

The Size Factor in the Inclusion of Regional Foods in School Canteen: An Empirical Analysis

Eliška Svobodová¹, Ivo Zdráhal², Barbora Daňková³, Marika Tkáčová⁴,

Soňa Raszková⁵, Kristina Somerlíková⁶

Abstract: School catering is an important element of the public food service system and represents a stable market with high and consistent demand for food. In recent years, increasing academic and political attention has focused on the inclusion of regional food into school canteens. Such an initiatives are also linked to sustainability goals, regional economic support, and reduction of environmental impact of food system. This study investigates the relationship between school canteen size (measured by the number of meals served per day) and the share of regional food used in daily operations. A data from a survey among primary schools in Brno (Czech Republic) revealed no significant correlation between canteen size and the use of regional food in school canteens. These results contribute to understanding factors that are important for designing more sustainable food systems.

Keywords: school canteen, local farms, sustainability, SFSCs, agriculture.

JEL Classification: Q13, Q18, Q12

1 Introduction

The primary goal of school catering is to provide children and students with a consistent supply of nutritionally balanced meals during the school day. This initiative aims to support healthy growth, proper development, and concentration in children while also promoting the adoption of healthy lifestyle habits (Nixon et al., 2025). Proper nutrition during childhood is crucial for healthy growth and development, both physically and cognitively. It also plays a significant role in preventing obesity and other lifestyle-related diseases later in life (Cohen Kadosh et al., 2021). Additionally, school catering has a social dimension, as it fosters shared dining experiences and ensures that affordable meals are available to all children (Hart, 2016). In the Czech Republic, school catering is an integral part of the healthcare system for children and youth. Its organization is grounded in legal regulations, particularly the Education Act No. 561/2004 Coll. and Decree No. 107/2005 Coll. on School Catering. These legal frameworks define the operational rules for school canteens, categorize diners by age, and establish nutritional requirements (Kejvalová, 2010; Klimešová & Stelzer, 2013). High-quality meals should not only provide the necessary energy and nutrients but also positively influence students' school performance, intellectual ability, immune systems, and mental well-being. Conversely, excessive consumption of sugars and unhealthy fats can contribute to the rising prevalence of childhood overweight and obesity (Dehghan et al., 2005). The demand for school meals is notably extensive and stable. School canteens in the Czech Republic prepare approximately 383 million meals each year, serving around 2 million children aged 2 to 19 daily (New rules for school canteen, 2025). School lunches are substantially subsidized, with the subsidy rate reaching around 60% (Pavel, 2023). The state allocates approximately CZK 2.4 billion annually for the operation of school canteens, while about CZK 10 billion is spent each year on food purchases for these lunches.

The sustainability of food production within agricultural farms is becoming an urgent issue. Declining farm profits, along with the pressure to reduce production costs and commodity prices, create increasing barriers to market access, leading many farms to leave the agricultural sector (Berti & Mulligan, 2016). One potential solution to address the challenges posed by conventional agri-food systems is to reconstruct regional and local agri-food systems. This approach could serve as a competitive or survival strategy for agricultural farms (Berti & Mulligan, 2016).

¹ Mendel university, Faculty of regional development and international studies, Department of regional and business Economics, Zemědělská 1, Brno, Czech Republic, eliska.svobodova@mendelu.cz

² Mendel university, Faculty of regional development and international studies, Department of regional and business Economics, Zemědělská 1, Brno, Czech Republic, ivo.zdrahal@mendelu.cz.

³ Mendel university, Faculty of regional development and international studies, Department of regional and business Economics, Zemědělská 1, Brno, Czech Republic, barbora.dankova@mendelu.cz.

⁴ Mendel university, Faculty of regional development and international studies, Zemědělská 1, Brno, xtkacova@mendelu.cz.

⁵ Magistrát města Brna, Odbor strategického rozvoje a spolupráce, Husova 196/2 Brno, Czech Republic, raszkova.sona@brno.cz

⁶ Mendel university, Faculty of regional development and international studies, Department of regional and business Economics, Zemědělská 1, Brno, Czech Republic, kristina.somerlikova@mendelu.cz

Direct sales to consumers are typically conducted through channels such as farmers' markets, community-supported agriculture, farm stands, and other consumer-oriented sales channels (Low et al., 2015). However, a new marketing option has also emerged — the so-called “intermediated market channel,” which appeared alongside the growing consumer demand for locally and regionally produced foods. This channel includes sales made directly to restaurants, institutions, or regional food aggregators, such as schools and hospitals (Low et al., 2015; Christensen et al., 2017). The expansion of intermediated market channels can benefit agricultural farms by improving their access to the expanding local food market (Dimitri & Gardner, 2018). This approach increasingly serves to respond to the challenges posed by conventional agri-food systems (Berti & Mulligan, 2016; Gori & Castellini, 2023).

The State Agricultural Intervention Fund (SZIF) and the Ministry of Agriculture (MZe) are working to incorporate local foods into public catering. These priorities align with the European Union's agricultural strategy, which emphasizes the “Farm to Fork” approach aimed at producing sustainable and healthy food. Additionally, they contribute to achieving goals related to climate action, biodiversity, and public health.(Elshaer et al., 2023).

The article argues that larger canteens are generally better equipped, from an administrative perspective, to engage local suppliers in their supply and demand processes. They have a more comprehensive management and logistics structure, which allows them to integrate local suppliers more effectively into their catering systems.

This article aims to confirm or refute the following statement concerning the higher share of local foods in larger canteens. The research is based on data from a survey conducted by the Brno City Municipality.

One of the main contributions of this article is to verify the possibilities for involving local suppliers in the catering system of kindergarten and primary schools and to identify the barriers that hinder such involvement.

2 Methods

The theoretical background of this article is given by the Local Food Systems Theory, which assumes that connections between producers, distributors, and consumers within a specific region (locality) generate not only economic but also social, environmental, and institutional benefits (Martinez et al., 2010). In the context of school catering, this theory explains why and how individual institutions, such as school canteens, involve-regional food suppliers in their catering systems and what factors influence this process. According to the above-mentioned theory, the involvement of regional foods is a function of institutional capacity and supplier networks (van Paassen et al., 2022). For these reasons, we assume that larger canteens, with more robust management and logistics structures, are better prepared (equipped) to integrate local (regional) suppliers into their catering systems and therefore tend to exhibit a higher share of local (regional) foods.

In this context, the following hypothesis was formulated: The average share of regional foods is influenced by the size of the canteen. Larger canteens are expected to show greater involvement of regional foods.

By testing this hypothesis, the article defines a regional food as a product that originates from a specific geographic area known as a region. In the context of sustainability, particularly near regional borders, it is also appropriate to include local foods that come from the immediate vicinity of the consumption area, even if they technically belong to a different region (Augere-Granier, 2016; Holcomb et al., 2018).

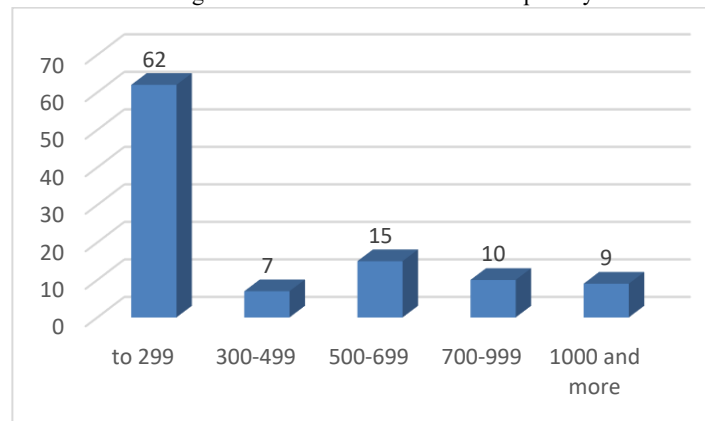
The presented data are the outcome of the survey “*Utilization of Regional Food Production in School Canteens*”, conducted by the Department of Strategic Development of the Brno City Municipality within the MECOG-CE project (Metropolitan Cooperation and Governance in Central Europe) under the Interreg Central Europe program, under the patronage of JUDr. Irena Matonohová, Councillor for Education. The survey was carried out in February 2025 among kindergarten and primary school canteens established by the Statutory City of Brno. In total, 127 school canteens were contacted, and 103 completed questionnaires were received.

The size of the school canteens was determined by the average number of lunches served each day. Figure 1 shows the distribution of canteen sizes.

To test the hypothesis regarding the relationship between the use of regional foods and the size of the school canteen, a linear regression analysis was conducted. The goal was to determine if there is a statistically significant association between the number of lunches served daily (which reflects the canteen size) and the proportion of regional foods utilized. In this analysis, the dependent variable was the average percentage of regional foods used, while the independent variable was the average number of lunches served per day, representing the size of the canteen.

The regression analysis was performed using a dataset comprising 103 observations.

Figure 1 The size of the school canteens according to the number of served lunches per day



Source: Results of the questionnaire survey conducted by the Brno City Municipality, own processing

The relationship in the regression was modelled using the following equation:

$$Y = \beta_0 + \beta_1 X + \varepsilon$$

where:

- Y is the dependent variable (the share of the regional food),
- X is the independent variable (number of the served meals),
- β_0 is the absolute term (intercept),
- β_1 is the regression coefficient (slope),
- ε is the random error (residue).

We assume that the predictor (explanatory variable) does not have a linear effect on the dependent variable.

The null hypothesis $H_0: \beta_1=0$

A residual analysis was conducted to verify the assumptions of linear regression, specifically data normality. The results of the analysis showed that the data exhibited strong skewness and therefore did not meet the assumption of normality. Due to the need for transformation, data with a zero share of regional foods were removed. The subsequent data, adjusted through logarithmic transformation, still did not meet the required normality assumption; therefore, the Box-Cox data transformation was applied. The Box-Cox transformation is a method used to stabilize variance and bring data closer to normality. It is mainly applied in regression models where the assumption of normally distributed residuals is not met (Atkinson et al., 2021). After applying the transformation, the models can be interpreted more easily, and the results are statistically more robust.

The regression analysis was applied to 66 adjusted data for the given variables.

3 Research results

The article aimed to map the level of involvement of regional/local suppliers in the nursery and primary school canteens established by the statutory city of Brno. Based on the obtained results (Figure 2), it can be concluded that only about 25% of school canteens do not monitor the regional origin of their food. On the other hand, more than 37% of school canteens show interest in the regional origin of food several times a week.

The involvement of local farmers, growers, and small-scale processors in the school catering system can offer several benefits, as suggested by Ilbery & Maye (2005). These advantages include increased transparency regarding the origin of ingredients and improved communication between the school canteen and suppliers. As well as the locality leads to fresher and higher quality of food due to shorter storage times. This approach also reduces the unnecessary packaging and food waste while supporting the regional economy and promoting sustainable rural employment (Renting et al., 2003).

In addition to the positive impacts mentioned above, the involvement of school canteens in short food supply chains also entails several disadvantages (Martinez et al., 2010). Schools often face administrative, logistical, and legislative barriers that complicate the involvement of the regional suppliers (Martinez et al., 2010; Bayir et al., 2022).

Figure 2 The possibility of monitoring the origin of regional foods by the school canteens



Source: Results of the questionnaire survey conducted by the Brno City Municipality, own processing

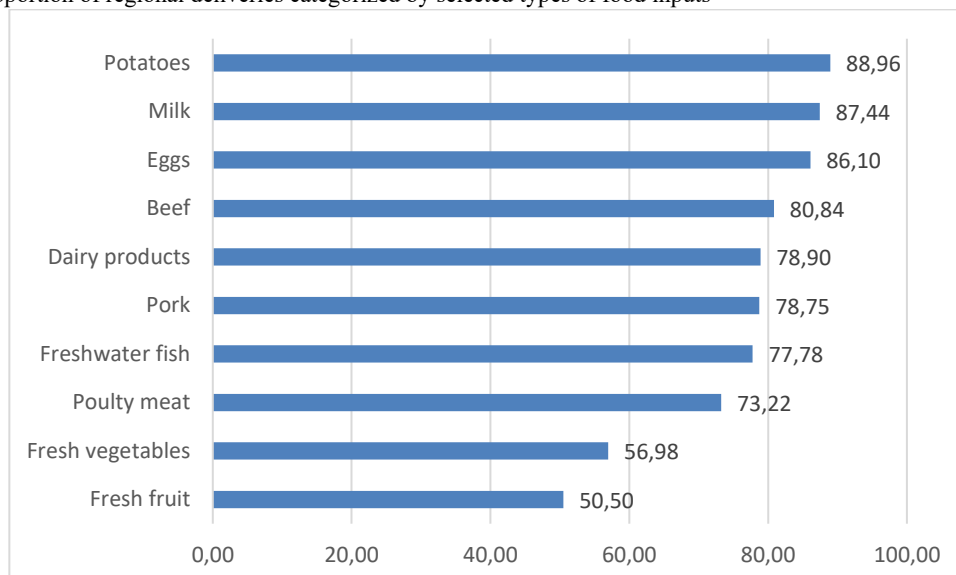
Considering the administrative barriers mentioned earlier, the research hypothesis was based on the premise that larger canteens, which typically have more advanced management and logistics systems, are likely to be better positioned to involve regional suppliers. As a result, these canteens tend to have a higher proportion of regional foods in their food sources.

To verify the hypothesis, a regression analysis was conducted based on 66 observations.

The calculated correlation coefficient $r = -0.10075$ ($p < 0.42086$) indicates a very weak negative relationship between the size of the canteen, expressed by the number of meals served, and the share of regional suppliers. The coefficient of determination shows that the calculated model explains only 1.02% of the variability of the dependent variable. The t-test for the regression coefficient confirms the statistical insignificance of the model.

Based on the presented results, it can be stated that the dependence between the size of the canteen and the level of involvement of local suppliers was not confirmed.

Figure 3 The proportion of regional deliveries categorized by selected types of food inputs



Source: Results of the questionnaire survey conducted by the Brno City Municipality, own processing

In terms of the share of individual foods sourced by nursery and school canteens from local suppliers (Figure 3), over 80% include potatoes, milk, eggs, and beef. Approximately 70% of the products come from dairy products (such as yogurts, curd cheese, cheeses, and cream) and various types of meat (including pork, poultry, and freshwater fish). Foods that have about a 50% share from local suppliers consist of vegetables and fruits.

The questionnaire survey results indicate that about 77% of school canteens intend to increase their use of regional suppliers in the future.

The main barriers for increasing the use of regional products are often mentioned by the respondents as higher prices (76%), seasonal supply issues (64%), and a shortage of suppliers able to provide sufficient product volumes (58%). Additionally, 77% of respondents noted that having a list of available products from local suppliers could be an effective tool for boosting the share of regional foods.

4 Conclusions

This article investigates the relationship between the size of a school canteen and its use of regional food when preparing meals for students.

Findings from the metropolitan area of Brno in the Czech Republic revealed that most school canteens are generally attentive to the origin of the food. Nonetheless, about 25% of school canteens do not screen at all whether the food comes from the local region. The school canteens mostly source potatoes, milk, and eggs from the local suppliers. On the other hand, fruit and vegetables are sources less often from local suppliers. The substantial majority of respondents revealed plans to increase the proportion of regional foods used in meal preparation.

The local food systems theory presumes that integration of regional foods in school canteens is a function of institutional capacity and supplier networks (van Paassen et al., 2022). For these reasons, we expected that larger canteens are better prepared (equipped) to integrate local (regional) suppliers into their catering systems because of a more robust management and logistics structure, and therefore larger school canteens would exhibit a higher share of local (regional) food served to the students.

Interestingly, the data did not confirm a relationship between the size of the school canteen and the level of involvement of local suppliers. A regression analysis was performed, and the statistical hypothesis $H_0: \beta_1 = 0$ (indicating no linear relationship) was not rejected. This suggests that canteen size does not significantly influence the use of regional food, implying that other factors are probably at play or the existence of barriers to increase the share of the food coming from the local region. The survey revealed such barriers preventing to increase the share of regional products in school canteens in Brno such as higher prices of local food when compared to non-local, seasonality of supply and lack of suppliers able to deliver adequate volume of the product. This is in line with existing literature (Bayir et al., 2022; Campbell, 2023; Zuercher et al., 2024).

A limitation of explanatory power of this study is its negligence of other factors and focus only on school canteens in Brno. The future research should incorporate other factors into the econometric analysis e.g. institutional rules, procurement procedures, or stakeholder motivations as well as the storage capacities, price factors, supply base in the region, administrative and legislative barriers.

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