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Evaluation of the Nonresponse in the Farm Economic Survey

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Preface

The Swedish Board of Agriculture has asked Statistics Sweden (SCB) to conduct an evaluation study of the nonresponse in the Farm Economic Survey. The primary reason is the relatively high rate of nonresponse in the survey.

Studies of the nonresponse in this survey have been done before and experiences from these earlier studies have been used as a basis for this one. The objective of this study is to investigate whether the nonresponse has an effect on the results of the survey and to present the main reasons for not participating in the survey.

Detailed tables from this evaluation study are presented at the end of the report.

The study has been made by Marina Jansson. Concerning subjects and variables of the survey, Fredrik von Unge and Jan Andersson were consulted. For information on register-based variables used in the study, Lars Persson and Jimmy Hagsten were consulted. Tomas Westling, Pär Brundell and Jörgen Svensson have contributed to the methodological work.

Statistics Sweden, May 2007

Inger Eklund Marie-Louise Widén

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Summary

The objective of this study is to see whether nonresponse affects the result of the Farm Economic Survey and to investigate whether the substitution procedure for the nonresponse has an affect on the outcome of the survey.

Furthermore, this study presents the main reasons for not participating in the survey. This data is normally not presented in the yearly publications on a detailed level.

In chapter 2.1, the causes of nonresponse are shown over the four years 2002 to 2005. The most common cause for not participating in the survey is lack of time. "Has given up the business during the year" and "lack of interest" are the second most common reasons for not participating.

In chapter 2.2, a comparison is made between the respondents and the nonrespondents. Because of the small sample size, the new samples from four years are merged together in order to get a larger number of farms for the analysis. A few selected register variables from the Swedish Farm Register and the Taxation Register are used in order to evaluate whether there are any differences between the two groups. The most visible differences between respondents and nonrespondents are in the age of the main holder and the size measure Standard Gross Margin (SGM). These two variables show significant results in four out of sixteen compared strata. In this analysis the respondents were also compared with the nonrespondents using the variable "Adjusted income of business activity". This adjusted income has been derived from variables in the Taxation Register and is believed to be close to the Net Income that is used in the Farm Accountancy Data Network, FADN. The adjusted income gives significant results, but only in four out of sixteen strata.

In chapter 2.3, a second comparison is made between farms from the ordinary sample and the substitute farms. In this part of the analysis a variable from the Farm Economic Survey is used when making the comparison. This is done in order to see how well the substitute farms correspond to the nonrespondents in the ordinary sample. The variable with the highest number of significant results is "Sum of investments in agriculture and forestry", but the significant differences were only found in three out of twelve strata.

The conclusions from this study are not so far-reaching, partly because the basis of the analysis is just the new-recruited portion of the sample, and partly because many of the variables in the study are register-based ones and it is not known how well they co-vary with the variables used in the actual survey.

In order to draw further conclusions, a deeper and continuous nonresponse study would be needed.

1 Background

1.1 Introduction

The Swedish Farm Economic Survey (JEU) is an annual bookkeeping survey where farmer participation is voluntary. The aim of the survey is to illustrate the development of receipts and costs in agriculture. As a member state of the EU, Sweden is obliged to deliver data to the Farm Accountancy Data Network (FADN). This obligation is laid down in Commission Regulation (EC) No 2253/2004. The annual reporting of a selection plan for the sample is stipulated in Commission Regulation 1859/82.

In 1976 Statistics Sweden became responsible for conducting the survey (before 1976 another government authority had this responsibility). Since 1999 the Swedish Board of Agriculture is responsible for the Farm Economic Survey but has commissioned Statistics Sweden to carry it out.

The population of the survey covers the largest Swedish farms owned or leased by legal entities. The threshold for participating farms is 8 ESU (ESU is proportional to SGM). The population consists of about 30 000 holdings and the sample of approximately 1 000 holdings. Each year a new sample of about 100 holdings is drawn in order to compensate for overcoverage and nonresponse that occurs over time.

1.1.1 Sampling design

A new sample is drawn yearly (usually in November). The sampling frame used is the Swedish Farm Register (LBR). The farm threshold, as mentioned above, is 8 ESU. The sample size and design is approved by DG Agri at the European Commission who receives selection plans from the member states every year. The aim of the selection plan is to ensure the representativeness of the surveyed farms as a whole.

The population (in practice the sampling frame) is stratified by activity (type of farming) and size class (ESU). The farm type "Dairying" is also stratified by region. The sample is selected in the autumn the same year as the reference year. In some cases there is also a complementary sample drawn later during the year. In this analysis, the complementary sample has been put together with the first selected sample.

According to the FADN-system the sample of the survey should consist of about 1000 holdings, and from the beginning there was a rotating panel sample. In 1976, one fourth of the sample was replaced every year. The share of replaced farms has varied over time but has fluctuated between one fourth and one eighth. Since 1995 the panel rotation procedure has been abandoned but a new sample is selected every year in order to meet the numbers in the selection plan presented to the European Commission. Each year there are holdings that are not willing to participate from the next year onwards. This means the expected sample size of newly selected farms is as follows:

Sample size of new sample^t = *Known nonresponse*^{t} + *Known overcoverage*^{t} + *Number of expected future nonresponse*^{t} ,

where t is the reference year.

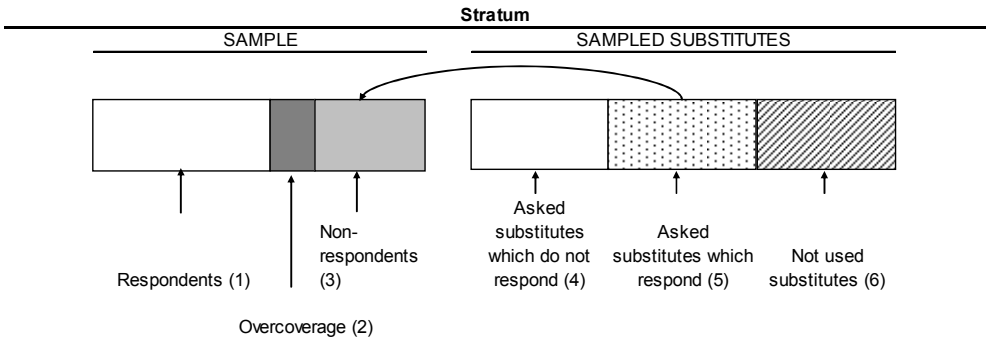
1.1.2 Nonresponse

The Farm Economic Survey is afflicted with a relatively large nonresponse rate. In 1978 the survey nonresponse rate was about 25 -30 percent. Since then the nonresponse rate has increased and in 2002 the (unweighted) unit nonresponse was about 61 percent among the newly selected farms. The corresponding rate in 2005 is 60 percent (48 percent when the rate is weighted according to size, i.e. by design weights and ESU for the holding). Actually, the real nonresponse rate is even higher, considering that the new sample each year is drawn in order to replace farms from the "old" samples that do not want to respond any more.

In the survey there is a procedure to compensate for each nonrespondent holding. The procedure is in principle simple: for each nonresponse that occurs among the newly selected farms, a new farm is selected from a pre-constructed list of substitute farms. The list of substitutes is produced at the same time as the ordinary sample and the potential substitutes are sorted by type of farm and economic size (ESU). The idea is then to select a substitute farm with a similar type and size as the ordinary one.

In the picture below the substitution procedure is illustrated for a stratum (the procedure is carried out within each stratum). Please note that the size of the rectangles is not necessarily proportional to the real number of holdings.

Figure 1
Overview of the substitution procedure for nonresponse



The respondents (1) and the responding substitutes (5) are the basis for the estimations and the final published results.

Overcoverage holdings (2) are found after the selection and recruitment of farms. These objects consist for example of farms that are not large enough for the scope of this survey.

The nonrespondents (3) are selected holdings that for different reasons do not participate in the survey. These farms are substituted by the substitution holdings. The substitutes can be divided in two groups: the nonrespondent substitutes (4) and the participating substitutes (5). The unused pre-selected substitutes constitute category (6).

Below in the report categories (1) to (6) are referred to as above.

1.2 Objectives

The objective of this study is to clarify whether there are any differences between respondents and nonrespondents in JEU 2002 to JEU 2005. The following variables from the Swedish Farm Register of 2002, 2003, 2004 and 2005 are used for the study:

Age of main holder

Area of arable land

Area of cereals

Area of feeding grain

Area of forest land

Number of cattle

Number of pigs

Standard Labour requirement

Standard Gross Margin (SGM)

We also wanted to make a comparison using one or several variables from the Taxation Register. In an effort to create a variable from the Taxation Register that is comparable with the Net Income from FADN we calculated what we call "Adjusted income of business activity". In this variable the profit equalizations that can be found in the Taxation Register are regarded. Although not all types of profit equalizations can be found in the Taxation Register, the variable "Adjusted income of business activity" is considerably closer to the Net Income of FADN than the "Assesed Income from Business".

Furthermore, the objective is to point out the reason for the nonresponse (to not participate) in the survey. Moreover, the last objectives are to make clear whether there are differences between the ordinary respondents and the substituted respondents.

To achieve the objectives:

- A comparison between the respondents and the nonrespondents is done to see the differences in a few selected variables from the Farm Register and one variable from the Taxation Register
- An analysis is done of the nonresponse at the different kind of causes to not participate in the survey
- A comparison between the ordinary respondents and the substitution sample respondents is done in order to see the differences in certain published figures between the two groups.

1.3 Earlier studies

Earlier there have been several studies about the nonresponse in JEU. Thomas Polfeldt made the first one in 1978 concerning JEU 1977. He tried to study the bias caused by the nonresponse. His conclusion was that the largest nonresponse was caused by elder farmers, a regional factor and by

farmers without animals. A tendency he noticed was that there was larger nonresponse among farms with a large forest area. The difference in the LBR variables between the nonrespondents and the respondents of the survey were relatively small. It is difficult to decide whether the differences affect the results since we only study variables from the register and not the variables we really want to study, that is the variables from the survey.

Another study was made in 1991 concerning JEU 1986–1988 by Bolin, Brånvall, Kraftling and Wilson. Their conclusion was that there is a tendency of differences in register variables between respondents and nonrespondents in some groups. There are also some regional differences.

The last study, concerning JEU 1997 and JEU 1998 was done in 1998 by Pär Brundell. This study was a follow up to the study in 1991. It was done in the same way as the 1991 report but there was also a comparison between the ordinary respondents and the substitutes. The conclusion from this study was not clear. Even if the result on the register variables showed that there are no differences between respondents and nonrespondents we could not exclude possible distorting effects, bias, by the nonresponse. This is because the register variables are not the variables we really want to study, but we hope that this new part of the study, concerning the differences between the ordinary sample holdings and the substitutes can give some information about how the nonresponse will affect the bias among the answers.

2 Results

In the tables below, the number of holdings is not equal for the same stratum. That is because there are different number of holdings who match between the survey data and different registers.

2.1 Causes of the nonresponse

In JEU there are two different types of unit nonresponse. The first is a holding that is not willing to participate from the beginning, and for this nonresponse we follow the substitution process described above. The second type is the unit nonresponse occurring during the processing of the figures (for example, the holdings bookkeeping is not complete).

The result from this study is shown in table 1 and table 2. The first table describes the nonresponse and how we succeed with recruitment of the new sample.

The second table shows the causes of the nonresponse as well as which causes that are the most common. The most common causes not to respond in the survey are found to be that the farmer "has no time" for it. In the second and third place we got the answer "lack of interest" and "gave up the business during the year".

2.2 Comparison between respondents and nonrespondents

The purpose of this analysis is to study if there are any differences between respondents (1+5) and nonrespondents (3) in JEU 2002–2005 using certain variables from the Swedish Farm Register of 2002–2005 as shown earlier.

To investigate if there are some differences between respondents and nonrespondents, we make a t-test. For the t-test first we must assume that the estimators of the means of the populations are normally distributed, and then we make a measure t_h^* in each stratum (h) with more than 5 observations in each group as follows

$t_h^* = \dfrac{\bar{\hat{Y}}_{r,h} - \bar{\hat{Y}}_{nr,h}}{d_h\left(\bar{\hat{Y}}_{r,h} - \bar{\hat{Y}}_{nr,h}\right)}$, where $\bar{\hat{Y}}_{r,h}$ *and* $\bar{\hat{Y}}_{nr,h}$ are the estimators of the means of the variable for respondents (r) and nonrespondents (nr) respectively in each stratum (h).

The estimated standard error $d_h\left(\bar{\hat{Y}}_{r,h} - \bar{\hat{Y}}_{nr,h}\right) = \sqrt{\left(\dfrac{s^2_{\hat{Y}_{r,h}}}{n_{\hat{Y}_{r,h}}} + \dfrac{s^2_{\hat{Y}_{nr,h}}}{n_{\hat{Y}_{nr,h}}}\right)}$, where

$n_{\hat{Y}_{r,h}}$ and $n_{\hat{Y}_{nr,h}}$ are the numbers of respondents and nonrespondents

respectively in each stratum, and where $s_{\hat{\bar{Y}}_{r,h}}$ and $s_{\hat{\bar{Y}}_{nr,h}}$ are the standard deviations for $\hat{\bar{Y}}_{r,h}$ and $\hat{\bar{Y}}_{nr,h}$ respectively.

The approximate 95 percent confidence interval for $(\hat{\bar{Y}}_{r,h} - \hat{\bar{Y}}_{nr,h})$ is

$$\left(\hat{\bar{Y}}_{r,h} - \hat{\bar{Y}}_{nr,h}\right) \pm 1.96 * d_h \left(\hat{\bar{Y}}_{r.h} - \hat{\bar{Y}}_{nr,h}\right)$$

If $\left|t_h^*\right| \leq 1.96$, we conclude that the difference is not significant between the two groups, with the risk controlled at a 5 percent level $(when \ \hat{\bar{Y}}_{r,h} - \hat{\bar{Y}}_{nr,h} = 0)$. For many of the strata, it is doubtful whether the estimators are normally distributed, due to few observations. Thus, the results must be judged with care.

In table 3, we can see the results from the evaluation by the variables from the Farm Register. There is no variable that consistently leads to significant differences in each stratum, but there are two variables that each gives a significant result four times. These two variables are "Age of main holder" and the size measure "SGM". The first one shows higher values for the nonresponse in fifteen out of sixteen strata. Even if there are some significant results from the evaluation, we cannot draw any firm conclusions about the effect the nonresponse has on the figures we produce. Even if we do not see a strong tendency that there are differences between the two groups, we cannot reject that there are differences between the respondents and the nonrespondents. This is because we do not know how well the register variable fits the survey variable. The correlation between the register variables and the survey variables are often small. Due to the stratification, the register variables are often limited in the span of their values, while the study variables are not limited.

2.3 Comparison between ordinary sample and substitutes

This comparison will be a measurement of how well the substitutes fit the nonrespondents in the ordinary sample. The line of thought for this comparison is as follows: If there is a big difference between the ordinary respondents and the substitutes who responded, it could be based on the following:

i. The substitutes used differ from the ordinary holdings. This entails that the substitutes are not like "twin" holdings and that the substitution process will affect the result of the survey.

ii. The nonresponse which will be substituted already differs from the ordinary respondents and therefore their substitutes will differ from the nonrespondents in the ordinary sample. This might indicate that the nonresponse could be biased.

If there are no differences according to (i), the substitution procedure would not affect the result of the survey, unless the differences (ii) between the ordinary respondents and the nonrespondents are substantial.

Here we do the same t-test as described earlier. In table 5 we show the result from the t-test of the comparison between the ordinary sample and the substitutes. In the result there are some significant differences. They are not so many and there is no variable that is significant in many strata. The most common variable that got a significant result is "Sum of investments in agriculture and forestry". This is a very fluctuating variable. Other variables with significant results are "Working hours" and "Age of the farmer", but from this result we could not draw any conclusions that the substituted objects entail more bias to the result.

The conclusion from this part is that there is no clear evidence of any differences between the ordinary sample and the substitutes among the new-recruited farmers during these years. However, in fact we do not know what the differences between the supplementary sample and the nonresponse are.

3 Conclusions

The conclusions from this study about the nonresponse in JEU 2002, JEU 2003, JEU 2004 and JEU 2005 are not so far-reaching, partly because it is only based on the newly recruited samples. The nonresponse from the "old" samples has not been studied. Another reason for the difficulties in drawing conclusions is that many of the variables in the study are register variables, and we do not know how well they co-vary with the survey variables.

The most common causes not to respond to the survey is that the farmer "has no time" for it. In the second and third place we got the answer "lack of interest" and "gave up the business during the year".

From this we can draw certain conclusions. Firstly, this is a survey that burdens the farmers heavily, and secondly some farmers do not realize that they can benefit from the results of this survey.

From the t-tests of the differences we could not draw any firm conclusions because we do not know how well the register variables fit the survey variables and how well the supplementary farmers fit the nonrespondents.

To draw further conclusions there must be deeper investigations of the nonresponse.

Tables

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Table 1
Result of the new selected sample in JEU 2002 – 2005

Sample and year	2002	2003	2004	2005	Totally	
Number of selected in the ordinary sample	113	140	163	109	525	100 %
overcoverage	20	13	16	20	69	13 %
yes-answers	41	36	74	46	197	38 %
no-answers	52	28	72	37	189	36 %
not asked		63	1	6	70	13 %
Number of total asked farmers	265	189	319	226	999	100 %
overcoverage	49	13	16	20	98	10 %
yes-answers	104	95	148	100	447	45 %
no-answers	112	81	155	106	454	45 %
Total number of participants	104	95	148	100	447	

Table 2
Causes of nonresponse in JEU 2002 – 2005

Causes of the nonresponse among the no-answers	2002	2003	2004	2005	Totally	
Illness	6	1	5	6	18	4 %
Gave up business during the year	20	6	27	23	76	17 %
Dissatisfaction of the common agricultural policy (CAP)	8	9	10	1	28	6 %
Have no time	27	20	42	25	114	25 %
Contribution for book-keeping is to low	1	1	1	2	5	1 %
Do not trust the Secrets Act	0	0	0	1	1	0 %
Difficulty to report the break-down of activity	2	3	3	4	12	3 %
High ages	22	4	10	8	44	10 %
Lack of interest	31	14	10	19	74	16 %
Other reason		7	28	7	42	9 %
Missing value	19	8	6	7	40	9 %
					454	100 %

Table 3
Comparison of some variables from the Farm Register between respondents and nonrespondents in JEU 2002–2005

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
013005	**Cereals, esu 8-16**					
	Age of main holders	50,8	5,6	55,8	2,9	no
	Area of arable land	41,1	4,8	34,6	2,2	no
	Area of cereals	5,3	2,5	7,7	1,7	no
	Area of feeding grain	18,2	4,0	15,0	1,6	no
	Forest land	6,0	0,0	36,2	15,8	no
	Number of cattle	7,4	7,4	0,0	0,0	no
	Number of pigs	43,2	32,4	0,0	0,0	no
	Standard Labour requirement	1 377,0	431,1	926,8	58,2	no
	SGM	16 664,2	862,4	13 609,6	632,9	**yes**
			Respondents	Nonrespondents		
	Number of holdings		5,0	13,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
013008	**Cereals, esu 40-100**					
	Age of main holders	52,4	3,4	52,9	3,2	no
	Area of arable land	190,5	18,7	149,0	13,1	no
	Area of cereals	49,1	7,2	51,6	11,2	no
	Area of feeding grain	76,8	9,8	55,1	12,2	no
	Forest land	33,2	17,1	149,5	91,1	no
	Number of cattle	11,0	9,5	7,8	7,8	no
	Number of pigs	53,3	53,3	1,0	1,0	no
	Standard Labour requirement	2 459,4	244,7	2 138,6	249,6	no
	SGM	80 096,2	5 682,1	65 921,0	5 383,5	no
			Respondents	Nonrespondents		
	Number of holdings		12,0	8,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
014005	**General cropping, esu 8-16**					
	Age of main holders	51,3	3,2	62,8	3,5	**yes**
	Area of arable land	26,1	1,7	21,7	2,7	no
	Area of cereals	3,2	1,5	1,5	0,8	no
	Area of feeding grain	9,2	2,2	8,5	1,3	no
	Forest land	40,1	21,0	0,0	0,0	no
	Number of cattle	2,3	2,3	3,1	2,2	no
	Number of pigs	0,0	0,0	8,9	8,9	no
	Standard Labour requirement	1 092,3	111,0	937,7	117,5	no
	SGM	15 049,6	884,7	11 038,9	293,5	**yes**
			Respondents	Nonrespondents		
	Number of holdings		8,0	8,0		

Table 3 (continue)

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
014007	**General cropping, esu 16-40**					
	Age of main holders	51,7	2,5	59,9	2,9	**yes**
	Area of arable land	39,2	2,8	38,1	4,3	no
	Area of cereals	9,1	2,0	7,9	2,2	no
	Area of feeding grain	11,4	1,4	9,6	2,4	no
	Forest land	39,6	18,5	20,1	8,6	no
	Number of cattle	2,0	1,2	9,1	3,9	no
	Number of pigs	22,7	15,7	0,0	0,0	no
	Standard Labour requirement	1 993,6	172,7	1 774,4	193,3	no
	SGM	31 068,0	2 127,4	26 641,8	1 967,2	no
		Number of holdings	Respondents 20,0	Nonrespondents 15,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
014008	**General cropping, esu 40-100**					
	Age of main holders	51,6	3,3	57,5	2,7	no
	Area of arable land	92,7	9,7	93,6	11,3	no
	Area of cereals	19,3	8,0	20,8	7,0	no
	Area of feeding grain	25,7	5,4	33,2	6,5	no
	Forest land	21,7	12,6	32,8	22,5	no
	Number of cattle	25,5	12,3	5,0	5,0	**yes**
	Number of pigs	0,0	0,0	0,0	0,0	no
	Standard Labour requirement	3 440,1	526,4	2 517,9	442,2	no
	SGM	69 437,6	8 767,4	60 482,9	6 686,1	no
		Number of holdings	Respondents 8,0	Nonrespondents 8,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
041005	**Dairying, esu 8-16**					
	Age of main holders	55,3	2,3	59,4	1,9	no
	Area of arable land	21,0	3,7	16,6	1,8	no
	Area of cereals	0,0	0,0	0,0	0,0	no
	Area of feeding grain	2,2	0,6	1,4	0,4	no
	Forest land	56,7	30,3	75,5	37,2	no
	Number of cattle	18,9	2,0	19,1	1,3	no
	Number of pigs	0,0	0,0	0,5	0,5	no
	Standard Labour requirement	1 813,5	86,8	1 774,3	73,3	no
	SGM	15 416,0	744,3	15 684,2	528,9	no
		Number of holdings	Respondents 14,0	Nonrespondents 28,0		

Table 3 (continue)

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
042005	**Drystock, esu 8-16**					
	Age of main holders	49,5	2,1	52,8	2,0	no
	Area of arable land	27,9	3,1	37,3	3,8	no
	Area of cereals	0,0	0,0	0,0	0,0	no
	Area of feeding grain	3,4	1,0	5,1	1,2	no
	Forest land	73,3	22,8	86,5	26,9	no
	Number of cattle	54,0	5,6	60,4	5,4	no
	Number of pigs	0,0	0,0	0,0	0,0	no
	Standard Labour requirement	1 602,3	108,8	1 837,0	159,6	no
	SGM	12 911,4	489,8	14 280,4	539,2	no
		Number of holdings	Respondents 20,0	Nonrespondents 16,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
042007	**Drystock, esu 16-40**					
	Age of main holders	49,7	2,1	51,1	2,6	no
	Area of arable land	58,3	5,4	53,0	7,4	no
	Area of cereals	0,9	0,5	0,5	0,3	no
	Area of feeding grain	6,7	1,5	5,5	1,7	no
	Forest land	37,9	13,3	31,4	15,2	no
	Number of cattle	127,6	13,1	110,0	11,4	no
	Number of pigs	0,0	0,0	0,0	0,0	no
	Standard Labour requirement	2 336,5	127,1	2 102,8	141,2	no
	SGM	29 613,6	1 891,6	30 510,4	1 718,6	no
		Number of holdings	Respondents 19,0	Nonrespondents 18,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
042008	**Drystock, esu 40-100**					
	Age of main holders	53,3	2,6	52,0	2,6	no
	Area of arable land	94,5	13,0	93,5	9,0	no
	Area of cereals	0,0	0,0	4,9	1,6	**yes**
	Area of feeding grain	14,2	4,6	15,0	3,5	no
	Forest land	53,6	25,7	67,1	22,7	no
	Number of cattle	281,4	41,7	212,0	21,2	no
	Number of pigs	26,5	20,5	27,0	27,0	no
	Standard Labour requirement	3 915,5	367,3	3 398,0	152,1	no
	SGM	65 781,0	2 219,1	67 283,2	3 383,2	no
		Number of holdings	Respondents 12,0	Nonrespondents 20,0		

Table 3 (continue)

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
050107	**Pig farming, esu 16-40**					
	Age of main holders	51,2	2,0	54,3	2,4	no
	Area of arable land	19,4	2,8	18,7	1,6	no
	Area of cereals	3,9	1,2	2,4	0,9	no
	Area of feeding grain	10,6	1,6	12,5	1,6	no
	Forest land	19,9	8,6	60,2	48,1	no
	Number of cattle	4,8	3,1	3,2	1,5	no
	Number of pigs	486,7	81,8	278,2	37,9	**yes**
	Standard Labour requirement	1 904,1	92,1	1 641,3	59,4	**yes**
	SGM	34 095,5	1 620,1	31 857,8	1 229,5	no
		Number of holdings	Respondents 28,0	Nonrespondents 24,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
050108	**Pig farming, esu 40-100**					
	Age of main holders	47,4	1,8	57,2	2,2	**yes**
	Area of arable land	43,5	10,4	47,1	7,2	no
	Area of cereals	10,9	5,6	9,1	3,2	no
	Area of feeding grain	18,6	3,5	29,4	4,6	no
	Forest land	35,2	16,0	7,1	5,7	no
	Number of cattle	5,6	2,7	4,9	3,9	no
	Number of pigs	897,0	90,0	900,1	296,9	no
	Standard Labour requirement	2 956,8	175,6	2 894,3	324,3	no
	SGM	82 759,4	4 458,4	78 865,3	7 022,8	no
		Number of holdings	Respondents 24,0	Nonrespondents 9,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
070007	**Mixed, esu 16-40**					
	Age of main holders	48,1	2,1	52,5	3,2	no
	Area of arable land	56,7	7,0	38,3	4,1	**yes**
	Area of cereals	4,8	1,5	2,8	0,8	no
	Area of feeding grain	19,0	2,7	14,3	1,9	no
	Forest land	48,2	17,5	15,3	9,4	no
	Number of cattle	52,0	8,3	40,8	9,8	no
	Number of pigs	130,0	62,6	67,1	40,9	no
	Standard Labour requirement	2 343,1	133,0	1 930,0	176,5	no
	SGM	32 678,6	1 911,4	26 289,3	1 912,6	**yes**
		Number of holdings	Respondents 21,0	Nonrespondents 14,0		

Table 3 (continue)

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
141007	**Dairying, region 710, esu 16-40**					
	Age of main holders	53,3	1,7	54,8	2,5	no
	Area of arable land	30,5	3,9	28,2	2,2	no
	Area of cereals	0,4	0,3	0,6	0,9	no
	Area of feeding grain	8,9	1,9	9,3	1,3	no
	Forest land	22,6	6,0	28,0	8,3	no
	Number of cattle	33,4	2,7	37,5	2,2	no
	Number of pigs	0,0	0,0	5,0	3,4	no
	Standard Labour requirement	2 414,0	118,0	2 479,7	60,1	no
	SGM	33 861,6	1 962,2	33 909,7	1 631,1	no
			Respondents	Nonrespondents		
	Number of holdings		15,0	21,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
241007	**Dairing, region 720, esu 16-40**					
	Age of main holders	51,5	1,6	56,8	1,2	**yes**
	Area of arable land	31,6	2,2	28,6	1,6	no
	Area of cereals	0,6	0,4	0,1	0,1	no
	Area of feeding grain	7,0	1,1	6,2	0,7	no
	Forest land	58,6	9,8	73,0	10,6	no
	Number of cattle	33,9	1,8	42,5	1,7	**yes**
	Number of pigs	0,0	0,0	0,0	0,0	no
	Standard Labour requirement	2 418,6	82,7	2 519,5	50,4	no
	SGM	34 597,2	1 285,6	38 230,9	1 114,7	**yes**
			Respondents	Nonrespondents		
	Number of holdings		36,0	53,0		

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
341007	**Dairing, region 730, esu 16-40**					
	Age of main holders	48,1	2,9	54,2	2,4	no
	Area of arable land	42,8	4,0	34,9	2,5	no
	Area of cereals	0,0	0,0	0,0	0,0	no
	Area of feeding grain	5,9	2,0	3,4	1,2	no
	Forest land	186,6	46,6	174,5	51,1	no
	Number of cattle	40,1	4,6	33,6	3,0	no
	Number of pigs	0,2	0,2	0,0	0,0	no
	Working hours	2 564,9	140,3	2 463,9	85,3	no
	SGM	34 423,6	2 091,1	32 971,3	2 270,6	no
			Respondents	Nonrespondents		
	Number of holdings		13,0	16,0		

Table 3 (continue)

Stratum at time for sample	Variable from LBR	Respondents		Nonrespondents		Significant differences
		Mean	Standard deviation for mean	Mean	Standard deviation for mean	
341008	**Dairing, region 730, esu 40-100**					
	Age of main holders	48,1	2,3	49,1	3,0	no
	Area of arable land	72,3	6,6	66,1	8,1	no
	Area of cereals	0,0	0,0	0,0	0,0	no
	Area of feeding grain	14,7	4,5	3,6	3,4	**yes**
	Forest land	161,3	33,0	93,7	34,9	no
	Number of cattle	79,4	8,0	78,4	12,1	no
	Number of pigs	0,0	0,0	0,4	0,4	no
	Standard Labour requirement	3 528,6	139,7	3 441,2	163,2	no
	SGM	73 554,6	5 565,3	69 179,8	6 746,4	no
	Number of holdings	Respondents 15,0		Nonrespondents 8,0		

Table 4
Comparison between respondents and nonrespondents by the variable "Adjusted income of business activity"

Stratum at time for sample	Number of holdings	Respondents		Number of holdings	Nonrespondents		Significant differences
		Mean	Standard deviation for mean		Mean	Standard deviation for mean	
013005	5	42 716	29 095	11	40880	27027	no
013008	12	220 035	54 879	8	373550	121028	no
014005	8	46 995	46 819	8	77579	57569	no
014007	20	131 952	31 470	14	43870	23334	yes**yes**
014008	8	119 677	64 588	8	160383	31019	no
041005	14	44 589	19 746	27	33267	11239	no
042005	19	150 987	43 433	14	45731	31426	yes**yes**
042007	17	129 055	30 578	18	144019	45332	no
042008	12	168 846	38 299	19	273158	91501	no
050107	23	107 066	42 583	20	82606	17487	no
050108	23	108 735	26 157	9	193064	57009	no
070007	20	146 448	20 987	14	71744	31293	yes**yes**
141007	15	103 872	27 403	21	132698	18485	no
241007	36	98 493	14 524	51	107359	17752	no
341007	13	222 317	46 123	16	106714	21122	yes**yes**
341008	15	184 719	29 996	8	209959	69151	no

Table 5
Comparison between ordinary sample and substitution sample by some published variables

Sample stratum	Variable of interest	Ordinary		Supplement		Significant differences
		Mean	Std for mean	Mean	Std for mean	
013008	**Cereals, esu 8-16**					
	Number of holdings	5		5		
	Total receipts, before any cost	1 362 408	258 534	1 230 490	356 488	no
	Costs in agriculture, sum of farm supply	605 828	137 471	441 445	106 919	no
	Sum of depreciation in current costs	141 727	48 153	241 462	86 692	no
	Costs in agriculture, sum of maintenance	71 224	38 822	98 178	25 854	no
	Net income in current costs	17 550	117 796	99 765	104 476	no
	Working hours	3 395	875	2 598	564	no
	Total equity	1 330 992	744 549	1 754 685	610 083	no
	Sum of investments in agriculture and forestry	116 806	79 557	231 979	158 840	no
	Age of the farmer	44	7	53	3	no
014007	**General cropping, esu 8-16**					
	Number of holdings	7		8		
	Total receipts, before any cost	486 594	157 023	678 637	93 463	no
	Costs in agriculture, sum of farm supply	118 989	32 905	162 445	18 151	no
	Sum of depreciation in current costs	65 666	30 304	141 236	27 477	no
	Costs in agriculture, sum of maintenance	33 002	9 136	66 072	12 368	**yesyes**
	Net income in current costs	59 204	56 061	62 162	101 891	no
	Working hours	1 609	599	2 417	369	no
	Total equity	626 419	266 934	798 460	514 269	no
	Sum of investments in agriculture and forestry	29 524	18 272	163 907	50 331	**yesyes**
	Age of the farmer	49	3	47	5	no
042005	**Drystock, esu 8-16**					
	Number of holdings	8		8		
	Total receipts, before any cost	519 480	74 430	374 728	89 675	no
	Costs in agriculture, sum of farm supply	73 492	12 867	58 025	12 916	no
	Sum of depreciation in current costs	174 496	37 683	131 785	23 131	no
	Costs in agriculture, sum of maintenance	39 752	9 779	52 001	9 425	no
	Net income in current costs	76 013	52 084	13 686	50 628	no
	Working hours	2 009	303	1 825	411	no
	Total equity	1 085 731	502 263	583 677	258 854	no
	Sum of investments in agriculture and forestry	222 300	77 939	183 628	88 479	no
	Age of the farmer	48	4	45	2	no

Table 5. (continue)

Sample stratum	Variable of interest	Ordinary		Supplement		Significant differences
		Mean	Std for mean	Mean	Std for mean	
042007	**Drystock, esu 16-40**					
	Number of holdings	8		7		
	Total receipts, before any cost	1 208 845	167 794	957 538	321 339	no
	Costs in agriculture, sum of farm supply	253 963	68 814	118 732	28 991	no
	Sum of depreciation in current costs	222 535	18 072	207 827	63 702	no
	Costs in agriculture, sum of maintenance	65 694	11 182	67 857	16 222	no
	Net income in current costs	315 313	85 629	256 025	134 283	no
	Working hours	3 133	369	3 037	623	no
	Total equity	540 777	146 253	1 011 271	492 557	no
	Sum of investments in agriculture and forestry	247 396	79 341	282 739	130 299	no
	Age of the farmer	47	3	45	4	no
042008	**Drystock, esu 40-100**					
	Number of holdings	5		6		
	Total receipts, before any cost	2 850 070	378 337	1 990 019	754 600	no
	Costs in agriculture, sum of farm supply	705 551	150 188	461 503	233 450	no
	Sum of depreciation in current costs	491 218	123 091	349 226	164 875	no
	Costs in agriculture, sum of maintenance	147 574	31 610	81 991	29 091	no
	Net income in current costs	469 871	238 097	469 357	109 343	no
	Working hours	4 531	162	3 970	1 347	no
	Total equity	855 532	630 424	472 947	204 904	no
	Sum of investments in agriculture and forestry	376 862	282 986	281 972	126 834	no
	Age of the farmer	50	4	51	5	no
050107	**Pig farming, esu 16-40**					
	Number of holdings	10		14		
	Total receipts, before any cost	744 501	261 759	970 296	245 278	no
	Costs in agriculture, sum of farm supply	306 875	131 933	461 818	139 794	no
	Sum of depreciation in current costs	284 202	41 410	283 119	51 987	no
	Costs in agriculture, sum of maintenance	34 975	5 713	36 270	7 607	no
	Net income in current costs	-90 258	90 750	-60 404	45 003	no
	Working hours	2 277	310	1 705	252	no
	Total equity	1 550 487	434 581	-232 049	317 625	**yesyes**
	Sum of investments in agriculture and forestry	43 722	20 405	175 499	62 105	**yesyes**
	Age of the farmer	53	2	44	3	**yesyes**

Table 5. (continue)

Sample stratum	Variable of interest	Ordinary		Supplement		Significant differences
		Mean	Std for mean	Mean	Std for mean	
050108	**Pig farming, esu 40-100**					
	Number of holdings	9		11		
	Total receipts, before any cost	1 688 846	340 943	2 145 501	469 594	no
	Costs in agriculture, sum of farm supply	720 414	174 520	844 022	197 254	no
	Sum of depreciation in current costs	504 676	93 050	531 682	129 497	no
	Costs in agriculture, sum of maintenance	87 818	21 354	70 193	20 671	no
	Net income in current costs	-79 484	101 927	82 365	137 118	no
	Working hours	3 161	549	3 391	631	no
	Total equity	970 991	425 981	309 440	376 216	no
	Sum of investments in agriculture and forestry	83 085	44 587	292 407	124 536	no
	Age of the farmer	47	4	44	2	no
070007	**Mixed, esu 16-40**					
	Number of holdings	8		9		
	Total receipts, before any cost	1 033 362	245 870	826 994	139 336	no
	Costs in agriculture, sum of farm supply	175 323	38 530	219 721	61 469	no
	Sum of depreciation in current costs	215 549	56 062	193 571	38 842	no
	Costs in agriculture, sum of maintenance	77 643	29 492	58 077	12 041	no
	Net income in current costs	304 793	105 533	135 930	64 649	no
	Working hours	2 643	435	2 927	242	no
	Total equity	947 365	340 540	831 183	388 682	no
	Sum of investments in agriculture and forestry	462 867	111 261	90 787	50 325	**yesyes**
	Age of the farmer	42	3	51	4	**yesyes**
070008	**Mixed, esu 40-100**					
	Number of holdings	7		5		
	Total receipts, before any cost	1 565 067	287 778	1 203 028	512 938	no
	Costs in agriculture, sum of farm supply	554 302	196 726	419 914	207 224	no
	Sum of depreciation in current costs	407 284	66 371	339 534	99 079	no
	Costs in agriculture, sum of maintenance	94 395	24 098	97 768	34 249	no
	Net income in current costs	-10 638	127 613	-232 621	140 701	no
	Working hours	4 177	560	2 556	942	no
	Total equity	1 638 855	695 110	200 734	404 053	no
	Sum of investments in agriculture and forestry	554 306	388 744	81 533	31 202	no
	Age of the farmer	45	4	43	2	no

Table 5. (continue)

Sample stratum	Variable of interest	Ordinary		Supplement		Significant differences
		Mean	Std for mean	Mean	Std for mean	
141007	**Dairying, region 710, esu 16-40**					
	Number of holdings	6		7		
	Total receipts, before any cost	558 343	111 856	390 706	39 824	no
	Costs in agriculture, sum of farm supply	137 490	10 641	98 632	22 919	no
	Sum of depreciation in current costs	140 852	27 772	117 048	24 087	no
	Costs in agriculture, sum of maintenance	55 946	12 240	37 822	5 157	no
	Net income in current costs	28 758	70 521	12 250	41 408	no
	Working hours	3 688	436	2 578	279	**yesyes**
	Total equity	633 586	406 464	611 309	197 556	no
	Sum of investments in agriculture and forestry	184 933	130 497	51 453	14 097	no
	Age of the farmer	53	2	49	3	no
241007	**Dairying, region 720, esu 16-40**					
	Number of holdings	9		20		
	Total receipts, before any cost	349 491	74 982	477 532	50 178	no
	Costs in agriculture, sum of farm supply	71 031	19 266	114 829	13 552	no
	Sum of depreciation in current costs	96 832	20 462	116 712	14 917	no
	Costs in agriculture, sum of maintenance	36 493	11 391	42 464	9 884	no
	Net income in current costs	11 560	26 049	42 744	33 962	no
	Working hours	3 066	614	3 199	411	no
	Total equity	621 723	219 747	966 714	310 905	no
	Sum of investments in agriculture and forestry	77 221	56 796	88 005	23 834	no
	Age of the farmer	52	4	46	2	no
341008	**Dairying, region 730, esu 40-100**					
	Number of holdings	8		7		
	Total receipts, before any cost	1 211 352	120 916	1 617 735	134 927	**yesyes**
	Costs in agriculture, sum of farm supply	305 828	24 493	403 256	55 788	no
	Sum of depreciation in current costs	338 744	31 754	408 655	75 600	no
	Costs in agriculture, sum of maintenance	63 493	9 337	98 133	20 840	no
	Net income in current costs	139 041	83 638	163 742	87 582	no
	Working hours	4 437	515	6 409	730	**yesyes**
	Total equity	559 785	411 802	189 450	225 865	no
	Sum of investments in agriculture and forestry	215 446	79 075	986 915	640 055	no
	Age of the farmer	45	3	45	4	no

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