

# DISCUSSION PAPER SERIES

No. 9452

**MEASURING POLITICAL  
INFORMATION RENTS: EVIDENCE  
FROM THE EUROPEAN  
AGRICULTURAL REFORM**

Hans Peter Grüner and Daniel Müller

*PUBLIC POLICY*



**Centre for Economic Policy Research**

[www.cepr.org](http://www.cepr.org)

Available online at:

[www.cepr.org/pubs/dps/DP9452.asp](http://www.cepr.org/pubs/dps/DP9452.asp)

# MEASURING POLITICAL INFORMATION RENTS: EVIDENCE FROM THE EUROPEAN AGRICULTURAL REFORM

Hans Peter Grüner, Universität Mannheim and CEPR  
Daniel Müller, Queensland University of Technology

Discussion Paper No. 9452  
April 2013

Centre for Economic Policy Research  
77 Bastwick Street, London EC1V 3PZ, UK  
Tel: (44 20) 7183 8801, Fax: (44 20) 7183 8820  
Email: [cepr@cepr.org](mailto:cepr@cepr.org), Website: [www.cepr.org](http://www.cepr.org)

This Discussion Paper is issued under the auspices of the Centre's research programme in **PUBLIC POLICY**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as an educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Hans Peter Grüner and Daniel Müller

CEPR Discussion Paper No. 9452

April 2013

## ABSTRACT

### Measuring Political Information Rents: Evidence from the European Agricultural Reform\*

This paper develops a method to estimate information rents of losers of a reform who receive a monetary compensation. Our method explicitly accounts for survey respondents' reluctance to reveal a willingness to accept which is smaller than the actual compensation. We apply our approach to the case of the 2005 European agricultural reform using uniquely gathered survey data from farmers in Lower Saxony, Germany. We find empirical indications for strategic misreporting. Correcting for these effects with a structural model, we find that information rents are in the order of up to 15 per cent of total compensation paid. Moreover, we show that the reform could not have been implemented distinctly cheaper by conditioning compensation schemes on observable factors.

JEL Classification: D70, D78 and H20

Keywords: European agricultural reform, information rents

Hans Peter Grüner  
Lehrstuhl für Wirtschaftspolitik  
Universität Mannheim  
D-68131 Mannheim  
GERMANY

Daniel Müller  
Queensland University of Technology  
GPO Box 2434  
Brisbane, QLD 4001  
AUSTRALIA

Email: [hgruener@staffmail.uni-mannheim.de](mailto:hgruener@staffmail.uni-mannheim.de)

Email: [d3.mueller@qut.edu.au](mailto:d3.mueller@qut.edu.au)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=144072](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=144072)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=177148](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=177148)

\*We thank the LWK Niedersachsen and especially Hans Georg Hassenpflug for their support in collecting the data and Andreas Lumpe from ZENDAS for legal advice regarding data privacy issues. We are indebted to Russell Davidson, Fabian Herweg and Andrew McClelland for helpful discussions. We also thank seminar participants at MPI Bonn, WZB, Berlin, DICE, Düsseldorf and Silvacplana for useful comments and Kira Gährken and Charlotte Wollenhaupt for research assistance. Part of this paper was written while one of the authors also was a research fellow of the Directorate General Economics and Finance of the European Commission. However, this research has not received any funding from the European Commission. Views expressed represent exclusively the positions of the authors and do not necessarily correspond to those of the European Commission. Financial Support from the German research foundation (DFG, SFB 884) is gratefully acknowledged.

Submitted 22 April 2013

# 1 Introduction

Reforms creating huge welfare gains may fail when they face substantial opposition of special interest groups (see for example Boeri, Börsch-Supan, and Tabellini (2002), Drazen (1996), Saint-Paul (2000), Rodrik (1996) and Rodrik (1993)). In principle, it should be possible to compensate losers of such reforms if the gains of the winners are large enough. However, losses are often distributed unevenly and they may also be private information. In this case, information rents of reform-losers are an obstacle to any compensation. If the information rents are large enough, compensating enough reform losers may turn out to be too costly and hence even welfare enhancing reforms may fail.<sup>1</sup> In this paper we estimate information rents that arise when policy makers are not informed about how individuals expect to be affected by a reform. For this purpose, we develop a method to estimate political information rents of losers of a reform, which explicitly accounts for the reluctance of reform winners to reveal their willingness to accept.

Estimating the distribution of information rents is useful because this distribution is key in determining whether it is possible to compensate enough reform losers. Consider for example the case where a fraction  $\beta$  of the – politically organized – losers of a reform have to be compensated in order to get the approval of their interest group. Moreover, assume that there is a maximum amount  $G$  which is available for the compensation of each reform loser. Call  $F(\theta)$  the known cumulative distribution function of the losses  $\theta$ . In order to buy the support of a fraction  $\beta$  of the reform losers, all reform losers have to be given the amount  $x$  satisfying  $\beta \leq F(x)$ . In this case, all individuals with a smaller willingness to accept,  $\theta < x$ , get a rent  $r = x - \theta$ . Figure 1 describes a case where the amount  $G$  is insufficient to fully compensate the fraction  $\beta = 0.6$  of reform-losers even though the average aggregate losses  $\bar{\theta}$  are smaller than  $G$ . Hence, a compensation becomes too expensive when the information rents are high. If instead  $F(\theta)$  is skewed such as in Figure 2, a compensation is theoretically still possible. This illustrates the importance of knowing the distribution of losses when a certain policy issue shall be implemented.

---

<sup>1</sup>A different reason for the failure of reforms has been studied by Fernandez and Rodrik (1991). In their paper individual uncertainty about reform outcomes potentially constitutes an obstacle to successful reform implementation. The role of information rents in labor market reforms has been theoretically studied by Grüner (2002).

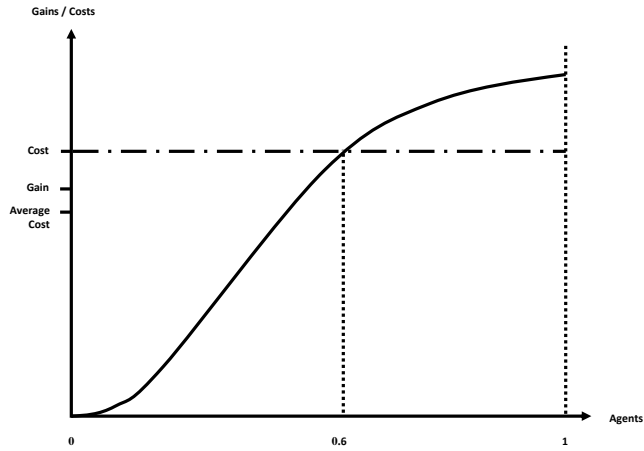


Figure 1: Example of a reform that is going to fail if 60% of the reform losers need to be compensated.

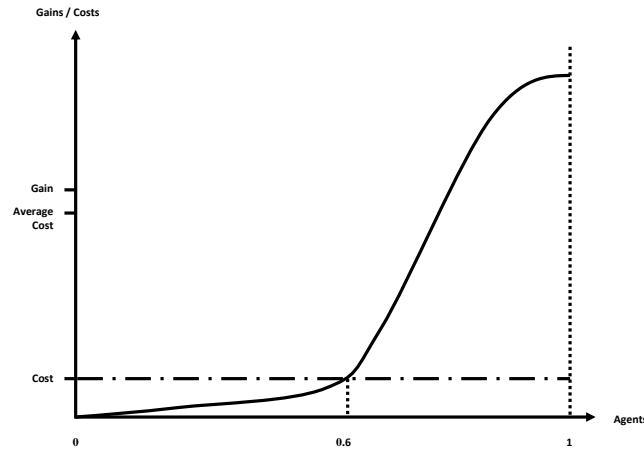


Figure 2: Example of a reform that is going to be successfully implemented if 60% need to be compensated.

In general, the empirical analysis of the political feasibility of a reform is complicated because it requires knowledge about the distribution of losses. The possibility to compensate reform losers can be evaluated more easily in the special case where a simple majority of reform-losers has to be compensated. This case is relevant when reform losers are organized in an interest group and use majority voting to settle their internal conflicts. A reform increases the overall surplus if the aggregate gains  $G$  exceed the average loss of reform losers,  $\bar{\theta}$ . In the case where a simple majority is required, a reform is politically feasible if the median of the distribution of types is not smaller than its mean. If the distribution of types is symmetric, this condition is always fulfilled. Therefore, empirical support for symmetry of the distribution of losses implies that an efficiency enhancing reform should always be politically feasible.

The contribution of this paper is twofold. Firstly, we derive a method to estimate the distribution of political information rents based on survey data related to the 2005 European agricultural reform. During this reform the European agricultural subsidies were shifted away from payments bounded to quantities produced to flat payments. This reform was efficiency enhancing in the sense that prices for agricultural products are now closer to their distortion-free market price. In order to estimate the aggregate size of information rents we collected unique survey data from more than 300 farmers in Lower-Saxony, Germany. The main problem that one is facing in this context is that winners' and losers' response rates may differ in the sense that reform profiteers are more reluctant to reveal their willingness to accept than losers. In fact the survey data we collected exhibits exactly this characteristic. We show how one can tackle this problem: we ask people about their willingness to accept (WTA) in a two step procedure. First, we ask a yes-no question about whether the respondent belongs to the group of reform losers or winners - where non-responses do not seem to be a matter of concern - and, in a second question, we ask for the exact amount in monetary units. Based on this information, we then develop a maximum likelihood procedure to estimate the distribution of the willingness to accept that explicitly takes this into account. This estimator is derived from a utility function which assumes that people dislike both, lying and harming their fellow farmers by stating a low WTA. Then, we structurally estimate this model and make inference about the empirical distribution of losses and gains. Applying this method to the survey data we gathered, we show that substantial

information rents of up to 15 per cent of total compensation have been paid to European farmers during the 2005 agricultural reform. We also find some empirical support for strategic misreporting.

Second, we study whether it would have been theoretically possible to implement the reform in a less expensive way by conditioning compensation packages on observable or unobservable characteristics of farmers and their farms. We find that it is unlikely that public expenses could have been reduced substantially by conditioning compensation packages on observable characteristics ex-ante.

Our paper points out that the European Union has been successful in compensating its farmers for the 2005 agricultural reform. This is why we believe that this reform may serve as the blueprint for other reforms in the future. The paper proceeds as follows. Section 2 describes the agricultural reform of 2005 in more detail, depicts how the survey was practically implemented and presents the data we collected in more detail. In Section 3 political information rents are structurally estimated using a simple survey response model. Section 4 presents some robustness checks including nonparametric methods where we show that our estimates do not critically depend on the assumptions made in the Section before. Section 5 demonstrates to what extent verifiable information could have been used to reduce the information rents based on the European agricultural reform and Section 6 concludes.

## 2 The Reform

### 2.1 The EU Agricultural Reform of 2005

The European agricultural reform of 2005 seems to be a textbook example of a political innovation that most economists would consider to be efficiency enhancing. This is of interest in its own, but is also particularly relevant in our context since it gives us a unique setting to study ex-post an efficiency enhancing reform that was successfully implemented. As mentioned before, the reform included a renunciation of subsidies bounded to quantities in favor of flat payments by area. This Section explains the reform in more detail.

The “Luxembourger Decrees” or “Mid-term Review”, that entered into force at the first of January 2005, were the last decree of a series of market orientated reforms, starting with the MacSharry reform in 1992. The reform was conducted



within the “Common Agricultural Policy” (CAP) of the European Union, which is the European agricultural policy system. In the 30 years before 1992 the CAP was characterized by direct interventions in markets of agricultural products, for example through buy outs, intervention prices and export subsidies. This practice created high excess supply and costs for European tax payers.

Although the share of agricultural subsidies at the total budget of the European Union has been steadily fallen in the last two decades from about 60% to slightly more than 40%, the agricultural spending is with approximately 55 billion euros per annum still by far the largest position in the European Union budget.<sup>2</sup> The key aspect of the reform was the replacement of output- and quantity-oriented agricultural subsidies by a flat premium, paid per hectare cultivated. From an efficiency point of view this is a desirable adjustment of agricultural politics since the incentives to overproduction are minimized and prices of agricultural products will be closer to their distortion-free equilibrium level.

There are minor differences in the way the post-reform subsidies (that is the flat payments) are calculated on the national level in different member states. In general there are two main approaches, the “farm model” (“Betriebsmodell”) in which the premium from 2013 onwards depends on farm specific characteristics evaluated in the reference period 2000 to 2002 and can as a consequence slightly vary from farm to farm. The second one is the so-called regional model where the payments from 2013 onwards only vary across regions (“Regional Model”). The latter model is implemented in Germany.<sup>3</sup> In the case of Lower-Saxony we know that the flat premium amounts to 352 euros per hectare and year from 2013 on.<sup>4</sup>

The “Mid-term Review” reform consists of three cornerstones. The first is “Decoupling”, which means that all agricultural direct payments and payments for livestock and area and so on are from 2013 onwards subsumed in one common flat subsidy. The amount paid in Lower-Saxony as of 2013 is as mentioned above 352 euros per year and hectare cultivated and is thus independent of the

---

<sup>2</sup>See for example the homepage of the European Commission at [ec.europa.eu/agriculture/cap-post-2013/graphs](http://ec.europa.eu/agriculture/cap-post-2013/graphs) .

<sup>3</sup>For more information, see the official Journal of the German Federal Ministry of Food, Agriculture and Consumer Protection (2006), Rohwer (2010) and Henning and Nord (2004).

<sup>4</sup>See the official note of the German Federal Ministry of Food, Agriculture and Consumer Protection: “Regionale Zielwerte im Rahmen der Betriebsprämienregelung”, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, February 2010.”

quantity produced.<sup>5</sup> The decoupling became effective at the first of January 2005, but it is not until 2013 when the system is fully reorganized. During that period the total amount of subsidies a farm has received per hectare in 2004 is linearly adjusted to the target level of 352 euros per hectare in 2013, with yearly changing adjustment factors.<sup>6</sup>

The second cornerstone is “Cross-compliance”. It implies that payments are bounded to the compliance with ecological, animal-welfare and quality regulations. Moreover, the entire area under cultivation needs to be maintained in a “good ecological and agricultural condition”.

The third major change in the European agricultural policy, called “Modulation and Degression”, denotes the shift of payments from the first pillar (which supports production and market measures) to the second pillar (which is concerned with rural development and ecology). Modulation also encompasses the deduction of overall payments by five per cent until 2007.

Although the change in policies does not involve a significant reduction in the European Agricultural budget (except the five per cent deduction mentioned above), the reform can be considered as social efficiency enhancing in the sense that flat payments do not create market distortions and thus it should theoretically be possible to redistribute the surplus in a Pareto improving way. The payments of 352 euros as of 2013 can be thought of as a compensation to the farmers to break their opposition against the reform. As mentioned before, the reform entered into force at the beginning of 2005, but it will take until 2013 to complete the process. This implies that the adjustment process was on-going while we collected the survey data and thus recall of relevant information was as well as in any way possible. This gives us an almost ideal setting to study the willingness to pay and the value of private information in reform processes.

## 2.2 The Survey

In order to study this reform in more detail, we conducted a comprehensive survey among farmers starting in October 2011 to February 2012 in Lower Saxony, the second largest state in Germany as measured by area. We not

---

<sup>5</sup>As mentioned before, this premium can vary slightly from state to state, but will not be distinctly different from 352.

<sup>6</sup>The payment is a linear combination of the 2004 and the 2013 payment, with weights  $w_t$  on the 2004 value equal to 1 between 2005 and 2009 and  $w_{2010} = 0.9$ ,  $w_{2011} = 0.7$ ,  $w_{2012} = 0.4$  and  $w_{2013} = 0$ . See Henning and Nord (2004) for more details.

only asked farmers directly for their willingness to accept (WTA) the reform, the core of the survey, but also asked a battery of demographic and socio-economic questions and technical and financial data of their farm.<sup>7</sup> For data privacy reasons we had to ensure the anonymity of the participants and thus, sometimes had to summarize answers in categories (especially for precarious questions such as those for subsidies and the size of the area cultivated). The aim of the survey was first of all to elicit individual's WTA and secondly, to retrieve factors that could potentially impact on it. For example, we asked for the number of children that are potentially willing to take over the farm and we asked whether the farm is in family possession and if so, for how long. We conjectured beforehand that these factors might influence the farmers WTA in one way or another.

The questionnaire was divided into three larger sections. In the first part we asked people about their attitudes towards and experiences with agricultural subsidies, but also about the amount of subsidies they received in 2011. We asked them how farmers judge the impact of the 2005 reform for themselves but also for all other farmers. The two key questions in the survey are question six where we ask whether they are personally better or worse off after the reform of 2005 (a yes – no question) and – question seven or eight – by how much in monetary terms. The “winner or loser” question is an important building block when we estimate the distribution of losses, since this question was answered by virtually everybody (as opposed to the question where we asked for the concrete WTA). Section 3 describes the method in more detail. In the second part of the survey, we gathered detailed information on the farm from an agricultural and technical perspective. For example we asked how large the area is the farmer tills, what products exactly the farms produced and in which order of importance (in terms of revenue), the number of employees, whether and for how long the farm is family property, the quality of the soil and how many children the farmers has who would be willing to take over the farm later. The last part was about personal and demographic factors such as age, sex, education, religion and political attitudes. All in all the questionnaire included 34 questions.

All questions were closely coordinated with the “Landwirtschaftskammer Niedersachsen“ (LWK), which is the official agency of farmers in Lower Saxony

---

<sup>7</sup>An English version of the questionnaire can be found in the appendix, the original German version is available upon request.

and is commissioned with the assistance and support of its members in legal and administrative issues in its jurisdiction. It supervises more than 50,000 farmers in Lower Saxony. Membership in the corresponding LWK is compulsory for all farmers in Germany. The LWK was also delivering up the questionnaires to the farmers.

Concretely, the survey was conducted as follows. We sent the questionnaire to the central department of the LWK in Hannover, Lower Saxony. From there it was spread randomly to its subbranches, where consultants of the LWK were asked to take the survey with them once they were about to visit one or more farms. A consultant visits the clients on a regular basis to help them with general organizational and administrative tasks (for example bookkeeping, tax declaration and subsidy claims). The survey was then handed to the farmer. It is important to note that the order in which consultants visit their clients is random and thus completely independent from any factor that could potentially influence our results. That means, consultants do not follow any particular order or procedure when they visit the farmers and they are also not called by the farmers. We made sure that the questionnaire was answered independently by the respondent and that the consultant as well as the LWK in Lower Saxony were well aware that for data privacy reasons they were legally not allowed to influence or even look at the answers given. However, it was in principal possible for the respondent to ask the consultant for any required information. This might have been helpful for the respondent when he or she faced problems to recall dates since the consultant's main task is to assist the farmer with the bookkeeping and tax filing and he or she is thus an expert for any kind of financial and other data concerning the farm. We received the questionnaires in sealed envelopes from the LWK between December 2011 and March 2012. The farmers had also the option to directly send the questionnaires to the University of Mannheim. However, only one farmer has chosen to do so.

### **2.3 Some Descriptive Statistics**

On balance we sent out 500 questionnaires and received 368 completed questionnaires back, which yields an overall response rate of almost 75 per cent. This gratifying high rate can be explained by the personal relation between the consultant and the farmer, which is typically characterized by mutual trust. As mentioned before we asked two questions on their WTA. One where the respon-

dents simply state they were better or worse off after the reform and one where we actually requested precise information on their WTA, the key question of the survey. We dropped those who did not answer the WTA questions at all and (in a few cases only) those who gave inconsistent answers between the two,<sup>8</sup> which leaves us with 315 observations out of the 368 responses we initially received.

The exact phrasing of the “winner or loser” question was: “Is the compensation of 352 Euro per annum and hectare you are going to receive in 2013 sufficient to make you at least as well off as you would have been under continuation of the old subsidy-system of 2004?”. In the follow-up question we then asked the respondents how large the compensation in 2013 would have to be per hectare and annum for them to be exactly break even compared to 2004, the year right before the reform was put into force.

Empirically, we find that judging from the yes – no question the share of reform winners is practically as large as the share of reform losers (159 versus 156 respondents or 50.5 per cent versus 49.5 per cent). The mean of the WTA answer is 408, the standard deviation is 117, the minimum zero and the maximum is 1000 (not adjusting for the asymmetric non-responses). The average age of the respondents was 43 years. 93 per cent of the respondents were male and 70 per cent protestants.

One problem that we expected beforehand was that respondents who profited from the reform are reluctant to reveal their exact WTA. And indeed, this is also what we find when analyzing the data: response rates are highly asymmetrical in the sense that almost 40 per cent of the reform winners but less than 12 per cent of the loser do not reveal their WTA. In fact all other question have a distinctly lower non-response rate. Even the thorny question on the amount of subsidies a farmer currently receives has a substantially lower non-response rate of only 3.5 per cent. From this cursory look at the data, it seems obvious that there is a systematic bias in the willingness to elicit ones WTA, which cannot be ignored in the further analysis. We will tackle this problem in Section 3 by a weighted maximum likelihood approach. Figures 3 and 4 display the empirical distribution of the WTAs.

---

<sup>8</sup>Combined with the information that in 2013 all farmers in Lower Saxony are going to receive a flat payment of 352 Euro per hectare and year, this leaves us also the opportunity to spot inconsistent answers. A reform winner needs to declare a WTA lower or equal than 352 and vice versa.

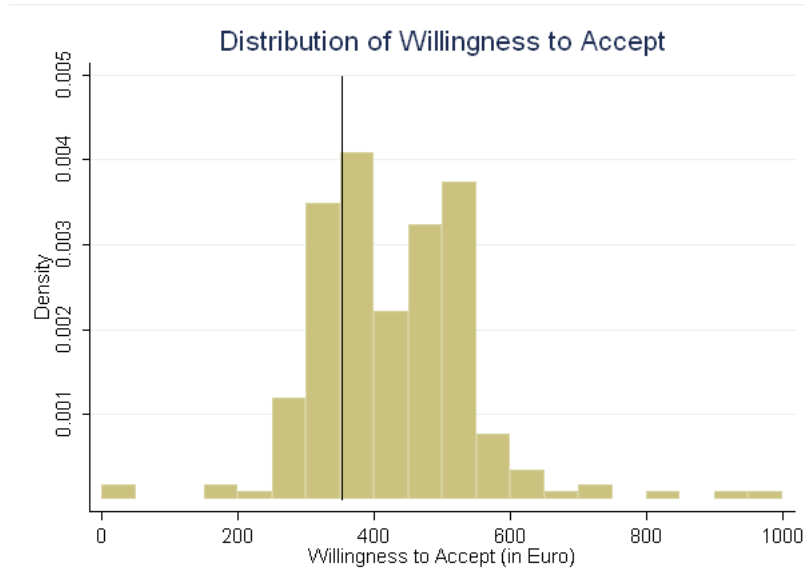


Figure 3: Histogram of Willingness to Accept. The vertical line is at 352, the value which divides reform losers and winners.  $N = 315$ .

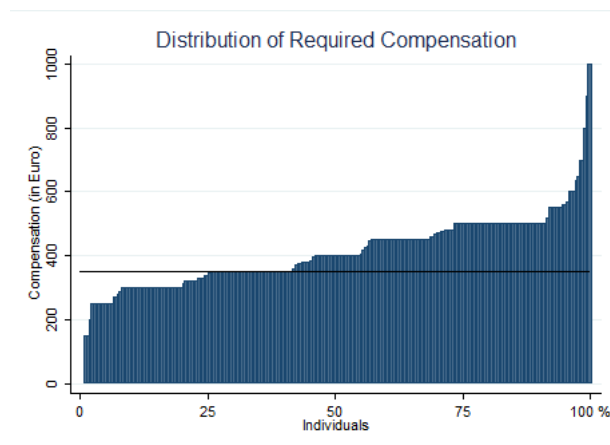


Figure 4: Empirical Distribution of Willingness to Accept. Number of individuals is normalized to 100. The horizontal line is at 352.  $N = 315$ .

## 3 Structural Estimation of a Survey Response Model

### 3.1 Estimation

In this section, we estimate the size of information rents in the case of the 2005 European agricultural reform. Their magnitude is determined by the distribution of losses and the size of the compensation paid. As outlined before, information rents can be a major obstacle in implementing economic reforms and hence play a crucial role for economic policy and social welfare.

Our estimation of the distribution of losses faces two possible problems. One is strategic non-response: farmers may choose not to respond to question eight (required compensation) because they understand that a low value of the WTA may be used as an argument for the reduction of the subsidy in the future. In fact this is also in line with our empirical observation: While reform profiteers are somewhat reluctant to elicit their WTA, this does not seem to be a concern for the reform losers. In fact around 40 per cent of the reform winners and only slightly more than 10 per cent of the reform losers do not respond to the question asking for their WTA. We presume that there would be similar problems in comparable situations, which is why we think our approach is not only applicable in our case, but is also of general importance in economic policy analysis.

A second problem that we are facing might be strategic misreporting. Farmers who have admitted to be reform winners in their response to question six may report a value of their WTA in question eight that is too high. This might be the case because farmers may not want to harm their fellow farmers. This effect is likely to play a role empirically given the double peak distribution of responses in Figure 3 where one peak is located slightly to the left of 352 euros.

Our empirical model takes care of both kinds of strategic behavior. The key in our approach to tackle both problems is the winner–loser question, a “yes or no” question, to which 315 farmers responded. Based on this and the precise answers on the WTA (which still 235 respondents replied to), we develop a novel likelihood based approach to structurally identify the distribution of losses during the reform process.

To be more precise, let  $\theta$  denote the WTA which is private information

to every agent. We model survey response behavior as a process with two stages. First nature draws  $\theta$  from a distribution  $F(\theta)$  with the corresponding density  $f(\theta)$  for every agent. We know that there exists a certain cut-off  $c$  which divides reform profiteers and losers ( $c = 352$  in our case). Hence we know that respondents facing  $\theta > c$  are reform losers and those with  $\theta < c$  belong to the profiteers. We permit the response rates to differ above and below  $c$  and assume that farmers in the second step give a numerical answer to question seven or eight with probability  $\underline{p}$  if  $\theta < c$  and with probability  $\bar{p}$  if  $\theta > c$ . We assume that  $\underline{p}$  and  $\bar{p}$  are exogenously given.

Finally, we permit that agents who reveal being a reform winner in question six understand that by reporting a value far below 352 euros in question eight, may create a public bad for farmers in general because readers of the survey may reconsider the size of the compensation in the future. This is why the respondent may be tempted to increase the reported WTA. Based on these considerations, the likelihood-based estimation procedure we propose is motivated by the following quadratic utility function:

$$U(y_i, \theta_i) = -\alpha(y_i - \theta_i)^2 - (1 - \alpha)\delta(\theta_i)(y_i - c)^2, \quad (1)$$

where  $y_i$  denotes the stated WTA and the value  $1 - \alpha \in [0, 1]$  measures the importance of the misreporting effect. The dummy variable  $\delta(\theta_i)$  is one if and only if  $\theta_i < c$ .

Maximization of (1) yields  $y_i$  as a convex combination of the cut-off  $c$  and the true  $\theta_i$

$$\alpha y_i + (1 - \alpha)\delta(\theta_i)y_i = \alpha\theta_i + (1 - \alpha)\delta(\theta_i)c \quad (2)$$

$$\Leftrightarrow y_i = \frac{\alpha\theta_i + (1 - \alpha)\delta(\theta_i)c}{\alpha + (1 - \alpha)\delta} \quad (3)$$

which implies

$$y_i = \begin{cases} \alpha\theta_i + (1 - \alpha)c & \text{if } \theta_i \leq c \\ \theta_i & \text{if } \theta_i > c. \end{cases} \quad (4)$$

That is the actual compensation  $c = 352$  euros may attract respondents differently depending on which side of the break-even point they are. This also seems to be empirically reasonable given the differing clustering of observations on both sides of  $c$  in the dataset we observe, see Figure 3.



For now we assume that  $\theta_i$  is normally distributed, that is we use  $f = \phi(\theta | \mu, \sigma^2) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}(\frac{\theta-\mu}{\sigma})^2}$ . We will later on relax this assumption and test for robustness towards different parametric functional form specifications, see Section 4. Since the normal distribution has two parameters we end up with five parameters  $\mu$ ,  $\sigma$ ,  $\alpha$ ,  $\bar{p}$  and  $\underline{p}$  that fully describe our model.

Empirically  $p \in \{\underline{p}, \bar{p}\}$  can be consistently estimated using sample averages. That is we can get estimates of  $\underline{p}$  by computing the share of winners who answer questions seven or eight compared to all winners and  $\bar{p}$  by the share of losers who answer questions seven or eight compared to the number of all losers. We use these estimates as inverse probability weights and estimate the distribution using weighted maximum likelihood.

Normality and the identifying assumption that the probability to answer questions seven or eight is uncorrelated to the precise amount of  $\theta_i$  itself after conditioning on whether  $c > \theta_i$  or  $c < \theta_i$ , alone will yield consistent estimates of the parameter that are of primary interest,  $\mu$  and  $\sigma$  (if there is no misreporting effect).

In accordance with equation (4), we allow the WTA we observe,  $y$ , to be a linear combination of the true WTA,  $\theta$ , and the cut-off  $c$ . Since we assume at this stage that  $\theta_i \sim N(\mu, \sigma^2)$  it is clear from equation (4) that

$$y_i \sim \begin{cases} N((1-\alpha)c + \alpha\mu, \alpha^2\sigma^2) & \text{if } \theta \leq c \\ N(\mu, \sigma^2) & \text{if } \theta > c. \end{cases} \quad (5)$$

conditional on proper weighting with the inverse response rates.

### 3.2 The Size of Information Rents

When we estimate the model as explained above using a normality assumption, we find that

$$\theta \sim N(\hat{\mu} = 373, \hat{\sigma} = 148) . \quad (6)$$

Hence, the estimated mean is only slightly higher than the compensation  $c = 352$ .

We now infer the size of the information rents as follows. We know in our case that the amount of compensation paid to each agent was  $c = 352$ . The size of the information rent is approximated by the area under  $F(\theta)$ ,

$$\text{IR} = \int_0^{352} \Phi(\theta | \mu = 373, \sigma = 148) \quad (7)$$

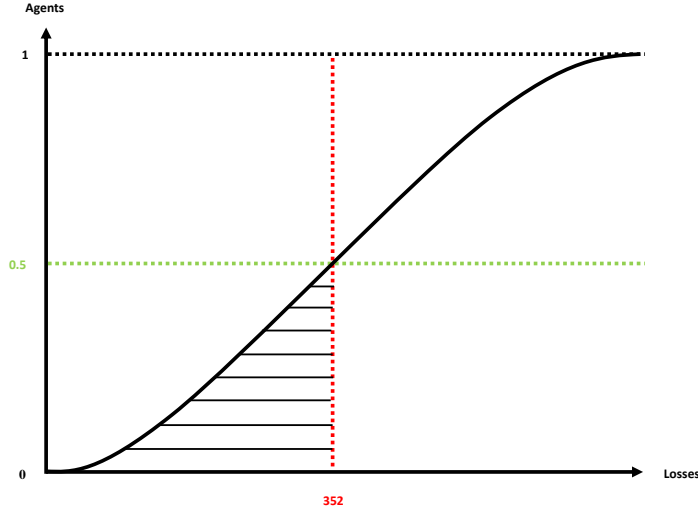


Figure 5: Stylized graph of information rent.

since, in the finite case, the sum of information rents is equal to  $\sum_{i=1}^N c - \theta_i$ ,  $\forall \theta_i < x$ . See Figure 5 for a stylized representation of the information rents, the total compensation paid and the distribution of  $\theta$ .

We express all magnitudes in percent of total compensation paid with the mass of agents normalized to one, that is all numbers are in percentage of 352. The size of the information rent paid is then given by the relative share of the shaded area under the curve relative to the one times 352 quadrangle, illustrated in Figure 5. Our estimates indicate that approximately 14 per cent of the total compensation paid are information rents, meaning that the European agricultural budget could have theoretically been reduced by this amount in a world without private information in which individual specific compensations  $x_i$  would be feasible. Interestingly we also estimate  $\alpha \approx \frac{1}{2}$ , which is clearly statistically different from one (at the one per cent level) – the case where there is no strategic misreporting. Table 1 summarizes all parameter estimates in addition to the information rent estimate.

Parameter	Estimates
Size of Information Rent	13.91%
$\mu$	372.6
$\sigma$	147.9
$\alpha$	0.53
$\underline{p}$	0.61
$\bar{p}$	0.88

Table 1: ML model parameter estimates of distribution of  $\theta$ , based on a normality assumption.  $\alpha$  is statistically significant different from one. The overall sample size is 315.

## 4 Assessing the Robustness Using Different Estimation Methods

We check the robustness of this information rent estimate using two different approaches. First, we use two different distributional assumptions for the distribution of  $\theta$ ,  $F(\theta)$  to re-estimate the model from above without the potential misreporting effect. Moreover, we also implement a nonparametric weighting approach to get estimates that are independent of any parametric assumptions.

First, we estimate the distribution using a gamma distribution, which is given by the following density function

$$f(x) = \frac{x^{\gamma-1} e^{-\frac{x}{\beta}}}{\beta^{\gamma} \Gamma(\gamma)}, \quad (8)$$

where  $\gamma, \beta > 0$  are the shape and scale parameters and  $\Gamma(a) = \int_0^{\infty} t^{a-1} e^{-t} dt$  is the complete gamma function. The gamma distribution also has the feature that a random variable distributed according to (8) cannot take on values below zero, which is also what we empirically observe.<sup>9</sup>

Here and in the nonparametric approach we are not concerned with the identification of potential misreporting effects. Instead these robustness checks can be considered to deliver a lower bound on information rents paid. This is so because in the presence of misreporting effects of reform losers (and we indeed found some empirical support for this before), the WTA we observe

<sup>9</sup>However, note that theoretically, the WTA could well be negative.

will be closer to  $c$  than the true  $\theta$  (for  $\theta < c$ ). Hence the surface under the curve will tend to be smaller than under the MLE approach using the normality assumption employed before that accounts for this behavior. The information rents are again given by the relative size of the area under the estimated curve of losses compared to the overall compensation paid, as depicted in Figure 5. Using a gamma distribution we estimate information rents in order of slightly more than six per cent.

As a second robustness test, we also use a normal distributional assumption without accounting for potential misreporting here as well) and find rents in the order of eight per cent. These results and the corresponding parameter estimates ( $\mu$  and  $\sigma$  for the normal distribution and the shape and the location parameter for the gamma distribution) are depicted in Table 2.

Thirdly, we estimate the distribution of  $\theta_i$  nonparametrically to be able to work without any sort of functional form assumption. We use local linear polynomial regression to estimate a more flexible regression of the form

$$y = m(x) + \varepsilon , \quad (9)$$

where  $m(\cdot)$  is an unknown function and  $\varepsilon$  is a disturbance term. Using local polynomial regression,  $m(\cdot)$  is approximated by a polynomial of order  $p$ . The criterion function for the estimate of  $y$  at  $x = x_0$  is given by

$$\hat{\beta} = \underset{\beta}{\operatorname{argmin}} \sum_{i=1}^N \left( y_i - \sum_{j=0}^p \beta_j (x_i - x_0)^j \right)^2 K \left( \frac{x_i - x_0}{h} \right) , \quad (10)$$

where  $h$  is the bandwidth,  $K(\cdot)$  is a kernel function and  $\beta$  is the parameter vector. The curve estimate at  $x_0$  is then given by the estimated intercept  $\beta_0$  (since at  $x_0$ ,  $x_i = x_0$ ). Practically, we construct the left-hand side variable by matching to every observation a number  $n = 1, 2, \dots, N$  in increasing order of the stated  $y_i$  and normalize this to  $[0, 1]$  by multiplying by  $\frac{1}{N}$ . Then,  $y_i$  constitutes the right-hand side variable.

Additionally we also use the information contained in  $\underline{p}$  and  $\bar{p}$  – the relative response rates of reform profiteers and disadvantaged respectively (see Section 3) – and use them again as weights. This basically means that the nonparametrically estimated curve is scaled up by  $\frac{1}{\underline{p}}$  to the left of the cut-off  $c$  and by  $\frac{1}{\bar{p}}$  to the right. Under similar identifying assumptions as before, namely that the probability to reveal  $\theta$  only depends on whether  $\theta > c$  or  $\theta < c$ , we are able

to estimate the distribution of losses consistently.<sup>10</sup> Then, as shown before, the integral under the estimated curve determines the size of the rent.

In general it would be possible to estimate the density nonparametrically via simple kernel density estimators. However since we employ a weighting approach, in principle the density needs to be estimated separately to the left and to the right around the cut-off  $c$ . In these settings kernel estimators are known to be badly biased at the boundaries. Since local polynomial regressions are free of boundary bias (Fan and Gijbels, 1992) this seems to be the preferred approach. We use an Epanechnikov kernel,  $K(u) = \frac{3}{4}(1 - u^2)\mathbb{1}_{[|u| \leq 1]}$  and an order one polynomial.<sup>11</sup> We try different bandwidths between 50 and 100 euros, which seem to be large enough to be able to smooth over the relatively large gaps between the observations at the extremes but not too large to overly increase the bias. We find a nonparametrically estimated information rent of approximately ten per cent. This is very much in line with those parametric estimates that do not account for potential misreporting and about four percentage points smaller than the estimates derived from the strategic misreporting model. The results are summarized in Table 2.

To sum up, we find estimates of the relative size of information rents in Lower Saxony between approximately 6 and 15 per cent with a tendency towards 15, which seem to be robust towards different estimation procedures. It seems ex-ante unclear whether we can extrapolate from farmers in Lower Saxony to the European farmers in general. However, the evidence in Section 5 implies that the individual WTA is not driven by any of the variables that we asked for in our survey. Hence, extrapolating our results may not be far-fetched. If we approximate the European agricultural budget of 2013 by 57 billion euros, and if we extrapolate our estimates to the entire union then this would imply that roughly six billion euros per annum are information rents.

---

<sup>10</sup>And excluding any misreporting or similar effects.

<sup>11</sup>The Epanechnikov is optimal and odd order polynomials outperform even ones, see Fan and Gijbels (1996)

Size Information Rent	
Gamma Distribution	6.12%
Normal Distribution	8.13%
Nonparametric Estimate ( $h = 50$ )	9.85%
Nonparametric Estimate ( $h = 75$ )	10.02%
Nonparametric Estimate ( $h = 100$ )	10.05%

Table 2: Information Rent estimates using other distributional assumptions plus the nonparametric estimate, which do not exploit the misreporting model.  $\underline{p} = 0.61$  and  $\bar{p} = 0.88$  are used as inverse weights in all cases. All information rent estimates are expressed as a fraction of total compensation paid.

## 5 Estimating the Value of Information

In the 2005 agricultural reform compensation payments are not conditioned on other factors that may be of importance for explaining farmer’s WTA. In principle, it may be possible to reduce information rents by tailoring the compensation payments to any additional observable and verifiable factor that is statistically significant in explaining the compensation required. In this section, we try to estimate the value of information about the farmers from a policy maker’s point of view. To this end we exploit the control variables retrieved in our survey to test their explanatory power for farmer’s WTAs.

Empirically, to examine the explanatory power of the control variables, we estimate OLS regressions (with heteroscedasticity robust standard errors) of the form

$$\theta_i = \beta_0 + \mathbf{x}_i' \boldsymbol{\beta} + \varepsilon_i, \quad i = 1, 2, \dots, N \quad (11)$$

where the dependent variable  $\theta_i$  is the stated WTA (measured in euros) and  $\mathbf{x}$  is a vector of control variables taken from the survey.

Our estimates yield a some interesting results (which are displayed in Table 3). First, we find that there is almost no significant relation between the WTA

	(1)	(2)	(3)	(4)	(5)
Subsidies	0.55*** (0.11)				0.59*** (0.11)
Reform good for all farmers	-30.10*** (9.79)	-35.92*** (11.32)	-36.46*** (10.93)	-34.46*** (10.92)	-29.08*** (10.24)
Time farm is in family possession	-8.60* (4.76)	-4.49 (5.31)			-10.40** 4.94
Cow farmer		0.49** (0.21)	0.55*** (0.21)	0.50** (0.21)	
Fowl farmer			1.44 (1.46)		1.92 (1.65)
Beef farmer				1.27* (0.68)	
<i>N</i>	230	218	218	218	215
<i>R</i> <sup>2</sup>	0.22	0.08	0.10	0.10	0.25

Table 3: Estimating the value of information. Ordinary least squares with willingness to accept as dependent variable (measured in euros). Robust standard errors in parentheses below, a constant is included in all cases. \*, \*\* & \*\*\* indicate significance at the 10%, 5% and the 1% level respectively.

and demographic controls such as age, gender, education, religious affiliation, number of children and political attitudes (therefore the results are not depicted here). Practically it would be anyway fairly hard to condition compensation payments on these factors, mainly because of data privacy and legal reasons. Also the total number of employees and the number of relatives working on the farm turns out to be irrelevant for the size of the WTA, as well as the dummy indicating whether the farm is specialized on organic cultivation and the average quality of the soil. Moreover, the size of the farm, both in 2004 and in 2011, and the growth rate of the area for the same period appear to be unrelated to the amount of compensation required.

Second, we find that some factors that are potentially observable are able to explain a certain part of the WTA. In particular, we estimate a significant and positive coefficient on the dummy indicating beef and fowl farmers, which

we define as farmers whose main product has been either cows or fowl in 2004. This implies that both groups of farmers face a higher likelihood of belonging to the losers of the reform and would potentially demand higher compensations.<sup>12</sup> However, the point estimates are quite small and hence economically not very relevant.

Moreover, the level of subsidies per hectare and year in 2011 turns out to be robust in practically all specifications, which is not surprising given the fact that the levels of subsidies between 2005 and 2012 are a linear combination of the 2004 and the 2013 level. Also, the time the farm is in family possession seems to play a role in determining the WTA. The longer it is in family hand, the lower *ceteris paribus* the WTA. Interestingly, we find the largest point estimate in our regression on the dummy of the question whether the farmer perceives the reform to be beneficial for farmers *in general* - a factor that is not directly observable. One possible explanation is that farmers seem have a positive opinion on the reform in general when he or she is personally better off. Table 3 displays the regressions with the WTA as the left-hand side variable where we find the highest  $R^2$ .

To sum up, the overall explanatory power of the models estimated is quite small and the  $R^2$  is never higher than 25 per cent. Moreover, the point estimates are too small to play economically a significant role and the models do not seem to be robust towards different specifications. We conclude that it is hard to reduce information rents that need to be paid by conditioning on personal and technical characteristics, at least in case of the 2005 agricultural reform.

## 6 Conclusion

This paper presents the first attempt to estimate political information rents in a reform process empirically. In principle, high rents resulting from private information about the distribution of losses may be an impediment to successful reform implementation. We find that rents in our example are approximately in the range from 6 to 15 per cent of total compensation paid, but most likely closer to 15 than to 6 per cent. To evaluate the economic significance of this, two things need be considered. First of all, it might well be that approval

---

<sup>12</sup>This is consistent with what professionals from the LWK told us beforehand: the reform seems to disadvantage large beef and fowl farms.



rates need to be higher than 50 per cent. In that case, the magnitude of rents increases rapidly since the slope of the distribution seems to be steepest around the mean, at least in the case of the reform considered in this paper. Secondly, the agricultural budget of the European Union is, with approximately 55 billion euros per annum, enormous. Hence, every percentage point rent translates into a large amount of public spending that could potentially be saved.

As a second contribution, we showed using a novel survey dataset that it would have been hard to implement the European Union agricultural reform cheaper using observable factors to condition compensation packages on. This is a negative result from the perspective of a policy maker who wants to reduce the cost of a reform. However, it also implies that the current reform was almost efficiently implemented if we assume that 50 per cent of the farmers needed to be compensated.

The method we use is suited to be applied in similar situations to estimate the distribution of losses and thereby circumvent problems with asymmetric non-responses in survey data. For future research in related situations, we suggest to always include a yes–no question regarding the acceptance of the planned compensation to be able to test for the overall reliability of the precise WTA answers.

In general, an obstacle to the implementation of compensation packages might be that individual’s incentives to strategically manipulate the WTA answers are potentially increasing once it is known that the answers are going to be used for policy making. Moreover, in the practical implementation of any group specific survey it is necessary to access the corresponding individuals. In order to so, one most likely needs the support of relevant interest groups. In our case it has proven quite difficult to find the support amongst these groups. This might be an impediment to the practical design of compensation packages in the future. This is why it would be very useful to design questionnaires which make it more difficult to strategically misreport a willingness to accept. Progress in this direction may be helpful to design more successful political reform packages.

## References

BOERI, T., A. BÖRSCH-SUPAN, AND G. TABELLINI (2002): “Pension Reforms and the Opinions of European Citizens,” *The American Economic Review*,

92(2), 396 – 401.

DRAZEN, A. (1996): “The Political Economy of Delayed Reform,” *The Journal of Policy Reform*, 1(1).

FAN, J., AND I. GIJBELS (1992): “Variable Bandwidth and Local Linear Regression Smoothers,” *The Annals of Statistics*, pp. 2008 – 2036.

——— (1996): *Local polynomial modelling and its applications*, vol. 66. Chapman & Hall/CRC.

FERNANDEZ, R., AND D. RODRIK (1991): “Resistance to reform: Status quo bias in the presence of individual-specific uncertainty,” *The American Economic Review*, pp. 1146 – 1155.

GRÜNER, H. P. (2002): “Unemployment and Labor market Reform: A Contract Theoretic Approach,” *The Scandinavian Journal of Economics*, 104(4), 641 – 656.

HENNING, C., AND R. NORD (2004): *Auswirkungen der Mid-Term-Review-Beschlüsse auf den Agrarsektor und das Agribusiness in Schleswig-Holstein und Mecklenburg-Vorpommern*. AgriMedia.

RODRIK, D. (1993): “The Positive Economics of Policy Reform,” *The American Economic Review*, pp. 356 – 361.

——— (1996): “Understanding Economic Policy Reform,” *Journal of Economic Literature*, 34(1), 9 – 41.

ROHWER, A. (2010): “Die Gemeinsame Agrarpolitik der EU–Fluch oder Segen?,” *ifo-Schnelldienst*, 3, 27–36.

SAINT-PAUL, G. (2000): “The Political Economy of Labour Market Institutions,” *Oxford University Press, United Kingdom*.

## A Appendix - Questionnaire

## I. Subsidies

1. Did your farm frequently change its product range due to the modification of the subsidy system before the 2005 reform?
- Very often       frequently       less frequently       never
2. **In hindsight**, would you say that the reform in 2005 had a rather positive or negative impact on your personal situation?
- rather positive       rather negative       neutral
3. **In hindsight**, would you say that the reform in 2005 had a rather positive or negative impact on farmers in **Germany as a whole**?
- rather positive       rather negative       neutral
4. **Before** the implementation of the reform, have you been a reform supporter or an opponent?
- supporter       opponent       neutral
5. The reform includes the discontinuation of quantitative subsidies in many agricultural subsectors. At the same time subsidies are now conditioned on the size of the farm land that is tilled. Was your farm affected by these changes?
- yes       no
6. Is the compensation of 352 Euros per annum and hectare that you are going to receive in 2013 sufficient to make you at least as well-off as you would have been under continuation of the old subsidy system of 2004?
- Yes (please continue with question 8)       No (please continue with question 7)
7. If the compensation of 352 Euros per annum and hectare you are going to receive in 2013 is not sufficient to make you at least as well-off as you would have been under continuation of the old subsidy system of 2004, what payment per hectare and year would have maintained you your financial and economic situation?
- \_\_\_\_\_ € (continue with question 9)
8. If the compensation of 352 Euros per annum and hectare you are going to receive in 2013 is sufficient to make you at least as well-off as you would have been under continuation of the old subsidy system of 2004, what payment per hectare and year would have maintained you your financial and economic situation?
- \_\_\_\_\_ €
9. How high are the subsidies your farm received on average per hectare and year in 2011?
- less than 100 €       between 100 and 150 €       150 - 200 €  
 200 - 250 €       250 - 300 €       300 - 350 €  
 350 - 400 €       400 - 450 €       450 - 500 €       more than 500 €
10. Do you think that the existing system of the agricultural subsidies will remain unchanged for the next five years?
- yes       no       don't know.

## II. Farm

11. Was the farm family-owned in 2004?

- yes  no

12. Is the farm currently family-owned?

- yes  no

13. If so, for how long has the farm been family-owned?

- less than 10 years  11-20 years  21-30 years  31-40 years  41-50 years  more than 50 years

14. If you have children, did one of your children take over the farm?

- yes (continue with question 14)  no (continue with question 15).

15. Did one of your children take over the farm before or after 2005?

- before 2005  2005 or later. (continue with question 16).

16. Do you expect that one of your children takes over the farm?

- yes  no.

17. How many family members as well as relatives (besides yourself) worked on the farm in the years 2004 and 2011 on average?

\_\_\_\_\_ members in 2004 and \_\_\_\_\_ members in 2011.

18. How large was the area your farm tilled in 2004 and in 2011?

**2004:**

- less than 2 hectares  2-10  10-30  30-50  
 50-75  75-100  100-200  200-500  more than 500 hectares?

**2011:**

- less than 2 hectares  2-10  10-30  30-50  
 50-75  75-100  100-200  200-500  more than 500 hectares?

19. Were you the sole proprietor of the farm in 2004?

- yes  no

20. Are you currently the sole proprietor of the farm?

- yes  no

21. How many workers did you employ in 2004 and in 2011 on average?

**2004:**

- less than 5  5-10  11-20  21-50  51-100  101-250  251-500  more than 500?

**2011:**

- less than 5  5-10  11-20  21-50  51-100  101-250  251-500  more than 500?

22. Which of the following agricultural products are generally speaking on your farm rather important and which are rather unimportant?

- Crops:  very important  important  rather unimportant  unimportant  
 Root crops:  very important  important  rather unimportant  unimportant  
 Pigs:  very important  important  rather unimportant  unimportant  
 Cow:  very important  important  rather unimportant  unimportant  
 Poultry:  very important  important  rather unimportant  unimportant  
 Beef cattle:  very important  important  rather unimportant  unimportant  
 Sheep/ goat:  very important  important  rather unimportant  unimportant  
 Others:  very important  important  rather unimportant  unimportant

23. How high was the proportion of revenue of the following agricultural products in 2004 and 2011 in per cent of total revenues?

Product	2004	2011
Crops		
Root crops		
Pigs		
Cows		
Poultry		
Beef cattle		
Sheep/Goat		
Others		
<b>Sum:</b>	<b>100%</b>	<b>100%</b>

24. Was your farm until 2004 exclusively specialized in products from controlled biological cultivation?

- yes  no

25. Is your farm today still specialized in products from controlled biological cultivation?

- yes  no

26. How high was the indicator for the quality of the soil for your farm in 2004? [„landwirtschaftliche Vergleichszahl“]

- Up to 20  21-40  41-60  61-80  more than 80

### III. Personal Information

27. Sex

- Male  female

28. How old are you?

\_\_\_\_\_ years

29. How many of your children were born before 2005?

\_\_\_\_\_ children

30. What is your highest educational achievement?

„Hauptschulabschluss“  „Mittlere Reife“  „Abitur“  University degree  no graduation

31. Religious Affiliation?

protestant  catholic  other  no affiliations ?

32. Did you also gather some other practical experience outside the agricultural sector until 2005 (at least six months)?

yes  no

28. On a scale from 1 (left) to 5 (right), how would you rank your political views?

1  2  3  4  5  no answer

28. How would you evaluate your knowledge about the details of the reform on a scale from 1 (no knowledge) to 5 (very well informed) **before** the implementation?

1  2  3  4  5

Thank you very much for your cooperation!