

Link between the Farmers' Age and Farm Engagement in Short Food Supply Chains: Empirical analyses of small and medium farms in the Czech Republic

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Abstract. *The article aims to assess whether there is a link between the farmers' age and farm engagement in the short food supply chains (SFSC). We interrogate this link using the primary data from 172 interviews with small and medium farmers in the Czech Republic (99 participating and 73 not participating in SFSC). Descriptive statistics were used to analyse the responses. The results suggest an existing relationship between the age of farmers and engagement in SFSC. The young farmers are willing to participate in SFCS more when compared to older farmers. Nonetheless, the Cramer's V indicates a moderate association (0.192). Despite the Czech Republic being a post-communist country with specific social and economic conditions for SFSCs, the results showed consistency with most of the existing literature on the link between age characteristics of farmers and uptake of the SFSC strategy. Given that participation is influenced by age, the future policy design should consider more targeted outreach to older farmers, who may face informational or administrative barriers.*

Key words: *Local Food Systems, SFSC, small and medium farms, socio-demographic characteristics*

Introduction

The prevailing food system in Europe is largely characterised by long supply chains (Veraart Research Group, 2019). In contrast, short food supply chains (SFSCs) represent an evolving paradigm that fosters a more direct interface between agricultural producers and consumers through the disintermediation of complex logistical networks and are developing in parallel with established long food chains (Jarzebowski et al., 2020).

A substantial body of evidence (Marsden et al., 2000; Renting et al., 2003; Malak-Rawlikowska, 2019; Kiss et al., 2019; Jarzebowski et al., 2020) indicates that SFSCs contribute positively to multiple dimensions of sustainability. Economically, SFSCs can enhance farmer income, diversify product offerings, and stimulate job creation in rural locales. Socially, they can reinforce cultural heritage, cultivate mutual trust between producers and consumers, and improve local quality of life, particularly for marginalised or peripheral populations. Environmentally, SFSCs have been associated with reductions in greenhouse gas emissions and the preservation of biodiversity. In the context of increasing demands for sustainable natural resource management, it is crucial to understand the structural and demographic factors that influence the participation of farms in SFSCs.

The article assesses the link between the farmers' age and farm engagement in short food supply chains in the Czech Republic. Despite the existence of empirical studies in this area (see the chapter Theoretical background and hypothesis development), the importance and originality of this article are twofold. First, the existing empirical evidence is not strictly conclusive. Some studies provide evidence that younger farmers are more inclined to engage in SFSC. Contrary, other studies report a higher engagement of older farmers in SFSC or a non-significant age effect. Second, there was not such a study done in the Czech Republic.

Context of SFSC in the Czech Republic

The Czech Republic is a post-communist country and scholars who examined SFSC in post-communist countries have found specific social and economic conditions for SFSC development due to their communist legacy. The post-communist countries typically had to deal with the consequences of collectivisation of the agricultural sector, restructuring of their economies from a centrally planned to a market-driven system and the associated social transformation. The era of socialist economic planning used to create large agricultural companies and used to eliminate small farms and private farming in the Czech Republic.

Small independent farms only reappeared in the Czech Republic after the fall of the communist regime in 1989 (Zagata, 2012; Spilková et al., 2013). In 2020, the overall number of farms in the Czech Republic was 28,910. This includes 16 thousand small farms (55.3%) below 20 hectares. According to CZSO (2025) an average farm size was about 106 hectares in the Czech Republic in 2023. Although the total output of the Czech agrarian sector is mostly delivered by big farms small farms constitute an important share of farms in the total number of farms and play important social roles in the rural areas in the Czech Republic.

Also, the state retail network of stores disintegrated, and the retail sector started its transformation in the early 1990s of the 20th century (Foret, et al., 2011; Zagata et al., 2019). The inflow of foreign capital gave rise to multinational retail chains at the beginning of the new millennium. The multinational retail chains started their domination and control over the retail market in the Czech Republic (Kunc et al., 2022). One of the implications was that it also contributed to fundamental changes in shopping preferences and shopping behaviour of the Czech customers, and it has changed the way the Czechs buy their food (Spilková and Hochel, 2009). Another implication (like other countries in the European Union) was that the food systems in the Czech Republic became organised mostly around long (sometimes even global) food supply chains. Unfortunately, farmers (especially small and medium ones) are often dissatisfied with their position in long food supply chains because of e.g. entry barriers, severe cost price squeeze and the possibility of losing autonomy over their business (Becvarova and Zdrahal, 2013).

Currently, around 75% of consumers buy food in supermarkets in the Czech Republic, most of which are retail chains of multinational companies. As an alternative to these mainstream forms of food retail markets, the SFSCs began developing in the Czech Republic in the last two decades (SZIF, 2022). Direct sales as well as farmer markets are popular types of SFSCs in the Czech Republic (Zagata, 2012; Spilková and Perlín, 2013; Miškolci, 2017; Balcarová et al., 2018). Nonetheless, other types of short supply chains have also developed in the last decades e.g. farm shops, box schemes/home deliveries, community-supported agriculture or community gardens (Spilková et al. 2013; Srovátková, 2016; Konečný et al. 2016; Asfourová et al. 2015). A recent study of Zdrahal et al. (2024) shows that farmers are experiencing challenges in engaging in short food supply chains.

Theoretical Background and Hypothesis Development

The farmers' population is getting older (Carbone and Subioli, 2011; Mollers, et al., 2011; Cardillo and Cimino, 2022). Along with the lack of interest from the younger generation in taking over family farms, this is often mentioned as one of the factors leading to the shutting down of micro and small enterprises in developed countries.

In the literature on technology adoption (Davis, 1989; Venkatesh et al., 2003; Mitzner et al. 2019; Vankudre, 2022) there is a generally recognised connection between the age of an entrepreneur and the decision to adopt a new technology. Age can have a complex relationship with technology adoption among entrepreneurs. While younger entrepreneurs might be more readily inclined to embrace new technologies, older entrepreneurs may possess valuable experience and resources that facilitate successful technology-driven innovation. However, other factors like

digital exposure, experience, and access to resources can significantly influence adoption rates across all age groups (Low et al., 2021).

The literature that is specifically focused on SFSCs indicates that the young farmers are willing to participate more in SFCS because they are more open to new ideas and are future-oriented (Lang, 2010; Martinez et al., 2010; Kneafsey et al., 2013; Aubert and Enjolras, 2024). Higher persistence to change (inertia or a limited inclination to accept change) among older farmers was found in the study of Epule and Bryant (2017).

The empirical evidence is not strictly conclusive. Many studies provide evidence that younger farmers are relatively more inclined to engage in SFSC e.g. Hunt (2007), Detre et al. (2011), Bruce and Castellano (2016), Mundler and Laughrea (2016), Benedek et al. (2018), Bermond et al. (2019), Chen et al. (2019), Dong et al. (2019), Mundler and Jean-Gagnon (2020). Contrary, other studies report a higher engagement of older farmers in SFSC Kacz et al. (2019) or a non-significant age effect Silva et al., 2015), Ahearn et al. (2018), Rocchi et al. (2019) and Smędzik-Ambroży et al. (2024).

Thus, we expect a negative correlation between the farmers' age and the farms' participation in SFSCs. The corresponding null hypothesis is:

H₀: There is no correlation between the farmers' age and farms' participation in SFSCs.

Materials and Methods

The paper uses primary data collected in the Czech Republic in 2023-2024. We used semi-structured interviews to understand farmers' experiences and perceptions when participating in SFSC as a mechanism for distributing their products. Similar semi-structured interviews were used for farmers not participating in SFSCs. Data were collected by members of the research team during personal meetings with farmers. This allowed for a combination of pre-prepared questions with the possibility of flexibly responding to respondents' answers and developing topics as needed. There is no existing database of farmers in the Czech Republic marketing their products via SFSC. The research team had to find these farms on the web, or the snowball method (based on recommendations from people already approached) was used. This method of selection made it possible to address a wider range of participants, but the sample observed cannot be considered representative of small and medium farmers within the Czech Republic. The results should therefore be interpreted with this limited scope of generalizability in mind.

The analysis focuses only on small and medium farms, and the Farm Accountancy Data Network or FADN (FADN, 2025) classification of farm sizes was applied. FADN is a system used to collect and analyse economic data from farms in the European Union and is legally defined by Commission Implementing Regulation (EU) No 2015/220 of 3 February 2015). According to FADN the small and medium farms are classified into 14 economic size classes:

- Small-scale farms are classified in the economic size classes I-V (the value of the total standard output is less than 25,000 EUR),
- Medium-scale farms - economic size classes VI-IX (the value of the total standard output is less than 500,000 EUR).

The economic size of the holding is determined by the total value of the standard output of the holding, which is equal to the sum of the values for the particular agricultural products. These values are calculated by multiplying the acreages of particular crops and the number of heads belonging to one holding by the relevant standard output coefficients. As the analysis focused only on small and medium farms, the total standard output of selected farms was smaller than 500,000 EUR:

We interrogate this link using the primary data from 172 interviews with small and medium farmers in the Czech Republic (99 participating and 73 not participating in SFSC). Descriptive statistics were used to analyse the responses.

The following table (Table 1) presents the initial descriptive characteristics of the sample population (gender, education, age, farming experience). We applied the chi-square test to assess empirical frequencies of responses statistically test the differences. The null hypothesis was:

H0: There is no correlation between the farmers' age and farms' participation in SFSCs.

Tab. 1. Descriptive characteristics of the sample population from the Czech Republic

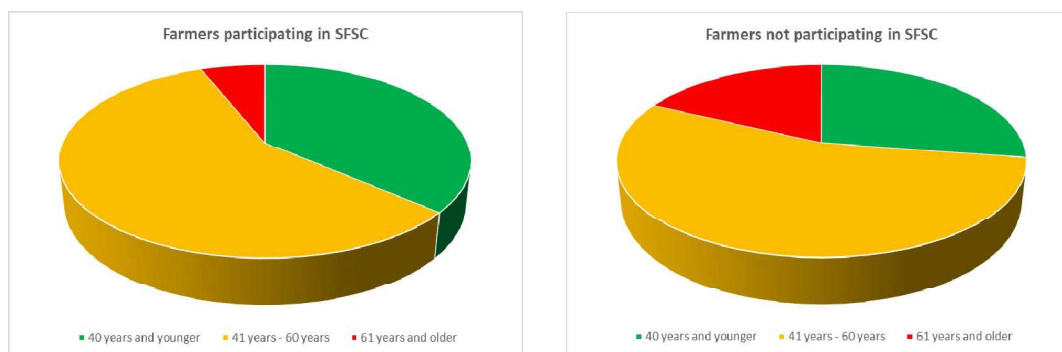
	Total	Participating in SFSC	Not Participating in SFSC
Number of farmers	172	99	73
Gender			
<i>Female</i>	27	21	6
<i>Male</i>	145	79	66
Education – selected levels of education (% of all farmers)			
<i>Complete secondary school</i>	66.3%	65.7%	67.1%
<i>Complete Bc. or higher education</i>	33.7%	34.3%	32.9%
Age (year)			
<i>Mean</i>	45.6	43.9	47.9
<i>Median</i>	47.0	44.0	49.0
<i>Range (min-max)</i>	19-77	19-74	20-77
Farming experience (years)			
<i>Mean</i>	19.0	17.3	21.4
<i>Median</i>	16.0	15.0	22.0
<i>Range (min-max)</i>	2-65	2-53	2-65

Source: Authors' construct

Results and discussion

We analysed the response from 172 farmers, out of which 99 participated in SFSC and 73 did not participate in SFSC. The following figure (Figure 1) presents the age composition of farmers in the group of participating and non-participating farmers.

Figure 1: Structure of responses in the group of farmers participating (n = 99) and not participating (n = 73) in SFSCs



Source: Authors' construct

To statistically assess whether there is a link between the farmers' age and farm engagement in the SFSC, a traditional Chi-square test was applied (Table 2 and Table 3). This non-parametric test determines the relationship between the age characteristics and SFSCs' participation in the analysed sample.

Tab. 2. Pivot table with farmers' responses

	age			
	40 and younger	41 - 60	61 and older	
Not participating in SFSC	20	40	13	73
Participating in SFSC	36	57	6	99
	56	97	19	172

Source: Authors' construct

For the selected level of significance $\alpha=5\%$ and $\alpha=1\%$ the degree of freedom $v=2$ corresponds to $\chi^2_{0.95}(2) = 5.990$ and $\chi^2_{0.99}(2) = 9.210$. The calculated The Chi-Square value (χ^2) is 6.344. This suggests a statistically significant relationship between the farmers' age and farm engagement in the SFSC. The null hypothesis of independence between the farmers' age and farms' participation in SFSCs can be rejected at the 5% level but not at the 1% level. Cramer's V indicates a moderate association (0.192). The values are presented in the following table (Table 3).

Tab. 3. Chi-square and

	χ^2 test	Dependence	V-Cramer
Age of the farmer	6.344	yes	0.192

Source: Authors' construct

Conclusion

This study analyses the link between the farmers' age as a factor of farm engagement in SFSC. The results indicate that the demographic and structural characteristics of small and medium farms in the Czech Republic correlate with the adoption of novel distributional practices as SFSC.

The results confirmed the hypothesis and showed consistency with most of the existing literature on the link between age characteristics of farmers and uptake of SFSC strategy. The socio-demographic (age) variable behaved in the expected direction. Although no unexpected patterns emerged, the confirmation of the associations using a novel dataset strengthens the external validity of prior findings and demonstrates their applicability in the Czech Republic's context. These results contribute to a more nuanced understanding of how established participation drivers function within different agricultural systems and institutional environments when compared to e.g. Western Europe.

The findings of this study offer several concrete implications for the design and implementation of measures within the Czech Rural Development Programme. Given that participation is significantly influenced by age, the future policy design should consider more targeted outreach to older farmers, who may face informational or administrative barriers. In addition, support mechanisms—such as simplified application procedures, tailored advisory services, and awareness campaigns—could be instrumental in encouraging participation among farms. By aligning measure design more closely with the structural and social realities of small and medium farms, policymakers can enhance the rate of engagement of farmers in SFSC.

These findings suggest that improving the uptake of the SFSC strategy requires more than sector-specific adjustments. Tailored educational and training programs should be developed in cooperation with advisory services and local institutions, aimed especially at older farmers. These

recommendations actually go beyond the scope of agricultural policy and should be seen as part of a rural development approach that integrates multiple sectors, including education, territorial planning, and social inclusion.

This study offers a unique, data-driven perspective on the factors shaping farmers' engagement in SFSC, providing key insights for improving the design, targeting and effectiveness of future agrarian policy and rural development programs. This study is particularly significant because there has not been such a study done in the Czech Republic and it also provides further evidence from countries with specific social and economic conditions for SFSC development due to their communist legacy.

Although this study provides valuable insights into the demographic and structural factors influencing the adoption of SFSC, it has several limitations.

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