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# Job Preferences of Dairy Farmers in Eastern Switzerland: A Discrete Choice Experiment

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## Abstract

*Using a discrete choice experiment and a mixed-effects logit model, this article analyses the job preferences of 300 dairy farmers in the eastern part of Switzerland who intend to stay in milk production. The results show that a shift to suckler cow husbandry plus additional employment or to a job completely outside of agriculture would only be considered by dairy farmers in exchange for compensation of around 52,900 Swiss francs (CHF), equal to one-and-a-half times the annual on-farm income of a full-time family work unit. At CHF 45,800, the compensation required for farming without cattle is slightly lower, whilst giving up self-employment would require compensation of CHF 32,300. Dairy farmers would be willing to sacrifice around one-fifth of their annual income for an additional week's holiday, which shows how precious leisure time is for them. Overall, we conclude that the farmers interviewed are passionate about dairy production and that they clearly prefer to remain self-employed. Accordingly, there is evidence that these dairy farmers have substantial non-pecuniary job preferences.*

## Key Words

*work content; working condition; non-pecuniary preferences; valuation method; dairy farming; Switzerland*

## 1 Introduction

Several studies indicate that Swiss dairy farmers are confronted with multi-layered challenges in their line of work. Firstly, as regards income per full-time family work unit, dairy farmers' earnings are consistently below the average for the Swiss agricultural sector, achieving between just 85 and 92% of mean earnings in said sector over last ten years (2004-2013) (AGROSCOPE, several years). Secondly, there is an enormous income gap between on-farm and off-farm work for dairy farmers, as analysed by LIPS et al. (2013). Com-

pared on a full-time basis, dairy-farm family members employed off-farm earn on average twice the salary of on-farm workers. Thirdly, in a recent survey on the health situation of dairy farmers, 69% of respondents indicated that they regularly suffered discomfort in the musculoskeletal system (KAUKE et al., 2010). Lastly, DROZ et al. (2012) analyse the psychological health of dairy farmers in the French-speaking part of Switzerland, Franche-Comté in France, and Québec in Canada by means of a survey. The percentages of farmers with high stress levels in these three locations are 55%, 40% and 45%, respectively. In light of these essentially unfavourable working conditions, the question arises as to whether dairy farmers are motivated by non-pecuniary preferences in their choice of work. The answer is especially relevant for agricultural policy-makers as well as for farm advisers, since dairy farms are the most important farm type in Switzerland.<sup>1</sup>

The literature provides evidence of non-pecuniary or non-financial preferences in farming. GASSON (1973) shows that for East Anglian farmers in the United Kingdom, independence and the way of life are what make farming life most attractive. KEY (2005) estimates risk and autonomy premiums for hog producers in the United States, and finds indications of a strong preference for autonomy. Analysing farm household data from the United States, KEY and ROBERTS (2009) identify a large on-farm/off-farm wage differential and find evidence of substantial non-pecuniary benefits from farming. Finally, RUSSELL and BEWLEY (2013) conclude that many non-economic factors influence the decisions of dairy producers in Kentucky.

<sup>1</sup> Although in the basic population of the Swiss Farm Accountancy Data Network (FADN) the mean annual farm exit rate over the last decade has been higher for dairy farms than for the agricultural sector as a whole (2.2% instead of 1.4% annually; AGROSCOPE, several years), dairy remains the most important farm type in Switzerland.

In a review of the literature on the preferences of health workers, LAGARDE and BLAAUW (2009) present ten studies applying discrete choice experiments, and highlight the fact that non-pecuniary incentives are significant determinants, sometimes even more powerful than financial ones. Discrete choice experiments are an appropriate tool for eliciting willingness to pay, which may be used to rate non-pecuniary preferences. Compared with other elicitation methods (e.g. contingent valuation), discrete choice experiments offer two advantages: firstly, they allow the simulation of market situations, making hypothetical decisions understandable for respondents. Secondly, several attributes of the object under consideration, in our case the working conditions, can be analysed simultaneously. Discrete choice experiments are widely used to analyse consumer preferences. In agricultural economics, an extensive literature is available for analysing farmers' preferences in terms of their willingness to participate in agri-environmental schemes based on discrete choice experiments (e.g. CHRISTENSEN et al., 2011; BREUSTEDT et al., 2013; WAMBERG BROCH et al., 2013; SCHULZ et al., 2014). Furthermore, discrete choice experiments are applied to elicit farmers' preferences in terms of their adoption of genetically modified crops (BREUSTEDT et al., 2008), their acceptance of weather insurance (LIEBE et al., 2012), the design of biogas substrate supply contracts (REISE et al., 2012), and investment decisions (ANASTASSIADIS and MUßHOFF, 2014).

The aim of this paper is to use the merits of discrete choice experiments to determine whether non-pecuniary preferences exist in dairy farming. In order to address the working conditions, four attributes, including work content and income, are considered. To our knowledge, a discrete choice experiment has never yet been applied in agriculture to analyse preferences vis-à-vis working conditions.

This paper is structured as follows: the Materials and Methods section outlines the applied discrete choice experiment, which was embedded in a farm survey carried out in eastern Switzerland, as well as the theoretical foundation of the statistical analysis. The remaining sections present the results, a discussion of these, and lastly, our conclusions.

## 2 Materials and Methods

### 2.1 Dairy Farm Survey

The discrete choice experiment formed part of a survey addressing present-day challenges facing dairy farmers (GAZZARIN et al., 2008). Eastern Switzerland (the cantons of Appenzell Innerrhoden, Appenzell Ausserrhoden, St. Gall, Thurgau and Zurich) was chosen for the survey for two reasons. Firstly, it does a fairly good job of representing the different regions (plain, hill and mountain), as well as the different sizes of dairy farms for Switzerland as a whole. Secondly, the farms in this area are about an hour's drive from the Agroscope research station in Tänikon – an important practical advantage for the study design.

The telephone survey took place between the summer of 2006 and March 2007 – in between the years of 2003, when the Swiss Government decided to abolish the milk quota, and 2009, when the quota was definitively removed. A random sample of 530 dairy farmers were questioned about their plans. Of these, 123 refused to answer, resulting in a rate of return for the survey of 77%. The 407 participating dairy farmers were asked whether they planned to continue in milk production after abolition of the quota, and 103 farmers indicated their intention to stop production. As our interest was in those dairy farmers wishing to remain in milk production, these 103 farmers were excluded from the analysis. The remaining 304 farmers were asked to complete a questionnaire that included items on changes in milk production, production technology and socio-economic factors. Several weeks later, a researcher visited the farms to conduct an oral interview that included the discrete choice experiment with the dairy farmers. Complete information on the results of the discrete choice experiment is available for 300 of the 304 respondents. Of these respondents, 174 (58%) are on farms in the plain region, whilst 71 (24%) and 55 (18%) are on farms in the hill and mountain regions, respectively. Thirty-five farms produce in accordance with the requirements of organic farming. On average, the dairy farms are 23.0 hectares in area and have 24.0 milking cows, which is slightly above the mean of 20.4 hectares and 18.7 milking cows recorded in 2007 for the 1,280 dairy farms of the Swiss Farm Accountancy Data Network (FADN) (AGROSCOPE, 2008). With a total milk yield of almost 6,500 kilograms, the dairy farms in the sample also exceed the FADN dairy farms' average of around 6,200 kilograms.

## 2.2 Discrete Choice Experiment

To identify the important aspects or attributes of dairy farmers' working conditions, we held discussions with dairy experts and farmers and consulted recent farm surveys. We then selected four attributes for addressing job preferences in the discrete choice experiment: work content, terms of employment, leisure time, and variation in income (Table 1). For all attributes except leisure time, one level is devoted to the status quo, enabling us to calculate the absolute value of the willingness to pay with respect to the status quo. The work content comprises four levels. *Dairy production* represents the status quo for the farmers interviewed. *Suckler cow husbandry* is typically less labour-intensive than *dairy production*, and therefore – assuming a similar farm size – less lucrative, rendering additional employment necessary. This employment can be in or outside agriculture, and was not defined in greater detail in the experiment. *Farming without cattle* indicates a focus on crop cultivation, for example arable crops, vegetable or fruit crops, or viticulture; or it can indicate that livestock other than cattle (e.g. sheep or goats) are kept on the farm. The fourth and final option, *outside agriculture*, means the farmer must exit the agricultural sector completely. The terms of employment here are either 'self-employed' (status quo) or 'employed' (i.e. by a third party). All work-content levels can be achieved as an employee of another farm or enterprise. The attribute 'leisure time' comprises two aspects: free weekends, and number of weeks' holiday per year. We demarcate the possible range of leisure time with two levels: four weeks' holiday and every weekend off (52) represents the current entitlement for employees in Switzerland. 'Hardly a weekend' and 'hardly a week's holiday' – meaning that leisure time is an exception rather than the rule – is the wording used to denote the minimum level of leisure time in the experiment. For the statistical analysis, we focused on holidays, and translated 'hardly a week' into 0.5 weeks. The third level falls between the minimum and maximum levels, and consists of two weeks' holiday a year and one free weekend a month, coming to 12 free weekends a year. The latter to some extent reflects the benefits of a farm cooperative that can give workers some weekends off, as pointed out by SCHMITT and HOFFMANN (2000) in a study of dairy farms in southern Germany.

'Variation in income per year' refers to the on-farm income of a full-time family work unit (FFWU). The maximum amount is close to the three-year average (2006-2008) of the on-farm income of an FFWU, which is CHF 34,452 (AGROSCOPE, 2009).

**Table 1. Attributes and levels of working conditions**

| Attributes                   | Levels  |
|------------------------------|---|
| Work content                 | <ul style="list-style-type: none"> <li>• dairy production (<i>status quo</i>)</li> <li>• suckler cow husbandry plus additional employment</li> <li>• farming without cattle</li> <li>• outside agriculture</li> </ul> |
| Terms of employment          | <ul style="list-style-type: none"> <li>• self-employed (<i>status quo</i>)</li> <li>• employed</li> </ul>   |
| Leisure time                 | <ul style="list-style-type: none"> <li>• hardly a weekend or hardly a week's holiday</li> <li>• 12 weekends or 2 weeks</li> <li>• 52 weekends or 4 weeks</li> </ul>   |
| Variation in income per year | <ul style="list-style-type: none"> <li>• CHF -6,000.-</li> <li>• CHF 0.- (<i>status quo</i>)</li> <li>• CHF +15,000.-</li> <li>• CHF +30,000.-</li> </ul>   |

CHF = Swiss francs<sup>2</sup>

Source: authors' presentation

Based on Table 1, 96 combinations ( $=4 \times 2 \times 3 \times 4$ ) are theoretically possible, some of which are unrealistic or unlikely to occur. For example, with four weeks of holidays being standard for employees in Switzerland, it is not possible to state 'hardly a week' or '2 weeks' if one is an employee. The combinations involving these statements are excluded, leading to 55 possible combinations. All realistic combinations are used in the survey, allowing a full factorial design to be applied. The combinations are subdivided into five groups with 11 alternatives each, whilst block building is performed manually, taking two criteria into account, viz., similar combinations are assigned to different groups, and the levels are allocated as equally as possible to the groups so as to avoid bias from possible sampling errors. As regards leisure time, each group consists of five alternatives with 'four weeks' holiday', whilst 'hardly a week' and 'two weeks' are included in three alternatives each. The four income levels are represented by two or three alternatives each. The levels 'employed' and 'self-employed' appear between one to three times and eight to ten times, respectively. Finally, the four work contents are represented by one to four alternatives in each group.

A card is prepared for each combination of levels constituting an alternative. In each interview, all

<sup>2</sup> average exchange rates  
(<http://fxtop.com>, accessed 18 September 2015):  
2006/2007: 1 CHF = 0.62 Euro  
2015 (January until August): 1 CHF = 0.95 Euro

11 cards of a group are used, whilst the sequence of the cards is changed each time. The farmers decide whether to accept the alternative or to stay with the status quo. The procedure was evaluated in a pretest, and proved to have good understandability. Prior to each interview, the group was randomly chosen.

A dataset of 3,300 decisions in total is available (300 farms with 11 decisions each). Respondents chose between zero and seven of the 11 alternatives. Sixteen farmers chose the status quo in every case instead of selecting an alternative. All in all, 903 or 27% of the alternatives were chosen.

## 2.3 Data Analysis

In the experiment, dairy farmer  $n$  is confronted with 11 alternatives  $i$  of a group of cards or choice sets.  $U_{in}$  is the utility of alternative  $i$  for farmer  $n$  and consists of two components.  $V_{in}$  represents the systematic component and is a linear function of  $k$  attributes of the alternative  $i$ , whilst  $\varepsilon_{in}$  is the random component reflecting unobserved individual idiosyncrasies (LOUVIERE et al., 2006: 38):

$$U_{in} = V_{in} + \varepsilon_{in} \quad (1)$$

The choice set includes only the status quo 0 and the alternative  $i$ . Accordingly, a binary decision model is applied. We assume that the choice made by dairy farmer  $n$  is the result of his utility maximisation. Accepting the alternative means that the dairy farmer prefers the combination of levels presented on the card to the status quo. The probability  $P_n(i)$  of farmer  $n$  choosing alternative  $i$  is as follows (BEN-AKIVA and LERMAN, 1997: 59):

$$P_n(i) = \Pr(U_{in} \geq U_{0n}) \quad (2)$$

Inserting Equation 1 in Equation 2 and rearranging terms yields:

$$P_n(i) = \Pr(V_{in} - V_{0n} \geq \varepsilon_{0n} - \varepsilon_{in}) \quad (3)$$

Assuming that  $\varepsilon_n = \varepsilon_{0n} - \varepsilon_{in}$  is logically distributed, and using the positive scale parameter  $\mu$ , the probability of alternative  $i$  being chosen is (BEN-AKIVA and LERMAN, 1997: 71):

$$P_n(i) = \frac{1}{1+e^{-\mu(V_{in}-V_{0n})}} \quad (4)$$

Equation 4 constitutes the binary logit model. For convenience, we make the assumption that  $\mu = 1$  (BEN-AKIVA and LERMAN, 1997: 71).

The ratio of the probabilities of the alternative  $i$  and the status quo 0 is termed the ‘odds ratio’ [ $P_n(i)/P_n(0)$ ]. Taking the logarithm of the odds ratio yields

the logit. Inserting the probability of Equation 4, the logit equals the sum of the estimated coefficients  $\beta_k$  of attributes  $k$  and the explanatory variables  $X_{kn}$  of attribute  $k$  and farmer  $n$  (LOUVIERE et al., 2006: 77):

$$\ln\left(\frac{P_n(i)}{1-P_n(i)}\right) = \sum_{k=1}^K \beta_k X_{kn} \quad (5)$$

$X_{kn}$  describes the change in attribute  $k$  between the alternative  $i$  and the status quo (e.g. an increase in annual income of CHF 15,000). As regards holidays, the difference between the number of weeks in the alternatives and the current status quo of the respondents is calculated individually. For the current status quo, farmers were asked about their existing holiday entitlement. An average 0.8 weeks was reported, with one out of three respondents reporting no holidays whatsoever.

The coefficients on the right-hand side of Equation 5 are estimated by means of a binary logistic regression. Fixed-effects logit and probit models have the advantage of taking a random effect into account. We opted for a mixed-effects logit model – also known as a ‘random parameters logit model’ – because it allows the consideration of several random effects addressing intracluster correlations (STATA CORP, 2011). The binary variable to be explained is the decision about the alternative (accepted [1] or not accepted [0]). All levels are treated as fixed effects and are coded as follows: *suckler cow husbandry plus additional employment*, *farming without cattle*, and working *outside agriculture*, as well as being employed, are entered into the model as binary variables. Income and holidays are coded in CHF and number of weeks’ holiday, respectively. The model also includes a constant term addressing the potential general tendency of dairy farmers to choose the status quo. This is based on an analysis by DOBRICKI (2010) about basic human values held by Swiss farmers. DOBRICKI identifies an above-average score for conservation and a below-average score for openness to change in farmers compared to the population as a whole. The coefficient of the intercept thus represents the utility for the status quo, which is not captured by the attributes used in the experiment. Finally, the model consists of two random effects. Because each dairy farmer makes 11 decisions, we treat the farm as a random effect. The region (plain, hill or mountain) is the second random effect. By means of the log-likelihood ratio test, we compare the estimated model with an ordinary logit model without random effects. This allows us to determine whether the consideration of the two random effects improves the estimate. Fi-

nally, the Wald test assesses the null hypothesis that all estimated coefficients are simultaneously equal to zero.

## 2.4 Monetary Equivalent

Together, the estimated coefficients  $\beta_k$  form the systematic component  $V$  of the utility difference for dairy farmers between the alternative  $i$  and the status quo ( $V = V_i - V_0$ ). Based on this function, the marginal rate of substitution ( $MRS$ ; VARIAN, 1992) between the change of attribute  $X_k$  and the change in income ( $X_{Income}$ ) is defined as follows:

$$MRS = \frac{-\frac{\partial V}{\partial X_k}}{\frac{\partial V}{\partial X_{Income}}} = \frac{-\beta_k}{\beta_{Income}} \quad (6)$$

The  $MRS$  can be calculated by dividing the estimated coefficient  $\beta_k$  of the attribute  $k$  by the estimated coefficient for the attribute ‘income’ ( $\beta_{Income}$ ). Because income is measured in monetary units, the  $MRS$  is a financial indicator of willingness to pay (WTP) or willingness to accept (WTA; LOUVIERE et al., 2006: 61), enabling preferences to be expressed in monetary equivalents. Whereas WTA is the compensation required for accepting something negative and is expressed in positive numbers, WTP is expressed in negative numbers and represents the amount an individual is prepared to spend for a desirable good, or, in our case, a desirable level. The  $MRS$  indicates the necessary amount in CHF when one attribute is altered in order to maintain the utility of the status quo. Since all attribute changes refer to the status quo, the  $MRS$  is also related to the status quo.

## 3 Results

Table 2 shows the results of the mixed-effects logit model. The Wald test indicates that the null hypothesis of no significant explanatory power can be rejected. According to the log-likelihood ratio test result, the mixed-effects model is preferable. Significant standard deviations of random effects can be observed at the farm level, but not at the regional level. All variables and the intercept are significant at the 1% level. Because the coefficients of logistic regressions are difficult to interpret, we give the odds ratios. Values above or below 1 indicate the tendency to accept or not accept the alternative, respectively. With a value of 0.666, the odds ratio for the intercept indicates that dairy farmers have a tendency to opt for the status quo. The odds ratios for the three variables *suckler cow husbandry plus additional employment*, *farming without cattle*, and working *outside agriculture* are fairly low, meaning that it is fairly unlikely that alternative work content will be chosen. Similarly, being employed is not an appealing proposition for dairy farmers. As expected, additional income and additional holidays show odds ratios above 1. The odds ratio of an additional income of CHF 1,000 is 1.04. An additional income of CHF 10,000 has an odds ratio of 1.4, which is similar to the odds ratio of an additional week’s holiday.

Based on the coefficients in Table 2, the monetary equivalents ( $MRS$ ) as related to the status quo are calculated (Table 3). A dairy farmer would require an additional income per year (WTA) of CHF 52,900 to switch from *dairy production* to *suckler cow hus-*

**Table 2. Results of the mixed-effects logit model**

| Variable                         | Coefficient | Standard Error | P-Value | Odds Ratio |
|----------------------------------|-------------|----------------|---------|------------|
| Intercept                        | -0.406      | 0.125          | 0.001   | 0.666      |
| Income in 1,000s of CHF          | 0.040       | 0.003          | < 0.001 | 1.040      |
| Suckler cow + add. emp.          | -2.091      | 0.145          | < 0.001 | 0.124      |
| Without cattle                   | -1.810      | 0.132          | < 0.001 | 0.164      |
| Outside agriculture              | -2.128      | 0.134          | < 0.001 | 0.119      |
| Employed                         | -1.279      | 0.150          | < 0.001 | 0.278      |
| Holidays in weeks                | 0.291       | 0.035          | < 0.001 | 1.338      |
| <i>Random-effects parameters</i> |             |                |         |            |
| Region                           | 2.43E-08    | 0.002          |         |            |
| Farm                             | 0.998       | 0.080          |         |            |

number of observations: 3,300; log likelihood: -1,608

Wald Chi<sup>2</sup> = 441; Prob > Chi<sup>2</sup>:  $P < 0.001$

Log-likelihood ratio test vs. logistic regression without random-effects parameters, Chi<sup>2</sup> = 141; Prob > Chi<sup>2</sup>:  $P < 0.001$

+ add. emp.: plus additional employment

Source: authors’ calculation

**Table 3. Monetary equivalent (MRS) as related to the status quo in CHF**

| Levels                  | in CHF | Standard Error | 95% Confidence Interval |        |
|-------------------------|--------|----------------|-------------------------|--------|
| Suckler cow + add. emp. | 52,864 | 5,537          | 42,012                  | 63,715 |
| Without cattle          | 45,755 | 4,926          | 36,100                  | 55,410 |
| Outside agriculture     | 53,807 | 5,318          | 43,384                  | 64,230 |
| Employed                | 32,340 | 4,809          | 22,915                  | 41,765 |
| Holidays, 1 week        | -7,369 | 1,029          | -9,386                  | -5,352 |

positive values: willingness to accept (WTA); negative values: willingness to pay (WTP)

+ add. emp.: plus additional employment

Source: authors' calculation

*bandry plus additional employment*; in other words, the required compensation would be one-and-a-half times the on-farm income of an FFWU (1.53), which amounts to CHF 34,452 for the years 2006-2008 (AGROSCOPE, 2009). This means that, *ceteris paribus*, a dairy farmer switching to *suckler cow husbandry* will suffer a substantial loss of utility. To maintain the utility level of the status quo (dairy production), compensation of CHF 52,900 would be necessary. The result for *outside agriculture* (1.56 FFWU) is slightly higher than for *suckler cow husbandry*, indicating that the *suckler cow* and *outside agriculture* alternatives are comparable for dairy farmers. *Farming without cattle* would require less compensation (1.33 FFWU). Being employed by a third party instead of being self-employed (the status quo) has a WTA of CHF 32,300 (0.94 FFWU). For an additional week's holiday, dairy farmers have a WTP of CHF -7,400, equivalent to a fifth (-0.21) of the annual income of an on-farm FFWU.

## 4 Discussion

The resultant monetary equivalents are fairly high, and for most levels even exceed the annual on-farm income of an FFWU. Furthermore, they surpass the highest monetary value in the experiment (CHF 30,000). In this respect, five aspects must be borne in mind. Firstly, the analysis is restricted to dairy farmers who intend to stay in milk production despite the imminent abolition of the milk quota, with the expected fall in milk prices that this entails. Accordingly, it would seem reasonable to assume that they have a substantial preference for dairying. Secondly, the high values could be associated with the reference point used by dairy farmers to make income-related decisions. Although the income variation in the experiment refers to the annual on-farm income of just one FFWU, participating farmers might have been think-

ing of whole-farm income. Given that the dairy farms we visited obviously averaged more than one work unit, this would lead to an overestimate of monetary equivalents. In this case, the resultant WTP and WTA would need to be divided by the average number of FFWU's. Thirdly, the arithmetical reason for the large resultant values is the small coefficient for income ( $\beta_{Income}$ ), indicating the small marginal utility of income. Consequently, we cannot expect the results to be within the range of the income variation in the experiment. Fourthly, it is important to link the high WTA values for both work content and terms of employment on the one hand with the high WTP for leisure time on the other. When farmers chose work content other than *dairy production* in the choice experiment, they tend to choose additional holidays: The average holiday entitlement for the 513 accepted alternatives was 2.9 weeks. The work-content and holiday references therefore follow different directions, with both exhibiting high figures. To give an example, being employed automatically means 4 weeks' holiday, or 3.2 additional weeks compared with the sample's average of the status quo. Making the strong assumption that the *MRS* is also valid for additional weeks of holiday entitlement, the WTP would be CHF -23,700 (3.2 weeks times CHF -7,400 per week). Adding the WTA of being employed (CHF 32,300) leads to a reduced total WTA of CHF 8,600 which is, however, still a utility loss compared to the status quo. Finally, the literature provides examples of substantial preferences related to working conditions as reported by LAGARDE and BLAAUW (2009) for general practitioners in the United Kingdom. Dividing the quoted annual WTAs by the monthly income earned (WORLD SALARIES, 2008) working with highly deprived patients shows that a compensation of one month's salary is deemed necessary. For out-of-hours night shifts worked, there are two different scenarios: for working some night shifts, employees expect compensation equivalent to around two-and-a-half months' salary,

but for working more night shifts, their WTA adds up to almost four months' salary.

Two critical assumptions in the data processing require sensitivity analyses. Firstly, the mountain region offers limited options for production without cattle, so the level *farming without cattle* has less practical relevance than the other alternatives. We therefore repeat the statistical analysis, skipping all 163 decisions that include without cattle for farmers from the mountain region. The resulting WTA for *farming without cattle* is 9% lower (CHF 41,800 rather than CHF 45,800), whilst the WTA values for both *suckler cow husbandry plus additional employment* and *outside agriculture* are about 2% lower. Terms of employment and holidays are hardly affected. Secondly, instead of assuming 0.5 weeks' holiday for 'hardly a week', the analysis is repeated with the assumption of 0 weeks' holiday. Accordingly, the dairy farmers' decisions are interpreted differently, with 'hardly a week' being taken to mean a willingness to accept no holidays. The resultant WTP for holidays is 2% lower than that given in the Results section. Similarly, the compensation required for being an employee is 2% higher (CHF 33,100 rather than CHF 32,300). The other levels are hardly affected.

## 5 Conclusions

This paper uses a discrete choice experiment to analyse the job preferences of 300 dairy farmers in the eastern part of Switzerland who intend to remain in milk production. The results are statistically highly significant, and are scarcely affected by the critical assumptions made in the processing of the data. Because dairy farmers may have equated the variation in income in the experiment with whole-farm income rather than with the income of one full-time family worker, the resulting monetary equivalents may have been overestimated. In addition, bearing in mind that the data used originate from the years 2006 and 2007 the present situation on dairy farms might be different.

Nevertheless, the analysis reveals that dairy farmers have very strong preferences in terms of their working conditions. We, therefore, conclude that there is clear evidence of substantial non-pecuniary job preferences – a factor that should be taken into account in future analyses of Swiss dairy farms dealing with income issues.

The alternatives '*suckler cow husbandry plus additional employment*' and '*outside agriculture*' exhibit

similar results, namely a willingness to accept around CHF 52,900, equivalent to one-and-a-half times the annual income of a full-time family work unit, as a trade-off. For dairy farmers, therefore, *suckler cow husbandry* is by no means a replacement for *dairy production*, which is clearly their number-one job preference. *Ceteris paribus*, if farmers had to exit dairy production, a shift towards *farming without cattle* would be more likely than a move towards *suckler cow husbandry* or work *outside agriculture*, supported by a lower required compensation (CHF 45,800). Being employed requires a compensation equivalent to around one year's income, illustrating the preference for remaining self-employed. The willingness to sacrifice around one-fifth of one's annual income for an additional week's holiday highlights how precious leisure time is for dairy farmers. To some extent, additional weeks of holiday entitlement can offset the substantial monetary compensation demanded as a trade-off for another work content, or for being an employee. All in all, we conclude that the farmers interviewed are extremely passionate about *dairy production*, and have a clear preference for remaining in this sector as self-employed individuals.

The results indicate that income maximisation is not the top priority of dairy farmers. This is important information for farm advisers and policymakers, as it helps with the development of advisory services and agricultural policy programmes. Dairy farmers are loath to exit milk production, and their revealed preferences go some way towards explaining their acceptance of an under-average income in agriculture. Because these preferences are likely to influence the decision to exit dairy farming, the results presented here are also of interest for understanding farm exit and structural change in the Swiss agricultural sector. Bearing in mind the amount of compensation considered necessary for switching from *dairy production* to another work content, an agricultural policy programme for encouraging dairy farmers to exit milk production would be extremely expensive. The same argument holds for a potential early retirement programme. Accordingly, when endowed with limited resources, such programmes are likely to fail.

Whether these strong preferences are also characteristic of farmers running other sorts of farms such as arable crop or livestock-fattening farms is an issue requiring further research analysis. In addition, a comparison with the job preferences of dairy farmers in neighbouring regions such as Bavaria and Baden-Wuerttemberg in southern Germany or Vorarlberg in Austria would be very informative.

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