LIVING CONDITIONS AND SUBJECTIVE WELL-BEING OF FARMERS: AN ORDERED RESPONSE ANALYSIS OF REGIONAL DIFFERENCES AND CHANGES OVER TIME

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Abstract: The liberalisation of trade with building down of tariffs and quotas, and with subsequently lower output prices, has enforced considerable structural changes in the agricultural sector. In Norway, both naturally given factors such as climate and topography, and social conditions such as a tradition for small family farms and strong governmental regulations, contribute in making this process even harder on the individual farmer. In this paper we utilise sample survey data on living conditions in agricultural households to examine whether we can observe changes in farmers' experienced utility. We examine whether satisfaction has dropped and if there are any obvious regional differences in satisfaction. The data consists of non-overlapping cross-sections for the years 1995 and 2002 and we make use of an ordered probability model in the estimations. The primary contribution of this paper is in giving a sector specific study of subjective well-being. The results indicate that there are differences in experienced utility between regions and that we can identify changes over time.

Keywords: Subjective well-being. Agriculture. Regional economics. Ordered response model.

JEL classification: C25, I31, J19, Q12, R29

[1] I am indebted to Erik Biørn at the University of Oslo for valuable suggestions and encouragement. The paper has been substantially improved by his comments and advice. Helpful comments from Anne Moxnes Jervell and Jo Thori Lind are greatly appreciated. Remaining shortcomings and errors are entirely my responsibility. I would also like to thank Statistics Norway and Anne Snellingen Bye for use of the data. Financial support from the Norwegian Agricultural Economics Research Institute, the Norwegian Institute of Urban and Regional Research and the Research Council of Norway is gratefully acknowledged.

The Year's At The Spring

The year's at the spring,
And day's at the morn;
Morning's at seven;
The hill-side's dew-pearled;
The lark's on the wing;
The snail's on the thorn;
God's in his Heaven—
All's right with the world!

- Robert Browning

1 Introduction

When thinking of farming and farmers, people like to picture pastoral life with green meadows, grazing sheep, blue skies, the summing of bees, lakes and streams, and the occasional mooing of contented cows. Neat little farms scattered around the hillsides in which lives the happy farmer with his wife and children, all of them enjoying the blissful quietness of country living. Scenes that could have been taken out of a "Anne of Green Gables"-episode. Even though we like to hold a romantic view to farming, we all know that this is not an altogether realistic picture. Farming has at all times involved hardships, and the agricultural sector has not been more shielded from structural and technological changes than the economy as a whole. In Norway the situation is rather the opposite according to official statistics. Even so, the agricultural population reports to be happier than other people (Løwe 1998). Why is this so?

In this paper we examine what characterises the contented farmer. We aim to identify regional differences in contentment among Norwegian farmers and pose three specific claims, namely that

i) periphery farmers are more content with life than farmers in central regions,
ii) that all farmers have grown less content from 1995 to 2002, and
iii) that the negative change in experienced contentment is greater among periphery farmers than among centrally located farmers.

In the following analysis we distinguish between satisfaction with life as a farmer and general life satisfaction because the two measures are not necessarily concurrent, although the claims we put forth are valid for both. The first claim is based on an assumption that rural farmers dedicate more of their total working time to farm activities and that they identify themselves as farmers to a greater

degree. However, production type and diversification of tasks on the farm may explain much of the regional differences. The two subsequent claims are based on structural changes.

The reason why we want to study farming and happiness is rooted in changes in the Norwegian government's agricultural policies since 1992 and in the international agreements on liberalisation of trade in agricultural products. The last decade has seen an increased focus on productivity growth, cost efficiency and competitiveness in agricultural production, and it is claimed that this will have disastrous effects to future production in Norway [Vårdal (2003)]. Most Norwegian regions are not very well suited for large scale production for climatic and topographic reasons and the small family farm holds a strong position both historically and politically. Labour productivity has increased more in agriculture than in other sectors during the last 30 years and it is difficult to see how production can become much more efficient within the present family farm structure. Employment in agriculture is down to three percent of the total labour force and the number of farms decreases by ten every day, which is more than four percent annually. The consequences of this trend will be most discernible in rural regions and may lead to depopulation in some municipalities in the periphery. Agriculture and associated activities account for more than 50 percent of all jobs in as much as one quarter of all municipalities. A viable and geographically spread out agricultural sector is of great importance if we are to maintain a decentralised population structure, which is in fact a particular policy objective of the Government's agricultural as well as it's regional policies.

2 Theoretical framework

Economists have traditionally not paid much attention to determinants of happiness for the obvious reason that happiness is hard to define and quantify. Instead, economists have developed an ordinal utility measure which makes it possible to explain the choices individuals make between various goods. People are assumed to behave rationally and to choose, within the feasible set, the good combinations that maximise their utility. Since Samuelson in 1938 argued that it could be axiomatically taken that utility was no more than preference, few economists have strayed from the neoclassical path where preferences can be ranked in a well-defined order. Cardinal utility measures were more or less discharged in the 1930s and forgotten about until Easterlin wrote his seminal work on happiness in 1974[2]. In recent years, happiness has become a topic of interest to economists, largely based on the developments in happiness research in psychology. Important contributions in the field of measuring happiness are Easterlin (2001, 2003), van Praag and Frijters (1999), Diener and Biswas-Diener (2000), Frey and Stutzer (1999, 2002), Blanchflower and Oswald (2004), Winkelmann (2004), and Boes and Winkelmann (2004). To my knowledge, there is no recent economic literature on sector-specific analyses of happiness and well-being.

[2] Cardinal utility measures are used in cost-benefit analyses.

Why should we tread into the muddled waters of finding factors that determine happiness rather than stick to well-defined preference orderings of neoclassical theory? One reason may be that philosophers through all times have been concerned with the concept of happiness. Aristotle defined happiness as the supreme good and the only value that is final and sufficient in it self [Nicomachean Ethics (1947)]. Everything else, he argued, was merely means to an end. Other examples from the history of philosophy is Kant who said that happiness, though an indefinite concept, is the goal of all rational beings [Critique of Practical Reason (1788)] and Hume who claimed that the great end of all human industry is the attainment of happiness [Essays, Moral and Political (1742)]. If it is true that happiness is the ultimate goal of life then it should obviously be of concern to economic research. At any rate, it is of interest to know how happiness differs between countries (rich and poor), regions, political systems, over time, between age groups, sexes, social classes ect. Research shows that happiness tends to be correlated with achievement [Argyle (1999)]. Happy people are more successful in both work and social relations. Or maybe it is the other way around, that people become happy as a result of their successfulness. Either way, there are social costs connected with discontentment that economists have tended to ignore.

Happiness is usually equated with utility in economic theory and we argue that the good combination that is most preferred by an individual will bring the highest amount of happiness. This may be true given that people are rational and have full information to make choices within their feasible set of alternatives, but it allows for only a narrow definition of happiness. It is not difficult to find examples to show that individual preferences and happiness are distinct and that they may even diverge. We also know that many of the things that improve or aggravate quality of life can not be priced and traded in markets. Success in pecuniary pursuits may even have a negative effect on happiness because of the causal effects it has on nonpecuniary goals such as time available for family and recreation [Easterlin (2003)]. According to Frey and Stutzer (2002) there are five classes of factors that determine happiness. These are

1) *Personality factors*, such as self-esteem, extraversion, self-reliance, tidiness, and optimism.
2) *Socio-demographic factors*, such as age, gender, marital status, and education.
3) *Economic factors*, such as income, wealth, unemployment, economic growth, competition exposure, profitability.
4) *Contextual and situational factors*, such as working conditions, structural changes, interpersonal relations, living conditions, health.
5) *Institutional factors*, such as extent of political decentralisation and the citizen's direct political participation rights.

Among the five classes of factors, economic theory usually only includes economic and socio-demographic factors. Personality factors and contextual factors are assumed to enter into more measurable factors or are simply treated as unspecified exogenous variation affecting the form of the

utility function. Including such factors will thus increase the explanatory power of the econometric models.

2.1 Indicators of happiness

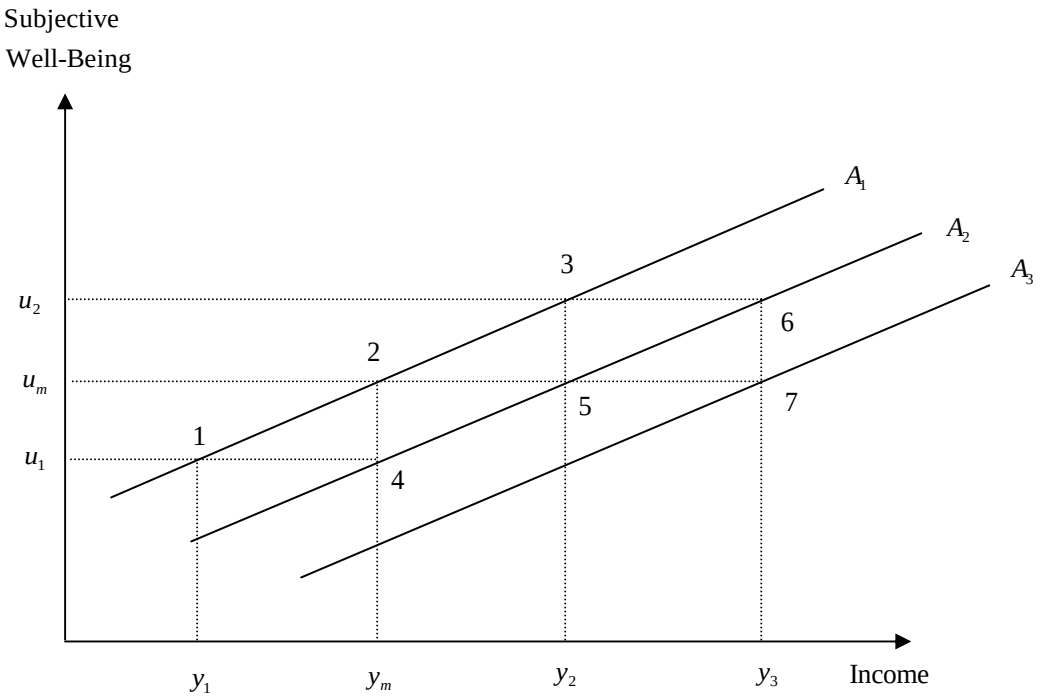
One of the reasons why economists are reluctant to study happiness is that we do not have very good indicators for measuring happiness. Psychologists experiment with neurobiological indicators that rely on i.e. brain waves, but they are so far not very reliable nor practicable in widespread use [Frey and Stutzer (2002)]. Observed behaviour is also an uncertain measure of happiness because people do not always act in accordance with their inner feelings. A friendly smile and outgoing behaviour may indicate happiness but may also just be a blind. At the same time, we know that most people who commit suicide are unhappy, but still there are lots of unhappy people who would not even consider such an act. It seems like surveys on self-reported happiness (subjective well-being) is the best available indicator of happiness.

Subjective well-being is accepted as a reliable measure in most of the literature with the exception (in my list of references) of Schwarz and Strack (1999). In this article, they give a thorough discussion of the relationship between objective and subjective measures and of how subjective measures are prone to be influenced by contextual factors such as happy or sad events, emotional moods, past experience, future prospects and comparisons with others. They find that measures of subjective well-being have a test-retest reliability below 60 percent, i.e. less than 60 percent of the respondents will give an identical response when asked the same question twice (during an one-hour interview). Even so, the prevailing view within this field of research is that people are capable of consistently evaluating their own state of well-being. Diener (1984) has found that people who report to be happy are independently rated as happy by the people around them. Economists often argue that survey responses tend to be biased. Besides the factors considered by Schwarz and Strack, one reason for bias to occur is that the surveys usually fills a purpose and are commissioned by someone. If we are to assume that the respondents are rational, they will know that they enter a game situation when answering the questions and will thus act strategically. The respondents may e.g. have an incentive to underreport their level of happiness if they believe that a low score will result in desirable changes in policy. By analysing longitudinal data, Easterlin (2001) has shown that at a given point in time, people tend to underrate their feelings of happiness in the past and to overrate expected happiness in the future, but on average, their experienced happiness is constant over the life-cycle. He explains this by a distinction between what he calls *decision utility* and *experienced utility*. Decision utility is defined as the perceived (*ex ante*) satisfaction associated with making a choice among several alternatives. Experienced utility is the realised satisfaction (*ex post*) from the outcome actually chosen.

People have aspirations and expect that once their personal goals are achieved they will become happier than they are today. What they do not take into consideration is how easy one adjusts to the new situation. An increase in income will usually give a rise in subjective well-being, but after some time their happiness level tends to fall back to the level previous to the income raise. This may be

merely adjustment to higher income, or it may be that aspirations are not constant over the life-cycle but are influenced by, among other things, changes in income. Easterlin illustrates this in the following figure.

Figure 1: Subjective well-being (u) as a function of income (y) and aspiration level (A).



Source: Easterlin (2001), p.473.

If people increase their aspiration level when previous aspirations have been fulfilled, we see from figure 1 why happiness in the past tends to be underrated. Assume an individual starts out in point 2 with income y_m, aspiration level A_1 and the corresponding utility level u_m. A raise in income to y_2 will initially lead to an increase in utility to u_2 (point 3), but then aspirations are assumed to adjust to the higher income level and utility drops back to the original level (point 5). Being on aspiration level A_2, the individual will tend to underrate the utility he experienced at the original income level y_m. Easterlin has found evidence that this mechanism is reversible. Well-being is found to be stable over the life-cycle, also when income drops in retirement years.

2.2 Measuring subjective well-being

The principal way in which happiness is measured is to ask direct questions about subjective well-being (SWB). "All things considered, how happy are you with life at present?" The SWB-indicator is divided in a rank of (usually ten) possible outcomes where the respondent shall tick off his answer on a scale ranking from very happy (10) to most unhappy (1). In addition to overall happiness, surveys often include more specific indicators such as "How happy are you with your standard of living?" and "How happy are you with your professional career?" The happiness measure of subjective well-being is recognised to be a reflection of at least four factors: circumstances, aspirations, comparison with

others, and a person's baseline happiness or dispositional outlook as discussed in Blanchflower and Oswald (2004). We consider two such subjective well-being measures, the sector-specific question "All things considered, how satisfied are you with life as a farmer?" which we label *SWBF* and the general question "All things considered, how satisfied are you with life in general?" which we label *SWB*. The scale of possible responses is ten for both measures.

A way of formalising an individual's subjective well-being is to express it as a step-function of his utility:

$$(1) \qquad SWB = H\left[U\left(X,t\right)+\varepsilon\right]$$

The responses of an individual's subjective well-being (SWB) are bounded on an ordinal scale, often ranging from 1 to 10. The function $U(\cdot)$ represents actual well-being or utility and is differentiable but not observable and $H[\cdot]$ is a non-differentiable function relating actual to reported well-being. The argument *X* is a vector of determinants of the individual's actual well-being and *t* indicates that the relationship between these determinants and well-being may change over time. The error term ε serves to capture other hidden factors influencing the relationship between actual and reported well-being.

3 Econometric model

In the following, we give a general outline of the ordered response model. The dependent variable, subjective well-being, will for short be labelled *w*. There is no theoretical difference in modelling farm satisfaction and general satisfaction and we will not distinguish between the two measures in this chapter. When discussing data and results we reintroduce the labels subjective well-being (*SWB*) for general life satisfaction and subjective well-being with being a farmer (*SWBF*) for farm life satisfaction.

We measure subjective well-being of individual *i*, w_i, on an ordinal scale. The dependent variable can take J different outcomes coded in a rank preserving manner, $w_i = \{0,1,...,J-1\}$, where $i = 1,...,n$ represents observation number. The values of w_i are determined by a latent response model

$$(2) \qquad w_i^* = x_i'\beta + u_i$$

where $x_i = (x_{1i},...,x_{ki})$ is a $k \times 1$ vector of covariates, $\beta = (\beta_1,...,\beta_k)$ is a vector of parameters to be estimated, and u_i is normally distributed error term with zero mean and standard deviation σ_u. We are not able to observe w_i^*, but we know that he relationship between w_i and w_i^* is as follows

$$(3) \qquad \begin{aligned} & w_i = 0 \ \text{ if } w_i^* \le \mu_0 \\ & w_i = 1 \ \text{ if } \mu_0 < w_i^* \le \mu_1 \\ & \quad \cdots \\ & w_i = J-1 \ \text{ if } w_i^* > \mu_{J-2} \end{aligned}$$

The μs are free parameters that represent the threshold values of the model. The threshold values bound the J categories into which w_i^* falls and range within $\mu_0 = -\infty$ to $\mu_{J-2} = \infty$. The economic agents have individual conceptions of the values of the μs, but these are unobservable to the analyst and are treated as constants to be estimated together with the regression parameters β. Relating the model to the theoretical formalisation in chapter 2 we find that w_i equals the observable well-being function $H[\cdot]$ and w_i^* equals the latent utility function $U(X,t)$. Assuming uncorrelated error terms, the distribution of the qualitative variable, w_i can be derived from (2) and (3)

$$P_{0i} = P(w_i = 0) = P(w_i^* \le \mu_1) = F\left(\frac{\mu_1}{\sigma_u} - \frac{x_i'\beta}{\sigma_u}\right)$$

$$P_{1i} = P(w_i = 1) = P(\mu_1 < w_i^* \le \mu_2) = F\left(\frac{\mu_2}{\sigma_u} - \frac{x_i'\beta}{\sigma_u}\right) - F\left(\frac{\mu_1}{\sigma_u} - \frac{x_i'\beta}{\sigma_u}\right)$$

$$\vdots$$

$$P_{J-1i} = P(w_i = J-1) = P(w_i^* > \mu_{J-2}) = 1 - F\left(\frac{\mu_{J-2}}{\sigma_u} - \frac{x_i'\beta}{\sigma_u}\right)$$

We normalize μ_0 to zero in order to include a constant term in the model and σ_u to unity in order to identify β and μ. This leaves us with the parameter vector $\Theta = \{\beta, \mu_{1,\dots,}\mu_{J-2}\}$ and we estimate the $J-2+k$ parameters by maximum likelihood. With normally distributed disturbances, the response probabilities, conditional on the xs, are of the form

(4) $$P(w_i = j \mid x_i) = \Phi(\mu_j - x_i'\beta) - \Phi(\mu_{j-1} - x_i'\beta)$$

where Φ denotes the cumulative distribution function of u_i in the $N(0,1)$-distribution.

Let $w_{ij} = 1$ if w_i equals j and $w_{ij} = 0$ otherwise. Assuming that all observations $(w_i \mid x_i)$ are independent for all n, the likelihood function for this model becomes

(5) $$L = \prod_{i=1}^{n}\prod_{j=1}^{J}\left[\Phi(\mu_j - x_i'\beta) - \Phi(\mu_{j-1} - x_i'\beta)\right]^{w_{ij}}$$

and the corresponding log likelihood function

(6) $$\ln L(\beta, \mu_1, \dots, \mu_{J-2}; w, x) = \sum_{i=1}^{n}\sum_{j=1}^{J} w_{ij} \ln\left[\Phi(\mu_j - x_i'\beta) - \Phi(\mu_{j-1} - x_i'\beta)\right]$$

We know that $\Phi'(x) = \phi(x)$ and $\phi'(x) = -x\phi(x)$, and can then calculate the first and second derivatives as shown in Maddala 1983, pp. 48-49.

It has been shown that for the ordered response probit model, the matrix of second derivatives of $\ln L$ is everywhere negative definite (Pratt 1981) so the Newton-Raphson iterative procedure will converge to the global maximum of the likelihood function.

4 Data

4.1 Sample selection

The analysis is based on data from a Norwegian survey of living conditions among agricultural households conducted in 1995 and in 2002. The surveys cover topics such as personal factors (family relations, education), housing and material goods, informal/non-paid work, farm and off farm work, working conditions, income and financial conditions, health and well-being, friends and social networks, and leisure activities.

A total of 1401 farm units are included in the 1995 survey and all adults (aged 17-79) who participated in farm work (although not necessarily living on the farm) including their spouses, were interviewed. In the 2002 survey, only the farm operator and his/her spouse were interviewed, and a total of 1552 farm units are included. In the sample selection for the following analysis we have only considered farm operators, counting a total of 1251 persons in 1995 and 1508 in 2002. We have no information as to whether some farm operators appear in both samples so we treat the data as two separate cross-sectional samples.

The surveys on living conditions among agricultural households are carried out by Statistics Norway. The common objective of the two surveys is to present a representative selection of farm units in order to allow for comparisons between the two years. Both surveys aim to represent all geographical regions and landscapes, the most common production compositions and different farm sizes measured in farm income (profit and net disposable income) and in decare of cultivated land. Even so, the selection criteria are not exactly identical in the two surveys. The main difference is the geographical level from which farm units are drawn (see footnote 5 for more details). This may explain the differences we observe in regional spread between the 1995 and 2002 surveys, although the observed changes may equally well be structural.

When we apply survey data, we must also be aware of the possibility that the respondents do not have an equal understanding of the questions that are asked. Other factors, which may influence the results, are changes in agricultural policies, structural changes, and national economic performance. In 1994, the majority of the Norwegian people voted against applying for full membership in the European Union. Although this happened more than a year before the 1995-survey was carried out, the termination of the EU-membership question may have led to a more optimistic outlook in the agricultural populace. Also, the economy was booming in 1995 with increasing growth rates of income and production, and a decreasing rate of unemployment. In times of prosperity, centralisation tends to intensify, and relative income in regulated industries, such as agriculture, decreases. The effect of national economic performance on farmers' subjective well-being is thus, a priori, ambiguous.

In 2002, liberalisation of the agricultural sector was taken further, implying more exposure to competition, but also more flexible subvention schemes. Farmers' cooperatives were loosing power in

the food chain industries, particularly in processing and distribution. The economy was still expanding, but with lower growth rates and with a higher unemployment rate. The observed structural changes including redistributions of economical and political power, and specifically internationalisation of agricultural policy schemes with building down on tariffs and quotas, may have influenced the results from the 2002-survey negatively. We do not specifically include macroeconomic factors in the analysis. Nevertheless, it is possible to relate macroeconomic factors to shifts in the intercept, e.g. differences between 1995 and 2002 will be reflected in a year specific dummy.

4.3 Definitions

The happiness scale for general subjective well-being (*SWB*) and for farm life subjective (*SWBF*) are reported on a 1-10 scale in the surveys, where 1 indicates completely dissatisfied and 10 indicates completely satisfied. The response distribution of subjective well-being tend to be skewed to the right [Di Tella et.al (2003, p.811)]. The mean value will lie above the median and the response categories representing the least happy contain relatively few observations. To avoid cells with low frequencies[3], the responses 1-4 are grouped in one category, leaving a total of seven categories. I choose to keep the original scale and code the seven response categories: {less than 5, 5, 6, ..., 10}. When calculating, I set the "less than 5"-category equal to 3 which give approximately the same average values as the 10-category scale[4]. The aggregation of the happiness categories is not strictly necessary for the *SWBF*-measure, but is done to make the presentation more uniform. In the text, we have applied the expressions happiness, (subjective) well-being, satisfaction and contentment more or less synonymously as descriptions of the ordinal subjective well-being measures *SWB* and *SWBF*, but as a rule, we use general well-being for *SWB* and farm (life) satisfaction for *SWBF*. Hopefully this will not be a cause of confusion.

Among the explanatory variables, we have included a centrality dummy differing between municipalities with less than 5000 inhabitants (periphery) and those counting more than 5000 (central)[5]. Using this distinction, we find that almost 40 percent of the farms fall into the periphery category in 1995 but that the proportion drops to 24 percent in 2002. The fall in the number of periphery farms may be a consequence of the somewhat different sample selection criterion, but may also be a result of more farms having been shut down in the periphery during the intervening years[6].

[3] Category 1-4 for *SWB* included {5,3,8,22} observations in 1995 and {10,10,50,52} in 2002. For *SWBF* the number are {6,9,15,31} and {10,22,58,91}, respectively.
[4] The mean value of the four categories is 2.5, but since there are more observations in categories 3 and 4 than in 1 and 2, we get closer to the true averages by representing the four categories by the value 3.
[5] The centrality indicator chosen, divides the total number of municipalities into two approximately equal shares, 47 percent of all municipalities are defined as periphery and 53 percent as central.
[6] We can not be certain of what causes the drop in periphery farms because the information on selection criteria is not sufficiently specific. The farms in the surveys are supposed to be representative of all regions and types of production. In 1995, the farms were drawn from municipality level, but with different weights for different regions. In the 2002 survey, farms were drawn from a total of 40 strata representing 8 regions. If the regional division in the two surveys are approximately equal in size and structure, we can say that the fall in periphery farms is a consequence of a relative higher rate of farms being shut down in the periphery.

The explanatory variables included in the analysis encompass personal and household characteristics, farm characteristics, and income and labour division characteristics and are described in table A1.1. To be able to run a pooled regression for both years, we include a dummy for year 2002, thus allowing for different intercept for the two years.

4.4 Summary statistics of exogenous variables

In the following, we present some summary statistics of the exogenous variables included in the x-vector of the model described in section 3. In order to give a more complete picture, I have supplemented with information on other relevant variables from the surveys. A more thorough data description for 1995 can be found in Løwe (1998). Tables A1.2 and A1.3, reported in appendix I, show the mean values of the regressors for the whole sample and for subsamples based on centrality and main production type.

When we look at the regional spread, we find that in 1995 30 percent of the farms are located at Østlandet, which is the most densely populated part of the country, and between 15 and 20 percent in each of the other four parts, Sørlandet, Vestlandet, Trøndelag and Nord-Norge. In 2002, the sample was more evenly distributed, with one fourth of the farms located at Østlandet, Sørlandet or Trøndelag respectively, while Vestlandet and Nord-Norge together covered the remaining quarter. A division of the sample according to principal type of production shows that dairy farms (39 pct.) comprise the largest group, followed by other livestock farms (34 pct.; includes all kinds of productive farm animals: poultry, sheep, cattle, pigs). Grain producers count for only 15 percent of the sample. The distribution with respect to production type is more or less the same for both years and representative for the total population. There are vast regional differences in type of main production and farm size. We find the largest farms in the lowland areas of Østlandet and Trøndelag. The average farm size in these regions is 117 decare[7], and grain production is the main produce. In other parts of the country (Rogaland, Vestlandet and Nord-Norge) we find that dairy, garden and meat produce are more important.

From table A1.2 we see that the farming sector is still extremely male-oriented. Only 9 percent of the farm operators are female in 1995 and 11 percent in 2002. Among the farm units in the sample, there seems to be a relatively high proportion of female operators in Nord-Norge, and we see from table A1.3 that the female proportion has increased most for dairy producers between 1995 and 2002. From other studies we know that a large proportion of the female operators are widows [Rogstad and Jervell (2002)]. The age distribution follows a bell-shaped curve peaking at 48 (47 in 2002) years of age, and the distribution on age groups is stable in the two surveys. In 2002, we see that farmers in the periphery are elder than average age. 80 percent of the farmers in the survey have a spouse, while approximately 14 percent are unmarried and 6 percent are divorced or widowed. Farm households are relatively large. Average household size is 3.15 and more than 40 percent of the households count 4 or more individuals. Even though we often hear of bachelor farmers in rural areas, single-person

[7] One decare equals 1000 square meters or ¼ acre.

households are rare among the agricultural population. One explanation may be that every third farm includes more than one household because the parental generation continues to live at the farm when the son/daughter takes over the daily running. The average number of children is 1.24 but is falling from 1995 to 2002. We also see that periphery farmers have more children than central farmers, and that dairy farmers have more children than average. Traditional farm production does not require higher education and we find that only 5 percent of the farm operators have education at university level in 1995, compared to 28 percent of the total working population. There are no obvious geographical or production type differences between the highly educated farmers in 1995. In 2002, the share with higher education is more than doubled, but still well under the national average.

A rather large proportion of the farm operators in the sample have an illness or injury that, at least to some degree, affects their working ability. In 1995, more than one third of the sample reported bad health but the proportion dropped to one fourth in 2002. Approximately half of the farmers had the farm as their main income source in 1995 and half of the farmers also worked off the farm. In 2002, the proportion of farmers working off the farm has increased and only 35 percent have farm production as their principal source of income. Dairy production is more labour intensive than grain production and we find large differences in how the farmers divide their time between working on and off the farm. From table A1.3 we see that in 1995, 84 percent of all dairy farmers had farm production as main income source (*work primarily on the farm*) and only 30 percent had off-farm work. For grain producers the situation was quite the opposite, with only 18 percent having the farm as main income source and 75 percent having off-farm work. Livestock farmers fall between with 63 percent working off the farm and 34 percent working primarily on the farm. In 2002, the differences are not that large, mainly because more dairy farmers work off the farm. Looking at the entire sample, we find that 55 percent of the farm operators have off-farm work while 42 percent report farming to be their principal occupation. Farmers who work either part time or full time off the farm tend to have a larger number of total working hours than the ones whom only work on the farm, but also more than the average non-farmer (Løve 1998, 2004). The larger the farm the higher the total working hours, and the higher the share of total working time spent on the farm. This may seem obvious, but the positive relationship between farm size and work effort is counteracted by the fact that grain production, which also is positively related to farm size, requires relatively little work effort.

Farm tourism is a relatively new industry in a commercial sense and less than 10 percent of the farms are in this business. It is far more common to let out fishing and hunting rights. Some farmers also run a self-employed enterprise as a supplement to farming. Such businesses are often services connected to farm work or fishing/hunting, forestry, timber industry and constructing. Tourism, hunting and associated activities are aggregated into one dummy variable named *Tourism*. We see that these industries play a more important role in the periphery and among grain producers. This probably has the natural explanation that grain producers have more time available and that recreational resources are more plentiful in the periphery.

5 Results

Before discussing the probit estimation results, we present some tables of mean values of the satisfaction indicators conditional on one or more of the exogenous variables. These are given in appendix 2 and discussed in section 5.1. In section 5.2 we discuss the relationship between the two measures of general well-being and farm life satisfaction. The estimation results are given in 5.3 with supplementary tables in appendix 3, and the derived marginal probability effects are given in section 5.4 and appendix 4.

Table 1: Joint sample distribution of farm satisfaction (SWBF) and general well-being (SWB). Percent of total for pooled sample.

	SWBF<5	**SWBF=5**	**SWBF=6**	**SWBF=7**	**SWBF=8**	**SWBF=9**	**SWBF=10**	**Total**
SWB<5	1.3	1.0	0.2	0.5	0.3	0.1	0.1	3.6
SWB=5	2.2	2.8	1.5	0.7	0.8	0.0	0.1	8.2
SWB=6	1.4	1.9	1.7	1.2	1.1	0.1	0.2	7.6
SWB=7	2.1	2.9	3.3	4.3	2.7	0.4	0.2	15.9
SWB=8	2.2	4.7	5.4	7.9	8.8	1.5	1.1	31.6
SWB=9	1.1	2.1	2.4	2.9	5.2	2.3	0.9	16.9
SWB=10	0.8	1.8	1.1	2.4	4.3	2.2	3.7	16.2
Total	11.0	17.2	15.6	19.9	23.3	6.7	6.3	100.0

In table 1 we show the joint distribution of responses relating to farm life satisfaction (columns) and general well-being (rows) where the cell entries are relative frequency, in percent, of the total number of observations (*n=2759*). We see that most observations are on or below the diagonal because most farmers report to be more satisfied with life in general that they are with being farmers. The most frequent response category is *j=8* for both farm satisfaction and general well-being. 9 percent of the sample reported *j=8* for both SWBF and SWB. Only a few farmers report to be more satisfied with life as farmers than with life in general. In total, we find that 25 percent of the observations are on the diagonal while 60 percent are below.

Table 2: Relative row frequencies of responses on each happiness category.

	Year	**j<5**	**j=5**	**j=6**	**j=7**	**j=8**	**j=9**	**j=10**	**Total**
SWBF	**1995**	9.8	12.9	16.8	18.5	25.3	8.4	8.4	100.0
	2002	12.0	20.7	14.7	21.2	21.7	5.3	4.5	100.0
SWB	**1995**	3.0	6.2	8.2	14.9	31.4	18.3	17.9	100.0
	2002	4.0	9.7	7.2	16.7	31.8	15.8	14.7	100.0

In table 2 we present the happiness responses on each category as relative frequencies for each year separately. The distribution of responses on the seven categories confirms the impression that most farm operators are fairly or completely satisfied with life, but that they are not equally happy with being farmers. The three top scores of subjective general well-being are chosen by two thirds of

all farm operators in 1995, while only four out of ten reported to be in the top three categories of farm satisfaction. We also see that both general well-being and farm satisfaction decrease between 1995 and 2002. In 2002, fewer operators are completely satisfied whilst more are dissatisfied. Less than one third of all farmers fall into the top three categories of farm satisfaction in 2002.

5.1 Average level of subjective well-being

The average level of subjective well-being for the pooled sample is 7.8 and for farm satisfaction it is 6.6. On a scale where 10 is the highest score, this indicate that farmers are rather content, but more so with life in general than with life as a farmer.

Table 3 and 4 show the average satisfaction scores for farmers occupied with the three principal production types, separated for central and rural areas. The general impression is that periphery farmers are more satisfied than farmers in central regions. Farmers in the periphery score higher on both general well-being and farm life satisfaction for all production types. Equally striking is the fact that happiness drops from 1995 to 2002 in both regions and for all types of production.

Table 3: Average level of farm life satisfaction.

SWBF	**All**		**Dairy**		**Livestock**		**Grain**	
	1995	**2002**	**1995**	**2002**	**1995**	**2002**	**1995**	**2002**
Central	6.79	6.41	6.81	6.34	6.83	6.48	6.75	6.39
Periphery	6.96	6.45	6.94	6.24	7.05	6.50	7.07	6.66
All obs.	6.86	6.42	6.86	6.32	6.91	6.49	6.87	6.48

We see that livestock farmers have the highest average farm satisfaction level but that dairy farmers experience the greatest drop in farm satisfaction from 1995 to 2002. Grain farmers seem to be the happiest with life in general although they show a marked drop in both farm satisfaction and general satisfaction in 2002. In total, farm satisfaction falls by 0.44 points, or more than 6 percent from 1995 to 2002, while general well-being falls by 3 percent.

Table 4: Average level of general life satisfaction.

SWB	**All**		**Dairy**		**Livestock**		**Grain**	
	1995	2002	1995	2002	1995	2002	1995	2002
Central	7.81	7.71	7.73	7.56	7.84	7.67	8.05	7.57
Periphery	8.03	7.74	7.97	7.68	8.03	7.84	8.11	7.78
All obs.	7.89	7.65	7.82	7.59	7.91	7.71	8.08	7.63

The self-reported scores of subjective well-being support the a priori hypotheses that, on average, rural farmers are happier than farmers in central regions and that all farmers have turned less satisfied. We also see that periphery farmers experience a larger fall in their satisfaction level from 1995 to 2002 than centrally located farmers. Dairy producers report the largest drop in farm life satisfaction, while grain producers show the largest fall in general well-being.

In tables A2.1 and A2.2 we present the sample means of the endogenous variables, SWBF and SWB, conditional on the explanatory variables. The appendix tables supplement tables 3 and 4. We show the sample means for the pooled sample as well as for subsamples for the two years and regions. The standard deviations are given in italics. The sample means are given for both values of the binary explanatory variables, while the continuous variables are aggregated into three or four intervals. For instance, income is aggregated into quartiles.

I will only comment upon a few striking facts that are revealed in these tables. Firstly, once more we see that periphery farmers report relative high levels of happiness, both for farm life satisfaction and for general well-being. For each of the two regions, average level of happiness decreases from 1995 to 2002. Both total household income and farm income have an ambiguous effect on satisfaction while higher education seems slightly positively related with happiness in both years. Only in 2002, for general well-being does there seem to be a uniquely positive relationship between household income and happiness level. Farmers with zero income from farm production experience higher general well-being than the ones who have positive earnings from the farm. In 2002, the difference in well-being between the first and fourth farm income quartile is 0.45 points and the difference is greater in central regions than in the periphery. The result is not as strange as it might seem because the respondents who report zero income from the farm are in no practical sense farmers and are therefore relieved of the stress and time pressures induced by holding multiple jobs. The literature on happiness research generally concludes that women are more satisfied with life than men (Frey and Stutzer 2002). We find that women are happier than men when it comes to life in general, but that men are more satisfied with life as farmers. Farm satisfaction was 0.34 percentage points higher for male operators in 1995 and 0.20 points higher for male operators in periphery regions. The difference in farm satisfaction between male and female operators was less in 2002 and in central regions. As discussed in section 2, this may be explained by the fact that farming is still principally a male profession and that many of the female farmers are widows. Another interesting fact is that the farmers that have an off-farm job are more likely to report high levels of general well-being but lower levels of farm life satisfaction. On average, they report *SWB* of 7.92 and *SWBF* of 6.50. Likewise, the ones who work primarily on the farm are more likely to report high levels of farm life satisfaction (6.69) and low levels of general well-being (7.63). What makes the farmer happy may thus not be the same as what makes the man happy.

5.2 How is farm life satisfaction related to general life well-being?

So far, I have not made any assumptions about the relationship between the two happiness measures. We would naturally assume them to be positively correlated but, as discussed above, the different explanatory factors may not have the same effect on farm life satisfaction as they have on general life satisfaction. The data show that ever more farmers work off the farm and that the time they spend in off-farm activities increases. Even though farming is still more a form of lifestyle rather than just an occupation, it seems like farm satisfaction and general satisfaction are not entirely corresponding. The

farmer is basically concerned with the running of the farm, while the man also considers personal life quality, social networks, access to cultural and recreational activities, and local labour market conditions. The marginal correlation coefficient between the two happiness measures is in fact below 0.4 for the pooled sample as well as for subsamples based on year and centrality.

It can be argued that general life satisfaction can be represented as a function of different domain satisfactions (DS_d), such as health, housing, occupational, financial and environmental satisfaction, where *d=1, ..., D* are the number of different domains. The domain satisfaction measures depend upon vectors of explanatory variables relevant to the specific domain and may also depend upon other domain satisfactions, i.e. job satisfaction is assumed to (among other things) depend upon health satisfaction (see van Praag et. al. 2000, 2002). General satisfaction is then assumed to depend on levels (and means) of the domain satisfactions and, possibly, of other factors,

$SWB = SWB\left[DS_1(x_1), ..., DS_D(x_D), x_{SWB} \right]$, where x_{SWB} is a vector of exogenous variables relevant to *SWB.*

Following this tradition, it is reasonable to assume that the general satisfaction of the farm operators will depend on, ceteris paribus, their satisfaction with being farmers. This assumption is supported by a chi-squared independence test between the two satisfaction measures. The test statistic is based on frequency counts of the joint distribution and strongly rejects the hypothesis of independence between *SWB* and *SWBF*[8]. The independence test does not say anything about causality, but we let that causality be represented the traditional way, i.e. general satisfaction depend upon farm life satisfaction in the estimations, and not the opposite. In this case the two relevant satisfaction levels can be expressed as,

$SWBF = SWBF(x_{SWBF})$ and

$SWB = SWB\left[SWBF(x_{SWBF}), x_{SWB} \right]$.

The implication of this assumption is that model becomes recursive. Farm satisfaction is assumed to be completely determined by a vector of exogenous variables relevant to *SWBF*, x_{SWBF} and when *SWBF* is derived, general well-being (*SWB)* can be determined by the predetermined *SWBF* in addition to the relevant vector of exogenous variables, x_{SWB}. If *SWBF* is independent of the disturbance term in the *SWB* regression, we can treat the variable as (asymptotically) exogenous and obtain consistent estimates [Greene (2000, p. 659)]. We can motivate the recursive model structure by the fact that all responses can be seen conditional to the choice of being a farmer.

5.3 Ordered probit estimations

The results from the ordered probit analysis are calculated using LIMDEP econometric software version 8.0. We model overall subjective well-being (*SWB*) and subjective well-being of farming

[8] The chi square test statistic with d.f. 36 is 720.928 and probability of acceptance of independence hypothesis is p=0.0000.

(*SWBF*) separately, using an ordered probit model as presented in chapter 3. As discussed above, *SWBF* can be treated as exogenous in the in the estimation of *SWB*. The parameter vector β is to be estimated together with *J-1* threshold values but since the latent regression equation includes a constant term, one of the *j* threshold values can not be identified. We solve the identification problem by normalising μ_0 to zero, which leaves *J*-2 free μ-parameters to be estimated.

There is a set of five time-varying, demographic and economic variables that appear in almost every study of subjective well-being (Ferrier-i-Carbonell and Frijters 2004). These are: *age*, *income*, *living in partnership*, *number of children in the household*, and *personal health*. Depending on the particular point of interest, the different studies include additional controls that may be distinct for each study.

We have included the five standard variables in the regression of overall happiness. In addition, we control for time period and region, and include some controls to account for the individuals' status as farmers. A large proportion of the variables appear as dummies, something that may lead us to underrate the true heterogeneity in the sample. We have also included a number of interaction terms to allow for different intercepts and slopes of the regression equation. The interaction terms chosen allow for the income effect to vary for different classes of farmers. The explanatory variables in the SWB-model are thus chosen in accordance with the theory and with previous empirical studies. Estimation of farm life satisfaction is based solely on farm characteristics and the farmers' age. In addition, I control for year and region and include interaction variables to allow for different income effects for different kinds of farm produce.

The ordered probit analysis is performed for the pooled sample as well as for each year and region separately. The chosen model specification seems to fit the data fairly well. The pseudo R squared measure for the ordered probit model, given by Zavoina and McKelvey (1975), reach 0.945 for *SWBF* estimation and 0.981 for *SWB* estimation. In the following, I will mainly comment on the results of the pooled regressions as given in tables 5 and 6. The complete estimation results are shown in appendix 3.

The estimation results concur fairly well with previous findings from the literature on subjective well-being (Winkelmann and Winkelmann 1995, Ferrier-i-Carbonell and Frijters 2004). Farm life satisfaction is U-shaped in age. Dairy, livestock and grain production all affect *SWBF* negatively compared to other crops and forage. New agricultural industries (*tourism*) affects *SWBF* negatively compared to traditional farming. Female farmers are less likely to report high farm satisfaction, while having a successor and access to hired help (*relief*) is regarded positive. A more interesting result in relation to the main problem in this paper is that working off the farm has a negative effect on farm satisfaction. We also see that the periphery parameter estimate is positive and that the 2002 dummy parameter estimate is negative, which is consistent with our hypotheses.

Table 5: Ordered probit estimation of farm satisfaction.

Independent variable	Estimate	St.error
Constant	2.1665	*(0.309)*
***Year2002**	-0.3914	*(0.067)*
***Periphery**	0.1123	*(0.067)*
ln(farm income)	-0.0392	*(0.061)*
Age	-0.2184	*(0.118)*
Age squared	0.0254	*(0.012)*
***Female**	-0.1144	*(0.066)*
***Successor**	0.0576	*(0.040)*
***Relief**	0.1593	*(0.051)*
***Work of farm**	-0.1446	*(0.042)*
***Tourism**	-0.1318	*(0.058)*
***Dairy**	-0.2877	*(0.119)*
***Livestock**	-0.2855	*(0.120)*
***Grain**	-0.4111	*(0.141)*
Psuedo- R^2	0.945	
Number of observations	2759	

Variables marked with an asterisk (*) are dummy variables.

The estimation results concur fairly well with previous findings from the literature on subjective well-being (Winkelmann and Winkelmann 1995, Ferrier-i-Carbonell and Frijters 2004). Farm life satisfaction is U-shaped in age. Dairy, livestock and grain production all affect *SWBF* negatively compared to other crops and forage. New agricultural industries (*tourism*) affects *SWBF* negatively compared to traditional farming. Female farmers are less likely to report high farm satisfaction, while having a successor and access to hired help (*relief*) is regarded positive. A more interesting result in relation to the main problem in this paper is that working off the farm has a negative effect on farm satisfaction. We also see that the periphery parameter estimate is positive and that the 2002 dummy parameter estimate is negative, which is consistent with our hypotheses.

For general subjective well-being (*SWB*), the parameter estimates of periphery and 2002 dummies have the same signs as above. Periphery farmers are more likely to report high levels of satisfaction than centrally located farmers and all farmers are more likely to report higher levels of satisfaction in 1995 than in 2002. In contrast to the results for farm life satisfaction, we see that women are more likely to report high levels of general well-being than are men. Another difference is that happiness is bell-shaped rather than U-shaped in age, at least for the periphery region and for 2002. For the pooled sample we see that parameter estimates for both age and age squared are negative. The variables *married*(+), *divorced*(-), *no. of children*(-), *health*(-), and *education*(+) all have the expected signs of the parameter estimates. Income follows a U-shaped curve for the pooled sample as for 2002 and central location, but is bell-shaped in 1995 and in the periphery. We also see that working primarily on the farm has a negative effect on general life satisfaction.

Table 6: Ordered probit estimation of general well-being.

Independent variable	Estimate	St.error
Constant	3.3999	*(1.006)*
Farm satisfaction (SWBF)	0.2733	*(0.122)*
***Year2002**	-1.2176	*(0.635)*
***Periphery**	0.9274	*(0.383)*
ln(hh.income)	-0.2319	*(0.103)*
ln(hh.income) squared	0.0038	*(0.003)*
***Female**	0.1815	*(0.080)*
Age	-0.1821	*(0.177)*
Age squared	-0.0050	*(0.012)*
***Married**	0.1371	*(0.057)*
***Widowed**	-0.4436	*(0.170)*
***High education**	0.0509	*(0.073)*
No of children	-0.3118	*(0.136)*
***Work mostly on the farm**	-0.1543	*(0.042)*
***Bad health**	-0.0360	*(0.044)*
Psuedo- R^2	0.981	
Number of observations	2759	

Variables marked with an asterisk (*) are dummy variables.

5.4 Marginal effects

The parameter estimates of the model $\hat{\Theta} = \left\{\hat{\beta}_1, ...\hat{\beta}_k, \hat{\mu}_{1,...,}\hat{\mu}_{J-1}\right\}$ are identified only up to scale and can not be directly interpreted. Above, we only considered the signs of the parameter estimates. To be able to analyse the effects of the explanatory variables on subjective well-being, it is better to evaluate the marginal probability effects defined as the first order conditions of (4) with respect to the covariates x_{ki}. Greene argues that the derivation is quite involved because there is no conditional mean function that can be manipulated in the ordered probability model (2002 p. E18-5). However, the computer program LIMDEP calculates the average marginal probability effects for us

$$(7) \qquad MPE_j\left(x_{ki}\right) = \frac{\partial \Pr\left[w_i = j\right]}{\partial x_{ki}} = \left[\phi\left(\mu_{j-1} - x_i'\beta\right) - \phi\left(\mu_j - x_i'\beta\right)\right] \times \beta$$

and reports marginal probability effects for each outcome of j where β in equation (6) is replaced by the maximum likelihood estimator $\hat{\beta}$.

The marginal probability effects tells us how a change in one of the exogenous variables affects the probability of observing an outcome (*j=less than 5, 5, ..., 10*) . For the binary explanatory variables the interpretation is of going from one state to the other, e.g. from not married to married or not working off the farm to working off the farm. The marginal effects of ordered response models are rather restrictive. We see from (7) that the magnitudes of the marginal effects are likely to differ from the estimated coefficients and that will always have the opposite sign for the lowest probability categories because $\mu_{j-1} < \mu_j$ for all *j* and ϕ is bell-shaped. For positive β s, MPE are negative for low response categories and positive for high categories and for all x_{ki} and β we have that $\sum_j MPE_j(x_{ki}) = 0$. Further, the relative magnitude of the marginal effects is not allowed to vary over the different outcomes of *j* and does not depend on x_{ki} since it follows from (7) that for any β_l, β_m we have

$$\frac{MPE_j(x_{li})}{MPE_j(x_{mi})} = \frac{\beta_l}{\beta_m}.$$

Tables 7 and 8 give the marginal probability effects of being in the top category *j=10* for *SWBF* and *SWB*, respectively. I have made a choice of variables where the marginal effects are presented for the pooled sample as well as for subsamples for the two years and two regions separately. Appendix tables A4.1 and A4.2 give the marginal effects for all variables and response categories for the pooled sample.

An increase in the explanatory variables for which the parameter values are positive will lead to an increase in the probability of reporting high values of *j*, i.e. high levels of happiness, and correspondingly decrease the probability of low scores on *j*. From table A4.2 we see that a 1 percent increase in income (increasing ln(household income) by 0,01) leads to a decrease in the probability of reporting category *j=10* by $(-0,0507 \times 0,01 \times 100 =)$ 0,05 percent. We see that income only has a negligible but negative effect on subjective well-being. Income raises actually increase the probability of reporting low levels of happiness. We find the same relationship between farm income and farm satisfaction, although the effect is even smaller for *SWBF*. We would, a priori, expect this relationship to be positive, as it also is in most of the literature. People usually prefer higher incomes to lower. It is though not unique to find a negative relationship between income and happiness and I can think of two possible explanations for this occurrence. Firstly, general well-being is U-shaped in income so one explanation may be that enough farmers' incomes are on the downward-sloping part of the U-curve. Another explanation may be that because the income level is already high (relative to covering basic needs), marginal changes in income are of little importance. The marginal income effects are all below 0.05 percent and only significant (and positive) for the low response categories. Marginal changes in age have the same pattern of effects on *SWB* and *SWBF* as income, although in magnitude the effects

are larger (up to 4 percent). Again the negative effect on the probability of being in one of the top happiness categories can be explained by the U-shaped relationship.

Being a female farmer has a negative effect on high scores of farm satisfaction, but a positive effect on general well-being. This result is not surprising and finds support in the literature. A general conclusion in happiness research is that women, ceteris paribus, are happier than men. Research on Norwegian farm households (Melberg 2003, Rogstad and Jervell 2002) has shown that parents often oppose when daughters claim their allodium (at least when there is a younger son), and that out of the small number of female farmers many are in fact widows. These widows are usually the spouse that married into the farm family and may not have had any preferences neither for farming nor for place of residence. Getting married increases the probability of *j=10* by $(0,0286 \times 1 \times 100 =)$ 2.86 percent, while a marginal increase in (absolute) number of children reduces the probability of *j=10* by almost 7 percent. Together with the marginal effect of worsened health condition (which is negative, but small and insignificant) these findings are in accordance with the literature (Easterlin 2003, Winkelmann 2004).

We are particularly interested in the year and region effects, as well as the division of total working time between farm and off-farm activities. From table A4.1 and A4.2 we see that working off the farm has a negative effect on the probability of reporting high levels of farm satisfaction, while having farm work as principal occupation has a negative effect on general well-being. Farmers who work off the farm often work more hours in total than both full-time farmers and wage workers in other industries [Løwe (1998)]. In the capacity of being farmers, it is natural that the respondents prefer to have as much time as possible available to farm activities. At the same time, both technological and structural changes have led to considerable increases in farm labour productivity. Seen together with a preference for keeping up with the general income growth in society, this has led to a milieu for multiple job holdings among farmers. In addition, higher education and later take-overs give the younger generation both preferences for and dependence of off-farm jobs [Bjørnsen (2005)].

Going from year 1995 to 2002 reduces, ceteris paribus, the probability of reporting high levels of both farm satisfaction and general well-being. For farm satisfaction, we see from A4.1 that the marginal probability effect of year 2002 is negative for *j=7* and higher. The probability of *j=10* is reduced by almost 5 percent. For general well-being, the marginal probability effect shifts from positive to negative at a higher satisfaction level (response category *j=9*), but then the effect is much stronger. Going from 1995 to 2002 reduces the probability of *j=10* by as much as 28 percent. Living in the periphery has rather the opposite effect. A change from central to periphery location increases the probability of both farm satisfaction (small effects) and general well-being (large effects). These results are in accordance with the claims we put forth in the introduction.

In tables 7 and 8, we only consider the marginal probability effects on *j=10* for *SWBF* and *SWB*, but here we include year specific effects and region specific effects.

Table 7: Marginal probability of reporting highest possible satisfaction, j=10. Farm satisfaction.

Independent variable	Pooled sample	Year specific coeff.		Region specific coeff.	
		1995	2002	Central	Periphery
Year 2002	-0.0475	n.a.	n.a.	-0.0497	-0.0575
Periphery	0.0136	0.0130	-0.0001	n.a.	n.a.
Ln(farm income)	-0.0046	-0.022	-0.0035	-0.0041	-0.0058
Age	-0.0255	-0.0761	0.0089	-0.0168	-0.0480
Female	-0.0124	-0.0334	-0.0040	-0.0109	-0.0162
Work off farm	-0.0171	-0.0236	-0.0132	-0.0166	-0.0202
Tourism	-0.0157	-0.0174	0.0098	-0.0172	-0.0116
Dairy	-0.0322	-0.0102	-0.0271	-0.0330	-0.0327
Livestock	-0.0313	-0.0114	-0.0263	-0.0301	-0.0410
Grain	-0.0384	0.0156	-0.0356	-0.0422	-0.0275

The most striking result in table 7 is that while living in the periphery increases the probability of having high farm satisfaction for the pooled sample well as in 1995, it decreases the probability of *j=10* in 2002, although the effect is small (0.1 pct.). We also see that the negative effect of the year 2002-dummy is larger in the periphery than in central regions. These results support our a priori hypotheses that farmers consider themselves worse off in 2002, and that the effect is stronger in the periphery. The negative effect of having multiple jobs (*work off farm*) is also stronger in the periphery and in 1995 than in central regions and in 2002.

Table 8: Marginal probability of reporting highest possible satisfaction, j=10. General well-being.

Independent variable	Pooled sample	Year specific coeff.		Region specific coeff.	
		1995	2002	Central	Periphery
SWBF	0.0598	0.0682	0.0530	0.0577	0.0636
Year 2002	-0.2838	n.a.	n.a.	-0.1851	-0.3476
Periphery	0.2430	0.6447	0.1800	n.a.	n.a.
Ln(hh. income)	-0.0507	0.2404	-0.0321	-0.0461	0.0032
Age	-0.0399	0.0876	-0.0333	-0.0342	0.0612
Female	0.0429	0.0461	0.0412	0.0423	-0.0154
Married	0.0286	0.0697	-0.0043	0.0292	0.0251
High education	0.0114	0.0185	0.0036	0.0014	0.0386
No. of children	-0.0682	-0.0608	-0.0569	-0.0679	-0.0259
Work mostly on farm	-0.0333	-0.0204	-0.0407	-0.0385	-0.0224
Bad health	-0.0078	-0.0285	0.0078	-0.0081	-0.0046

Looking at table 8, we find the same pattern, only the effects are stronger. Going from 1995 to 2002 reduce the probability that periphery farmers report satisfaction level *j=10* by almost 35 percent. In central regions the effect is –18.5 percent. Likewise, living in the periphery is considered extremely positive for general well-being in 1995. The probability of *j=10* of living in the periphery is close to 65 percent in 1995 and 18 percent in 2002. Having farm work as principal occupation reduces the probability of reporting high levels of general well-being for all farmers, but less so in 1995 and in the periphery.

One of the claims I put forth in the introduction was that farmers in the periphery are more vulnerable to changes in economic and political conditions. The analysis gives some support to this claim, but the results are not unambiguous. Changes in income seem to have more effect on happiness (j=10) and unhappiness ($j<5$) in the periphery for dairy farmers particularly. This result is valid for general well-being as well as for farm satisfaction. Centrally located grain producers have the highest probability of reporting levels of general well-being due to an income raise, while the effect on farm satisfaction is highest for the grain farmers in the periphery. When we consider the possibility of having farm work as principal occupation, the positive effect on happiness is decidedly greater in the periphery. We see that the marginal probability effects of outcome *j=10* is high for all farmers which indicates that farmers enjoy their work and prefer to have the farm as the main professional occupation.

6 Conclusions

The analysis gives support to all the three claims put forth in the introduction (page 2). Farmers in periphery regions are more content with both farming and life in general than are farmers in more central regions and the result holds for both years under investigation. The data clearly suggests that the average farmer, irrespective of region and produce, has become less satisfied with both farming and with life in general from 1995 to 2002. It is also clear that farmers in periphery regions have experienced a greater fall in their reported level of subjective well-being than farmers in central regions. The fall from 1995 to 2002 in average level of farm satisfaction and general life satisfaction is stronger in the periphery than in central regions and the negative effect on average farm satisfaction level (0.44 points) is stronger than the effect on average general well-being (0.24 points). Correspondingly, the marginal probability effect of shifting to year 2002 is stronger in the periphery than in central regions. The negative effect is particularly strong with respect to general well-being, but this holds only for response category *j=10*. From appendix 4 we see that going from 1995 to 2002 reduce the probability of reporting farm life satisfaction higher than category *j=6* while the negative effect on general well-being only holds for categories *j=9* and *j=10*.

The estimated marginal effects of the covariates are all more or less in accordance with our a priori hypotheses. So far, we have thus all reason to be satisfied, but regretfully, we are not able to give a firm conclusion about the relation between the results we have found on changes in subjective

well-being, and the implemented policy changes for the agricultural sector in Norway since 1992. In the introduction we argued that the deregulation of the agricultural sector and the liberalisation of trade in agricultural produce, induced by policy changes, will have negative consequences for future agricultural production in Norway and that the effects would be most discernible in peripheral regions. The available data, in particular the lack of panel information, does not give opportunity to formally test whether the policy changes affect the level of subjective well-being. It seems though obvious that the results reported above are in accordance with our expectations.

The study also supports the claim that farmers in periphery regions consider working off the farm more negatively than farmers in central regions. This holds not only marginally but also conditionally on the explanatory variables specified. These farmers are also more responsive to changes in income and working conditions. Even though a high percentage of rural farmers have off-farm jobs, it seems that the possibility of being primarily a farmer is highly valued. Depending on farm size and composition of farm output, it may thus seem like farmers in the periphery are more vulnerable to policy changes undertaken than are centrally located farmers.

Finally, we find that the average level of general well-being is higher than the average level of farm satisfaction for both years, both regions and for all principal produce. This may be taken as an indication that the increased uncertainty in the agricultural sector, which is induced by the change in Norwegian national policies, is better reflected in the farm satisfaction measure than in the general well-being measure. If this is true, the greater fall in farm satisfaction from 1995 to 2002 may be another indication that policy changes have had an influence on the level of well-being.

References

Argyle, M. (1999). Causes and Correlates of Happiness. Ch 18 in Kahneman, D., Diener, E. and N. Schwarz (Eds.) Well-being: The Foundations of Hedonic Psychology, Russel Sage Foundations: New York.

Aristotle. Nicomachean Ethics in Introduction to Aristotle. Trans. Richard McKeon. The Modern Library, 1947, New York.

Bjørnsen, H.M. (2005). Off-farm participation of farm couples. A bivariate random effects approach. Not published. Available from author.

Blanchflower, D.G. and A.J. Oswald (2004). Well-Being over Time in Britain and the USA. *Journal of Public Economics* 88: 1359-1386.

Boes, Stefan and Rainer Winkelmann (2004). Income and Happiness: New Results from Generalized Threshold and Sequential Models. *IZA Discussion paper* No. 1175.

Diener, E. (1984): Subjective well-being. *Psychological Bulletin*, 93:542-575.

Diener, E. and R. Biswas-Diener (2000). Will Money Increase Subjective Well-Being? A Literature Review and Guide to Needed Research. Mimeo. University of Illinois Urbaba-Champaign.

Easterlin, R.A. (1974). Does Economic Growth Improve the Human Lot? Some Empirical Evidence, in: P.A. David and M.W. Reder (eds.) Nations and Households in Economic Growth – Essays in Honor of Moses Abramovitz, Academic Press: New York and London.

Easterlin, R.A. (2001). Income and Happiness: Towards a Unified Theory. *The Economic Journal* 111:465-484.

Easterlin, R.A. (2003). Building a Better Theory of Well-Being. *IZA Discussion paper* No. 742.

Ferrer-i-Carbonell, A. and P. Frijters (2004). How important is methodology for the estimates of the determinants of happiness? *The Economic Journal*, 114:641-659.

Frey, B.S. and A. Stutzer (1999). Measuring Preferences by Subjective Well-Being. *Journal of Institutional and Theoretical Economics* 155: 755-88.

Frey, B.S. and A. Stutzer (2002). Happiness & Economics. Princeton University Press: Princeton, New Jersey.

Greene, W. (2002). LIMDEP Econometric Modeling Guide, Vol. 1. Econometric Software, Inc. New York.

Hume, D. (1742). Essays, Moral and Political, Vol. 2 “The Stoic”. In the Philosophical Works of David Hume. Ed. by Green T.H and T.H. Grose. Longmans, Green, 1874-1875: London.

Kant, I. (1788). Critique of Practical Reason. Trans. Lewis White Beck. Macmillan Publishing Company, 1969: New York.

Løwe, T. (1998). Levekår i landbruket. En studie av landbruksbefolkningens levekår. Rapport 98/25. Statistics Norway, Oslo.

Løwe, T. (2004). Bonden arbeider hardt for føden. *Samfunnsspeilet* 5: 5-10. Statistics Norway, Oslo.

Maddala, G.S. (1983). Limited-Dependent and Qualitative Variables in Econometrics. Econometric Society Monographs. Cambridge University Press.

Melberg, K. (2003). Landbruket som livsform: gårdbrukerparets levekår og livskvalitet. Rapport 18, Rogalandsforskning.

Pratt, J. (1981). Concavity of the Log Likelihood. *Journal of the American Statistical Association*, 76: 137-159.

Rogstad, B. and A.M. Jervell (2002). Kvinner i landbruket. Status etter 25 år med likestilling etter odelsloven. Temartikkel i Gudem & Søyland (red): Utsyn over norsk landbruk. Tilstand og utviklingstrekk 2002. NILF Oslo.

Samuelson, P.A. (1938). A Note of the Pure Theory of Consumer's Behaviour. *Economica* 5: 61-71.

Schwarz, N. and F. Strack, 1999. Ch 4 in Kahneman, D., Diener, E. and N. Schwarz (Eds.) Well-being: The Foundations of Hedonic Psychology. Russel Sage Foundations: New York.

van Praag, B.M.S, Frijters, P. and A. Ferrer-i-Carbonell (2000). A structural model of well-being: with an application to German data. Tinbergen Institute Discussion Paper 053/3.

van Praag, B.M.S, Frijters, P. and A. Ferrer-i-Carbonell (2002). The Anatomy of Subjective Well-being. Tinbergen Institute Discussion Paper 022/3.

Vårdal, E. (2003). Støtten til distriksjordbruket sett i et samfunnsøkonomisk perspektiv. SNF-arbeidsnotat nr 13/03. Bergen. Can be found at www.effektutvalget.dep.no

Winkelmann, L. and R. Winkelmann (1995). Happiness and Unemployment: A Panel Data Analysis for Germany. *Konjunkturpolitik* 41. Jahrg. H. 4.

Winkelmann, R. (2004). Subjective Well-Being and the Family: Results from an Ordered Probit Model with Multiple Random Effects. *IZA Discussion paper* No. 1016.

Zavoina, R. and W. McKelvey (1975). A Statistical Model for the Analysis of Ordinal Level Dependent Variables. *Journal of Mathematical Sociology*, Summer, pp. 103-120.

Appendix 1: Definitions and summary statistics

Table A1.1 Description of the explanatory variables included in the analyses.

Explanatory variables:	
***Dummy 2002**	Dummy variable taking the value 0 for year 1995 and 1 for 2002.
***Periphery**	Periphery dummy taking the value 0 for municipalities <5000 inhab, and 1 else.
Age	The farm operator's age. In the estimations we devide age by 10.
***Female**	Dummy variable taking the value 0 for male and 1 for female farm operator.
***Married**	Dummy variable taking the value 1 if married/cohabitant.
***Widowed**	Dummy variable taking the value 1 if widowed.
No. of children	Number of children in the household.
***High education**	Dummy variable taking the value 1 if completed education at university level.
***Bad health**	Dummy indicating reduced health condition and working ability.
***Work off the farm**	Dummy variable taking the value 1 if an individual has off farm work.
Household income	Sum of personal income for both spouses from wage work, farm work and other self-employed activities.
Household farm income	Sum of personal farm income for both spouses.
***Work mostly on farm**	Dummy indicating that farm work in the principal source of income.
***Successor**	Dummy variable taking the value 1 if there positively is a successor willing to take over.
***Relief**	Dummy variable taking the value 1 if the farm operator has someone (paid help) to relieve him/her in case of sickness and holiday leaves.
***Tourism**	Dummy variable taking the value 1 if the farm runs tourism, hunting, fishing or other recreational activities.
***Dairy**	Dummy indicating that dairy is the principal production on the farm.
***Livestock**	Dummy indicating that livestock is the principal production on the farm.
***Grain**	Dummy indicating that grain is the principal product.

Variables marked with an asterisk (*) are dummy variables.

Summary statistics

Table A1.2 Sample means for pooled sample and each year separately.

	Pooled sample			1995			2002		
Variable	**Both regions**	**Central**	**Periphery**	**Both regions**	**Central**	**Periphery**	**Both regions**	**Central**	**Periphery**
***Dummy year 2002**	0.547	0.597	0.428	0.000	0.000	0.000	1.000	1.000	1.000
***Periphery**	0.299	0.000	1.000	0.377	0.000	1.000	0.234	0.000	1.000
Age	47.8	47.5	48.6	48.4	48.9	47.7	47.3	46.6	49.7
***Female**	0.101	0.101	0.102	0.089	0.085	0.095	0.111	0.112	0.110
***Married**	0.805	0.805	0.804	0.804	0.798	0.814	0.805	0.810	0.790
***Widowed**	0.015	0.016	0.013	0.012	0.017	0.004	0.017	0.015	0.025
No. of children	1.235	1.209	1.293	1.245	1.207	1.304	1.225	1.211	1.363
***High education**	0.083	0.084	0.082	0.050	0.046	0.055	0.111	0.109	0.119
***Bad health**	0.299	0.295	0.309	0.362	0.371	0.347	0.247	0.244	0.258
***Work off the farm**	0.554	0.548	0.570	0.523	0.499	0.561	0.580	0.580	0.581
Household income	350 375	351 374	348 033	344 960	343 011	348 175	354 867	357 014	347 843
Household farm income	125 900	122 903	132 925	153 575	152 312	155 659	102 941	103 068	102 526
***Work mostly on farm**	0.420	0.417	0.429	0.500	0.503	0.494	0.355	0.358	0.343
***Successor**	0.516	0.541	0.456	0.540	0.593	0.451	0.496	0.506	0.462
***Relief**	0.792	0.789	0.801	0.671	0.637	0.729	0.893	0.891	0.898
***Tourism**	0.575	0.543	0.650	0.515	0.502	0.536	0.625	0.571	0.802
***Dairy**	0.394	0.402	0.377	0.390	0.383	0.403	0.398	0.415	0.343
***Livestock**	0.344	0.343	0.348	0.347	0.344	0.352	0.342	0.342	0.343
***Grain**	0.147	0.142	0.158	0.160	0.167	0.148	0.136	0.126	0.170
No. Obs	2759	1934	825	1251	779	472	1508	1155	353

Variables marked with an asterisk (*) are dummy variables

Table A1.3 Sample means of production type subsamples. Pooled sample and each year separately.

	All			1995			2002		
Variable	**Dairy**	**Livestock**	**Grain**	**Dairy**	**Livestock**	**Grain**	**Dairy**	**Livestock**	**Grain**
***Dummy year 2002**	0.551	0.543	0.506	0.000	0.000	0.000	1.000	1.000	1.000
***Periphery**	0.286	0.302	0.321	0.389	0.382	0.350	0.202	0.234	0.293
Age	47.0	48.3	49.0	47.2	49.0	49.8	46.7	47.7	48.3
***Female**	0.090	0.107	0.121	0.055	0.106	0.135	0.118	0.109	0.107
***Married**	0.793	0.805	0.835	0.797	0.795	0.835	0.790	0.814	0.834
***Widowed**	0.017	0.012	0.015	0.012	0.014	0.005	0.022	0.010	0.024
No. of children	1.360	1.196	1.059	1.359	1.247	1.045	1.362	1.153	1.073
***High education**	0.082	0.091	0.074	0.059	0.046	0.050	0.100	0.128	0.098
***Bad health**	0.303	0.294	70.326	0.361	0.362	0.370	0.257	0.236	0.283
***Work off the farm**	0.434	0.607	0.716	0.299	0.631	0.745	0.543	0.587	0.688
Household income	363 763	344 381	352 969	343 420	342 467	356 269	380 308	345 991	349 750
Household farm income	134 992	126 210	116 333	155 520	146 745	155 735	118 296	108 939	77 892
***Work primarily on farm**	0.606	0.339	0.217	0.842	0.336	0.175	0.413	0.341	0.259
***Owner**	0.913	0.919	0.933	0.906	0.906	0.905	0.918	0.930	0.961
***Successor**	0.531	0.495	0.548	0.537	0.502	0.615	0.527	0.488	0.483
***Relief**	0.739	0.829	0.807	0.613	0.719	0.695	0.842	0.922	0.917
***Tourism**	0.588	0.571	0.570	0.531	0.523	0.475	0.635	0.610	0.663
No. Obs	1088	950	405	488	434	200	600	516	205

Variables marked with an asterisk (*) are dummy variable

Appendix 2: Mean values of the satisfaction variables conditional on the exogenous variables.

Table A2.1: Mean value of farm life satisfaction conditional on the exogenous variables.

SWBF	**Pooled sample**		**1995**		**2002**		**Periphery**		**Central**	
Variable	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***
1995	6.8553	*1.890*	6.8553	*1.890*	n.a.	*n.a.*	6.9597	*1.898*	6.7920	*1.884*
2002	6.4178	*1.842*	n.a.	*n.a.*	6.4178	*1.842*	6.4533	*1.758*	6.4069	*1.868*
Periphery	6.7430	*1.855*	6.9597	*1.898*	6.4533	*1.758*	6.7430	*1.855*	n.a.	*n.a.*
Central	6.5620	*1.883*	6.792	*1.884*	6.4069	*1.725*	n.a.	*n.a.*	6.562	*1.883*
Age < 40	6.5279	*1.897*	6.7974	*1.953*	6.3181	*1.828*	6.6146	*1.835*	6.4919	*1.923*
40 <Age < 60	6.6043	*1.857*	6.7825	*1.835*	6.4630	*1.864*	6.7377	*1.867*	6.5473	*1.851*
Age > 60	6.8047	*1.904*	7.1704	*1.952*	6.4106	*1.774*	6.9621	*1.834*	6.7349	*1.933*
Female	6.4444	*1.878*	6.5495	*2.109*	6.3750	*1.712*	6.5595	*1.884*	6.3949	*1.879*
Male	6.6355	*1.875*	6.8851	*1.866*	6.4231	*1.858*	6.7638	*1.852*	6.5808	*1.883*
Married	6.6117	*1.882*	6.8668	*1.888*	6.4003	*1.851*	6.6968	*1.877*	6.5755	*1.884*
Not married*	6.6345	*1.853*	6.8082	*1.899*	6.4898	*1.804*	6.9321	*1.756*	6.5066	*1.881*
Widowed	6.2683	*2.050*	6.6667	*2.127*	6.0385	*2.010*	6.9091	*2.343*	6.0333	*1.921*
Not widowed	6.6214	*1.873*	6.8576	*1.888*	6.4244	*1.839*	6.7408	*1.849*	6.5704	*1.882*
No children	6.6839	*1.858*	6.9747	*1.862*	6.4457	*1.823*	6.8739	*1.810*	6.6028	*1.874*
1-2 children	6.5824	*1.887*	6.8182	*1.931*	6.3908	*1.829*	6.7468	*1.881*	6.5188	*1.886*
3 and more	6.5388	*1.891*	6.6790	*1.855*	6.4139	*1.918*	6.4830	*1.879*	6.5676	*1.900*
High education	6.6000	*1.968*	6.8226	*2.131*	6.5179	*1.905*	6.6324	*1.860*	6.5864	*2.018*
Low or intermediate level	6.6176	*1.868*	6.8570	*1.877*	6.4052	*1.834*	6.7530	*1.855*	6.5598	*1.871*
Bad health	6.6005	*1.909*	6.8874	*1.875*	6.2520	*1.894*	6.8235	*1.977*	6.5009	*1.871*
Good health	6.6229	*1.863*	6.8370	*1.899*	6.4722	*1.822*	6.7070	*1.798*	6.5877	*1.888*
Work off the farm	6.5003	*1.858*	6.7064	*1.900*	6.3463	*1.812*	6.6319	*1.837*	6.4419	*1.865*
Work only on farm	6.7602	*1.889*	7.0184	*1.867*	6.5166	*1.879*	6.8901	*1.871*	6.7074	*1.895*

Table A2.1 continues	Pooled sample		1995		2002		Periphery		Central	
Variable	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***
Household income < 200'	6.6333	*1.942*	6.8919	*1.974*	6.3844	*1.879*	6.7822	*1.922*	6.5702	*1.948*
200' < hh. income < 315'	6.6371	*1.841*	6.7559	*1.841*	6.4953	*1.832*	6.7803	*1.789*	6.5702	*1.862*
315' < hh. income < 450'	6.6534	*1.868*	6.8659	*1.871*	6.4608	*1.846*	6.8615	*1.817*	6.5613	*1.884*
Household income > 450'	6.5295	*1.856*	6.9777	*1.875*	6.3504	*1.820*	6.4852	*1.903*	6.5459	*1.840*
No farm income	6.6199	*1.890*	6.8595	*2.038*	6.5392	*1.833*	6.6221	*1.788*	6.6192	*1.922*
Farm income < 70'	6.6533	*1.856*	6.9321	*1.826*	6.2842	*1.835*	6.8544	*1.897*	6.5591	*1.831*
70' < farm income < 200'	6.5288	*1.863*	6.8060	*1.891*	6.2645	*1.798*	6.7322	*1.804*	6.4258	*1.885*
Farm income > 200'	6.6692	*1.895*	6.8229	*1.880*	6.5000	*1.901*	6.7452	*1.931*	6.6348	*1.880*
Work primarily on the farm	6.6905	*1.913*	6.8553	*1.890*	6.4189	*1.911*	6.9124	*1.858*	6.5931	*1.929*
Work primarily off the farm	6.5622	*1.848*	6.7875	*1.894*	6.4173	*1.804*	6.6157	*1.845*	6.5399	*1.850*
Successor	6.6585	*1.876*	6.7511	*1.927*	6.5749	*1.827*	6.6915	*1.914*	6.6466	*1.863*
No successor	6.5711	*1.876*	6.9774	*1.840*	6.2632	*1.845*	6.7862	*1.805*	6.4622	*1.902*
Relief	6.6418	*1.845*	6.9750	*1.812*	6.4339	*1.836*	6.7534	*1.796*	6.5934	*1.864*
No relief	6.5183	*1.989*	6.6107	*2.020*	6.2840	*1.893*	6.7012	*2.082*	6.4450	*1.949*
Involved in farm tourism (new ind.)	6.6452	*1.837*	7.1067	*1.659*	6.3333	*1.894*	6.5851	*1.810*	6.7065	*1.873*
Not involved in farm tourism	6.6141	*1.879*	6.8393	*1.903*	6.4245	*1.838*	6.7633	*1.861*	6.5548	*1.884*
Dairy production	6.5616	*1.844*	6.8607	*1.805*	6.3183	*1.842*	6.6386	*1.832*	6.5278	*1.850*
Livestock production	6.6821	*1.884*	6.9147	*1.894*	6.4864	*1.855*	6.8464	*1.840*	6.6179	*1.899*
Grain production	6.6716	*1.911*	6.8650	*1.930*	6.4829	*1.878*	6.8686	*1.943*	6.5709	*1.890*

*** The category "Not married" includes unmarried, divorced and widowed.**

Table A2.2: Mean value of general well-being conditional on the exogenous variables.

SWB	**Pooled sample**		**1995**		**2002**		**Periphery**		**Central**	
Variable	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***
1995	7.8897	*1.639*	7.8897	*1.639*	n.a.	*n.a.*	8.0254	*1.609*	7.8074	*1.652*
2002	7.6472	*1.722*	n.a.	*n.a.*	7.6472	*1.722*	7.7394	*1.714*	7.6190	*1.725*
Periphery	7.9030	*1.660*	8.0254	*1.609*	7.7394	*1.714*	7.9030	*1.660*	n.a.	*n.a.*
Central	7.6949	*1.698*	7.8074	*1.652*	7.6190	*1.725*	n.a.	*n.a.*	7.6949	*1.698*
Age < 40	7.7053	*1.767*	7.8529	*1.730*	7.5903	*1.789*	7.8976	*1.716*	7.6255	*1.783*
40 <Age < 60	7.781	*1.640*	7.8892	*1.576*	7.6949	*1.685*	7.9160	*1.626*	7.7233	*1.644*
Age > 60	7.7512	*1.742*	7.9417	*1.714*	7.5459	*1.753*	7.8636	*1.707*	7.7013	*1.758*
Female	7.7814	*1.807*	7.8559	*1.868*	7.7321	*1.770*	7.9298	*1.613*	7.8308	*1.710*
Male	7.7544	*1.676*	7.8930	*1.616*	7.6367	*1.717*	7.9298	*1.613*	7.6797	*1.696*
Married	7.8032	*1.677*	8.0030	*1.563*	7.6376	*1.749*	7.9321	*1.663*	7.7482	*1.681*
Not married*	7.5677	*1.726*	7.4245	*1.851*	7.6871	*1.608*	7.7840	*1.648*	7.4748	*1.752*
Widowed	6.8780	*1.952*	6.6667	*2.160*	7.0000	*1.855*	7.4545	*2.339*	6.6667	*1.788*
Not widowed	7.7704	*1.682*	7.9045	*1.627*	7.6586	*1.718*	7.9091	*1.650*	7.7111	*1.692*
No children	7.7349	*1.696*	7.8148	*1.693*	7.6693	*1.697*	7.8680	*1.630*	7.6779	*1.722*
1-2 children	7.7772	*1.664*	7.9758	*1.582*	7.6158	*1.713*	7.9416	*1.599*	7.7136	*1.686*
3 and more	7.7636	*1.728*	7.8724	*1.635*	7.6667	*1.803*	7.9034	*1.823*	7.6912	*1.675*
High education	7.8391	*1.625*	8.0161	*1.779*	7.7738	*1.566*	8.0882	*1.513*	7.7346	*1.664*
Low or intermediate level	7.7497	*1.695*	7.8831	*1.632*	7.6313	*1.741*	7.8864	*1.672*	7.6913	*1.701*
Bad health	7.7203	*1.746*	7.7969	*1.702*	7.6273	*1.795*	7.9255	*1.711*	7.6287	*1.755*
Good health	7.7729	*1.664*	7.9424	*1.600*	7.6537	*1.698*	7.8930	*1.638*	7.7227	*1.673*
Work off the farm	7.9248	*1.577*	8.0229	*1.538*	7.8514	*1.602*	8.0596	*1.547*	7.8650	*1.587*
Work only on farm	7.5488	*1.798*	7.7437	*1.732*	7.3649	*1.840*	7.6958	*1.780*	7.4891	*1.803*
Household income < 200'	7.7128	*1.820*	8.0420	*1.707*	7.3960	*1.872*	8.0990	*1.725*	7.5493	*1.837*
200' < hh. income < 315'	7.5743	*1.762*	7.7218	*1.656*	7.3981	*1.869*	7.6278	*1.836*	7.5493	*1.728*
315' < hh. income < 450'	7.8606	*1.639*	7.9749	*1.572*	7.7570	*1.693*	7.9827	*1.495*	7.8065	*1.698*
Household income > 450'	7.8852	*1.488*	7.7933	*1.575*	7.9219	*1.452*	7.9231	*1.512*	7.8712	*1.480*

Table A2.2 continues	Pooled sample		1995		2002		Periphery		Central	
Variable	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***	**Con. mean**	***St. error***
No farm income	7.9423	*1.653*	7.8811	*1.793*	7.9636	*1.605*	8.0759	*1.770*	7.9021	*1.615*
Farm income < 70'	7.6858	*1.723*	7.8533	*1.675*	7.4640	*1.763*	7.8641	*1.679*	7.6023	*1.739*
70' < farm income < 200'	7.6709	*1.778*	7.9253	*1.698*	7.4270	*1.821*	7.8577	*1.709*	7.5763	*1.807*
Farm income > 200'	7.7141	*1.582*	7.8971	*1.451*	7.5126	*1.694*	7.8510	*1.482*	7.6522	*1.623*
Work primarily on the farm	7.6336	*1.756*	7.8897	*6.855*	7.3944	*1.836*	7.8870	*1.696*	7.5223	*1.772*
Work primarily off the farm	7.8468	*1.633*	7.9409	*1.617*	7.7862	*1.641*	7.9151	*1.634*	7.8183	*1.633*
Successor	7.8166	*1.628*	7.9067	*1.583*	7.7353	*1.664*	8.0213	*1.581*	7.7431	*1.639*
No successor	7.6939	*1.750*	7.8698	*1.703*	7.5605	*1.774*	7.8040	*1.718*	7.6381	*1.764*
Relief	7.7758	*1.686*	7.9440	*1.636*	7.6709	*1.708*	7.8850	*1.667*	7.7285	*1.692*
No relief	7.6859	*1.701*	7.7786	*1.642*	7.4506	*1.828*	7.9756	*1.635*	7.5697	*1.715*
Involved in farm tourism (new ind.)	7.6935	*1.705*	8.0267	*1.551*	7.4685	*1.773*	7.7128	*1.617*	7.6739	*1.798*
Not involved in farm tourism	7.7618	*1.688*	7.8810	*1.644*	7.6614	*1.718*	9.9275	*1.665*	7.6960	*1.693*
Dairy production	7.6950	*1.699*	7.8238	*1.627*	7.5900	*1.749*	7.8464	*1.715*	7.6283	*1.689*
Livestock production	7.7989	*1.697*	7.9101	*1.693*	7.7054	*1.696*	7.9588	*1.686*	7.7365	*1.698*
Grain production	7.8519	*1.651*	8.0750	*1.487*	7.6341	*1.773*	7.9489	*1.555*	7.8022	*1.699*

*** The category ”Not married” includes unmarried, divorced and widowed.**

Appendix 3: Estimation results.

Table A3.1 Ordered probit estimation of farm life satisfaction (st.errors in parentheses).

SWBF	**All obs.**	**1995**	**2002**	**Central**	**Periphery**
Constant	2.1665*	2.5393*	1.1372*	2.0265*	2.6616*
	(0.309)	*(0.496)*	*(0.427)*	*(0.352)*	*(0.660)*
***Year2002**	-0.3914*	n.a.	n.a.	-0.4116*	-0.4713*
	(0.067)			*(0.074)*	*(0.145)*
***Periphery**	0.1123*	0.0862	-0.0016	n.a.	n.a.
	(0.067)	*(0.061)*	*(0.065)*		
ln(farm income)	-0.0392*	-0.0146	-0.0394*	-0.0366*	-0.0458*
	(0.061)	*(0.024)*	*(0.014)*	*(0.013)*	*(0.020)*
Age	-0.2184*	-0.5138*	0.0993	-0.1498	-0.3787
	(0.118)	*(0.172)*	*(0.170)*	*(0.135)*	*(0.256)*
Age squared	0.0254*	0.0556*	-0.0081	0.0177	0.0422*
	(0.012)	*(0.017)*	*(0.018)*	*(0.014)*	*(0.025)*
***Female**	-0.1144*	-0.2631*	-0.0454	-0.1034	-0.1388
	(0.066)	*(0.105)*	*(0.085)*	*(0.078)*	*(0.121)*
***Successor**	0.0576	-0.1111*	0.1928*	0.0912*	-0.0269
	(0.040)	*(0.059)*	*(0.053)*	*(0.047)*	*(0.072)*
***Relief**	0.1593*	0.2004*	0.1157	0.1922*	0.0947
	(0.051)	*(0.063)*	*(0.090)*	*(0.062)*	*(0.094)*
***Work of farm**	-0.1446*	-0.1584*	-0.1436*	-0.1464*	-0.1562*
	(0.042)	*(0.066)*	*(0.059)*	*(0.051)*	*(0.079)*
***Tourism**	-0.1318*	-0.1171*	0.1112*	-0.1516*	-0.0899
	(0.058)	*(0.059)*	*(0.056)*	*(0.074)*	*(0.096)*
***Dairy**	-0.2877*	-0.0698	-0.3151*	-0.3068*	-0.2698
	(0.119)	*(0.283)*	*(0.135)*	*(0.140)*	*(0.230)*
***Livestock**	-0.2855*	-0.0782	-0.3167*	-0.2869*	-0.3481
	(0.120)	*(0.288)*	*(0.133)*	*(0.140)*	*(0.237)*
***Grain**	-0.4111*	0.1006	-0.5525*	-0.4970*	-0.2071
	(0.141)	*(0.323)*	*(0.158)*	*(0.167)*	*(0.260)*
Periphery*Year2002	-0.1149	n.a.	n.a.	n.a.	n.a.
	(0.088)				
ln(f. inc)*dairy	0.0285*	0.0145	0.0241	0.0241	0.0396*
	(0.012)	*(0.026)*	*(0.016)*	*(0.015)*	*(0.023)*
ln(f.inc)*livestock	0.0358*	0.0216	0.0328*	0.0278*	0.0587*
	(0.013)	*(0.026)*	*(0.016)*	*(0.015)*	*(0.024)*
ln(f.inc)*grain	0.0376*	0.0047	0.0363*	0.0358*	0.0390
	(0.015)	*(0.029)*	*(0.019)*	*(0.017)*	*(0.027)*
Year2002*tourism	0.2321*	n.a.	n.a.	0.2455*	0.2060
	(0.081)			*(0.096)*	*(0.170)*
Threshold values:					
μ1	0.6602*	0.5600*	0.7333*	0.6499*	0.6925*
	(0.022)	*(0.032)*	*(0.029)*	*(0.025)*	*(0.041)*
μ2	1.0892*	1.0520*	1.1189*	1.0723*	1.1402*
	(0.022)	*(0.033)*	*(0.030)*	*(0.026)*	*(0.041)*
μ3	1.6066*	1.5287*	1.6779*	1.5983*	1.6401*
	(0.024)	*(0.035)*	*(0.034)*	*(0.029)*	*(0.044)*
μ4	2.4026*	2.3062*	2.5069*	2.4057*	2.4154*
	(0.030)	*(0.042)*	*(0.044)*	*(0.037)*	*(0.054)*
μ5	2.8179*	2.7314*	2.9164*	2.8057*	2.8660*
	(0.038)	*(0.052)*	*(0.057)*	*(0.046)*	*(0.068)*
Log-likelihood	-5054.873	-2310.183	-2718.518	-3535.310	-1513.881
Number of observations	2759	1251	1508	1934	825

Table A3.2 Ordered probit estimation of general well-being (st.errors in parentheses).

SWB	All obs.	1995	2002	Central	Periphery
Constant	3.3999*	-5.9894	2.4002*	3.0514*	1.6362
	(1.006)	*(4.881)*	*(0.846)*	*(1.124)*	*(3.556)*
Farm satisfaction (SWBF)	0.2733*	0.2949*	0.2556*	0.2773*	0.2622*
	(0.122)	*(0.018)*	*(0.017)*	*(0.015)*	*(0.228)*
***Year2002**	-1.2176*	n.a.	n.a.	-0.8128	-1.5912
	(0.635)			*(0.753)*	*(1.220)*
***Periphery**	0.9274*	2.3867*	0.7132*	n.a.	n.a.
	(0.383)	*(1.099)*	*(0.414)*		
ln(hh.income)	-0.2319*	1.0401	-0.1551*	-0.2215*	0.0133
	(0.103)	*(0.739)*	*(0.079)*	*(0.114)*	*(0.346)*
ln(hh.income) squared	0.0038	-0.0376	0.0038	0.0055	-0.0048
	(0.003)	*(0.030)*	*(0.003)*	*(0.004)*	*(0.008)*
***Female**	0.1815*	0.1848	0.1836*	0.1870*	-0.0653
	(0.080)	*(0.137)*	*(0.099)*	*(0.081)*	*(0.123)*
Age	-0.1821	0.3788	0.1607	-0.1645	0.2523
	(0.177)	*(0.500)*	*(0.222)*	*(0.193)*	*(0.598)*
Age squared	-0.0050	0.0014	-0.0094	-0.0056	-0.0064
	(0.012)	*(0.018)*	*(0.019)*	*(0.014)*	*(0.026)*
***Married**	0.1371*	0.3368*	-0.0204	0.1479*	0.1071
	(0.057)	*(0.086)*	*(0.078)*	*(0.069)*	*(0.105)*
***Widowed**	-0.4436*	-0.5626*	-0.4493*	-0.5679*	-0.1512
	(0.170)	*(0.280)*	*(0.218)*	*(0.199)*	*(0.336)*
***High education**	0.0509	0.0772	0.0170	0.0067	0.1498
	(0.073)	*(0.139)*	*(0.086)*	*(0.086)*	*(0.136)*
No of children	-0.3118*	-0.2631	-0.2744*	-0.3264*	-0.1068
	(0.136)	*(0.401)*	*(0.145)*	*(0.159)*	*(0.314)*
***Work mostly on the farm**	-0.1543*	-0.0884	0.2030*	-0.1885*	-0.0931
	(0.042)	*(0.060)*	*(0.059)*	*(0.050)*	*(0.078)*
***Bad health/ reduced working ability**	-0.0360	-0.1257*	0.0372	-0.0391	0.0190
	(0.044)	*(0.062)*	*(0.063)*	*(0.053)*	*(0.080)*
ln(hhinc)*year2002	0.0918*	n.a.	n.a.	0.0595	0.1120
	(0.051)			*(0.060)*	*(0.097)*
ln(hhinc)*periphery	-0.0650*	-0.1824*	-0.0488	n.a.	n.a.
	(0.031)	*(0.088)*	*(0.033)*		
ln(hhinc)*children	0.0251*	0.0200	0.0230*	0.0253*	0.0110
	(0.011)	*(0.032)*	*(0.012)*	*(0.013)*	*(0.025)*
ln(hhinc)*age	0.0185*	-0.0319	0.0208*	0.0174	-0.0141
	(0.011)	*(0.038)*	*(0.012)*	*(0.012)*	*(0.043)*
periphery*female	-0.2466*	-0.2317	-0.2904	n.a.	n.a.
	(0.145)	*(0.215)*	*(0.202)*		
Threshold values:					
μ1	0.6770*	0.6286*	0.7134*	0.6834*	0.6612*
	(0.029)	*(0.046)*	*(0.037)*	*(0.034)*	*(0.054)*
μ2	1.0410*	1.0717*	1.0291*	1.0648*	0.9822*
	(0.027)	*(0.042)*	*(0.035)*	*(0.032)*	*(0.050)*
μ3	1.5865*	1.6171*	1.5794*	1.6257*	1.4919*
	(0.025)	*(0.038)*	*(0.034)*	*(0.030)*	*(0.047)*
μ4	2.4918*	2.5342*	2.4825*	2.5341*	2.3980*
	(0.026)	*(0.038)*	*(0.035)*	*(0.031)*	*(0.046)*
μ5	3.1003*	3.1804*	3.0634*	3.1320*	3.0341*
	(0.031)	*(0.046)*	*(0.042)*	*(0.037)*	*(0.056)*
Log-likelihood	-4616.058	-2039.621	-2559.861	-3246.974	-1362.889
Number of observations	2759	1251	1508	1934	825

Appendix 4: Marginal probability effects

Table A4.1 Marginal effects on farm life satisfaction (st.errors in parentheses).

SWBF	**j<5**	**j=5**	**j=6**	**j=7**	**j=8**	**j=9**	**j=10**
Year 2002	0.0701*	0.0592*	0.0235*	-0.0060	-0.0644*	-0.0348*	-0.0475
	(.001)	*(.002)*	*(.009)*	*(.030)*	*(.006)*	*(.006)*	*(.092)*
Periphery	-0.0199*	-0.0172*	-0.0069	0.0017	0.0187*	0.0101	0.0136
	(.004)	*(.004)*	*(.022)*	*(.015)*	*(.010)*	*(.010)*	*(.064)*
ln(farm income)	0.0072*	0.006*	0.0023*	-0.0008	-0.0066*	-0.0035*	-0.0046
	(.002)	*(.002)*	*(.001)*	*(.003)*	*(.002)*	*(.001)*	*(.004)*
Age	0.0398*	0.0333*	0.0128*	-0.0042	-0.0369*	-0.0194*	-0.0255
	(.022)	*(.018)*	*(.003)*	*(.020)*	*(.020)*	*(.011)*	*(.023)*
Female	0.0221*	0.0172*	0.0060	-0.0032*	-0.0198*	-0.0098	-0.0124
	(.003)	*(.003)*	*(.015)*	*(.002)*	*(.007)*	*(.007)*	*(.069)*
Successor	-0.0105*	-0.0088*	-0.0034	0.0011	0.0097*	0.0051	0.0067
	(.004)	*(.003)*	*(.019)*	*(.011)*	*(.009)*	*(.009)*	*(.064)*
Reilef	-0.0308*	-0.0240*	-0.0083	0.0045	0.0276*	0.0137	0.0173
	(.005)	*(.004)*	*(.017)*	*(.023)*	*(.011)*	*(.011)*	*(.055)*
Work off farm	0.0261*	0.0221*	0.0086	0.0026	-0.0243*	-0.0129*	-0.0171
	(.003)	*(.003)*	*(.015)*	*(.008)*	*(.006)*	*(.007)*	*(.076)*
Tourism	0.0238*	0.0201*	0.0079	-0.0023	-0.0221*	-0.0117*	-0.0157
	(.003)	*(.003)*	*(.016)*	*(.007)*	*(.007)*	*(.007)*	*(.076)*
Dairy	0.0546*	0.0433*	0.0155	-0.0072	-0.0491*	-0.0249*	-0.0322
	(.002)	*(.002)*	*(.013)*	*(.018)*	*(.006)*	*(.006)*	*(.080)*
Livestock	0.0551*	0.0428*	0.0149	-0.0079	-0.0491*	-0.0245*	-0.0313
	(.002)	*(.002)*	*(.014)*	*(.017)*	*(.006)*	*(.006)*	*(.078)*
Grain	0.0891*	0.0585*	0.0152	-0.0189	-0.0728*	-0.0327*	-0.0384
	(.001)	*(.002)*	*(.019)*	*(.021)*	*(.007)*	*(.007)*	*(.074)*

Table A4.2 Marginal effects on general well-being (st.errors in parentheses).

	j<5	**j=5**	**j=6**	**j=7**	**j=8**	**j=9**	**j=10**
SWBF	-0.0146*	-0.0305*	-0.0234	-0.0314	0.0031	0.0370	0.0598
	(0.001)	*(0.001)*	*(0.072)*	*(0.091)*	*(0.061)*	*(0.035)*	*(0.087)*
Year 2002	0.0694*	0.1265*	0.0928	0.1253	0.0074	-0.1376	-0.2838
	(0.002)	*(0.004)*	*(0.430)*	*(0.205)*	*(0.217)*	*(0.127)*	*(0.474)*
Periphery	-0.0381*	-0.0847*	-0.0702	-0.1083*	-0.0411	0.0994	0.2430
	(0.004)	*(0.007)*	*(0.502)*	*(0.043)*	*(0.128)*	*(0.136)*	*(0.212)*
ln(hh.income)	0.0124*	0.0259*	0.0198	0.0266	-0.0026	-0.0314	-0.0507
	(0.006)	*(0.012)*	*(0.070)*	*(0.067)*	*(0.051)*	*(0.039)*	*(0.074)*
Female	-0.0084*	-0.0188*	-0.0151	-0.0218	-0.0022	0.0235	0.0429
	(0.002)	*(0.003)*	*(0.174)*	*(0.101)*	*(0.033)*	*(0.060)*	*(0.273)*
Age	0.0097	0.0204	0.0156	0.0209	-0.0021	-0.0247	-0.0399
	(0.009)	*(0.020)*	*(0.060)*	*(0.049)*	*(0.041)*	*(0.036)*	*(0.080)*
Married	-0.0080*	-0.0160*	-0.0118	-0.0152	0.0034	0.0189	0.0286
	(0.002)	*(0.003)*	*(0.154)*	*(0.090)*	*(0.041)*	*(0.056)*	*(0.246)*
Widowed	0.0363*	0.0592*	0.0378	0.0387	-0.0343	-0.0623	-0.0754
	(0.000)	*(0.000)*	*(0.111)*	*(0.180)*	*(0.090)*	*(0.079)*	*(0.283)*
High education	-0.0026*	-0.0056*	-0.0043	-0.0059	0.0002	0.0068	0.0114
	(0.001)	*(0.003)*	*(0.111)*	*(0.111)*	*(0.013)*	*(0.052)*	*(0.277)*
No. of children	0.0167*	0.0348*	0.0267	0.0358	-0.0035	-0.0422	-0.0682
	(0.007)	*(0.015)*	*(0.087)*	*(0.010)*	*(0.070)*	*(0.046)*	*(0.109)*
Work mostly on the farm	0.0085*	0.0175*	0.0132	0.0175	-0.0023	-0.0210	-0.0333
	(0.001)	*(0.002)*	*(0.010)*	*(0.135)*	*(0.030)*	*(0.050)*	*(0.299)*
Bad health	0.0020*	0.0041*	0.0031	0.0041	-0.0005	-0.0049	-0.0078
	(0.001)	*(0.002)*	*(0.068)*	*(0.120)*	*(0.003)*	*(0.050)*	*(0.282)*