



The structure of ageing in Swiss agriculture

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ABSTRACT

Farm managers on average are getting older. This demographic development represents a challenge for the sector that is additional to or even exacerbates other factors including low profitability and the impact of climate change. This study disentangles ageing by looking at the development of key components. These are the age of a person handing over the farm, the age of new and exiting farmers as well as entry and exit rates. The descriptive analysis of the demographic development in Swiss agriculture during the period 2004–2020 is based on data from public administration of direct payments. The increase in the average age of farm managers in Switzerland is explained by increasingly older farm managers who hand over or give up the farm. The age of farm successors and new entrants is increasing slightly. Increasing rates of farmer managers leaving farming together with decreasing shares of new entrants into farming further contribute to increasing the average age of farmers. The analysis also shows that handing over the farm to someone not much younger, usually the female partner, also contributes to ageing. The ratio of old to young farmers increases sharply from 1.8 to 2.7. Swiss agriculture such as the European agricultural sector faces a high number of pending farm transfers in the years to come. The higher participation of younger farm managers in environmental and animal welfare programs opens up the possibility for agricultural policy to align farms with the objectives of the transformation in the course of the handover. The results are relevant for the management of structural change in agriculture and in particular for the design of support for young farmers. The results highlight the effects of age-specific direct payment policies, in particular Switzerland's unique rule of stopping payments at age 65, on farm transitions. Insights from the Swiss case provide broader lessons for the design of agricultural policies in Europe and beyond, offering strategies to address ageing farm populations, promote generational renewal, and support the transformation of food systems.

1. Introduction

Agriculture and forestry in Switzerland has had the highest average age of the labour force over the last three decades (BFS, 2022)²; the situation is similar in neighbouring countries (e. g. France, Cour des comptes, 2023). The average age of farm managers in Europe is increasing (Debonne et al., 2022; Eistrup et al., 2019; European Commission, 2012; European Court of Auditors, 2017; Zagata and Sutherland, 2015). On the one hand, this development in the agricultural sector reflects a general demographic trend, the so-called baby boomer generation is reaching the retirement age. On the other hand, however, it also raises the question of whether and, if so, how the European agricultural sector, is particularly affected by ageing.

In the light of these trends, this paper seeks to examine the

demographic changes in Swiss agriculture, focusing in particular on their implications for farm succession, new entrants and agricultural sustainability. Switzerland provides a unique case study of demographic change in agriculture, particularly due to its specific policy framework. One crucial difference compared to most European countries is that Swiss farmers are no longer entitled to direct payments after the age of 65 (Schweizerischer Bundesrat, 2013, Art. 3b). This system creates a financial incentive to hand over or give up farms earlier. By contrast, farmers in many EU countries continue to receive subsidies even in old age, which could lead to delayed farm transfers and a higher age structure (European Commission, 2020). The Swiss experience therefore provides important insights into how political incentives can influence the age structure and structural change in agriculture.

The analysis is guided by the following research questions: Which

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² This can be partly explained by the relatively high age of self-employed workers and family workers throughout Switzerland, who make up a significant proportion of those working in agriculture.

parameters explain the increasing age of farm managers? How do demographic changes vary by regions (e.g., valley, hill and mountain areas) and farm type (e.g., livestock, arable farming)? How does the Swiss age limit for receiving direct payments affect farm transitions? How does the age profile of new entrants differ from that of successors, and what are the implications for policy design? Are there differences between farmers of different ages when it comes to adopting sustainable practices such as organic farming or animal welfare practices? How can demographic changes be used to support the transformation of agricultural systems in line with societal and environmental objectives?

Changes in the population structure affect agriculture in different ways. General economic consequences of demographic change are expected to be a shortage of labour and rising wages (European Commission, 2020). Agriculture could be particularly affected by the expected labour shortage, as the attractiveness of agricultural jobs is limited: agriculture partly suffers from image problems because of animal welfare and environmental issues (Moses, 2022; Saleh et al., 2021; Weible et al., 2016; Zander et al., 2013); wage levels in the agricultural sector are mostly lower than in other sectors of the economy (Martin, 2017; Taylor et al., 2012); the workload is perceived as high and highly seasonal (BFS, 2017; Gindele, 2016; Navarrete et al., 2015). This has a negative impact on the attractiveness of agricultural jobs. A recent report by the OECD sees serious bottlenecks in Switzerland in the acquisition of workers with the desired qualifications and skills in the food sector (Ryan, 2023). These challenges raise critical questions about how to ensure generational renewal and make farming a more attractive career path.

Given challenging economic (low profitability with continuously growing financial needs, climate change, competition for skilled labour), political (increasing environmental demands on production in crop and livestock farming) and social conditions (appreciation, societal expectations), ageing may pose particular difficulties for the agricultural sector. The often low profitability of agricultural activities (Rocchi et al., 2020)³ combined with the challenge of leasing or acquiring land for farm growth results in a disproportionate ageing of agriculture compared to society (Debonne et al., 2022). Here, the differentiation of farm types with their specific orientation and corresponding environmental and economic characteristics can help to better understand farm type specific challenges related to demography of the farming sector.

However, the age structure also provides policy opportunities, particularly in shaping the transformation of the food system. Younger farmers, e.g., are said to be more efficient (Zagata and Sutherland, 2015), more open to change (Slijper et al., 2022) and hereby more likely to adapt the farming system, e.g. switch to organic farming (Läpple and Van Rensburg, 2011; Stofferahn, 2009), to diversify farm income (Mishra et al., 2004; Weltin et al., 2017) and to increase farm size (Akimowicz et al., 2013). As the handover process takes a long time, it is important that political efforts are made to influence this process at an early stage. For the transformation of the food system, having knowledge of the age structure of farm managers is an important aspect.

Zagata and Sutherland (2015) assessed the evidence for a “young farmer problem” in Europe. They analysed the ageing of the farm population and focused on the relation of younger to older farmers. On European level they could not find such problem but mention potential regional differences within countries. Goujon et al. (2021) point out the importance of regional differentiation. In mountain areas agricultural productivity is lower and transport costs are higher than in the lowlands. This study builds on these insights, focusing on how regional and structural characteristics in Switzerland shape farm transfers and new entries.

³ On average, the return on assets has been negative throughout Switzerland over the past 20 years. Only individual farm types, specifically arable farming, special crops and finishing farms, have shown a positive return on assets in several years (Agroscope, var. yrs.).

Although recent papers consider demography to be an important “megatrend” for agriculture (Debonne et al., 2022), the ageing of the agricultural workforce has received only limited attention so far, both in policy and science. To my knowledge, there is not yet any analysis of the individual factors that make up the ageing of the farming population. Previous studies have generally analysed age groups (Debonne et al., 2022; European Commission, 2012; European Court of Auditors, 2017). In the present analysis, age groups and the development of average values are combined and differentiated for the factors influencing the ageing of agriculture. A recent study on the transformation of the European Food System only briefly mentions the demographics on a macro scale (EEA, 2023). This is surprising in view of the various and important functions and roles of agriculture for society (supply of food and raw materials, earning function), but especially for rural areas (maintenance of cultural landscapes, support of tourism, settlement, rural heritage) (Huang et al., 2015; Huylenbroeck et al., 2007; Nowack et al., 2022; OECD, 2021).

This article contributes to closing this gap by analysing the ageing of farm managers through metrics such as exit age, handover patterns, and entry age. It also connects these trends to structural changes and policy implications, making findings relevant beyond Switzerland. The Swiss case, with its unique policy of ending eligibility for direct payments at the age of 65, provides a valuable example of how financial incentives can influence farm succession decisions. This instrument highlights both opportunities and challenges for promoting generational renewal, offering insights that may inform reforms in other countries facing similar demographic situations in agriculture.

The following chapter sets out the framework for the analysis. After that the data used for the analysis and methods applied will be presented. The ageing of Swiss farm managers will be described and this is followed by an analysis of the age development of Swiss farm managers as a whole and of those who give up farming, transfer or start a new farm. The focus will especially be on the characteristics relevant to the transformation of the food system. Finally, the results are discussed and conclusions are drawn.

2. Background of the analysis

Fig. 1 illustrates the conceptual framework used in this analysis. It assumes that demographic changes in the agricultural sector are shaped by three key processes: farm transfers or succession, farm exits and new entries into farming. These processes determine the age structure of farm managers and influence the long-term sustainability and generational renewal of the sector. This framework builds on succession theories and emphasizes that the age distribution of farm managers is dynamically influenced by these key processes. Transfers between spouses, for example, may artificially delay generational renewal, while economic barriers can limit access for young entrants.

Firstly, an important factor in the age distribution is the decision to hand over the farm to a younger successor. This decision is mainly determined by economic and traditional considerations; however, also political, social and health issues may play a role. An important economic incentive to hand over the farm to a younger farm successor is the age limit of 65 years to get direct payments. In contrast to other countries, in Switzerland there is a maximum age limit of 65 years for receiving direct payments (Schweizerischer Bundesrat, 2013, Art. 3b). After reaching the age limit, farming can be continued but the farm manager no longer receives direct payments. Direct payments are essential for the profitability of farms (in 2021, average direct payments per farm were almost equal to average farm income (Jan et al., 2022)). Continuing running a farm beyond the age limit is therefore probably not for economic reasons, but rather serves a lifestyle or is a hobby. One way of getting around the age limit is to hand over the farm to a younger

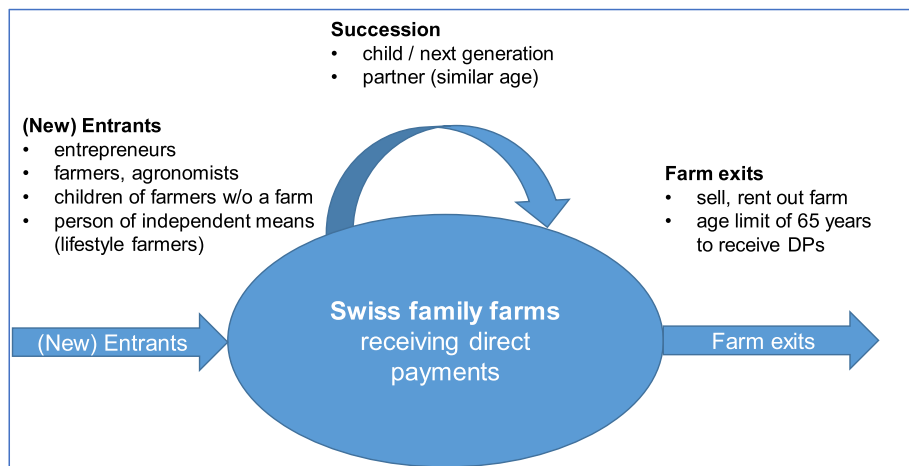


Fig. 1. Factors shaping the age structure of Swiss agriculture. (DP – direct payments, w/o – without).

partner.

Another economic incentive for farm transfer is young farmers support.⁴ This support is paid up to the age of 35 years in Switzerland (Schweizerischer Bundesrat, 1998). In the European Union (EU), the threshold is 40 years (European Court of Auditors, 2017; European Parliament and Council of the European Union, 2013). The general objective is to enhance competitiveness and generational renewal. In order to benefit from this support, the farm must be handed over to the successor before the latter exceeds the age limit of 35 years. The design and implementation of young farmer support is criticised (European Court of Auditors, 2017); it is suggested to sharpen the objective and better integrate the transformation to sustainable farming systems (e.g. France: Cour des comptes, 2023; e.g. Switzerland: EFK, 2015).

Handing down the farm within the family is important to farm managers because knowledge transfer and maintaining family farming traditions play a major role in Western European family farming systems. The tradition of patrilineal inheritance is common and predominant (Downey et al., 2016; Price, 2012; Sheridan et al., 2021; von Davier et al., 2023). In Switzerland and the EU, the vast majority of agricultural holdings are family farms (Eurostat, 2022). Passing on a farm to a descendant is the most common way of transferring a farm in Europe (Fischer and Burton, 2014; Gasson et al., 1988; Hennessy and Rehman, 2007; Lobley et al., 2010).

The legal or tax system often favours the transfer of farms within the family, as it is the case in Switzerland. In case of intra-family transfers the more favourable income value is used to rate a farm (Meier and Flury, 2018); in case of non-family transfers, the significantly higher market value is used (Dieterle, 2017, 2019).

Second, farm exit is mainly influenced by social, economic and political factors (Breustedt and Glaubens, 2007). An important factor in the transfer of a farm is the family situation (Sottomayor et al., 2011). If the farmer has descendants, one or more of them usually take over the farm. Less profitable farms are often not abandoned but continued as part-time farms. However, if there is no successor, the farm is likely to be given up or sold (Duesberg et al., 2017). Either the whole farm or parts of it are then leased or sold. Furthermore, the personal well-being is another relevant factor for leaving the sector which is influenced by the work situation, the quality of life and health (Hansen, 2022).

Third, farm exits open up the possibility for others to enter farming. Individuals outside the farming family can enter the holding and buy or

rent it. Non-family farm transfers can be further differentiated according to the background of the person that is taking over the farm who either does not have an agricultural background or grew up on a farm but could not or was not allowed to take over the farm of their parents. These farmers are referred to as lateral entrants (Meier and Flury, 2018). Entrepreneurs who are new or lateral entrants to agriculture have recently received political attention. Entrants are considered to have a certain innovative strength and also a role model function regarding sustainable forms of business (BLW, 2018; Cour des comptes, 2023; Konzett and Grüner, 2022).

The main factors that influence the age structure of Swiss farm managers are illustrated in Fig. 1.

3. Data and method

The analysis of the demographic development with regard to entry into agriculture, transfer of the farm as well as exit is based on data from the agricultural information system (BLW, 2022) for the period 2003–2020. The year 2003 is used to determine new entrants in 2004; generally, results are reported for 2004–2020.

This dataset is based on data from the cantonal administration of direct payments and is therefore considered reliable especially with regard to the characteristics relevant for direct payments. The analysis uses data on the birth year of the person running the farm (age), the farmed area and livestock as well as participation in direct payment programmes (production system contributions, such as organic production, for the promotion of near-natural, environmentally and animal-friendly forms of production). Unfortunately, the data do not include information on the gender of farm managers. This is a significant gap in the data and does not allow any analysis in this respect.

The age of the farm manager is derived from the year of birth. This data exists exclusively for farms with the legal form "natural person", where the farm is managed by a sole proprietor. This legal form represents typical Swiss family farms and – on average over the years – a share of 87.3% of the farms recorded in the official statistics,⁵ 84.9% of the utilised agricultural area and 83.4% of the livestock. The above-mentioned shares of the legal form under consideration decrease in the period under consideration 2004–2020 by 5 and 6 percentage points respectively. In addition to the criterion of legal form, only year-round farms and farms that meet the minimum size applied by the Swiss

⁴ In Switzerland, young farmers up to the age of 35 years are supported by "Starthilfe" which is a start-up aid. This is an interest-free investment loan for young farmers subject to conditions relating to the size of the farm, qualifications and a viable business plan (Schweizerischer Bundesrat, 1998).

⁵ The Swiss Federal Statistical Office only takes into account farms in the agricultural statistics that have a certain minimum size: either 1 ha of agricultural land, 30 acres of special crops, 10 acres in protected cultivation, 8 mother pigs, 80 fattening pigs or places, 300 poultry (BFS, 2016).

Federal Statistical Office are considered in the analysis (cf. footnote 5). The analysis of new entrants is based on farm observations that occur for the first time in the dataset.

To describe the age structure, all these farms are considered at first. Regarding entry, exit and handover, only farms that receive direct payments are taken into account. The receipt of direct payments is linked to a minimum size of the farm (standard labour force of at least 0.2), with requirements for training, compliance with the proof of ecological performance (Ökologischer Leistungsnachweis, i.e. good environmental practices corresponding to cross-compliance obligations (OECD, 2015)) and the work must be carried out mainly by the farm's own labour. On the one hand, the selection criterion to receive direct payments is based on the function of the data source, the collection of data for the administration of direct payments. It can be assumed that these data are reliably recorded. On the other hand, the receipt of direct payments is considered as criterion whether a farm is active. Farmers that continue to operate beyond the age limit of 65, under the waiver of direct payments – which on average corresponded to the agricultural income of a Swiss farm in the years 2018–2020 (Hoop et al., 2021) – are not considered in this study since economic viability seems not to be given.

Descriptive statistics are used to illustrate the age situation and trends. Means of age, age classes commonly used to illustrate the age structure, trends over time or between the first and last year of observation, frequency distributions and related statistical indicators such as skewness are used as methods to analyse Swiss farming's age structure. To illustrate demographic development quantitatively, a ratio between age groups is often used (Coopmans et al., 2021; Debonne et al., 2022; Zagata and Sutherland, 2015). In the following, the focus is on farm managers up to the age of 35 – the age limit for receiving the start-up aid (interest-free loan for young farmers) – and farm managers between 56 and 65 (the age limit⁶ for receiving direct payments in Switzerland) and the ratio between these groups, i.e. the ratio of older to younger farm managers.

The analysis differentiates farms by type. The farm typology used in Switzerland (Hoop and Schmid, 2020) is based on physical farm characteristics of land use and animal husbandry. A basic distinction is made between specialised and combined farm types. In order to map the orientation of farms towards certain environmentally and animal welfare-oriented husbandry systems, data on participation in corresponding direct payment programmes is used. In the area of dispensing with certain plant protection products in arable farming, we look at participation in the so-called Extensio programme (payments for extensive crop production when fungicides, insecticides and growth regulators are dispensed with) (OECD, 2015). For animal welfare, there are two programmes, BTS (animal welfare through housing systems) and RAUS (regularly keeping animals outdoors) (OECD, 2015), whose participation is used as a proxy for the orientation of the farms. Finally, the share of organic farms is used. In Switzerland, the entire farm must be managed organically (Schweizerischer Bundesrat, 2013).

To measure the monetary production specialisation of a farm's production, a Herfindahl-Hirschman index is calculated on the basis of 18 farm branches and their standard output (Schürch and Schmid, 2010). The index results from the sum of the squared shares of the farm standard output (Di Vita et al., 2014; Eurostat, 2018) and tends towards zero in the case of high diversity and towards one in the case of high specialisation.

A farm handover cannot be reliably determined with the present data set, as only the year of birth of the farm manager is available. The transfer of the farm is therefore assumed to occur when the year of birth of the farm manager changes between annual records. A handover to any person of the same birth year, e.g. the partner or the twin brother, is

therefore not recorded as a farm handover; the number of handovers could be underestimated. From the age difference, conclusions can be drawn about the relationship between the previous and the new farm manager. The transfer to the next generation can be assumed from a certain age difference.

Entry into agriculture is defined as the first appearance of a farm in the AGIS data (first appearance of the farm unique identifier). This interpretation of the data as a new entry of a farm was confirmed by two persons familiar with the data collection (Heierli, 2023; Streit, 2022).

4. Results

4.1. Age development in Swiss agriculture

The mean age of farm managers on Swiss farms with the legal form "natural person" increased by 2.6 years from 47.5 to 50.1 years between 2004 and 2020 (see Fig. 2). The age distribution was right-skewed in 2004 (skewness of 0.46) which changed to a left-skewed distribution (−0.21) by 2020 (see Fig. 3). The proportion of farm managers who will reach the age limit for receiving direct payments of 65 years in the next ten years increased from 23.4% of farmers to 31.9% in 2020. Thus, in the years 2021–25 around 5600 and in the years 2026–30 over 7000 Swiss farm managers will presumably reach this age limit.

Differentiating age groups, the age groups above 46 years in the period 2004–2020 increased. In contrast, the shares of the age groups up to 45 decreased (see Fig. 4). In recent years, this trend has stopped (age group 36–45 years) or even reversed slightly (age group up to 35 years). The strong increase in the age group 56–65 years and the parallel decrease in the age group 36–45 years are particularly striking.

The ratio of older to younger farmers is often used to illustrate the demographic situation in agriculture. For Swiss agriculture, taking the age limit into account, the ratio of older farm managers (56–65 a) to younger farm managers (up to and including 35 years of age) was 1.8 in 2004. This ratio increased to a value of 2.7 in 2020.

Looking at the farm type (see Table 1), there are differences regarding the average age and the age development of the farm managers. Arable farming, specialised crops and horses/sheep/goats have on average the oldest farm managers, in the first and the last year of observation. Finishing farms (pig and poultry) and those with a focus on cattle farming (suckler cows, dairy cows, cattle mixed) have younger farm managers on average.

The age development of the farm managers, i.e. their average "ageing" in the period under consideration is highest for the farm types horses/sheep/goats (average age increases by 4.0 years between 2004 and 2020), suckler cows (3.8 a), arable farming (3.7 a) and specialised intensive livestock farms (3.6 a), while ageing is lowest for the types mixed cattle (1.2 a) and dairy cows (1.5 a) – the latter is by far the most important farm type in Switzerland.

The result of the farm types is also reflected in the age distribution across the regions: farm managers in the valley, where the majority of arable and specialised crop farms are located, are older (at 51.1 years in 2020) than those in the hill region (50.0 a) and those in the mountain region (48.7 a) (see Fig. 2).

4.2. Farm exit

Next, the exit from agriculture and the exit age are considered. When considering farm exit, only farms that receive direct payments are considered. During the years 2004–2019 (last year of observation, 2020, is used to determine farm exit), the exit age increased from 52.4 years in 2004 to 56.0 years in 2019 (see Fig. 5). This increase is particularly marked in the early years of the observed period. There was also an increase in the proportion of holders who retired at the age of 65.

In the mountain region, exiting farm managers were younger than in the hill and valley regions (see Fig. 5). This is related to the farm branches dominant in the regions: Farms with arable farming and

⁶ The comparability of the age structure with other countries without age limits is limited.

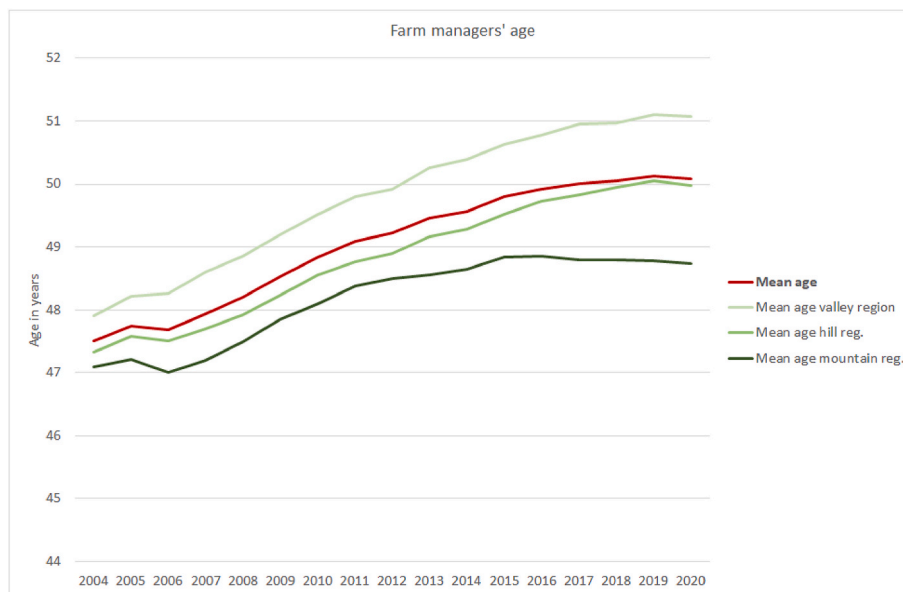


Fig. 2. Average age development on Swiss farms, divided into farms in the valley, hill and mountain region. Source: Own representation. AGIS data for the years 2004 to 2020.

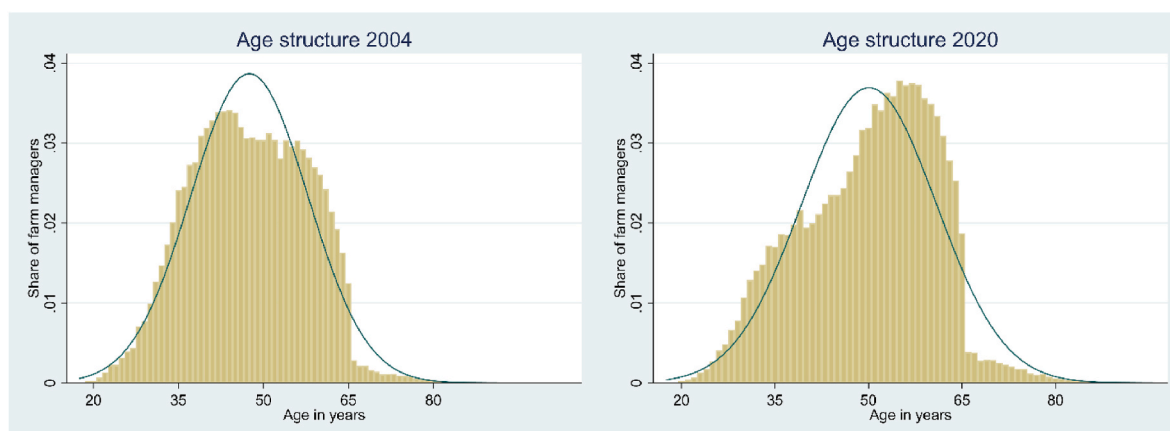


Fig. 3. Histograms of the age distribution of managers of Swiss farms 2004 ($n = 56257$) and 2020 ($n = 41323$). Source: Own representation. AGIS data for the years 2004 and 2020.

special crops, which are mainly located in the valley, had above average exit ages. Farms with a focus on milk production, mixed cattle farming or horses/sheep/goats, which dominate in the mountain region, were leaving at a younger age.

The differentiation according to five age classes shows increasing shares of farmers above 50 years over time, while the relevance of exiting farm managers under 50 years decreased until 2019 (see Fig. 6).

In the period under review, the mean Swiss exit rate in relation to all farms receiving direct payments increased from 2,7% to 3,1% based on five-year averages (comparing the periods 2004–2008 with 2015–2019). Increasing exit rates can be observed in the valley and the hill region, whereas the rate in the mountain region is relatively stable.

4.3. Farm handover

Farm managers were on average 60.5 years old (median 63 years) when handing over their farm. The handover age increased from 58.3 years in 2004 to 61.0 years in 2019 (see Fig. 7). Swiss farms are most often handed over to a younger successor at the farm manager age of 65, the age limit to receive direct payments. The share of farm handovers at

the age of 65 nearly doubled comparing the first (19.8 % from 2004 to 2008) and the last five years of observation (38.3 % from 2016 to 2020).

4.4. Farm takeover

The average age of farm managers taking over a farm was 36.7 years (median 33 years). The Swiss-wide mean of the age of farm takeover shows a slightly upward trend, which is due to increasing takeover ages in the valley and the hill region, while successors in the mountain region tend to be younger (see Fig. 8).

At an age between 27 and 35 years is most common for farm takeovers – almost half of the farmer managers that take over the farm (49.2%) are in this age range. Above the age of 35, the frequency of takeovers decreases (see Fig. 9).

However, 17% of the farm managers taking over a farm are 50 years and older. In these cases the age difference to the age limit for receiving direct payments of 65 years is 15 years or less (assuming that the transfer took place before the age limit was reached). This implies a handover to the younger partner. The distribution of the age of farm manager taking over is bimodal with the absolute maximum at an age of 31 and a second

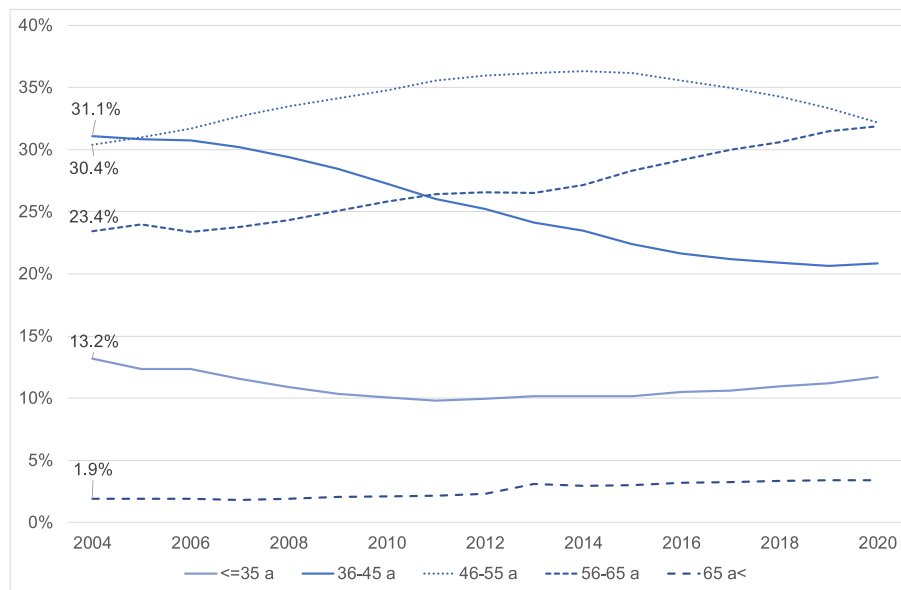


Fig. 4. Share of five age groups in all farm managers. Source: Own representation. AGIS data for the years 2004 to 2020.

Table 1
Average age of farm managers by farm type in 2004 and 2020 and ageing.

Year	2004		2020		
	Mean age	Ageing	# of farms	Share (farms)	
Arable farming	49.1	52.8	3.7	2312	6.0%
Special crops	49.6	52.5	2.9	2690	6.9%
Dairy cows	47.3	48.9	1.5	10268	26.5%
Suckler cows	45.3	49.0	3.8	3708	9.6%
Cattle mixed	47.7	48.9	1.2	3734	9.6%
Horses/sheep/goats	48.3	52.3	4.0	3088	8.0%
Finishing (pig/poultry)	46.8	50.4	3.6	897	2.3%
Mixed dairy/arable	47.1	50.1	3.0	1676	4.3%
Mixed suckler cows	46.6	49.1	2.5	1263	3.3%
Mixed finishing	45.8	48.4	2.6	3597	9.3%
Mixed other	47.9	51.0	3.0	5519	14.2%
Total	47.5	50.1	2.6	38752	

Source: Own representation. AGIS data for the years 2004 and 2020.

local maximum at 61. The frequency of taking over a farm around the age of 60 slightly increased comparing the first with the last five years of observation.

4.5. Newcomers

The average age of new farm managers⁷ was 42.1 years. Newcomers are on average six years older than farm successors. In the considered period, the average age of entry according to the five-year averages increased slightly from 41.5 (average age of entry in the years 2004–2008) to 42.3 years (mean value in the years 2016–2020) (see Fig. 10). An average entry age of over 40 years is remarkable, since support for new farmers is paid until the age of 35 years. During the period under review, the share of the oldest farm managers (aged 56–65) among the new farms increased from 22 to 32 %.

The proportion of new entrants into Swiss agriculture decreased over time. In 2020, their share was around 0.54 % of all farms that received

⁷ New entrants are defined as farms that appear in the AGIS data for the first time with a new farm identification number and have received direct payments from the Confederation.

direct payments. The rate of new entrants decreased especially in the years till 2010. Since then it only slightly decreased. As the total number of farms diminished continuously over the period under consideration, the absolute number of new entrants decreased more significantly – this almost halved comparing five-year averages (years 2004–2008) to 235 newly registered farms per year recently (average of the years 2016–2020).

The differentiation by region shows for the mountain region that the rate of new farm entrants is usually higher (2016–2020 at 0.66%) and that the farm managers entering were younger (at an average age of 41.0 years) most recently than in the hill (rate: 0.54 %, age 43.0 a) and valley region (rate: 0.56 %, age 43.0 a).

High entry rates can be observed for special crop farms and farms with horses/sheep/goats. These farm types are particularly attractive for new entrants with entry rates twice as high as the average. The age of entry differed between farm types especially in recent years (5-year average 2016–2020). New entries of younger farm managers have been particularly in suckler cow farm types (both specialised and combined) as well as the horse/sheep/goat type.

4.6. Ageing of Swiss farmers and farm demographic characteristics

The interaction between farm takeovers, farm exit and the establishment of new farms represents structural change in agriculture. The high number of farm exits clearly exceeds the number of newly established farms. The trend in the number of farm exits is slightly decreasing over the reviewed period. At the same time, the number of newly established farms is also decreasing. The rate of decline in the number of new farms however is greater than the rate of farm exits. The bottom line (net total of farm entries and exits) is that the trend in the number of annual farm closures among the family farms under consideration is slightly increasing (see Fig. 11).

To understand the potential relevance of the age structure for structural change and the challenges the Swiss farm sector is facing, the age structure is analysed with regard to farm characteristics such as farm size, the participation in environmental programs and their specialisation. As many farmers reach the age of retirement, there are numerous upcoming farm transfers in the next ten years. This can include entire farms, farmland, livestock or corresponding infrastructure. In 2020, the older farm managers between 56 and 65 years correspond to a share of 32 % of the farms considered. In 2020, these farms managed a share of

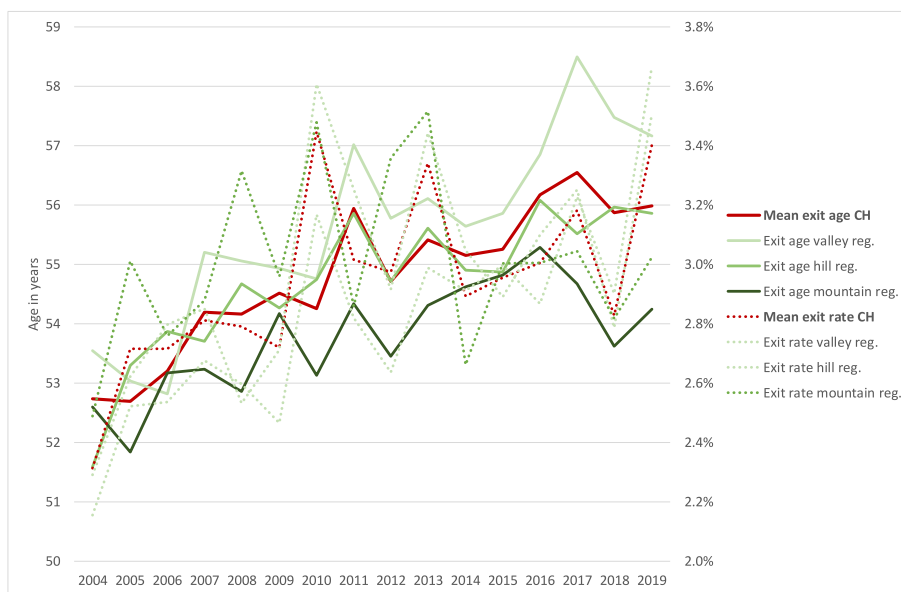


Fig. 5. Farm exit age and exit rate for Swiss farms. Source: Own representation. AGIS data for the years 2003 to 2020.

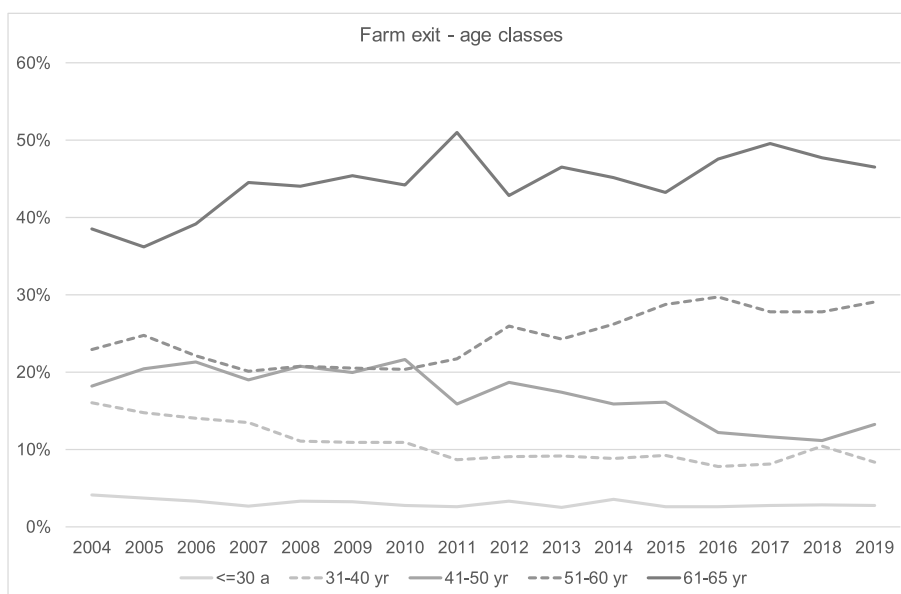


Fig. 6. Shares of age classes of exiting farm managers of Swiss farms. Source: Own representation. AGIS data for the years 2003 to 2020.

29 % of the utilisable agricultural area and 27 % of livestock units in the sample. Younger farm managers – excluding the youngest age group – are managing larger farms, both in terms of area and the number of animals kept (see Table 2).

The proportion of farms participating in programs for specific production systems such as organic, RAUS, BTS is higher among younger farm managers (age <36) than among older farm managers (age 56–65). Only in the programme for the reduction of plant protection products in arable farming (Extensio programme) is the participation of older farm

managers higher. The difference is most evident in organic production, with a share of 20 % in the age group 26–35 compared to 14 and 15 % respectively for farm managers aged 46 and over (see Table 2).

The specialisation of farm production is mapped with a Herfindahl index.⁸ The diversity of farm branches and the balance of their contribution to the farm standard output is highest in the middle age groups (between 36 and 55 years). Specialisation of farm production is highest among the oldest and youngest farm managers.

⁸ The Herfindahl-Inex is determined on the basis of 18 farm branches and their respective share in the farm standard output (Schürch and Schmid, 2010). A high concentration results in values close to 1; this can result in the case of very few farm branches and strongly differing standard outputs.



Fig. 7. Average age of farm managers handing over their farm to a successor. Source: Own representation. AGIS data for the years 2004 to 2020.

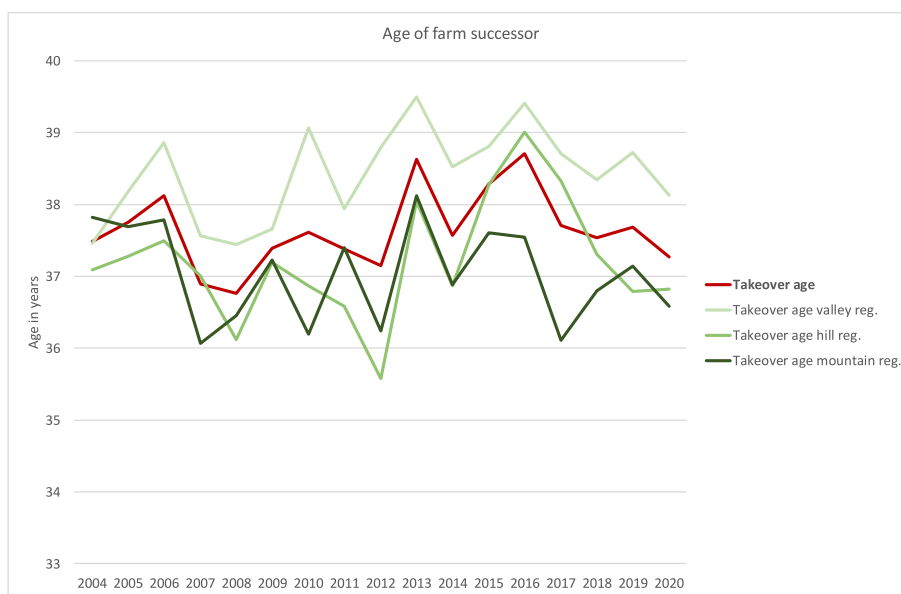


Fig. 8. Average age of farm successors of Swiss farms. Source: Own representation. AGIS data for the years 2004 to 2020.

5. Discussion

The average age of people employed in agriculture is higher than in other sectors (BFS, 2022). This can be explained by increasing age of farmers handing over their farms to successors, slightly increasing age of farm successors and increasing age of exiting farmers. A significant proportion of transfers to people who are only slightly younger also contributes to the ageing process. These are presumably transfers to younger partners in order to circumvent the age limit of 65 years for receiving direct payments.

From an economic perspective, the situation is surprising that farms with difficult production conditions, such as dairy or cattle farms, which are often located in mountain regions, have relatively young farm managers. This could be related to the greater relevance of family traditions, emotional ties to animal husbandry, special funding

programmes for mountain regions and fewer non-agricultural employment opportunities (Larcher, 2022).

The wave of pending farm transfers illustrates the current demographic situation impressively (see Fig. 3). In view of the major challenges and the important functions of the sector (Huang et al., 2015; Nowack et al., 2022; OECD, 2021) special attention to its' demographic development seems necessary. This situation, which similarly exists in other European countries, offers opportunities for agricultural policy to have an impact on the transformation challenges, such as climate change, environmental sustainability, economic viability, technological innovation and digitalisation, which the agricultural sector in Europe faces.

Some of the farms will probably not be taken over; the release of land and production capacities offers other farms growth opportunities and the possibility to increase its competitiveness of the sector. Growth

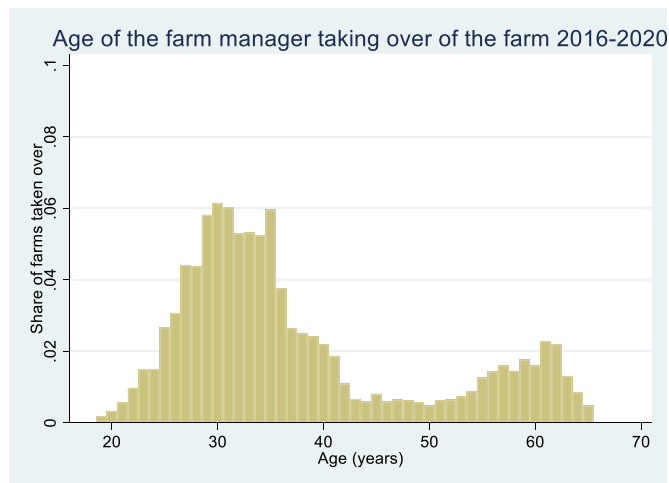


Fig. 9. Age distribution of farm successors of Swiss farms. Source: Own representation. AGIS data for the years 2016 to 2020.

potential is also offered by land that continues to be farmed by farm managers above the age limit, foregoing direct payments. The transfer of farms to younger successors and the higher participation of younger farm managers in the programmes to promote near-natural, environmentally friendly and animal-friendly ways of production (see Table 2) can promote a corresponding alignment of food production (Burton and Otte, 2022; Calus et al., 2008).

The effect of the age limit of 65 years for receiving direct payments is clearly reflected in the results: The majority of farms are handed over directly before or upon reaching the age limit. If we look at the age difference between the farm manager who transfers and the farm manager who takes over, we see that many farms are apparently not passed on to the next generation, but are continued by a person who is only a few years younger. This circumvention of the age limit thus shifts the decision as to whether and by which younger farm manager the farm is to be continued and thus also the potential for structural change and transformation. It can be assumed that these are transfers to spouses. In view of the low proportion of female farm managers, the transfer is probably primarily to female partners. This observation requires more in-depth analysis and a review of the interpretation. It is interesting to

note here whether and to what extent the age limit influences the proportion of female farm managers, which in Switzerland is very low compared to the rest of Europe (Hofer, 2023).

The increasing age at which farms are handed over, and the increasing proportion of farmers handing over at the age of 65, indicates a growing relevance of the age limit. An analysis of the effect of the age limit when it was introduced criticised that it slowed down structural change at that time; in the years before the age limit came into force in 1999, the number of farm transfers to younger farm managers increased significantly (Meier, 2007). This special effect of more frequent farm takeovers at that time probably also contributes to the large number of upcoming transfers. These transfers are expected to stimulate structural change in the coming years. Raising the age limit could slow down the pace of change and prolong the process.

An age limit for receiving direct payments is not very common in the rest of Europe. According to the Swiss experience, the introduction of an age limit for the receipt of direct payments can lead to a one-off bringing forward of potential transfers in the coming years. However, this is at the expense of the transformation potential in the following years. The use of such an instrument should therefore be carefully considered. In view of the current discussions on longer working lives and the partly high

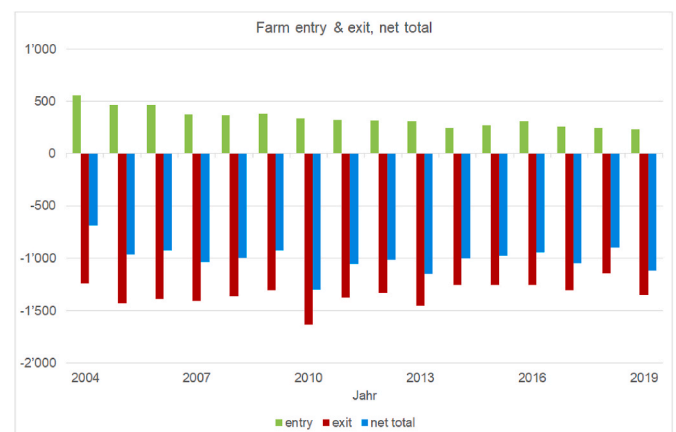


Fig. 11. Farm entry, exit and net total from 2004 to 2019. Source: Own representation. AGIS data for the years 2003 to 2020.

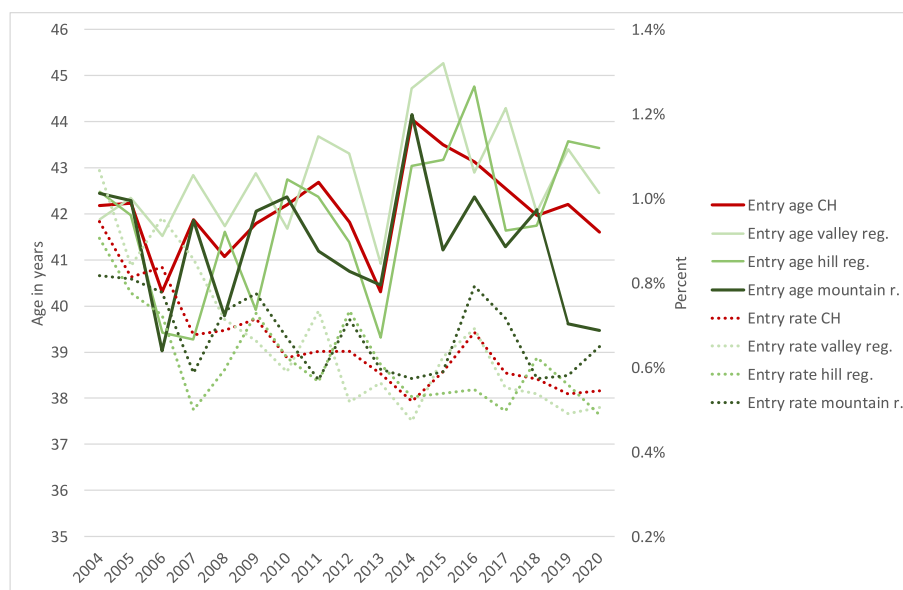


Fig. 10. Entry age and share of new Swiss family farms. Source: Own representation. AGIS data for the years 2004 to 2020.

Table 2
Six age groups of farm managers and selected farm characteristics.

Characteristic	Age group					
	<25 a	26-35 a	36-45 a	46-55 a	56-65 a	65 a<
Number of farms	293	4545	8618	13301	13169	1521
UAA (ha)	19.22	23.40	23.57	22.21	19.21	5.81
LU	21.91	29.79	30.43	27.49	21.67	6.76
BTS (%)	0.50	0.57	0.60	0.57	0.47	0.00
RAUS (%)	0.90	0.89	0.88	0.85	0.80	0.00
Extenso (%)	0.20	0.30	0.31	0.31	0.31	0.03
Organic (%)	0.16	0.20	0.18	0.15	0.14	0.00
Specialisation (0-1)	0.57	0.54	0.53	0.53	0.54	0.68
UAA total	5632	106374	203118	295386	252918	8839
Share in sample	1%	12%	23%	34%	29%	1%
LU total	6419	135374	262257	365632	285433	10289
Share in sample	1%	13%	25%	34%	27%	1%

LN - utilised agricultural area, LU - livestock units, BTS - animal-friendly husbandry systems, RAUS - regular outdoor exercise, Extenso - extensive production (reduced use of plant protection products in arable farming), Bio - organic production, Specialisation - index of production specialisation based on 18 farm branches and their standard output; values close to 1 correspond to highly specialised farms.

Source: Own representation. AGIS data for the year 2020.

dependence of the agricultural social security system on public funds (expenditure on the agricultural social security system accounts for more than half of the budget of the German Federal Ministry of Food and Agriculture), the age limit in Switzerland could remain a special case in future.

The age limit for receiving the starting grant in Switzerland at 35 years is lower than in Europe with 40 years. This age limit is an incentive to take over farms at an earlier age. The relatively frequent takeovers of farms between the ages of 35 and 40 and also the dilatory transfers to younger partners, suggest that raising the age limit for young farmer support could support the start-up of a considerable number of beginning farmers. In view of the challenges facing the sector, a stronger link between financial support for farm takeovers and policy objectives should however be considered (see also the French analysis of [Cour des comptes, 2023](#)).

The present analysis shows a decreasing share of new entrants. The high average age of new entrants of over 40 years means that only a small proportion of farm founders are entitled to support in the form of a start-up aid. This can be seen as an expression of different objectives pursued with farming. In addition to the economic motivation (income), which could explain the attractiveness of special crop farms for new entrants, literature mentions rural life, keeping animals or living and working together in a farm community ([Bundesrat, 2022](#); [Dessart et al., 2019](#)) as motives to farm. Lifestyle aspects play an important role for a large proportion of farms entering agriculture in Europe ([Bock et al., 2020](#); [EIP-AGRI Focus Group, 2016](#)); the high entry rate of horse/-sheep/goat farms could be explained by an increasing lifestyle orientation in difference to producing food. The observed increased ageing in agriculture is contrasted by an increasing number of trainees in agricultural professions ([BFS, 2023](#)). It remains to be seen whether the trained farmers will ultimately work in the sector or whether the demand for employees in upstream and downstream sectors with good earnings and job opportunities will attract these farmers.

The development of sustainable business ideas and processes in agriculture and the food sector does not depend on a large number of new farmers. However, given the trend in farm size development, the associated medium capital requirements for buying or starting a farm, and the often high workload, it is likely that starting a farm will become more closely linked to a corresponding level of equity. For example, the introduction of new technologies and the accompanying increase in

labour productivity are usually accompanied by higher capital requirements. The declining trend in new farm entrants could reflect these increasing financial challenges to enter farming.

Demographic trends are expected to reduce the supply of labour and consequently increase competition ([European Commission, 2021](#)). Increasing labour productivity could address this challenge. Technical progress and here especially digitalisation of agriculture offers potential for productivity gains ([McFadden et al., 2022](#)). However, whether the extent of the productivity gains associated with digitalisation is sufficient is viewed critically for different farm sectors ([McFadden et al., 2022](#)). The partially low profitability of agriculture could be a limiting factor here; high labour costs in Switzerland could compensate or even overcompensate for disadvantages resulting from the relatively small average size of Swiss farms.

The presentation of age trends in Swiss agriculture implies certain specificities, such as the age limit for receiving direct payments or the high level of support for agriculture. While the findings focus on Switzerland, they offer broader insights into the challenges of generational renewal and structural change faced by agriculture across Europe and beyond. The Swiss case highlights how policy instruments, such as age thresholds for subsidies, can influence succession timing. These findings are valuable for designing programs aimed at improving farm transfer rates and enhancing sustainability transitions internationally.

This detailed analysis of the age structure of farm managers in Switzerland shows the relevance of national specifics, such as the age limit, and their effects on the demographic situation. International comparisons of demographic development across countries (such as [Debonne et al., 2022](#)) must better take into account the national framework conditions such as agricultural old-age insurance or the direct payment system as well as the respective design of support for young farmers. If these country-specific characteristics are not taken into account, the comparability of mean values or ratios between age groups across national borders can therefore be challenging and even misleading. The basic considerations on the ageing of this socially important sector and its significance for various policy areas nonetheless are relevant – also for other European countries and beyond ([Liu et al., 2023](#)).

The literature discusses weaknesses in focusing solely on the age of the farm manager to depict the age situation in the farming sector. [Burton \(2006\)](#) suggests a family age index as an alternative. However, in the underlying Swiss data mostly only the age of the farm manager is recorded – and this only for the legal form "natural person". The breadth of data collection within the framework of the administration of direct payments and the reliability of the data collected are advantageous compared to specific data collections. The data on the age of farm managers provide a good picture of the demographic development in Swiss agriculture. Even though farms of the legal form "natural person" represent the vast majority of Swiss farms, this legal form does not represent the complete sector. In order to map the age development of the sector, it would be interesting and important in the future to anticipate the increase of other company forms and also to record birth data of their farm managers.

This analysis cannot assess whether agriculture is particularly affected by the megatrend of demographic development. Further research is needed using cross-sectoral data on managers' age. Additionally, information on the gender of the farm managers would be of interest; this information was not available in the data at hand. This made it possible to analyse in more detail the presumed effect of the age limit on the proportion of female heads of agricultural holdings.

6. Conclusions

Demographic development and structural change are both complex processes. The ageing of farm managers is the result of farm takeovers by successors, the establishment of new farms and the abandonment of farms. In this paper, these processes are separately described and

analysed with a focus on the age of farm managers as well as entry and exit rates. The analysis of the demographic development of Swiss agriculture in the period 2004–2020 illustrates and quantifies the ageing in the sector as a whole and differentiated by regions and farm types. The sharp increase in the ratio of old to young farm managers from 1.8 to 2.7 clearly shows the ageing. Differentiating farm managers by age groups shows the extent of upcoming handovers in the next years: more than 30 % of Swiss farms with shares of almost 30 % of agricultural land as well as livestock are and will presumably be transferred during the years 2021–2030.

The number of new entrants and lateral entrants into Swiss agriculture has decreased significantly in recent years and has settled at a low level. Even circumventing the age limit for receiving direct payments by handing over to partners who are not much younger indicates that taking over the farm is not attractive to the younger generation. Agricultural policy should keep agriculture an attractive field of activity for young people. This concerns the profitability of the sector, which often cannot match the income of other sectors, or at least not for a large proportion of farms. Currently, difficult or uncertain framework conditions, such as climate change, the diverse societal expectations and, in part, the associated appreciation of the profession, as well as the distribution of value added in the food chain, make it challenging to increase the attractiveness of agriculture. Increasing digitalisation and increasing farm sizes could address various challenges and improve working conditions in agriculture; this technological progress will at the same time increase the capital requirements of farms and could thus also drive structural change in small-scale Swiss agriculture.

Since the share of younger Swiss farmers in animal welfare and most environmental programmes is higher, upcoming farm transfers could contribute to the transformation of the Swiss food system. In shaping the transformation, agricultural policy should take into account the age structure of farm managers. Pre-planning and preparation of the transfer process, which sometimes takes place long before the actual transfer, can be an important starting point for the transformation process. This opportunity to exert influence should be used by the design of the start-up aid and accompanied extension to address the challenging goals of the transformation of agriculture and the food system.

The analysis of the demographic development in Swiss agriculture exemplary demonstrates the importance of policies supporting early succession planning, age-specific direct payment schemes, and programs promoting innovation and sustainability among younger farmers. These

measures are critical to addressing demographic shifts and ensuring the long-term viability of the agricultural sector.

The development of the demographic structure of Swiss agriculture raises various research questions for in-depth analysis: What are the motivations of numerous farm transfers to successors of similar age and what are the implications for structural change and transformation? If there is a successor, is he or she not yet ready to take over? How does the age limit and the start-up support for young farmers affect the sector's structural development; how can these instruments contribute to the desired transformation of the food system? What is the significance of the form of employment (part-time vs. full-time) in the demographic development of Swiss agriculture? These questions require in-depth analyses of farm demography, which could focus more on the evolution of individual farms using panel analyses and surveys.

AI statement

During the preparation of this work the author used DeepL in order to check the accuracy of English texts he had written himself and to translate German texts into English. During the revision of the text, ChatGPT (version GPT-4) was used to help rephrase and refine parts of the existing manuscript. After using these tools/services, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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Declaration of competing interest

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Appendix

Table A.1

Exit rate and age by farm type; overall (years 2004–2019) and for the for years 2015–2019.

Period (year)	2004–2019		2015–2019		2019	
	Exit rate	Exit age	Exit rate	Exit age	# of farms	Share (farms)
Arable farming	4.1%	58.1	3.4%	59.4	2338	5.9%
Special crops	4.8%	55.1	4.3%	56.2	2728	6.9%
Dairy cows	2.4%	55.0	2.1%	55.8	10582	26.8%
Suckler cows	2.4%	52.9	2.2%	54.8	3679	9.3%
Cattle mixed	3.4%	54.6	3.7%	54.7	3904	9.9%
Horses/sheep/goats	4.6%	53.6	4.3%	55.5	3145	8.0%
Finishing (pig/poultry)	2.6%	53.0	2.6%	54.2	926	2.3%
Mixed dairy/arable	1.8%	55.1	1.4%	57.3	1683	4.3%
Mixed suckler cows	2.2%	53.6	2.0%	55.2	1199	3.0%
Mixed finishing	1.6%	53.3	1.5%	55.0	3638	9.2%
Mixed other	3.2%	55.1	2.9%	56.1	5638	14.3%
Total	2.9%	54.7	3.1%	55.8	39460	

Source: Own representation. AGIS data for the years 2003–2020.

Table A.2

Entrant rate and age by farm type; overall (years 2004–2020) and for the years 2016–2020.

Period (year)	2004–2020		2016–2020		2020	
	Entry rate	Entry age	Entry rate	Entry age	# of farms	Share (farms)
Arable farming	0.62%	43.3	0.56%	41.6	2312	6.0%
Special crops	1.49%	42.5	1.35%	41.7	2690	6.9%
Dairy cows	0.40%	42.1	0.36%	43.9	10268	26.5%
Suckler cows	0.45%	40.9	0.37%	40.8	3708	9.6%
Cattle mixed	0.56%	42.2	0.58%	41.2	3734	9.6%
Horses/sheep/goats	1.33%	41.2	1.28%	40.8	3088	8.0%
Finishing (pig/poultry)	0.76%	41.8	0.64%	43.7	897	2.3%
Mixed dairy/arable	0.59%	43.2	0.51%	45.4	1676	4.3%
Mixed suckler cows	0.54%	41.7	0.37%	39.8	1263	3.3%
Mixed finishing	0.46%	41.4	0.34%	42.4	3597	9.3%
Mixed other	0.73%	42.5	0.63%	43.7	5519	14.2%
Total	0.66%	42.1	0.58%	42.6	38752	

Source: Own representation. AGIS data for the years 2004–2020.

Data availability

The authors do not have permission to share data.

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