gaps, the objective of the paper is to analyse the influencing factors of farmers' use of PHIs against conventional cash sales in Europe in an experimental setting. The considered PHIs are forward, futures and options contracts, as well as managed marketing. While the first three tools are commonly known and used (e.g. Goodwin and Schroeder, 1994; Sartwelle et al., 2000), managed marketing is a relatively new approach for European farmers. It can be understood as a complete delivery of marketing decisions to a third party. The considered determinants on farmers' hedging decisions are, amongst others, the price expectation compared to the actual price, the risk attitude and storage capacities as a proxy for the risk bearing ability and the already available risk management tools of a farm. The data for the analysis was gained through a DCE that was carried out

by 136 German grain farmers in the year 2012. The grain producers had to chose their preferred marketing alternative out of the available PHI under differing price constellations. The analysis of the DCE was conducted by using a mixed logit model within a maximum likelihood framework.

This study provides farmers as well as agricultural trading companies, consultants and politicians with important information regarding an improved understanding of marketing practices and motives. For example, the results indicate that in general, farmers with a price expectation below the actual price level have a higher preference for using PHIs against cash sales. Furthermore, the individual degree of risk aversion can have a significant impact on farmers' choice of a specific PHI. Based on this, the study might also lay the foundation for designing more efficient need-based PHIs in Europe in the future.

The rest of the paper is structured as follows: In section 2, the hypotheses that shall be tested by means of the DCE are derived from the literature. The design of the questionnaire, which includes the DCE, is described in the subsequent section. After the descriptive data is presented in section 4, the theoretical background of the analysis methods is explained in section 5. Finally, the results of the DCE are presented and discussed in section 6. The paper ends with some conclusive remarks (section 7).

2. Hypothesis generation

The hypotheses derived in this section directly refer to the main factors which potentially influence farmers' preferences for using PHIs. These factors are identified by looking at the goals farmers potentially pursue by using PHIs. In general, farmers' goals are recognised as being multi-dimensional (e.g. Patrick et al., 1983; Sumpsi et al., 1996). For farmers' marketing decisions, there are two goals which have been most comprehensively discussed in the literature, namely price enhancement and risk reduction, including their trade off (e.g. Peck, 1975; Musser et al., 1996).

An important factor that determines the extent to which a farmer achieves price enhancements by using a PHI is his individual price expectation. If, for example, the farmer expects prices to fall at the time of the harvest, he/she should have a higher preference to hedge the actual price level by using a PHI. This is, amongst others, supported by the analysis of Musser et al. (1996). Furthermore, Eales et al. (1990) find that the prices for futures and options grain contracts reflect the price expectations of Illinois farmers and grain merchandisers. Consequently,

farmers with price expectations below the actual price level are expected to be more willing to use PHI. From this information, we can hypothesize the following:

H1 (price expectation): An individual price expectation below the actual price level leads to a significantly higher preference for using PHIs.

With regard to the objective of risk reduction, the influence of a farmers' degree of risk aversion on the use of PHIs to reduce the income risk is emphasised in the literature. Patrick et al. (1980) come to the result that farmers generally see sequential marketing as a risk-reducing strategy. Holt and Brandt (1985) name numerous contributions, which state that it can be beneficial for risk averse farmers to hedge, even though hedging leads to lower prices on average. The studies of Shapiro and Brorsen (1988) and Sartwelle et al. (2000) confirm that a higher level of risk aversion generally leads to a stronger preference for hedging. This leads to the following hypothesis:

H2 (risk aversion): Farmers with a higher degree of risk aversion generally have a significantly higher preference for using PHIs.

Furthermore, the risk-bearing ability of a farm is crucial for the decision, whether or not a PHI is used to further reduce risks. Whilst other studies on PHIs use proxies like liquidity or the capital structure for the risk-bearing ability (e.g. Musser et al., 1996; Franken et al., 2012), in this analysis the available storage capacities of farms are investigated. In contrast to financial measures such as liquidity, the storage capacities of a farm usually do not change within a year and therefore, it is more easy to request these from farmers within a questionnaire. Furthermore, asking farmers for their available storage capacities might be seen as less indiscrete than key financial figures. In the literature, available storage capacities are seen as a key characteristic and method of a farm to bear and manage price risks in primary agricultural production as, for example, stated by Barry and Fraser (1976). Saha and Stroud (1994) show by means of their econometrical model that farmers tend to store a higher proportion of their harvest, the more risk averse they are. As a consequence, the storage capacities of a farm can be expected to have a negative influence on the usage of PHIs:

H3 (storage capacities): A smaller storage capacity leads to a significantly higher preference for using PHIs.

In addition to the above factors and following other contributions, sociodemographic factors, for example age and eduction, were queried in the DCE and subsequently evaluated (e.g. Musser et al., 1996; Paulson et al., 2010). Although hypothesis testings were not performed

for these additional factors, the respective results are also presented and briefly discussed in the results section (cf. section 6).

3. Experimental design

The questionnaire is divided into three sections. The first section queries data with regard to farm characteristics. In the second section the respondents have to conduct the DCE. Finally, the farmers are asked in the third section to answer questions about their risk attitude and their socioeconomic background.

In the decision-making situation of the DCE, farmers have are asked to market 75% of their milling wheat in November by chosing their preferred marketing alternative. Prior to making a decision, they are advised to make a decision that is as realistic as possible for their farm. The marketing alternatives comprise four PHIs ('Forward contract', 'Managed marketing', 'Futures contract' and 'Futures-options contract') and the alternative of not hedging at all ('Cash contract'). The contract types are chosen based on contract types that are for instance also analysed by Sartwelle et al. (2000), as well as information gained through comprehensive discussions with trading experts. To the experts' knowledge, 'Forward contracts' are the primary PHI utilised in Germany and are offered by most grain collectors. Using these kinds of contracts, farmers fix the price for a delivery date in the future with fixed quantity and quality requirements. 'Managed marketing', understood as a complete delivery of marketing decisions to a third party (e.g. a collector), is a wide spread marketing alternative in France. However, due to similarities in both markets, it could also be a useful alternative for German farmers. It allows farmers to deliver their harvest in August and receive the given harvest price right away. A professional trader tries to achieve a higher price throughout the year to be able to pay the farmer an additional supplement in June of the next year. By selling a 'Futures contract', farmers hedge a future price for the underlying product at the commodity exchange. If the farmer does not want to physically fulfill the traded quantity, he/she is obligated to buy the contract back, before it expires. Through the redemption of the contract, he/she makes a hedging profit or loss, which can be added to the received spot market price for the product. If the farmer buys a put-option on a futures contract instead, he/she has the right, but not the obligation, to sell a futures contract in a given period and therefore eliminates the risk of making a hedging loss at the commodity exchange. Alternatively to a PHI, a 'Cash contract', where delivery and price fixation occurs on the same day, is offered.

In Figure 1, an example of a respective choice set is presented. The contract types were explained to the respondents prior to the decision-making situation itself, including the respective requirements and possible outcomes without judgment.

Figure 1. Example of a choice-set [a)]

Imagine that the actual market price for milling wheat is **140 €/mt**.
The following marketing alternatives are offered for a delivery by November 2012.
Which alternative would you choose?

Marketing-alternatives	Forward contract (A)	Managed marketing (B)	Futures contract (C)	Futures-options contract (D)	No price setting (E)
Benefits	Fixed price **182** €/mt	Harvest price + possible **supplement** in June of next year	**195** €/mt Futures price	**190** €/mt Futures minimum price	-
Basis	-	-	approx. -10 €/mt	approx. -10 €/mt	-
Requirements	Delivery requirements (quantity and quality)	Trust in the marketing know-how of the trading partner	Know-how in Futures trading and market observation Liquidity (about 30 €/mt) Min. 2 trading partners	Know-how in Futures trading and market observation Min. 2 trading partners	Constant market observation
Risk	No additional profit at price increase	Dependency on marketing accomplishment of trading partner	No additional profit at price increase Basis risk (+/-10 €/mt) Liquidity risk at rising prices	Basis risk (+/-10 €/mt)	Price risk
Premium and costs	-	5 €/mt fix costs + 10 % of additional profit	0.5 €/mt	10.5 €/mt	-
Which of these marketing alternatives would you choose?	○ (A)	○ (B)	○ (C)	○ (D)	○ (E)

Source: Author's own illustration.
[a)] Translated from German to English.

'Benefits' describe the revenues a farmer fixes by using the given PHI. 'Basis' represents the average, but not a fixed difference between the futures price at the commodity exchange and the spot market price. 'Requirements' and 'Risk' briefly explain the main obstacles linked to the different marketing alternatives. Finally, the related 'Premium and costs' are shown. As the real names of the marketing alternatives are used, the experiment is labelled. The prices for the different marketing alternatives were strictly correlated with the spot market price (e.g. 'forward contract': +2 €/mt). Consequently, the price cannot vary independently between the marketing alternatives. The price differences were chosen in a way that there is no dominant PHI with regard to the calculated on-farm price (e.g. average on farm price for 'Futures contracts' is always +2.5 €/mt higher than for 'Forward contracts' due to additional liquidity and

basis risk). All in all, there exists no alternative-specific or generic attributes that can be independently varied from each other within the DCE. Merely in the initial situation, which is determined by the spot market as observed in February 2012, the price for wheat changes from one choice-set to another. Due to the complex set-up of the choice situation, varying attributes could have added too much information to the decision process resulting in potential inconsistencies in the results (cf. DeShazo and Fermo, 2002). Therefore and in contrast to standard DCEs, the DCE in this study do not allow for varying attributes over alternatives. To reduce the influence of fatigue due to a large number of choice-sets, the number of different price levels is restricted to six (120, 140, 160, 180, 200, and 220 €/mt). The resulting six choice-sets, as exemplarily shown in Figure 1, are presented in a random order.

After conducting the DCE, the farmers are asked for information about their usual marketing behavior and past usage of different contract types. In addition, the farmer's price expectation for August 2012 is queried in order to gain further insight into their marketing behavior. Following Dohmen et al. (2011), the farmers risk attitude is measured by the 'general risk question' using an ordinal scale from 0 to 10, whereby 0 represents 'not willing to take risk at all' and 10 'very willing to take risk'. Hence, farmers evaluate their risk attitude subjectively. Finally, the respondents are also asked to answer questions about their socioeconomic background, such as age, and farm characteristics, such as farm size.

4. Descriptive statistics

The online survey was completed by 136 farmers from all over Germany in February 2012. Farmers were recruited through online newsletters of two agricultural consulting companies. In addition, students from the University of Göttingen were also asked to make farmers aware of the experiment. Table 1 reports personal information and farm characteristics of the participants.

The farmers are 95% male, with an average age of 41 and a standard deviation of 14. 70% of them are farm-managers and 38% hold a college or university degree. On average, they are slightly risk-seeking (μ=6.4; σ=1.7; ordinal scale from 0='not willing to take risk' to 10='very willing to take risk'). Their expected average spot market price for milling wheat for August 2012 is on average 183 €/mt (σ=21 €/mt). The average farm size is 440 hectares (σ=894 ha). On average, 73% of the grain harvest can be stored and 75% of the participating farms use storage as their primary method of reducing price risks.

Table 1. Descriptive statistics for personal and farm characteristics [a)]

Personal characteristics	
Share of male farmers in %	95
Average age in years	41 (14)
Share of farm-managers in %	70
Share of farmers with a university or college degree in %	38
Average risk attitude as a self-assessment [b)]	6.4 (1.7)
Average spot market price expectation for milling wheat for August 2012 in €/mt	183 (21)
Farm characteristics	
Average farm size in ha	440 (894)
Average storage capacity in % of the grain harvest	73 (41)
Share of farmers who use storage as a central risk managment tool	75

Source: Author's own calculations.

[a)] The number of farmers, who answered the questions, varied from 115 to 136; standard deviation in parenthesis.

[b)] Ordinal scale from 0 to 10; 0='not willing to take risk at all'; 10='very willing to take risk' (cf. Dohmen et al., 2011). The following pairs show the frequency distribution: 0→0; 1→1; 2→1; 3→5; 4→14; 5→16; 6→26; 7→28; 8→26; 9→9; 10→2.

The volume of actual PHI usage of the participating farmers over the past five years is structured as follows: 36% forward contracts, 35% cash contracts, 6% managed marketing, 5% futures contracts, 2% futures-options contracts and 15% others. The share of others can be interpreted mainly as grain usage for on-farm animal feeding, as well as special contract types offered by local collectors (e.g. premium contracts). Hence, forward and cash contracts are the dominant marketing alternatives. In the DCE, the 'Forward contract' was chosen in 32%, 'Managed marketing' in 9%, 'Futures contracts' in 12%, 'Futures-options contracts' in 10% and the 'Cash contract' in 36% of all cases.

On the basis of the descriptive statistics, it becomes clear that the sample is not representative for the population of all German farmers. However, the study aimed to recruit farmers who are diverse regarding their farm structure, instead of generating a representative sample, which is indicated by the large standard deviation of the variable 'Farm size'.

5. Analysis method of the discrete choice experiment

In the DCE, the decision maker q choses one out of I alternatives. Under the assumption that all relevant alternatives are offered, his/her relative utility U of alternative i in the t-th occasion is represented by the following equation (for further insight see Hensher and Greene, 2003):

$$U_{iqt} = \beta_q' ASC_{it} + \varepsilon_{iqt} \quad (1)$$

β_q denotes the coefficient vector and ε_{iqt} a non-observable error term that is assumed to be an independent and identically distributed (i.i.d.) extreme value type 1. Instead of attributes that are not available due to the set-up of the DCE (cf. section 3), the alternative-specific constant (ASC_{it}) for a given alternative i represents the average effect on utility for this alternative in the t-th occasion (Train, 2009: 24). In this framework, a decision maker who aims to maximize his/her utility choses alternative i instead of j, if and only if $U_i > U_j \ \forall\, j \in I,\ i \neq j$.

Assuming that one would observe β_q and $\boldsymbol{\varepsilon}_{iqt}$, the choice probability would be standard logit and therefore conditional on β_q (Greene and Hensher, 2003):

$$L_{iq}(\beta_q) = \prod_t \frac{e^{\boldsymbol{\beta_q' ASC}_{it}}}{\sum_j e^{\boldsymbol{\beta_q' ASC}_{jt}}} \quad (2)$$

Yet, the decision makers' individual preferences are unknown. Therefore, the coefficients vector β_q and the random part of every alternative $\boldsymbol{\varepsilon}_{iqt}$ are treated as stochastic influences. β_q can be characterized by several functional forms such as normal, lognormal, or triangular distributions. Which functional form is used in the analysis depends inter alia on the coefficient's design (for further explanation see Hensher and Greene, 2003: 145-154). Following Greene and Hensher (2003), the following definition of β_q is assumed:

$$\beta_q = \beta + \Delta s_q + \Gamma v_q \quad (3)$$

where β is the fixed mean of the distribution. It also contains characteristics of the decision maker s_q, which, as Boxall and Adamowicz (2002) pointed out, are important interpreters of heterogeneity. Δ is the associated parameter matrix, v_q is the underlying random effect with variances on the diagonals of Γ. The fixed underlying parameters of the distribution are summarized by $M = (\beta; \Delta; \Gamma)$.

As previously mentioned, it is not possible to condition on β_q. Thus, the unconditional choice probability has to be calculated as the integral of the conditional probability over all values of

β_q weighted by its density f (Hensher and Greene, 2003). This model is also called the mixed logit model:

$$P_{iq}(M) = \int_{\beta_q} L_{iq}(\beta_q)\ f(\beta_q|M)d\beta_q \tag{4}$$

The estimation procedure is done using maximum-likelihood estimation. Since the integral of $L_{iq}(\beta_q)$ over all possible β_q does not have a closed form, it has to be approximated through simulation. To do so, *R* simulation runs are conducted, in which *R* realizations of the moments of the chosen distributions M^R out of the density function $f\left(\beta_q|M\right)$ are raised and the associated utility parameters β_q^R are calculated. The necessary quasi random numbers are determined with halton sequences[2]. For every β_q^R , the conditional logit probability L_{iq}^R is calculated. The simulated mixed logit probability P_{iq} is calculated as the average of all calculated conditional logit probabilities L_{iq}^R.

6. Results discussion

For illustration purposes, the explanatory variables of the analysis are listed and explained in Table 2. It is also depicted to which of the three hypotheses (cf. section 2) each variable refers to.

In the following, the results of the calculated mixed logit model are discussed. In the model, all ASCs are treated as random variables and normal distributions are assumed (cf. section 4). As the standard deviations of the ASCs are highly significant, their specification as random variables can be confirmed (Hensher and Greene, 2003: 145). In order to explain the heterogeneity in preferences, individual-specific variables are also added into the model as an interaction term with the ASCs. The estimated parameters of these variables express how the preference of chosing a certain marketing alternative changes due to the influence of individual characteristics in comparison to the reference farmer[3], leaving all other effects constant. All statements are understood as being in comparison to the base alternative 'Cash contract'. The results of the mixed logit model are presented in Table 3.

[2] Halton sequences are numerical sequences which are generated in the way that they equally fill the integration volume with points that are not correlated with each other as in regular grids (for further inside cf. Bhat, 2001).

[3] The reference farmer is characterized by the zero-point of all interaction-variables. Therefore, he/she is 41 years old, has no university degree and is slightly risk-seeking. The difference between the current price and the reference farmer's price expectation for the future is zero. Moreover, his/her farm has no capacity to store the grain harvest (cf. Table 2).

Table 2. List of variables

Variable name	Description	Test on
ASC_{it}	Alternative specific constant for a specific marketing altenative *i* in the *t*-th occasion (dummy coded: 1=specific marketing alternative *i* chosen, 0=other)	
Age	Age in years is centered around the mean (41) of the sample	
Education	Decision makers with a university or college degree (dummy-coded: 1=having a university or college degree; 0=not having a university or college degree)	
Price expectation	Difference between the price level of the choice-set and the individual expected spot market price for milling wheat in August 2012 [a)]	H1
Risk attitude	Risk attitude [b)] is centered around the mean (6.4) of the sample	H2
Storage	Storage capacity in percent of the grain harvest	H3

Source: Author's own illustration.
[a)] Presented price levels in €/mt: 120, 140, 160, 180, 200, 220; average expected spot market price 183 €/mt.
[b)] Ordinal scale from 0 to 10; 0='not willing to take risk at all'; 10='very willing to take risk' (cf. Dohmen et al., 2011).

In the mixed logit model, the utility parameters of the ASCs are not significant for the PHIs except for the 'Managed marketing' alternative. The reference farmer, therefore, is indifferent between chosing a 'Forward contract', a 'Futures contract', a 'Futures-options contract' or a 'Cash contract'. The utility parameter of the alternative 'Managed marketing', by contrast, is significantly negative. Thus, the reference farmer prefers the 'Cash contract' over the 'Managed marketing' alternative. This may be partly explained by the fact that the alternative 'Managed marketing' is still a new and unknown concept for the majority of German farmers.

Looking at the individual-specific variables, 'Age' is significantly negative for the alternative 'Futures-options contract'. This means that a farmer who is older than the reference farmer *ceteris paribus* prefers a 'Cash contract' over a 'Futures-options contract', whereas a farmer who is younger than the reference farmer *ceteris paribus* prefers the 'Futures-options contract' over the 'Cash contract'. This partly reflects the results of Musser et al. (1996) who argue that older farmers do not use futures and options because they do not recover the associated learning and adjustment costs in their short time until retirement. For all other alternatives, the variable 'Age' has no effect on the utility.

Furthermore, the variable ‘Education’ has a negative effect on the utility of the alternative 'Futures-options contract'. This means that a farmer with a university degree would *ceteris*

Table 3: Results of the mixed logit model [a)]

Variable	Forward contract	Managed marketing	Futures contract	Futures-options contract
ASC [b)]	-0.301	-2.941**	-0.3636	-0.670
	(0.40)	(-2.58)	(-0.52)	(-0.78)
Standard deviation ASC	2.971***	2.568***	2.204***	2.949***
	(7.11)	(4.89)	(5.93)	(4.92)
Individual-specific variables				
Age [c)]	-0.021	0.008	-0.036	-0.050^{+}
	(-0.84)	(0.30)	(-1.56)	(-1.70)
Education [d)]	0.839	-0.345	0.547	-1.895*
	(1.23)	(-0.44)	(0.84)	(-2.08)
Price expectation [e)]	0.089***	0.026***	0.033***	0.031***
	(-10.54)	(-4.05)	(-5.83)	(-4.94)
Risk attitude [f)]	-0.485**	-0.877***	0.145	0.197
	(-2.96)	(-3.59)	(0.76)	(0.83)
Storage [g)]	-0.166*	-0.063	-0.191*	-0.080
	(-1.99)	(-0.59)	(-2.48)	(-0.83)
Choosen in % of all decisions	32	9	12	10
Participants / Observations	136 / 816			
Simulated Log Likelihood	-650.88			
AIC / BIC	1357.77 / 1528.61			

Source: Author's own calculation using the command 'mixlogit' (Hole, 2007) in Stata 12.

[a)] + p<0.1; * p<0.05; ** p<0.01; *** p<0.001; z-values in brackets; 1 000 Halton Draws; in the model we bear in mind that each participant answer six choice sets.

[b)] ASC-forward: 1='Forward contract', 0=other; ASC-managed: 1='Managed marketing', 0=other; ASC-futures: 1='Futures contract', 0=other; ASC-option: 1='Futures-options contract', 0=other.

[c)] Reference: 41 year old farmer (mean of the sample).

[d)] Binary coded; reference: 0= no university degree.

[e)] Reference: no difference between the current price and the farmer's price expectation for the future.

[f)] Reference: farmer with a risk attitude of 6.4 (mean of the sample) measured at a ordinal scale from 0 to 10; 0='not willing to take risk at all'; 10='very willing to take risk'.

[g)] Reference: farmer has no has no capacity to store the grain harvest.

paribus prefer a 'Cash contract' over a 'Futures-options contract', whereas a farmer without a university degree would be indifferent to both alternatives. This partly confirms Shapiro and Brorsen (1988), who find significantly negative effects of the personal characteristic education on farmers' usage of futures markets in general. However, this negative effect cannot be

confirmed for the alternative 'Futures-contract'. Likewise, 'Education' has no effect on the utility of all other alternatives.

Hereafter, the generated hypotheses from section 2 are tested.

Test on H1 (price expectation)

The utility parameters of the individual specific variable 'Price expectation' are significantly positive for all PHI alternatives. Taking into account that the reference farmer, first, expects no changes in the wheat price, second, evaluates the alternative 'Managed markting' as significantly negative compared to the 'Cash contract' and third, is indifferent to the other alternatives, one can conclude: If a farmer's individual price expectation is below the actual price level in the choice-set, he/she has *ceteris paribus* a preference for using PHIs in the form of a 'Forward contract', a 'Futures contract' and/or a 'Futures-options contract' instead of a 'Cash contract'. If, however, his/her individual price expectation is above the actual price level of the choice set, he/she would prefer a 'Cash contract' over using a PHI. A Wald test confirms that the utility parameters of the variable 'Price expectation' are not significantly different for the 'Managed marketing' alternative, the 'Futures contract' and the 'Futures-options contract' at a 5% level. The influence of the variable 'Price expectation' on the utility of the 'Forward contract' is significantly stronger than for the other PHIs. In light of these results, hypothesis 1 is accepted.

Test on H2 (risk attitude)

The utility parameters of the variable 'Risk attitude' are significantly negative for the alternatives 'Forward contract' and 'Managed marketing'. Furthermore, a Wald test confirms that both parameters are not significantly different. Considering that the reference farmer is slightly risk-loving, this indicates the following: First, farmers who are less risk-loving than the reference farmer would prefer a 'Forward contract' over a 'Cash contract' and *vice versa*. Second, farmers who are less risk-loving would prefer the 'Cash contract' over the 'Managed marketing' alternative less pointedly than the reference farmer and *vice versa.* This follows from the aforementioned fact that the reference farmer generally prefers the 'Cash contract' over the 'Managed marketing' alternative. However, the variable 'Risk attitude' has no influence on the farmers' preference for the remaining PHIs 'Futures contract' and 'Futures-options contract'.

Due to the results revealing no general direction in the general relationship between the farmer's preference for PHIs and his/her risk attitude, hypothesis 2 has to be partly rejected.

However, we can conclude from the results that the degree of risk aversion has a significant impact on farmers' preferences for a specific PHI.

Test on H3 (storage)

The utility parameters of the variable 'Storage' are significantly negative for the alternatives 'Forward contract' and 'Futures contract'. A Wald test confirms that these utility parameters are not significantly different. Compared to the reference farmer who has no storage capacity, this means: The more of the harvest the farmer is able to store, the higher is *ceteris paribus* his/her preference for a 'Cash contract' compared to a 'Forward contract' or a 'Futures contract'. Hence, the storage capacity as an additional risk management tool decreases farmers' preference for using these two PHIs. However, according to the results, the storage capacity has no significant influence on farmers' preference for the remaining two PHIs 'Managed marketing' and 'Futures-options contract'. Therefore, farmers with (higher) storage capacitites show no general preference for using PHIs and hypothesis 3 has to be partly rejected.

7. Concluding remarks

Need-based PHIs have become increasingly important for European farmers in order to manage the increasing price risks on agricultural markets. Existing contributions on farmers' use of PHIs, however, mainly focus on North America only and do not consider the special conditions of agricultural production in Europe. Furthermore, these are mostly empirical studies, which makes it difficult to clearly distinguish the factors which influenced past marketing decisions. Additional experiments can represent a solution to this issue. Hence, the objective of this paper was to examine the influencing factors on European farmers' use of PHIs against conventional cash sales in an experimental setting. For this, a DCE was performed in which German grain farmers had to chose their preferred PHI under different price constellations. The gained data was subsequently analysed by means of a mixed logit model within a maximum likelihood framework.

The results of the DCE reveal interesting insights into the drivers of farmers' marketing decisions. Accordingly, it can be shown that farmers with a negative price expectation have a higher preference for using PHIs against cash sales in general, which is in-line with existing empirical studies. With regard to the risk attitude, the individual degree of risk aversion can have a significant impact on farmers' choices of specific PHIs. However, a general

relationship with the preference for using PHIs cannot be observed. Here, the study contradicts most existing contributions which state that a higher degree of risk aversion generally leads to a stronger preference for hedging. Finally, the findings indicate that farmers with available grain storage capacities are less likely to hedge prices just with two out of the four investigated alternative instruments. A lower preference of using PHIs in general, as assumed in many theoretical contributions in the literature, however, cannot be confirmed.

The findings of this study are of practical importance for farmers as well as agricultural trading companies, politicians and consultants. On the basis of the results, farmers are able to market their grain more objectively and profitablely due to an improved understanding of their marketing practices and motives. Consequently, this could generally increase farmers' use of PHI, especially in Europe. Moreover, agricultural trading companies get useful information for the design of more effective customer-specific PHIs, instead of just offering standarised products. Finally, agricultural trading companies, consultants and politicians can include the results into the development of grain marketing educational programs.

Nevertheless, the results of the present study should be interpreted with care due to some limitations of the data gained in the DCE. In particular, the results are based on hypothetical decisions. The question of whether the decision-making behavior of real decision situations is different from those in hypothetical decision situations has been examined several times. The results of various studies provide abundant evidence that there is no discrepancy between real and hypothetical decision-making behavior (cf. e.g., Irwin et al., 1992; Wisman and Levin, 1996; Kuehberger et al., 2002). Hence, hypothetical decision-making behavior can be considered as a "reasonable, qualitatively correct picture of real choices" (Kuehberger et al., 2002: 1164). Nevertheless, this should be confirmed by further studies within the agricultural context. Furthermore, the transferability of the findings, for example to other agricultural commodities or other countries, should be tested in additional DCEs. For comparison purposes, it could also be of interest to perform the experiment again in the same setting at a later point in time.

References

Bhat, C. R. (2001). Quasi-random maximum simulated likelihood estimation of the mixed multinomial logit model. *Transportation Research Part B: Methodological* 35: 677–693.

Bond, G. E. & Thompson, S. R. (1985). Risk aversion and the recommended hedging ratio. *American Journal of Agricultural Economics* 67: 870-872.

Boxall, P. C. & Adamowicz, W. L. (2002). Understanding heterogeneous preferences in random utility models: a latent class approach. (Kluwer Academic Publisher, Ed.) *Environmental and Resource Economics* 23: 421-446.

Breustedt, G., Müller-Scheeßel, J. & Latacz-Lohmann, U. (2008). Forecasting the adoption of GM oilseed rape: evidence from a discrete choice experiment in Germany. *Journal of Agricultural Economics* 59: 237-256

DeShazo, J. R. & Fermo, G. (2002). Designing choice cets for ctated preference methods: the effects of complexity on choice consistency. *Journal of Environmental Economics and Management* 44: 123-143.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J. & Wagner, G. G. (2011). Individual risk attitudes: measurement, determinants, and behavioral consequences. *Journal of the European Economic Association* 3: 522-550.

Eales, J. S., Engel, B. K., Hauser, R. J. & Thompson, S. R. (1990). Grain price expectations of Illinois farmers and grain merchandisers. *American Journal of Agricultural Economics* 72: 701-708.

Espinosa-Goded, M., Barreiro-Hurlé, J. & Ruto, E. (2010). What do farmers want from Agri-environmental scheme design? A choice experiment approach. *Journal of Agricultural Economics* 61: 259-273.

European Commission (2005). Communication from the commission to the council on risk and crisis management in agriculture. COM (2005) 74, Brussels.

Finn, A. & Louviere, J. J. (1992). Determining the appropriate response to evidence of public concern: the case of food safety. *Journal of Public Policy & Marketing* 11: 12-25.

Franken, J. R. V., Pennings, J. M. E., & Garcia, P. (2012). Crop production contracts and marketing strategies: what drives their use? *Agribusiness* 28: 324-340.

Garcia, P. & Leuthold, R. M. (2004). A selected review of agricultural commodity futures and options markets. *European Review of Agricultural Economics* 31: 235-272.

Gardner, B. L. (1977). Commodity options for agriculture. *American Journal of Agricultural Economics* 59: 986-992.

Goodwin, B. K. & Kastens, T. L. (1996). An analysis of marketing frequency by Kansas crop producers. *Review of Agricultural Economics* 18:575–84.

Goodwin, B. K. & Schroeder, T. C. (1994). Human capital, producer education programs, and the adoption of forward-pricing methods. *American Journal of Agricultural Economics* 76: 936-947.

Greene, W. H. & Hensher, D. A. (2003): A latent class model for discrete choice analysis: contrasts with mixed logit. *Transportation Research Part B* 37: 681-698.

Hagedorn, L. A., Irwin, S. H., Good, D. L., Martines-Filho, J., Sherrick, B. J. & Schnitkey, G. D. (2003). *New generation grain marketing contracts*. Urbana-Champaign: AgMAS Project Research Report.

Hensher, D. A. & Greene, W. H. (2003). The mixed logit model: the state of practice. *Transportation* 30: 133-176.

Hole, A. R. (2007): Estimating mixed logit models using maximum simulated likelihood. *The Stata Journal* 7: 388-401.

Holt, M. T. & Brandt, J. A. (1985). Combining price forecasting with hedging of hogs: an evaluation using alternative measures of risk. *The Journal of Futures Markets* 5: 297-309.

Irwin, J. R., McClelland, G. H. & Schulze, W. D. (1992). Hypothetical and real consequences in experimental auctions for insurance against low probability risks. *Journal of Behavioral Decision Making* 5: 107-116.

Katchova, A. L. & Miranda, M. J. (2004). Characteristics affecting marketing contract decisions. *American Journal of Agricultural Economics* 86: 88-102.

Kuehberger, A., Schulte-Mecklenbeck, M. & Perner, J. (2002). Framing decisions: hypothetical and real. *Organizational Behavior and Human Decision Processes* 89: 1162-1175.

Lancaster, K. J. (1966). A new approach to consumer theory. *Journal of Political Economy* 74: 132-157.

Louviere, J. D., Hensher, D. A. & Swait, J. D. (2010). *Stated choice methods - analysis and applications.* Cambridge: University Press.

Loy, J. P. & Pieniadz, A. (2009). Optimal grain marketing revisited: a German and Polish perspective. *Outlook on Agriculture* 38: 47-54.

Lusk, J. L., Roosen, J. & Fox, J. A. (2003). Demand for beef from cattle administered growth hormones or fed genetically modified corn: a comparison of consumers in France, Germany, the United Kingdom, and the United States. *American Journal of Agricultural Economics* 85: 16-29.

Mahul, O. (2003). Hedging price risk in the presence of crop yield and revenue unsurance. *European Review of Agricultural Economics* 30: 217-239.

Mansfield, E. R. & Helms, B. P. (1982). Detecting multicollinearity. *The American Statistician* 36: 158-160.

Marley, A. & Louviere, J. D. (2005). Some probabilistic models of best, worst, and best-worst choices. *Journal of Mathematical Psychology* 49: 464-480.

McFadden, D. (1974). Conditional logit analysis of qualitative choice behavior. In: P. Zaremka, *Frontiers in Econometrics*, 105-142. New York: Academic Press.

McFadden, D. (1986). The Choice Theory Approach to Market Research. *Marketing Science* 5: 275-297.

Musser, W. N., Patrick, G. F. & Eckman, D. T. (1996). Risk and Grain Marketing Behavior of Large-Scale Farmers. *Review of Agricultural Economics* 18: 65-77.

Patrick, G. F., Blake, B. F. & Whitacker, S. H. (1980). Farmers' Goals and Risk Aversion: Some Preliminary Analyses. *Risk Analysis in Agriculture: Research and Educational Developments.* Department of Agricultural Economics AE-4492, University of Illinois.

Patrick, G. F., Blake, B. F. & Whitacker, S. H. (1983). Farmers' Goals: Uni- or Multi-Dimensional? *American Journal of Agricultural Economics* 65: 315-320.

Paulson, N. D., Katchova, A. L. & Lence, S. H. (2010) An Empirical Analysis of the Determinants of Marketing Contract Structures for Corn and Soybeans. *Journal of Agricultural & Food Industrial Organization* 8: 1-23.

Peck, A. E. (1975). Hedging and Income Stability: Concepts, Implications and an Example. *American Journal of Agricultural Economics* 57: 410-419.

Sartwelle, J., O'Brien, D., Tierney, W. J. & Eggers, T. (2000). The Effect of Personal and Farm Characteristics upon Grain Marketing Practices. *Journal of Agricultural and Applied Economics* 32: 95-111.

Shapiro, B. I. & Brorsen, W. B. (1988). Factors Affecting Farmers' Hedging Decisions. *Applied Economic Perspectives and Policy* 10: 145-153.

Stone, R., Warner, C. & Whitacre, R. (2011). Grain Marketing Tools: A Survey of Illinois Grain Elevators. *NCCC-134 Conference on Applied Commodity Price Analysis, Forecasting and Market Risk Management.* St. Louis, Missouri.

Sumpsi, J. M., Amador, F. & Romero, C. (1997). On farmers' objectives: A multi-criteria approach. *European Journal of Operational Research* 96: 64-71.

Tomek, W. G. (1987). *Effects of futures and options trading on farm incomes*. Department of Agricultural Economics, Cornell University Agricultural Experiment Station, New York State College of Agriculture and Life Sciences, Cornell University.

Train, K. (2009). *Discrete Choice Methods with Simulation.* Cambridge: University Press.

Verbeek, M. (2008). *A Guide to Modern Econometrics* (3 ed.). Rotterdam: John Wiley & Sons, Ltd.

Wisman, D. B. & Levin, I. P. (1996). Comparing risky decision making under conditions of real and hypothetical consequences. *Organizational Behavior and Human Decision Processes* 66: 241-250.

Diskussionspapiere

2000 bis 31. Mai 2006

Institut für Agrarökonomie

Georg-August-Universität, Göttingen

2000		
0001	Brandes, Wilhelm	Über Selbstorganisation in Planspielen: ein Erfahrungsbericht, 2000
0002	v. Cramon-Taubadel, Stephan u. Jochen Meyer	Asymmetric Price Transmission: Factor Artefact?, 2000
2001		
0101	Leserer, Michael	Zur Stochastik sequentieller Entscheidungen, 2001
0102	Molua, Ernest	The Economic Impacts of Global Climate Change on African Agriculture, 2001
0103	Birner, Regina et al.	‚Ich kaufe, also will ich?': eine interdisziplinäre Analyse der Entscheidung für oder gegen den Kauf besonders tier- u. umweltfreundlich erzeugter Lebensmittel, 2001
0104	Wilkens, Ingrid	Wertschöpfung von Großschutzgebieten: Befragung von Besuchern des Nationalparks Unteres Odertal als Baustein einer Kosten-Nutzen-Analyse, 2001
2002		
0201	Grethe, Harald	Optionen für die Verlagerung von Haushaltsmitteln aus der ersten in die zweite Säule der EU-Agrarpolitik, 2002
0202	Spiller, Achim u. Matthias Schramm	Farm Audit als Element des Midterm-Review : zugleich ein Beitrag zur Ökonomie von Qualitätsicherungssytemen, 2002
2003		
0301	Lüth, Maren et al.	Qualitätssignaling in der Gastronomie, 2003
0302	Jahn, Gabriele, Martina Peupert u. Achim Spiller	Einstellungen deutscher Landwirte zum QS-System: Ergebnisse einer ersten Sondierungsstudie, 2003
0303	Theuvsen, Ludwig	Kooperationen in der Landwirtschaft: Formen, Wirkungen und aktuelle Bedeutung, 2003
0304	Jahn, Gabriele	Zur Glaubwürdigkeit von Zertifizierungssystemen: eine ökonomische Analyse der Kontrollvalidität, 2003
2004		
0401	Meyer, Jochen u. Stephan v. Cramon-Taubadel	Asymmetric Price Transmission: a Survey, 2004

0402	Barkmann, Jan u. Rainer Marggraf	The Long-Term Protection of Biological Diversity: Lessons from Market Ethics, 2004
0403	Bahrs, Enno	VAT as an Impediment to Implementing Efficient Agricultural Marketing Structures in Transition Countries, 2004
0404	Spiller, Achim, Torsten Staack u. Anke Zühlsdorf	Absatzwege für landwirtschaftliche Spezialitäten: Potenziale des Mehrkanalvertriebs, 2004
0405	Spiller, Achim u. Torsten Staack	Brand Orientation in der deutschen Ernährungswirtschaft: Ergebnisse einer explorativen Online-Befragung, 2004
0406	Gerlach, Sabine u. Berit Köhler	Supplier Relationship Management im Agribusiness: ein Konzept zur Messung der Geschäftsbeziehungsqualität, 2004
0407	Inderhees, Philipp et al.	Determinanten der Kundenzufriedenheit im Fleischerfachhandel
0408	Lüth, Maren et al.	Köche als Kunden: Direktvermarktung landwirtschaftlicher Spezialitäten an die Gastronomie, 2004
2005		
0501	Spiller, Achim, Julia Engelken u. Sabine Gerlach	Zur Zukunft des Bio-Fachhandels: eine Befragung von Bio-Intensivkäufern, 2005
0502	Groth, Markus	Verpackungsabgaben und Verpackungslizenzen als Alternative für ökologisch nachteilige Einweggetränkeverpackungen? Eine umweltökonomische Diskussion, 2005
0503	Freese, Jan u. Henning Steinmann	Ergebnisse des Projektes 'Randstreifen als Strukturelemente in der intensiv genutzten Agrarlandschaft Wolfenbüttels', Nichtteilnehmerbefragung NAU 2003, 2005
0504	Jahn, Gabriele, Matthias Schramm u. Achim Spiller	Institutional Change in Quality Assurance: the Case of Organic Farming in Germany, 2005
0505	Gerlach, Sabine, Raphael Kennerknecht u. Achim Spiller	Die Zukunft des Großhandels in der Bio-Wertschöpfungskette, 2005
2006		
0601	Heß, Sebastian, Holger Bergmann u. Lüder Sudmann	Die Förderung alternativer Energien: eine kritische Bestandsaufnahme, 2006
0602	Gerlach, Sabine u. Achim Spiller	Anwohnerkonflikte bei landwirtschaftlichen Stallbauten: Hintergründe und Einflussfaktoren; Ergebnisse einer empirischen Analyse, 2006
0603	Glenk, Klaus	Design and Application of Choice Experiment Surveys in So-Called Developing Countries: Issues and Challenges, 2006

0604	Bolten, Jan, Raphael Kennerknecht u. Achim Spiller	Erfolgsfaktoren im Naturkostfachhandel: Ergebnisse einer empirischen Analyse, 2006 (entfällt)
0605	Hasan, Yousra	Einkaufsverhalten und Kundengruppen bei Direktvermarktern in Deutschland: Ergebnisse einer empirischen Analyse, 2006
0606	Lülfs, Frederike u. Achim Spiller	Kunden(un-)zufriedenheit in der Schulverpflegung: Ergebnisse einer vergleichenden Schulbefragung, 2006
0607	Schulze, Holger, Friederike Albersmeier u. Achim Spiller	Risikoorientierte Prüfung in Zertifizierungssystemen der Land- und Ernährungswirtschaft, 2006
	2007	
0701	Buchs, Ann Kathrin u. Jörg Jasper	For whose Benefit? Benefit-Sharing within Contractural ABC-Agreements from an Economic Prespective: the Example of Pharmaceutical Bioprospection, 2007
0702	Böhm, Justus et al.	Preis-Qualitäts-Relationen im Lebensmittelmarkt: eine Analyse auf Basis der Testergebnisse Stiftung Warentest, 2007
0703	Hurlin, Jörg u. Holger Schulze	Möglichkeiten und Grenzen der Qualitäts-sicherung in der Wildfleischvermarktung, 2007
Ab Heft 4, 2007:	**Diskussionspapiere (Discussion Papers), Department für Agrarökonomie und Rurale Entwicklung Georg-August-Universität, Göttingen (ISSN 1865-2697)**	
0704	Stockebrand, Nina u. Achim Spiller	Agrarstudium in Göttingen: Fakultätsimage und Studienwahlentscheidungen; Erstsemesterbefragung im WS 2006/2007
0705	Bahrs, Enno, Jobst-Henrik Held u. Jochen Thiering	Auswirkungen der Bioenergieproduktion auf die Agrarpolitik sowie auf Anreizstrukturen in der Landwirtschaft: eine partielle Analyse bedeutender Fragestellungen anhand der Beispielregion Niedersachsen
0706	Yan, Jiong, Jan Barkmann u. Rainer Marggraf	Chinese tourist preferences for nature based destinations – a choice experiment analysis
	2008	
0801	Joswig, Anette u. Anke Zühlsdorf	Marketing für Reformhäuser: Senioren als Zielgruppe
0802	Schulze, Holger u. Achim Spiller	Qualitätssicherungssysteme in der europäischen Agri-Food Chain: Ein Rückblick auf das letzte Jahrzehnt
0803	Gille, Claudia u. Achim Spiller	Kundenzufriedenheit in der Pensionspferdehaltung: eine empirische Studie
0804	Voss, Julian u. Achim Spiller	Die Wahl des richtigen Vertriebswegs in den Vorleistungsindustrien der Landwirtschaft – Konzeptionelle Überlegun-

		gen und empirische Ergebnisse
0805	Gille, Claudia u. Achim Spiller	Agrarstudium in Göttingen. Erstsemester- und Studienverlaufsbefragung im WS 2007/2008
0806	Schulze, Birgit, Christian Wocken u. Achim Spiller	(Dis)loyalty in the German dairy industry. A supplier relationship management view Empirical evidence and management implications
0807	Brümmer, Bernhard, Ulrich Köster u. Jens- Peter Loy	Tendenzen auf dem Weltgetreidemarkt: Anhaltender Boom oder kurzfristige Spekulationsblase?
0808	Schlecht, Stephanie, Friederike Albersmeier u. Achim Spiller	Konflikte bei landwirtschaftlichen Stallbauprojekten: Eine empirische Untersuchung zum Bedrohungspotential kritischer Stakeholder
0809	Lülfs-Baden, Frederike u. Achim Spiller	Steuerungsmechanismen im deutschen Schulverpflegungsmarkt: eine institutionenökonomische Analyse
0810	Deimel, Mark, Ludwig Theuvsen u. Christof Ebbeskotte	Von der Wertschöpfungskette zum Netzwerk: Methodische Ansätze zur Analyse des Verbundsystems der Veredelungswirtschaft Nordwestdeutschlands
0811	Albersmeier, Friederike u. Achim Spiller	Supply Chain Reputation in der Fleischwirtschaft
	2009	
0901	Bahlmann, Jan, Achim Spiller u. Cord-Herwig Plumeyer	Status quo und Akzeptanz von Internet-basierten Informationssystemen: Ergebnisse einer empirischen Analyse in der deutschen Veredelungswirtschaft
0902	Gille, Claudia u. Achim Spiller	Agrarstudium in Göttingen. Eine vergleichende Untersuchung der Erstsemester der Jahre 2006-2009
0903	Gawron, Jana-Christina u. Ludwig Theuvsen	„Zertifizierungssysteme des Agribusiness im interkulturellen Kontext – Forschungsstand und Darstellung der kulturellen Unterschiede"
0904	Raupach, Katharina u. Rainer Marggraf	Verbraucherschutz vor dem Schimmelpilzgift Deoxynivalenol in Getreideprodukten Aktuelle Situation und Verbesserungsmöglichkeiten
0905	Busch, Anika u. Rainer Marggraf	Analyse der deutschen globalen Waldpolitik im Kontext der Klimarahmenkonvention und des Übereinkommens über die Biologische Vielfalt
0906	Zschache, Ulrike, Stephan v. Cramon-Taubadel u. Ludwig Theuvsen	Die öffentliche Auseinandersetzung über Bioenergie in den Massenmedien - Diskursanalytische Grundlagen und erste Ergebnisse
0907	Onumah, Edward E., Gabriele Hoerstgen-Schwark u. Bernhard Brümmer	Productivity of hired and family labour and determinants of technical inefficiency in Ghana's fish farms
0908	Onumah, Edward E., Stephan Wessels, Nina Wildenhayn, Gabriele Hoerstgen-Schwark	Effects of stocking density and photoperiod manipulation in relation to estradiol profile to enhance spawning activity in female Nile tilapia

	u. Bernhard Brümmer	
0909	Steffen, Nina, Stephanie Schlecht u. Achim Spiller	Ausgestaltung von Milchlieferverträgen nach der Quote
0910	Steffen, Nina, Stephanie Schlecht u. Achim Spiller	Das Preisfindungssystem von Genossenschaftsmolkereien
0911	Granoszewski, Karol, Christian Reise, Achim Spiller u. Oliver Mußhoff	Entscheidungsverhalten landwirtschaftlicher Betriebsleiter bei Bioenergie-Investitionen - Erste Ergebnisse einer empirischen Untersuchung -
0912	Albersmeier, Friederike, Daniel Mörlein u. Achim Spiller	Zur Wahrnehmung der Qualität von Schweinefleisch beim Kunden
0913	Ihle, Rico, Bernhard Brümmer u. Stanley R. Thompson	Spatial Market Integration in the EU Beef and Veal Sector: Policy Decoupling and Export Bans
2010		
1001	Heß, Sebastian, Stephan v. Cramon-Taubadel u. Stefan Sperlich	Numbers for Pascal: Explaining differences in the estimated Benefits of the Doha Development Agenda
1002	Deimel, Ingke, Justus Böhm u. Birgit Schulze	Low Meat Consumption als Vorstufe zum Vegetarismus? Eine qualitative Studie zu den Motivstrukturen geringen Fleischkonsums
1003	Franz, Annabell u. Beate Nowak	Functional food consumption in Germany: A lifestyle segmentation study
1004	Deimel, Mark u. Ludwig Theuvsen	Standortvorteil Nordwestdeutschland? Eine Untersuchung zum Einfluss von Netzwerk- und Clusterstrukturen in der Schweinefleischerzeugung
1005	Niens, Christine u. Rainer Marggraf	Ökonomische Bewertung von Kindergesundheit in der Umweltpolitik - Aktuelle Ansätze und ihre Grenzen
1006	Hellberg-Bahr, Anneke, Martin Pfeuffer, Nina Steffen, Achim Spiller u. Bernhard Brümmer	Preisbildungssysteme in der Milchwirtschaft -Ein Überblick über die Supply Chain Milch
1007	Steffen, Nina, Stephanie Schlecht, Hans-Christian Müller u. Achim Spiller	Wie viel Vertrag braucht die deutsche Milchwirtschaft?- Erste Überlegungen zur Ausgestaltung des Contract Designs nach der Quote aus Sicht der Molkereien
1008	Prehn, Sören, Bernhard Brümmer u.	Payment Decoupling and the Intra – European Calf Trade

	Stanley R. Thompson	
1009	Maza, Byron, Jan Barkmann, Frank von Walter u. Rainer Marggraf	Modelling smallholders production and agricultural income in the area of the Biosphere reserve “Podocarpus - El Cóndor”, Ecuador
1010	Busse, Stefan, Bernhard Brümmer u. Rico Ihle	Interdependencies between Fossil Fuel and Renewable Energy Markets: The German Biodiesel Market
	2011	
1101	Mylius, Donata, Simon Küest, Christian Klapp u. Ludwig Theuvsen	Der Großvieheinheitenschlüssel im Stallbaurecht - Überblick und vergleichende Analyse der Abstandsregelungen in der TA Luft und in den VDI-Richtlinien
1102	Klapp, Christian, Lukas Obermeyer u. Frank Thoms	Der Vieheinheitenschlüssel im Steuerrecht - Rechtliche Aspekte und betriebswirtschaftliche Konsequenzen der Gewerblichkeit in der Tierhaltung
1103	Göser, Tim, Lilli Schroeder u. Christian Klapp	Agrarumweltprogramme: (Wann) lohnt sich die Teilnahme für landwirtschaftliche Betriebe?
1104	Plumeyer, Cord-Herwig, Friederike Albersmeier, Maximilian Freiherr von Oer, Carsten H. Emmann u. Ludwig Theuvsen	Der niedersächsische Landpachtmarkt: Eine empirische Analyse aus Pächtersicht
1105	Voss, Anja u. Ludwig Theuvsen	Geschäftsmodelle im deutschen Viehhandel: Konzeptionelle Grundlagen und empirische Ergebnisse
1106	Wendler, Cordula, Stephan v. Cramon-Taubadel, Hardwig de Haen, Carlos Antonio Padilla Bravo u. Samir Jrad	Food security in Syria: Preliminary results based on the 2006/07 expenditure survey
1107	Prehn, Sören u. Bernhard Brümmer	Estimation Issues in Disaggregate Gravity Trade Models
1108	Recke, Guido, Ludwig Theuvsen, Nadine Venhaus u. Anja Voss	Der Viehhandel in den Wertschöpfungsketten der Fleischwirtschaft: Entwicklungstendenzen und Perspektiven
1109	Prehn, Sören u. Bernhard Brümmer	“Distorted Gravity: The Intensive and Extensive Margins of International Trade”, revisited: An Application to an Intermediate Melitz Model

2012		
1201	Kayser, Maike, Claudia Gille, Katrin Suttorp u. Achim Spiller	Lack of pupils in German riding schools? – A causal- analytical consideration of customer satisfaction in children and adolescents
1202	Prehn, Sören u. Bernhard Brümmer	Bimodality & the Performance of PPML
1203	Tangermann, Stefan	Preisanstieg am EU-Zuckermarkt: Bestimmungsgründe und Handlungsmöglichkeiten der Marktpolitik
1204	Würriehausen, Nadine, Sebastian Lakner u. Rico Ihle	Market integration of conventional and organic wheat in Germany
1205	Heinrich, Barbara	Calculating the Greening Effect – a case study approach to predict the gross margin losses in different farm types in Germany due to the reform of the CAP
1206	Prehn, Sören u. Bernhard Brümmer	A Critical Judgement of the Applicability of 'New New Trade Theory' to Agricultural: Structural Change, Productivity, and Trade
1207	Marggraf, Rainer, Patrick Masius u. Christine Rumpf	Zur Integration von Tieren in wohlfahrtsökonomischen Analysen
1208	Sebastian Lakner, Bernhard Brümmer, Stephan v. Cramon-Taubadel Jürgen Heß, Johannes Isselstein, Ulf Liebe, Rainer Marggraf, Oliver Mußhoff, Ludwig Theuvsen, Teja Tscharntke, Catrin Westphal u. Gerlinde Wiese	Der Kommissionsvorschlag zur GAP-Reform 2013 - aus Sicht von Göttinger und Witzenhäuser Agrarwissenschaftler(inne)n
1209	Prehn, Sören, Berhard Brümmer undThomas Glauben	Structural Gravity Estimation & Agriculture
1210	Prehn, Sören, Bernhard Brümmer und Thomas Glauben	An Extended Viner Model: Trade Creation, Diversion & Reduction
1211	Salidas, Rodrigo and Stephan von Cramon-Taubadel	Access to Credit and the Determinants of Technical Inefficiency among Specialized Small Farmers in Chile
1212	Steffen, Nina und Achim Spiller	Effizienzsteigerung in der Wertschöpfungskette Milch ? -Potentiale in der Zusammenarbeit zwischen Milcherzeugern und Molkereien aus Landwirtssicht
1213	Mußhoff, Oliver, André Tegtmeier u. Norbert Hirsch-	Attraktivität einer landwirtschaftlichen Tätigkeit - Einflussfaktoren und Gestaltungsmöglichkeiten

	auer	
2013		
1301	Lakner, Sebastian, Carsten Holst u. Barbara Heinrich	Reform der Gemeinsamen Agrarpolitik der EU 2014 - mögliche Folgen des Greenings für die niedersächsische Landwirtschaft
1302	Tangermann, Stefan u. Stephan von Cramon-Taubadel	Agricultural Policy in the European Union : An Overview
1303	Granoszewski, Karol u. Achim Spiller	Langfristige Rohstoffsicherung in der Supply Chain Biogas : Status Quo und Potenziale vertraglicher Zusammenarbeit
1304	Lakner, Sebastian, Carsten Holst, Bernhard Brümmer, Stephan von Cramon-Taubadel, Ludwig Theuvsen, Oliver Mußhoff und Teja Tscharntke	Zahlungen für Landwirte an gesellschaftliche Leistungen koppeln! - Ein Kommentar zum aktuellen Stand der EU-Agrarreform
1305	Prechtel, Bianca, Maike Kayser u. Ludwig Theuvsen	Organisation von Wertschöpfungsketten in der Gemüseproduktion : das Beispiel Spargel

Diskussionspapiere

2000 bis 31. Mai 2006:
Institut für Rurale Entwicklung
Georg-August-Universität, Göttingen)
Ed. Winfried Manig (ISSN 1433-2868)

32	Dirks, Jörg J.	Einflüsse auf die Beschäftigung in nahrungsmittelverabeitenden ländlichen Kleinindustrien in West-Java/Indonesien, 2000
33	Keil, Alwin	Adoption of Leguminous Tree Fallows in Zambia, 2001
34	Schott, Johanna	Women's Savings and Credit Co-operatives in Madagascar, 2001
35	Seeberg-Elberfeldt, Christina	Production Systems and Livelihood Strategies in Southern Bolivia, 2002
36	Molua, Ernest L.	Rural Development and Agricultural Progress: Challenges, Strategies and the Cameroonian Experience, 2002
37	Demeke, Abera Birhanu	Factors Influencing the Adoption of Soil Conservation Practices in Northwestern Ethiopia, 2003
38	Zeller, Manfred u. Julia Johannsen	Entwicklungshemmnisse im afrikanischen Agrarsektor: Erklärungsansätze und empirische Ergebnisse, 2004
39	Yustika, Ahmad Erani	Institutional Arrangements of Sugar Cane Farmers in East Java – Indonesia: Preliminary Results, 2004
40	Manig, Winfried	Lehre und Forschung in der Sozialökonomie der Ruralen Entwicklung, 2004
41	Hebel, Jutta	Transformation des chinesischen Arbeitsmarktes: gesellschaftliche Herausforderungen des Beschäftigungswandels, 2004
42	Khan, Mohammad Asif	Patterns of Rural Non-Farm Activities and Household Acdess to Informal Economy in Northwest Pakistan, 2005
43	Yustika, Ahmad Erani	Transaction Costs and Corporate Governance of Sugar Mills in East Java, Indovesia, 2005
44	Feulefack, Joseph Florent, Manfred Zeller u. Stefan Schwarze	Accuracy Analysis of Participatory Wealth Ranking (PWR) in Socio-economic Poverty Comparisons, 2006

Die Wurzeln der **Fakultät für Agrarwissenschaften** reichen in das 19. Jahrhundert zurück. Mit Ausgang des Wintersemesters 1951/52 wurde sie als siebente Fakultät an der Georgia-Augusta-Universität durch Ausgliederung bereits existierender landwirtschaftlicher Disziplinen aus der Mathematisch-Naturwissenschaftlichen Fakultät etabliert.

1969/70 wurde durch Zusammenschluss mehrerer bis dahin selbständiger Institute das **Institut für Agrarökonomie** gegründet. Im Jahr 2006 wurden das Institut für Agrarökonomie und das Institut für Rurale Entwicklung zum heutigen **Department für Agrarökonomie und Rurale Entwicklung** zusammengeführt.

Das Department für Agrarökonomie und Rurale Entwicklung besteht aus insgesamt neun Lehrstühlen zu den folgenden Themenschwerpunkten:

- Agrarpolitik
- Betriebswirtschaftslehre des Agribusiness
- Internationale Agrarökonomie
- Landwirtschaftliche Betriebslehre
- Landwirtschaftliche Marktlehre
- Marketing für Lebensmittel und Agrarprodukte
- Soziologie Ländlicher Räume
- Umwelt- und Ressourcenökonomik
- Welternährung und rurale Entwicklung

In der Lehre ist das Department für Agrarökonomie und Rurale Entwicklung führend für die Studienrichtung Wirtschafts- und Sozialwissenschaften des Landbaus sowie maßgeblich eingebunden in die Studienrichtungen Agribusiness und Ressourcenmanagement. Das Forschungsspektrum des Departments ist breit gefächert. Schwerpunkte liegen sowohl in der Grundlagenforschung als auch in angewandten Forschungsbereichen. Das Department bildet heute eine schlagkräftige Einheit mit international beachteten Forschungsleistungen.

Georg-August-Universität Göttingen
Department für Agrarökonomie und Rurale Entwicklung
Platz der Göttinger Sieben 5
37073 Göttingen
Tel. 0551-39-4819
Fax. 0551-39-12398
Mail: biblio1@gwdg.de
Homepage : http://www.uni-goettingen.de/de/18500.html