

The new Swiss FADN income survey based on random sampling

Authors: Dux, Dunja; Jan, Pierrick; Renner, Swetlana; Hoop, Daniel; Schmid, Dierk
Agroscope, Farm Economics Research Group, Tänikon 1, CH-8356 Ettenhausen

1. Introduction and research question

Most OECD countries conduct on a yearly basis a farm-level monitoring of the economic situation in agriculture. This monitoring is motivated by two reasons. First, “*for strategic, social and political reasons there is a strong interest in what is happening in the agricultural industry within the context of the general economy*” (Hill, 1994). Second, this monitoring is of crucial importance for the design and evaluation of agricultural policy (Hill, 1994, see also ECA, 2016). In the European Union (EU) this monitoring occurs through the Farm Accountancy Data Network (FADN) established in 1965 (Hill, 1994). Switzerland has a quite similar monitoring system to the EU FADN. The Swiss FADN was established in 1969 and has been administered by Agroscope, the Swiss federal centre of excellence for agricultural research, since 1976. On behalf of the legislator, the Swiss FADN yearly collects and analyses the accountancy data of a sample of Swiss farms. The Swiss FADN survey system, which was in force until 2015, showed several serious weaknesses and failed to comply with some important statistical state-of-the-art standards. The three most important shortcomings that needed to be addressed were the following:

- The farms were not selected according to a random sampling procedure.
- Some parts of the target population were insufficiently represented (for instance the farms of the so-called type “special crops” encompassing fruits, grapes/wine and vegetables growers) or even not represented at all in the sample (for instance, the canton Ticino on the southern side of the Alps).
- Due to the sampling procedure, the sample suffered from a marked over- and under-representation of some strata.

These three major shortcomings were closely related to the accounting system of the Swiss FADN. Farms taking part in the Swiss FADN had to keep – in addition to the financial accounts required for tax purposes – a special so-called “Swiss FADN accountancy” with direct costing according to Swiss FADN accounting rules defined by Agroscope. Only one of the farm accounting softwares available on the market was able to produce both financial and Swiss FADN accounts. This led to a strong restriction in the farm selection process and implied that a large part of the farms from the target population had no chance to be selected for the Swiss FADN sample.

In order to overcome these shortcomings and to substantially improve the quality of the statistics on the income situation in Swiss agriculture, Agroscope initiated a fundamental reform of the Swiss FADN in 2007. The implementation of this reform (including test phases) took place between 2009 and 2016.

The objective of the present contribution is twofold. First, the new statistical design of the Swiss FADN survey aiming at monitoring the income situation in Swiss agriculture is introduced¹. Second, selected results regarding response and retention rate, sample representativeness and the effect of the system change on key indicators of the economic situation in Swiss agriculture are presented.

2. The new Swiss FADN survey design

The new Swiss FADN sample design is based on stratified random sampling and thus overcomes the statistical shortcomings of the former sample design. The target population is defined as all farms of the agricultural census above a certain standard output threshold. The stratification scheme is based on three groupings: (i) region (plain, hill and mountain region), (ii) farm type according to the new Swiss FADN typology and (iii) farm size, measured in standard output. The optimum sample size of 2300 farms was determined on the basis of accuracy requirements regarding the target variable (standard gross margin)² taking also into account the costs of the data collection and the budget available for it (Renner et al., 2018). This sample size enables to estimate the average standard gross margin for the total sample with an accuracy of $\pm 1.3\%$ (95% confidence interval; Renner et al., 2018).

¹ This survey is also called “Income situation sample”. In addition to this sample, the Swiss FADN also encompasses the so-called “farm management sample”, which is not based on random sampling and does not cover the whole target population. The present contribution focuses exclusively on the “income situation sample”.

² Standard gross margin is used as proxy for the core variable of interest, namely the farm agricultural income.

To facilitate the implementation of the random sampling procedure and, more precisely, in order to enhance the participation in the survey, Agroscope decided to abandon the “Swiss FADN accountancy”, which was highly demanding and time-consuming for the accounting offices and farmers. The new Swiss FADN survey relies on financial accounts. Besides detailed data from the financial accounts (profit and loss statement, balance sheets) and the tax return, additional data on labour input as well as structural data are collected. In order to ensure that the key economic indicators (farm income, household income and cash-flow) are consistently defined across farms, specific variables aiming at harmonizing the data are also collected. The data collection occurs via an online survey tool developed specifically for that purpose.

3. Results

The introduction of the new panel survey system was completed in 2015 & 2016 (accounting years 2014 & 2015). The willingness of the farmers to participate in the survey and provide data is lower than expected. The unweighted response rate is equal to 23% for the accounting year 2014. It strongly decreases for the subsequent accounting years and amounts to 12% for the accounting year 2017. The response rate varies considerably according to the farm type and linguistic area. The unweighted retention rate amounts to around 55% between waves 1 and 2, and waves 2 and 3 for the accounting year 2017. It is higher (around 67%) for the subsequent waves.

Whereas only around 30 accounting offices took part in the survey of the former system, now more than 220 accounting offices provide data to the Swiss FADN. The difference between these two figures illustrate the huge progress that has been made in terms of representativeness through the system change.

For the 2014 accounting year, the former and new survey system coexisted in parallel, which enables us to not only quantify the overall break in the time series due to the system change but also to analyse some of its constituents³. The average annual agricultural working income per family labour-force at national level is estimated to be 16 to 20 percent lower after changeover of the survey system. The results clearly show that the agricultural work-income was strongly overestimated in the former non-random sampling-based survey.

4. Conclusions

The fundamental revision of the Swiss FADN, which was undertaken between 2007 and 2016, enabled to overcome the major shortcomings that were associated with the former Swiss FADN survey system. The new survey system meets the state-of-the art standards for public statistics and provides thus reliable data for the agricultural policy-making process. However, there is still room for further improvements especially regarding the low average response rate observed in the French- and Italian-speaking regions and for some farm types. The relatively low willingness of farmers to take part in the survey calls for further improvements in the survey design and framework conditions.

The finding that the former system strongly overestimated the work-income per family unit is of high relevance especially for policy-makers and agricultural economists, who intensively make use of FADN data thereby very rarely paying attention to the survey design and the sample-related restrictions. This is especially true for national FADN surveys that still do not rely on a random sampling procedure as it was the case for Switzerland until the accounting year 2015.

5. References

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³ The break can be basically attributed to the following sources: (i) new definition of the target population, (ii) new typology definition, (iii) introduction of a random sampling procedure, (iv) shift from the “Swiss FADN accountancy” to a financial accountancy, (v) revision of the agricultural work-income definition and (vi) revision of the weighting approach for the extrapolation of the survey results to the target population.