FARMERS' OCCUPATIONAL ATTITUDES AND FINANCIAL SITUATION IN THE SWISS MOUNTAIN REGION

Sub theme: Entrepreneurship

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Abstract:

Based on three data sources, namely tax declaration, structural data and a survey, we investigate the relation between farmers' occupational attitudes and financial and structural indicators. 127 observations are available from the Canton of Obwalden, a Swiss province in the mountain region. A factor and a correlation analysis are carried out. The results show a clear correlation between the perception of the financial situation and the actual household or total income. Conversely, there is no significant correlation between the actual agricultural income and the perceived financial situation. Furthermore, farmers with high agricultural income tend to put a relatively higher focus on operating goals such as improving productivity than farmers with low agricultural income.

Keywords: *family farm, income, perceived financial situation, mountain region, Switzerland*

1   Introduction

The annual reporting of incomes in agriculture by means of the Swiss Farm Accountancy Data Network (FADN) regularly reveals low income compared with income earned in non-agricultural sectors. The agricultural income is especially low in the mountain region, where the median annual income per family work unit (FWU) was CHF 32'000.-[3] in 2015, approximately half of the median income outside agriculture (Dux et al., 2016). As a consequence of substantial variation within the mountain region, the worst performing quarter

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[3] Average exchange rates 2016: CHF 1.00 = Euro 0.92 = USD 1.02 (https://data.snb.ch, accessed January 9, 2017)

in 2015 earned on average CHF 13'000.- per FWU (Dux *et al.*, 2016). The low incomes are not in line with a sustainable agriculture postulated in the Swiss constitution (Article 104, SR 101) and question the economic viability of these farms. Furthermore, the consequences of low income could be excessive labour and financial troubles, which may cause burnout symptoms (Wagner, 2011), representing an antithesis of social sustainability.

As a precondition for agricultural policy makers and farm consultants to develop the mountainous agriculture in a more sustainable direction, it is essential to understand the occupational attitudes of farmers, especially of those with extremely low incomes. According to Eagly and Chaiken (1993), an attitude is defined as a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour.

To our knowledge, the relation between farmers' attitudes and their financial situation has never been assessed in the literature. The present paper aims to fill this gap and takes advantage of three data sources, namely tax declaration, structural information and a survey about occupational attitudes, which are available for farms in the Canton of Obwalden, a province situated in the centre of Switzerland (46°51′0′′ N, 8°13′48′′ E) surrounded by mountain chains of the Alpine foothills. Based on the tax declaration and structural information, Schmid *et al.* (2015) carried out an analysis of the economic situation of the farms in the Canton of Obwalden. While the average annual on-farm income per FWU was CHF 19'000.-, the lowest quarter earned on average CHF 2'100.-, indicating that the Canton of Obwalden is a highly suited region for our analysis due to the huge variation.

The description of the data, the necessary matching procedure to connect data sources and the statistical analysis are outlined in the methods section (section 2). Section 3 presents the results of the factor analysis and the rank correlations. In section 4, we discuss the results and possible implications before drawing conclusions in section 5.

2 Methods

2.1 Data sources

The tax declaration used is from the year 2012 and stems from the tax authority of the Canton of Obwalden. The farmers' tax declaration contains information about the employed principal and secondary earnings, the self-employed principal and secondary earnings, the income from social security funds, total assets and operating liabilities. Following Schmid *et al.* (2015) using the same data, the earnings from self-employed activities, either principal or secondary, constitute the agricultural income. We derived the following financial indicators: agricultural income (AI), household or total income (TI), share of agricultural income on total income (SAI), operational liabilities (OL) and own capital (OC)[4]. In addition, the tax declaration provides personal information about the farmer such as age, marital status and number of children in the household.

Structural information is taken from a second data source, namely AGIS, the agricultural policy information system (Bundesamt für Landwirtschaft, 2013). This data includes agricultural zone (AZ), farms size measured in livestock units (LU), organic production (OP) and number of household members (HHM).

Both data sources, tax declaration and AGIS, were matched by the cantonal department of agriculture to ensure anonymity. The resulting dataset includes 551 farm observations for the year 2012 (Schmid *et al.*, 2015).

As a third data source, we use a farm survey carried out in 2015 by the cantonal department of agriculture (Abächerli and Falconi-Bürgi, 2015). 321 anonymous questionnaires are available. Besides structural information, the farm managers were asked to state their attitudes towards the financial situation, their motivation to run a farm, their operating goals, the social recognition of farmers, upcoming changes, agricultural policy and their general workload. For

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[4] OC is calculated by subtracting the operating liabilities from the total assets.

these questions, the farmers had to choose an answer on a 6-point Likert scale where '1' corresponded to high and '6' to low agreement. We reversed the scale of the score to make it more intuitive. Furthermore, the farm managers stated their weekly on- and off-farm working hours in the summer and winter months separately. Assuming a duration of six months each, we calculated the all-season average, called weekly on-farm working hours (WHA) and weekly off-farm working hours (WHO).

2.2   Matching

To combine the first two data sources with the survey, a manual matching was necessary and carried out based on seven items. Four items are available in identical form: agricultural zone[5] (plain, hilly and mountain zone 1 to 4)[6], main types of production (dairy farm with or without breeding, cattle rearing, suckler cows, fattening or laying hens, piglet breeding, pig fattening, small ruminants and other production types), organic farming (yes, no) and the gender of the farm manager. For two items, namely land size and age of the farmer, the survey reports categorical data, whereas AGIS indicates the values[7]. Finally, the numbers of children above and below sixteen years that live in the household are available from both sources[8]. Given that the tax declaration and AGIS data stem from 2012 and the survey was conducted in 2015, the numbers were used with caution, because changes such as the enlargement of the farm might have happened in the meantime. By means of this information, we were able to match 127 questionnaires to the dataset containing tax and AGIS data.

Table *1* presents the characteristics of Obwalden's agricultural sector and compares it to our sample (coverage of 20%). The average land size of 12.0 ha per farm is extremely small and

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[5] The federal office of agriculture of Switzerland is responsible for the categorization of the agricultural area into zones by considering the climatic conditions, the infrastructural development and the surface conditions (Bundesamt für Landwirtschaft, 2013).
[6] From zone 1 to zone 4, the handicap of land cultivation is increasing.
[7] There are three categories for age (younger than 40 years, 40 to 55 years, over 55 years) and four categories for land size (less than 8 ha, 8 to 16 ha, 17 to 24 ha, greater than 24 ha).
[8] In the tax declaration, the available criterion was 18 years.

well below the Swiss average of 19.7 ha per farm (BfS, 2015). Farms in our sample tend to be slightly larger than the cantonal average, and organic farms are overrepresented.

Table 1: Characteristics of the agricultural sector in the Canton of Obwalden and the sample used

Characteristic	Unit	Obwalden	Our Sample
Number of farms	Number	649	127
Percentage of part-time farms	%	27.9	20.5
Percentage of organic farms	%	27.7	38.6
Average farm size	ha	12.0	14.2
Livestock units (LU) per farm	LU	22.0	25.6
Full-time employees	Number	627	165
Family members as full-time employees	%	90.3	92.7
Part-time employees	Number	980	206
Family members as part-time employees	%	95.5	93.2

Sources: BfS (2015), Bundesamt für Landwirtschaft (2013) and own calculations.

2.3 Statistical analysis

Given the large number of items in the survey, we conducted an exploratory factor analysis for different blocks of questions to reduce the number of response items. The resulting factors indicate the farmers' occupational attitudes. We excluded questions with too many missing answers to ensure that as many observations as possible remained in the dataset. Then we applied the minimum residual factoring method with varimax rotation of the psych package in R (Revelle, 2016) for the question blocks regarding the workload, the financial situation, the motivation to run a farm, goals and general viewpoints of the farmer and the motivation to undertake an off-farm employment. Because the last question block was completed only by farmers that undertook a secondary occupation, the number of observations was markedly low.

Subsequently, we carried out a pairwise rank correlation. In detail, we correlated the resulting factors with financial and structural indicators from the tax declaration and AGIS database. In addition, the weekly working hours (WHA, WHO) were correlated with all variables.

3 Results

The factor analysis yielded in total 14 factors that represented occupational attitudes, each representing a question block including between 4 and 12 question items; the factors included one for the perceived financial situation, three for the farmer's goals, one each for the social recognition and the satisfaction with the agricultural policy, three for the motivation to run a farm, three for the motivation to undertake an off-farm employment and two for the block of questions related to the workload. All factors are described in more detail in Table 2.

Table 2: Description of the resulting factors

Factor		Description	Items	Observations
F.FS	Financial situation	The higher the score, the better is the perceived financial situation; investments can be financed or liabilities be reduced.	6	119
F.OG	Operating goals	A high score represents the farmer's intention to improve the productivity in order to ensure the survival of the farm for the next generation and reduce the operating liabilities.	12	115
F.NOG	Non-operating goals	A high score indicates that personal goals play an important role in the farmer's life. He or she wants to spend time with his/her partner and family; leisure time and vacation have high priority.	12	115
F.GI	Growth intentions	A high score indicates that the farmer has intentions to enlarge the size of the farm and expand the production.	12	115
F.SR	Social recognition	A high score indicates that the local community recognizes the accomplishments of the farmer and advocates the agricultural sector. Furthermore, the farmer gets support from the agricultural extension services.	4	117
F.AP	Agricultural policy	The higher the score, the more the farmer agrees with the current agricultural policy. Specifically, he or she thinks that the frequency of the controls and the administrative work are justified and that the policy fosters the production process.	7	114
F.NMI	Non-monetary incentives	The higher the score, the higher is the intrinsic motivation to run the farm. The farmer especially likes the independence and variety of his/her work.	7	117
F.TR	Tradition	The higher the score, the more important are traditional motives to run a farm. The farmer wants to pursue the family business, which is also the wish of his/her parents.	7	117
F.DE	Destiny	A high score indicates that the farmer perceives his/her profession as calling and cannot imagine undertaking another profession.	7	117
F.EM	Extrinsic motivation	The higher the score, the stronger is the farmer's motivation for a secondary occupation related to financial reasons.	7	74
F.IM	Intrinsic motivation	A high score indicates that the farmer enjoys having an off-farm job and likes the contact to other people.	7	74
F.EE	Education/experience	A high score indicates that the farmer's motivation arises from the fact that he/she has learnt the extra profession and wants it to remain part of his/her life.	7	74
F.WL	Work–life balance	The higher the score, the more time the farmer has for leisure/family, and it is possible to take several days in a row off.	8	105
F.SS	Stress	A high score indicates that the workload is hardly manageable by the farmer and that he/she requires help from family or employees. Furthermore, the stress may affect the farmer's health.	8	105

Table 3 summarizes the rank correlations between the factor scores, the financial indicators and structural data and the farm managers' weekly on- and off-farm working hours. The financial situation (F.FS) is perceived better with higher household incomes (TI), but there is no significant correlation with the agricultural income (AI). Moreover, own capital (OC) plays a more important role than the amount of operating liabilities (OL) for the perception of the financial situation (F.FS). Organic farmers (OP) perceive their financial situation above average. Although farm managers spending most of their weekly working hours on-farm (WHA) show high agricultural incomes (AI), they tend to perceive their financial situation as inferior (F.FS).

Clearly defined operating goals (F.OG) such as improving productivity are significantly related to high agricultural income (AI), a high share of agriculture in the household income (SAI), large farms (LU) and a high timely on-farm commitment of the farm manager (WHA). High liabilities (OL) are related to low own capital (OC). Both might result from recent investments made due to the farmer's strong focus on operating goals (F.OG).

Farmers that set their goals in spending time with their family and for leisure (F.NOG) work more on-farm (WHA). Furthermore, F.NOG and substantial off-farm work (WHO) are negatively correlated. Growth intentions (F.GI) are related to low agricultural incomes (AI). The perceived social recognition (F.SR) seems to be highest among respondents with either small farms (LU) or organic production (OP).

The agricultural policy (F.AP) receives higher agreement among farms in higher than lower agricultural zones (AZ). In contrast, farm managers spending most of their working time on-

farm (WHA), having large farms (LU) or a large agricultural share in their incomes (SAI) show a critical perception of the agricultural policy (F.AP).

To perceive agriculture as calling (F.DE) is related to large farms (LU) and high on-farm share of the farm managers' working hours (WHA). Farmers that are strongly intrinsically motivated to run a farm (F.IM) tend to have more livestock units (LU) and a better capital endowment (OC) compared with farmers that have a low intrinsic motivation. Organic production (OP) is most likely when farm managers care about either their occupational skills outside agriculture (F.EE) or their work–life balance (F.WL).

Farmers that work many hours on their farms (WHA) seem to be clearly dependent on help from family members or employees and regard their workload as stressful (F.SS). Working hours on- and off-farm (WHA and WHO, respectively) show reciprocal and significant coefficients for three financial indicators: A large off-farm engagement is related to a low agricultural income (AI), a low share of agriculture in the total income (SAI) and a low own capital (OC). The total household income (TI) does not seem to be affected by the partitioning of the farm manager's working hours in on- and off-farm activities.

Table 3: Correlations between factors, financial indicators, structural items and weekly working hours of the farm manager

Factor	AI	TI	SAI	OC	OL	AZ	LU	OP	HHM	WHA	WHO
F.FS	0.12	0.19**	0.03	0.17*	−0.01	−0.07	0.06	0.24***	0.04	−0.26***	0.12
F.OG	0.25***	0.03	0.23**	−0.18**	0.25***	−0.07	0.25***	−0.06	0.18**	0.27***	−0.21
F.NOG	0.06	−0.07	0.11	−0.02	−0.05	−0.10	−0.05	−0.08	0.06	0.20**	−0.38***
F.GI	−0.18*	−0.13	−0.07	−0.13	0.15	0.09	0.05	0.05	−0.08	−0.06	0.11
F.SR	−0.02	0.00	−0.02	0.14	−0.15	−0.01	−0.16*	0.21**	−0.06	−0.07	−0.09
F.AP	−0.15	−0.11	−0.19**	0.12	−0.28***	0.19**	−0.32***	0.06	−0.14	−0.17*	0.06
F.NMI	0.03	0.10	−0.03	−0.08	0.16*	0.09	0.14	0.02	0.05	0.15	−0.30**
F.TR	−0.01	−0.02	0.04	−0.02	0.04	0.10	−0.02	−0.09	−0.19**	0.08	−0.07
F.DE	0.01	−0.04	0.04	0.10	0.13	0.03	0.30***	−0.12	0.13	0.27***	0.08
F.EM	0.05	0.03	0.05	−0.07	0.05	−0.08	−0.03	−0.04	0.10	−0.11	0.22*
F.IM	0.12	0.10	0.12	0.25**	0.08	−0.06	0.25**	−0.15	0.06	0.07	−0.14
F.EE	−0.06	0.13	−0.04	−0.15	0.01	0.14	0.02	0.21*	−0.14	−0.16	0.11
F.WL	−0.13	−0.06	−0.06	0.01	0.07	−0.06	−0.08	0.17*	−0.14	−0.13	−0.03
F.SS	0.06	0.08	−0.01	−0.15	0.13	−0.05	0.14	−0.10	0.03	0.31***	−0.13
WHA	0.35***	−0.04	0.29***	0.45***	−0.05	0.39***	0.20**	0.03	0.18*	-	−0.63***
WHO	−0.27**	0.08	−0.26**	−0.41***	−0.10	−0.24*	−0.24*	0.05	−0.02	−0.63***	-

Notes: *, ** and *** denote 10%, 5% and 1% significance levels, respectively.
Abbreviations are explained in the text.

4 Discussion

Using data sources that are independent from each other is beneficial, because strategic interactions between financial data and expressed occupational attitudes can be excluded. However, there was a time discrepancy of three years between the tax data and the questionnaires, and occupational attitudes might have been different in 2012 than they were in 2015. Thus, the obtained results have to be interpreted with caution. In addition, the required matching process is challenging because farms in the Canton of Obwalden are similar in structural terms, i.e. they often lie in the mountainous production zone 2, are engaged in dairy farming and comprise an area of 8 to 16 ha. Thus, farms with animals other than cattle and farmers with many children were easier to match. However, although versatile farms were easier to match, the sample corresponds well with the Canton's overall population regarding

farm size measured in LU. Thus, the sample represents the special features of the agricultural sector adequately.

Because the direction of the impacts of our applied variables was not explicit in this paper[9], we conducted a pairwise rank correlation analysis. Therewith, we avoided the issue of endogeneity as it arises in other common statistical methods such as linear regression analysis. Moreover, due to the pairwise investigation of the items, multicollinearity did not pose any problems.

5 Conclusions

Based on three data sources, namely tax declaration, structural data and a survey, we investigated the relation between farmers' occupational attitudes and financial and structural indicators for farms in the Canton of Obwalden, located in the Swiss mountains. Based on this unique dataset, the analysis revealed striking insight into the occupational attitudes of farm managers.

The farmers of our dataset seem to consider only the household or total income when evaluating their financial situation. There is no significant correlation between the perceived financial situation and the agricultural income. Given that the lowest quarter of the farms in the Canton of Obwalden earn almost no income in agriculture, we conclude that these farm managers either are not aware of their financial situation or they consider farming not for earning a living. Furthermore, the absence of a correlation between the financial indicators and the factors indicating stress and work–life balance does not suggest a high degree of suffering. We can conclude that there is no urgent need for action by policy makers although some incomes are low. However, agricultural policy should aim at strengthening the

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[9] Whether the perceived financial situation has an impact on the agricultural income or vice versa is not obvious.

awareness of the farmers' financial situation in order to improve the economic and social dimension of sustainability.

Low performing farms hardly set priorities on operating goals such as improving productivity, a result that could be addressed in the farm management education through improvements of training courses. No correlation could be found between traditional values and financial indicators. Accordingly, tradition seems not to be related to financial performance.

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