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Why do Farmers Spend Different Amounts of Transaction Costs in Agri-Environmental Schemes?

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Abstract

Agri-environmental schemes provide payments for farmers in return for environmental services. Implementation induces transaction costs (TCs). Borne by farmers (private TCs), their amount may inhibit participation. Research shows substantial variances in private TCs within single schemes, which are largely unexplained to date. Furthermore, no distinction has yet been made in research whether farmers spent TCs due to scheme-prescribed tasks, or voluntarily to achieve 'transaction gains.' This might be an important factor in farmers' perceptions of TCs. The overall aim of this analysis is to explain within-scheme TC variances. TCs are defined functionally as "costs of participation." The variance in TC spending is assumed to represent a different willingness to participate due to underlying motives. This is tested by ANOVAs and Pearson's correlations with the example of a German AES. Results show that all assumed motives are significant but differ along the implementation process and imply that different functions have TCs. Thus, general public reimbursement of private TCs, as allowed in current EU regulations, might therefore be inappropriate.

Keywords: Agri-environmental Schemes, Transaction Costs, Hesse, Germany

1. Introduction

One of the major objectives of the European Union's Common Agricultural Policy (CAP) on rural development as stated in Regulation EC 1698/2005 is, "Farmers and other land managers [shall be encouraged] to serve society as a whole by introducing or continuing to apply agricultural production methods compatible with the protection and improvement of the environment, the landscape and its features, natural resources, the soil, and genetic diversity" (Art. 35). This aim is pursued via publicly provided 'Agro-Environmental Schemes' (AES). AES can be seen as a contractual mechanism for the transaction of environmental goods or services between the farmer/seller and the agricultural authority as representative consumer (Mettepenningen *et al.*, 2009). AES offer payments to farmers in return for committing to carry out agr-environmental measures above mandatory standards on a voluntary basis.

Implementing AES involves transaction costs (TCs), which are broadly defined as "scheme organisational costs" (Falconer et al., 2001:84). The expense of TCs is necessary at different stages of the implementation process: as (1) search and information costs to find an adequate transaction partner; (2) bargaining and decision costs if agreements on the terms of participation are required, and (3) policing, monitoring, and enforcement costs to make sure that each contract party complies with the agreement (Dahlman, 1979). While the first two are referred to as *ex ante* costs (prior to formal agreement), the latter are referred to as *ex post* costs (McCann *et al.*, 2005). As an important cost component, researchers' and politicians' interest in upcoming TCs grew (Falconer and Whitby, 1999; Vatn, 2002). In empirical research, TCs were found to amount up to 70% on average, (e.g. Rørstad *et al.*, 2007; Falconer *et al.*, 2001). Previous research shows substantial variances in TCs borne by farmers (private TCs), as well as between different AES (Vatn, 2002; Rørstad *et al.*, 2007, Falconer and Saunders, 2002), and within single schemes (Rørstad *et al.*, 2007, Beckmann *et al.*, 2003). TC variances between schemes are explained by the classical assumptions of Transaction Cost Economics (TCE), stating the attributes of the transaction and the governance mode as determining factors (Williamson, 1985). Farm and farmer characteristics, which are likely to be an explanation for within-scheme variances have been not investigated in depth. Furthermore, private TCs may prevent farmers from participation, as they reduce the net payment (Falconer, 2000). This was taken up by policy; in the current regulation EC 1698/2005, one is allowed to add a TC compensation payment for farmers into the calculation

of payments up to 20% (Art. 39). However, to date no distinction has been made in research whether farmers' TCs have to be spent compulsorily, induced by scheme-prescribed tasks, or spent voluntarily in order to achieve 'transaction gains' This might be an important factor in farmers' perception of the amount of TCs.

This analysis considers both aspects; the overall aim of this paper is to explain within-scheme, private TC variances. TC spending is perceived in a functional way; TCs serve to overcome information gaps and are intentionally spent on resources in terms of time and money by the farmers according to their individual motives (Weber and Nuppenau, 2010). Thus TCs are defined as a monetary expression of voluntary and compulsory tasks conducted by farmers. In order to check for external influences, analysis is done within one scheme, implemented in one region. The AES 'site-specific grassland extensification' within the institutional surroundings of the state of Hesse, Germany, serves as an example. TCs are measured directly for each contract in a process-related approach. Results show that the decision by farmers to spend money on TCs stems from several motives and varies along the transaction process. It is also shown that voluntary TCs are incurred to pursue particular aims. By that, variances in private TCs are shown to be the result of different underlying motives (aims). Thus a general reimbursement of farmers' TCs might not be reasonable.

The outline of the paper is as follows: After a presentation of the scheme particulars (Section 2), previous findings on farmers' TCs are presented in Section 3. The theoretical background for analysis and testable hypotheses are elaborated in Section 4. Section 5 describes the methodology. Results are presented in Section 6 and discussed in Section 7. This is followed by a short conclusion.

2. The Site-Specific Grassland Extensification Scheme

2.1 Political Frame

The site-specific grassland extensification scheme (SSGES) aims to preserve ecologically valuable grassland habitats (HMULV, 2006). Closing down cattle farms in such areas, but also intensification to increase yield in productive areas lead to a loss of grassland, which in turn causes the loss of environmental and ecological benefits such as water pollution control, erosion and habitat protection. The scheme was established to secure the typical small-section land use and to prevent land from being abandoned (HMULV, 2006). Priority on participation is given to farmers managing habitats specified by the EU-Habitats' Directive, but an eligible area can also be protected by nature protection laws, as long as it is approved as being ecologically valuable. Grassland specified by the Habitats' Directive covers about 41,000 ha in Hesse.

Since 2007, all Hessian AES are implemented under the framework of the Hessian Integrated Agri-Environmental Programme. All AES are based on a management contract between a farmer and a county agricultural administration (CAA). The SSGES takes the largest share of the budget as well as the highest intended number of participants (HMULV, 2006).

2.2 Scheme Details

The sites to be put in the contract are mainly selected by the CAA based on the ecological value of the site habitat represented by an amount of points, but farmers can make suggestions and/or reject the suggested sites. The contract period is five years. Farmers have to apply formally for participation. The application is checked for formal correctness, and if the sites are approved as applied for, contract details can be specified. Contract terms include basic prescriptions such as prohibition of grassland conversion, of using chemical or synthetic pesticides, and of surface irrigation or melioration. Farmers are obligated to use the contracted area agriculturally at least once per year; a second use (mowing or grazing) may be compulsory due to habitat characteristics. Farmers can choose between a grazing and a

mowing agreement. The main obligation in the mowing agreement is the prescription of a fixed (usually late) date for first mowing and the removal of the swath. The main obligation in the grazing agreement is a prescribed cattle density and often a prescribed (comparatively late) date for first grazing and often additional mowing. Farmers have to keep a detailed field log and, in case of a grazing agreement, a pasturing log. Furthermore, they have to allow inspection visits to the farm. The calculation of payments made for each type of agreement is based on estimated opportunity costs for participating farmers (HMULV, 2009). The basic annual payment is 110 €/ha for the mowing agreement and 200 €/ha for the grazing agreement. If the contract area is located in a nature protection area, the farmer is paid an individually calculated payment of 200€/ha according to the legally based use restrictions. Farmers have to apply annually for the payment. The amount of premiums was adopted from a range suggested by the federal agricultural ministry as an average compensation needed for losses in income and extra costs (HMULV, 2009). Taking this range as a reference, the Hessian payment is at the lower end. Beside the basic premium, further compensation payments ("ecologically valuable special services," EVSS) can be agreed upon. EVSS are based on presumed extra effort due to specificities of the contracted area, such as slope, wetness, or difficult accessibility. They can be specified in 3 steps of intensity, linked to 3 steps in additional payment. Payments for EVSS are also calculated as an average compensation. A total payment of 360€/ha/year must not be exceeded. Double funding is strictly prohibited; farmers participating in the organic farming scheme only receive the difference between the extensification and the organic scheme payment for contracted plots.

3. Previous Findings

The following overview focuses on studies with approaches similar to the one of this analysis. The first process-oriented calculation of single farm/farmer TCs in AES delivery was made within the STEWPOL project (Huylenbroeck and Whitby, 1999). Within that project, the most important work, which shaped researchers' perception on the effects of private TCs, is given by Falconer (2000). She states that both actual and perceived TCs matter in decision-making on participation and that the amount of TCs may keep farmers from scheme participation. Comparing seven case studies on various AES in Europe, she fnd that private transaction costs of scheme participation (related mostly to registration) amount to several hundred Euros per farm per year. Private TCs amount to ~ 5% of the compensation payments made to farmers on average, although with a wide range. Organic aid schemes are expected to be more expensive for farmers (closer to 10% of typical compensation payments). Many TCs were found to be fixed, so a proportionately larger burden is borne by smaller farms. However, no distinction is made between voluntary and compulsory TCs.

Falconer and Saunders (2002) compare private TCs in a highly site-specific and standardised management agreement approach, similar to the AES used in this analysis. They were the first to estimate TCs by calculating the costs of single tasks. TCs were distinguished in *ex ante* negotiation costs (up to the date of signing the agreement), and ongoing TCs. They find total costs to be £ 464/ha. Negotiation costs amounted up to £ 163/ha on average; the annual ongoing costs amounted up to £ 81/ha. Variances re not indicated. Overall, they find the lower the negotiation costs, the more standardised the agreement is. This highlights the influence of scheme standardisation on *ex ante* TCs.

Beckmann *et al.* (2003) investigate public and private TCs in an analysis with respect to differences between the whole-farm AES "organic farming" and an accumulation of several plot-specific AES intended to have the same ecological effect. The sample consisted of 16 farmers each from two German states, Baden-Wuerttemberg and Thuringia. A semi-standardised questionnaire was used to collect information about time and financial effort of farmers on specified scheme implementation-related activities (*ex post* interviews). Results

show that farmers in Baden-Wuerttemberg[1] spent 19.6 hrs./year (range: 1.5-62.5 hrs./year) on obtaining information. Organic farmers spent fewer hours on average than conventional farmers. For the formal application for the schemes, they found a mean of 9.6 hrs./year for all farmers, but effort for conventional farmers is lower. At the stage of implementation, documentation effort ranges from 12.5 hrs./year from participants of a grassland extensification scheme to 19 hrs./year for arable farmers. This study provides the most detailed insights on TCs at the scheme implementation stage so far. However, presumably due to the small sample size, only descriptive insights are given.

Mettepenningen *et al.* (2009) measured private TCs in AES in 10 European regions with a survey and a one-year registration ("follow-up") system. The total sample number is 1,318 respondents to the survey, and 156 farmers in the follow-up. The follow-up findings shows mean search costs (across all regions) of 11.10 €/ha (s.d. 54.2, 0-700.8), negotiation costs of 15.30 €/ha (s.d. 44, 0-396), monitoring and control costs of 10.60 €/ha (s.d. 14.1, 0-138.6) and some not further specified TCs of 3.30€/ha (s.d. 14.1, 0-125). Private TCs accounts for 25.4% of the premium on average. Basing on the same data, Mettepenningen and van Huylenbroeck (2009) use linear regression models to identify possible influencing factors on each particular type of TCs. Results show overall regional differences, but in general search costs are lower the more professional the training obtained by farmers is, and higher the larger the area under contract is and the more specific the investments are that had to be done. Negotiation costs depend upon the type of AES and are highly positively correlated with search costs. They are also higher the larger the area under contract is. Monitoring and enforcement costs are negatively correlated to the age of the farm head, to a higher household income, and to the amount of advice obtained from the administration but positively correlated to the number and type of AES. Furthermore, they state a positive relationship between all types of TCs. However, results are not clearly differentiated for the various measures, and the goodness of fit of the models is rather low. This may be as the most influencing factor on farmers' TCs is the country and region in which the participating farmers are located, representing different institutional surroundings.

This overview shows that the methodology and quality of defining private TCs and the depth and collecting data necessary for calculation have constantly improved. Furthermore, it shows that the statements of transaction cost theory also hold in an agri-environmental context. However, variances within the same schemes have not been investigated thoroughly. Furthermore, the origin of TCs, i.e. whether they are incurred upon the farmers' own decisions or are compulsory by scheme regulation, has not been taken into account.

4. Theoretical Frame and Hypotheses

4.1 Background

The concept of TCs was founded by (Coase, 1937) to explain the choice of different governance modes at executing different transactions. TCs are "resource losses incurred due to imperfect information" (Dahlman, 1979:148) along the whole process of transacting. Search and information costs have to be incurred by transaction partners in order to overcome the gap of information on possible transaction partners; bargaining costs have to be incurred in order to overcome lacking knowledge on the terms of trade; and monitoring costs have to be incurred in order to secure correct transacting *ex post*. Thus TCs are also resources to be spent in order to overcome informational gaps (Dahlman, 1979). This functional interpretation of TCs is the foundation of this analysis; TCs are costs intentionally spent on time and resource-consuming tasks in transactions.

According to (Williamson, 1985), the amount of TCs to be incurred in order to carry out a transaction depends largely upon the nature of a transaction. He relates this nature of the

[1] Results for Thuringia were not that detailed.

transaction to particular coordination mechanisms, with market and firm as extremes along an axis and various forms of cooperation in between (Williamson, 1985). In latter work, he took additional factors, such as the behaviour of the transactors and the institutional environment into account when investigating TC-influencing factors (Williamson, 2003). Regarding the amount of TCs, one coordination mechanism may be efficient compared to another, but TCs are only reduced and not extinguished (Williamson, 2003).

The informational gaps described above do not only require effort to be minimised but also enable transaction partners to act opportunistically, i.e. to realise additional rents (Williamson, 1998). According to the principal agent theory, information asymmetry exists at the expense of the principal (Laffont and Tirole, 1993), which in this context is represented by the CAA (Mettepenningen and van Huylenbroeck, 2009). The agent (here the farmer) is supposed to use private information to generate an extra rent. As the CAA does not know his actual production costs, he might make a claim for higher payments, resulting in overcompensation (adverse selection, i.e agreement on a suboptimal contract). After contract signing, information gaps inhibit the administration's monitoring of the farmers' actions completely. Farmers may apply for payment without complying with the management prescriptions. In the case of prearranged payments, the agent may generate an extra rent due to the difference of his costs (effort) and the amount of the payment (moral hazard) (Laffont and Tirole, 1993). The possibility of rent-seeking increases transaction costs for both contract partners: the administration must design regulations which prevent farmers from non-compliance, and farmers might need to make an extra effort to prove compliance with documentation requirements, accepting this delegation of control. As these costs are part of scheme implementation on farms, they are further referred to as implementation costs.

4.2 Hypotheses

These considerations show that – within the fixed setting of analysis – famers have to spend transaction costs to participate in the scheme. Spending on TCs is a (necessary) decision by the farmers to overcome informational gaps. Thus farmers conduct such tasks that help achieve their goal. Prior to contract signing (*ex ante*), farmers can decide autonomously which and how many TC-inducing activities they conduct. *Ex post* TC-inducing activities are prescribed by scheme regulations but can be anticipated by the farmer. Thus farmers' TCs can be regarded as "costs of participation." As participation is voluntary, it can be assumed that farmers benefit from participation. As farmers have to spend participation costs, the amount of TC spent can be assumed to be "willingness to participate." Differences in spending may occur, as the personal value (or utility) of this benefit might be different among farmers.

Farmers' interest in participating in the SSGES is likely to stem from several motives. Farmers might have an interest in nature conservation (Wilson and Hart, 2000). Thus farmers with a higher interest in this derive a higher utility from participation and are willing to spend more on participation costs.

Farmers also may have an interest in AES participation due to economic motives (Wilson and Hart, 2000). Participation might be interesting as an additional source of farm income, e.g. when farm income is the main source of income, at farms run on a full-time basis or large farms. Thus farmers with a high dependency on farm income may derive a higher utility from participation and would be willing to spend more on participation costs.

Additionally, farmers might be interested in 'secure' income possibilities to reduce risks from volatile market good production. These farmers therefore may also derive a higher utility from participation and would be willing to spend more participation costs. Furthermore, financial need for additional income may stem from their general business situation: a high degree of dependency on public support may increase the need for income, resulting in higher spending of TCs. The underlying business decision to run a farm in accordance with organic farming prescriptions may also be important for the decision to spend TCs.

Furthermore, farmers may have interest in participation because of rent-seeking motives (Quillérou *et al.*, 2010). If participation for farmers is possible without significant management changes, the premium would have the effect of a windfall gain. Thus farmers with low opportunity costs would spend less on TCs.

Farmers might also strategically spend TCs in order to participate at an 'optimal' level, realising additional rents. Thus the spending of TCs could be connected with a higher contract output, i.e. an increase of the premium by negotiating for additional EVSS, for a larger share of mowing agreement or an increased share of contract area or number of plots.

Finally, socio-economic factors such as age or degree of education or training might influence the interest in participation in this actual scheme.

For each source of motivation, variables were constructed either out of the direct answers of the questionnaire (most of the nominal variables) or by calculation from information from the questionnaire and the contract. To meet the conditions of normality, some metric variables are expressed in their natural logarithm.

5. Methodology and Data Base

Single TC-inducing tasks were identified from previous studies and adjusted to the actual scheme by examining the regulations and with the help of CAA staff. Based upon that information, a questionnaire was designed that contained questions on quantitative and qualitative data (nominal as well as metric scale measurement).

The questionnaire contained 6 major thematic sections to obtain information on the characteristics of the contract area, on the motivation for participation, on contract details, and on changes in production and resulting opportunity costs. The most important part aimed to gather the quantitative information on additional time and financial effort imposed by scheme participation. Data was requested for the first year of participation. Costs for information and negotiation were regarded as on-point *ex ante* costs (McCann *et al.*, 2005); effort on implementation (*ex post* costs) was extrapolated on the total programme duration (see below). The last two sections of the questionnaire contained information on farm structure, business indicators, and socio-economic characteristics of the farm head. The single tasks are depicted in Table 1. Tasks set in italics indicate prescription by the scheme regulations. Information on time effort was requested as a discrete statement. Financial costs for telephone calls were left out, as most farmers have flat rate agreements with their phone companies. Postal charges were also left out, as they would only occur once at submitting the application by mail and amount only about 2 €.

Data collection was done in a one-point cross-sectional approach using a representative number of farmers. Total sample size is 29. Data was gathered *ex post*, as the aim was to calculate the actual, and not the expected effort. Although some difficulties exist, as farmers may not recall their actual effort correctly (McCann *et al.*, 2005), the method is supposed to deliver robust results as shown above. Farmers were selected from two counties in Hesse (*Vogelsbergkreis, Wetteraukreis*). To capture all upcoming TCs, only farmers could be selected who had at least participated for one complete year within the contract. To check for distortions in TCs due to different management prescriptions, the contract had to refer to the specified habitat type of hay meadows. Farmers were addressed either via data from the CAA or via the snowball system. The face-to-face interviews (60-90 minutes) took place in April and May 2010 on the farms. The questionnaire was filled out by the interviewer. The pre-test contained 5 farmers (16% of total sample). Contract details were directly collected from the contract, business indicators from the tax records. Table 2 shows the description of the sample.

Table 1: Specified tasks for data collection. Tasks set in italics indicate prescription by the scheme regulations.

Step in implementation process	Effort for specified tasks
Information	Time effort: - on internet search, - on official or professional press - on information meetings from CAA - on private consultancy - tasks to other farmers - on meetings with officials in the CAA - on telephone calls with the CAA - on calculation of profit margins Travel expenses
Negotiation	Time effort: *- on choice of contract plots* - to get permission by the landowner - meetings and telephone calls on negotiation with CAA *- to fill in and* *- submitting the application* *- to make corrections in case of mistakes at application*
Contract Adjustments and Documentation/Monitoring	Time effort: - for adjustments on changes in farm-specifics: time effort on calculation of new profit margins, meetings/calls with CAA due to contract adjustments, own effort, travel expenses *- for keeping the field and pasturing log for each business year (9 months)* *- for the annual payment application* Travel expenses
Control	Time effort: *- for control visits and post-processing* *Financial effort due to sanctions*

As the first step in data analysis, the amount of contract payment had to be calculated by the researcher, as the payment is not specified in the contract. Calculations for one year were done upon the contract details (basic premium/ha and EVSS/Site/ha in accordance with the kind of agreement). It was taken into account that farms run under the "organic farming" – programme only receive the difference between the per-ha-payment in organic farming and the SSGES payment. Thus, a basic payment of 160€/ha (HMULV, 2009) was subtracted in contracts of organic farmers. The calculated payment was multiplied by 5 according to the contract duration. To calculate TCs, data concerning the single tasks, their frequency, duration, and kilometres driven by the farmers were entered into an EXCEL spreadsheet. Time effort was first calculated for the single tasks and subsumed afterwards under the different kinds of TCs. Time effort was monetarised by multiplication with the average wage rate of 16.86€/hour for agricultural workers. The wage rate was derived from the net wage rate and an additional 70% for ancillary wage costs, as stated by the Association for Technology and Structures in Agriculture (KTBL, 2008:717). Transportation costs were calculated upon the reported kilometres driven, multiplied by 0.30€/km as practiced in tax purposes.

The content of the questionnaires and the results (in terms of time and money) from calculations were entered in PASW. Annually upcoming implementation costs were extrapolated into the future by multiplication of the first year costs by the contract duration of five years. Costs likely to occur only once during the contract period, but regarded as implementation costs due to their character, were divided by 5 and thus distributed as a 20% share on each year of the contract period. Control costs were treated similarly when

occurring[2]. TCs and other metric variables were transformed into the natural logarithm in order to meet the normality conditions. As the sample number of 29 only allowed limited statistical methods, nominal variables were tested by one-factor ANOVAs. Discrete variables were correlated by one-tail Pearson's correlation. Dependent variables were the natural logarithm of the particular TC of the whole contract period. TCs per contract were chosen instead of TC/ha, as the number of ha to be contracted is not clear until the actual signing. Thus *ex ante* costs have to be spent without regarding the scope of contract area. To keep results comparable, TCs/contract were also chosen as dependent variables for implementation costs.

Table 2: Description of the sample

		mean	min/max
Farm size		136.10 ha	4.63 – 410 ha
	Arable land	49.92 ha	0-300 ha
	Grassland	86.34 ha	4.63-250 ha
Suckler cow husbandry		37,9%	
Dairy farming		31%	
Arable farming		13.8%	
Others		17.2%	
Organic farmers		31%	
Fulltime run farms		69%	
Age farmer		48.7 yrs.	30-76 yrs.
Sex of farm head:	male	89.7%	
	female	10.3%	
Farmers' training level:	None	37.9%	
	Traineeship	13.8%	
	Advanced training/foreman	31.0%	
	University degree	17.2%	
Size of contract plots		1.75 ha	0.47 – 4.5 ha
Altitude		423m	120-670 m
Scope of contract		30 ha	3.46 -115.49 ha
Total number of plots /contract		18	4-148
Contract area/total grassland		41.0%	3-100%
Both agreements		41.1%	
Scope EVSS/contract		92.0%	

6. Results

6.1 Descriptive Results

Results from summarising task-related activities are presented in Table 3: They are indicated as TCW (mere working hours) and TC (TCW plus travel expenses). Descriptive results show that the amount of total TCs is substantial. A comparison of the first year costs and the total contract period shows that a digressive effect occurs over time, indicating the share of the fix costs on information and negotiation. The results also show that despite the fixed setting large variances in the individual TCs persist.

[2] 65.5% of the sample farms had been inspected in previous years. Effort for farmers only occurs when non-compliance is stated. This applied to only 3 farms. However, inspection costs were included.

Table 3: Total TCs of farmers in scheme participation

	First year		Total contract period	
	∅	s.d.	∅	s.d.
TCW/contract (hrs.)	28.9	25.06	82.9	98.62
TC/contract (€)	527.10.	432.70	1440.48.	1667.44
TCW/premium (€)	0.16	0.2	0.09	0.15
TC/premium (€)	0.17	0.21	0.09	0.15
TCW/ha contract area (€)	30.63	46.94	91.96	202.46
TC/ha contract area (€)	33.85	48.63	95.33	202.82
TCW/plot (€)	46.64	51.56	128.41	172.91
TC/plot (€)	51.87	57.66	133.98	176.23
Info costs/contract (€)	171.96	142.44	171.96	142.44
Negot. costs/contract (€)	126.84	127.32	126.84	127.32
Implem. costs/contract (€)	228.34	317.33	1141.69	1586.65
Information costs (%)	40.7	24.6	24.6	23.4
Negotiation costs (%)	27.5	19.7	15.0	13.6
Implementation costs (%)	31.8	22.4	60.5	27.1

6.2 Results on influences of motives

The results on the particular types of TCs are presented separately in Table 4. First, results show that farmers who participate due to an interest in nature conservation spend more on TCs at every stage of scheme delivery. This indicates a potential higher "willingness to participate." Second, it is obvious that variables from all identified motivational categories are significant, but with very different emphasis and in different composition along the contract process. This requires a closer look:

Information Costs

Regarding information costs, variables with reference to the agricultural income as main income source are significant: Farmers who manage large farms, organic farms, and/or run their farms full-time, and those who have a long-term business horizon spend more effort on information gathering. In line with TCE, farmers who face high opportunity costs when participating in the scheme invest more on previous information. This finding is corroborated by the negative correlation of the altitude of contract plots (indicating increasing marginal productivity) with information effort. Interestingly, effort on information gathering is also higher when farmers state fewer alternative use options for the contract plots. Thus windfall gains are likely to be attempted by farmers.

Variables that refer to strategic spending in order to obtain better contract conditions show no significance except for a negative correlation of the share of contracted grassland and costs spent on information. This can be interpreted as confirmation of the fixed-cost nature of information costs.

Finally, the amount of schooling as well as of farmers' training is positively connected to the willingness to spend money on information. This result is no surprise, as people that are more educated are likely to be more interested in information on further management options.

Table 4: Results of ANOVAs and correlations on the different Types of TCs

		Ln Information costs (n=29) mean/r	Ln Negotiation costs (n=28) mean/r	Ln Implementation costs (n=29) mean/r
Interest in nature conservation (y/n)		5.04/4.44*	4.67/3.93*	6.43/5.26*
Organic farming (y/n)		5.39/4.52**	4.61/4.25	5.57/6.11
Fulltime farm (y/n)		5.06/4.19**	4.46/4.14	6.43/4.87**
Ln total farm size (ha)		0.612****	-0.029	0.211
Long-term business horizon (y/n)		5.05/4.27**	4.28/4.57	6.11/5.87
Farm focus	Dairy:	4.63	4.63**	6.20
(3 most prevalent)	Suckler:	5.20	4.44**	5.43
	Arable farms:	5.16	2.89**	6.58
Volatility in production (y/n)		5.08/4.59	4.91/3.39**	6.61/5.47*
Volatility in market revenue (y/n)		5.00/4.85	4.40/4.61	6.15/5.86
Financial motives for participation (y/n)		4.80/4.78	4.31/4.45	6.37/5.01**
Subsidies CAP/ total revenue (%)		-0.071	0.427**	0.063
Sum of indicated management changes		0.489****	0.348**	0.285*
Ln altitude of contract plots (m a.s.l)		-0.357**	0.325**	-0.214
Alternative land use options/ contract plots (%)		-0.247*	0.232	0.056
Assumed high reversal costs (y/n)		4.86/4.73	4.25/4.43	5.67/6.17
Ln total premium		0.031	0.234	0.371***
Ln total premium/ha[a)] (n=20)[b)]		-0.038	0.716****	0.272
Ln contract area/ total grassland		-0.278*	-0.048	0.167
Ln number of plots under contract		0.148	-0.043	0.273*
Ln weighed Sum of EVSS		-0.044	0.043	0.157
Grazing agreement/contract		0.107	0.395**	0.284*
Age of farm head (yrs.)		0.027	-0.063	-0.104
School education	8 yrs	4.63*	4.31	5.86
	10 yrs	4.26*	4.41	6.07
	12/13 yrs	5.24*	4.36	5.95
Farmers' training degree	None	4.22**	4.32	5.35
	Traineeship	4.67**	3.62	7.04
	Advanced	5.26**	4.33	5.56
	University	5.31**	5.06	7.07

p= 0,1; p**=0,05; p***=0,01; p****=0,00*

[a)] Per ha premiums were correlated to the particular TCs per ha to identify direct input/output relationships.

[b)] Note that only premiums of conventional farms could be used due to the differences in premium calculation between conventional and organic farmers.

Negotiation Costs

At the stage of applying and negotiating contract details, results show a rather different picture. Significant results of financial motives show a strong influence of variables, indicating a dependency on subsidies as well as income stabilisation. Farmers who face annual variances in market commodity outcome spend more effort on negotiating than farmers with stable production. This is corroborated by the influence of the farm focus: Farmers with a business focus on animal husbandry spend more on negotiation activities. The prevalence of a ‘financial need’ as motive to invest in negotiation is supported by the significant results of contract output-indicating variables. Higher negotiation costs seem to result in a premium/ha as well as a higher share of grazing agreements (implying a higher basic premium) in the contract agreement. Variables on possible windfall gain motives show mixed results; on the one hand, farmers who face low opportunity costs when participating in the scheme invest less on bargaining, thus indicating no special interest in the contract outcome; on the other hand, the altitude of contract plots is positively linked to negations

costs, indicating rent-seeking motives. Despite the yet extensive land use due to limited productivity, higher premiums, possibly exceeding production costs, may be aspired by the farmers. Farmers' education shows no influence.

Implementation Costs

At the stage of implementation, a significant positive correlation exists between implementation costs and total farm size. Farmers who participate due to financial interest spend more effort on contract implementation, as well as farmers who face annual variances in market commodity outcome. Implementation costs also correlate positively with farmers' opportunity costs. Regarding the category of output indicators, a higher total premium, a higher share of grazing agreement, and the number of plots under contract are positively correlated with implementation effort.

7. Discussion

The findings show, that different categories of motivation lie behind farmers' willingness to spend transaction costs. Surprisingly, their particular influence varies along the different stages of scheme delivery.

At the stage of information gathering, farmers seem to be strongly influenced by the characteristics of their business and its meaning as source of income. The structure of prevalent farm characteristics for spending TCs also implies a certain necessity for 'professional management'. The more important the farm revenue as source of income is, the more willing farmers are to spend time on information possibilities offered by the AES. As information costs have to be spent prior to contract specification and signing, and as output related spending seems to play no role at this stage, effort on information costs can be interpreted as an initial investment (sunk costs), and as a necessary part of general business management. Spending on information gathering seems to be more important the more 'professional' the farm business is run.

At the stage of negotiation, financial output-improving motives are most prevalent. Thus negotiation effort may be interpreted in two ways. First, pure rent-seeking motives could prevail and imply that farmers act strategically and exploit loop-holes in contract regulations in the sense of adverse selection. However, basic premiums offered to farmers are rather low. Thus it is more likely that farmers try to increase their payment by additional negotiating. However, negation costs seem to have a substantial strategic function.

At the stage of implementation, farm characteristics indicating income maintenance and contract output specifications are prevalent. However, interpretation of this result has to be done with respect to TC-determining activities, which are mainly the compulsory keeping of the field log and, in case of a grazing agreement, the additional grazing records, and the post-processing of control visits. The farmer can anticipate these implementation costs prior to participation. The amount of paperwork is positively linked to the scope and kind of agreement, resembling the contract output details. The tasks serve as documentation of farmers' compliance with management prescriptions and their entitlement for payment. As farmers are largely obligated to state their own compliance, the willingness to spend implementation costs can be interpreted as an expression of willingness to comply as a necessary obligation to enhance income maintenance.

8. Conclusion

The analysis shows that variances between farmers' TC expenses can be explained by different motivational factors. Spending on TCs as "costs of participation" is a result of farmer-specific intentions. Different motives are prevalent at the various stages of scheme participation. Results also show that the actual amount of TCs may not be the prevalent factor in scheme participation, as a large part of TCs are spent voluntarily in order to realise gains from transaction. Thus, a general reimbursement of farmers' TCs by the public seems not to

be appropriate. If offered, a reimbursement should only refer to scheme-related, obligatory TCs.

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