

Organization, prices and quality of school food provision

Maria Ostrovnaya & Anna Panova¹

Healthy nutrition is crucial for health and academic performance of students (Belot, James, 2011; Anderson, Gallagher, Ritchie, 2017). In many countries, including Russia, the municipal government fully or partly finances breakfasts and lunches provided at schools. So both prices and quality of school meals become an issue of high importance for the local community. Recent studies show that characteristics of food providers (Maietta, Gorgitano, 2016; Anderson, Gallagher, Ritchie, 2017) significantly affect provided food quality. Prices of school meals may also vary a lot (Olivares et al., 2012). Thus the choice of the food provider may be important for the school, specifically, the choice between in-house provision and outsourcing. Although outsourcing in private commercial organizations is well examined, there are few works dedicated to public organizations including schools (e.g. see Johnson, Graman, 2015).

The main purpose of this study is to examine how organization of school food provision, namely, centralization and outsourcing, affect quality and prices of hot school meals. An empirical assessment of this relationship has not actually been carried out, and our study will fill an important gap in the economic literature.

We treat a school and a municipality as two main interconnected agents, whose behavior we are going to analyze. According to 44 Federal law on public procurement, each municipality decides whether to organize central school food provision or not. In the former case several schools buy hot meals from one selected supplier and we call this situation as *centralized outsourcing*. In the latter case each school independently decide either to outsource hot school meals (*decentralized outsourcing*) or choose *in-house production*.

We base our research on the new institutional theory. Since our main interest is to examine the link between centralization and outsourcing of school food provision, on the one side, and quality and prices of hot school meals, on the other side, we propose the following hypotheses:

Hypothesis 1: the quality of hot school meals decreases in the case of centralization and increases in the case of in-house production.

Hypothesis 2: the price of a hot school meal increases in the case of centralization and decreases in the case of in-house production.

¹ Corresponding author, e-mail: apanova@hse.ru.

Authors' affiliation: National Research University Higher School of Economics.

We use OLS regressions to test these hypotheses. The empirical relationships describing the effect of school food provision organization on quality and prices of hot school meals may be written as

$$outcome_{ij} = \alpha \cdot central_{ij} + \beta \cdot out_{ij} + \gamma \cdot X_i + \zeta \cdot Z_j + \varphi + \varepsilon ,$$

where

i - school index;

j – municipality index;

$outcome$ - the quality or the price of hot school meal provided in the school i in municipality j ;

$central$ – dummy variable reflecting centralized food provision in the municipality j : 1 if school food provision is centralized, 0 otherwise;

out – dummy variable reflecting outsourcing in the school i : 1 if outsourcing, 0 if in-house production;

X – vector of other school characteristics: school size, costs of in-house production, school status;

Z - vector of municipal characteristics: demand and supply in the local market, economic development of a municipality, political factors in a municipality;

φ - constant.

We have an opportunity to analyze a unique dataset that has not been studied before. We put together data from several sources, namely, monitoring of the status and the development of education in Irkutsk region in 2016 to get information about school characteristics, Irkutsk open data portal (<http://openbudget.gfu.ru>) and municipal dataset (<http://www.gks.ru/dbscripts/munst/>) to get information about municipal characteristics. One observation refers to one school. Total sample consists of 830 schools situated in both rural and urban areas.

Table 1 contains descriptive statistics for used variables. For each school we have information about average price for breakfast and lunch, level of food satisfaction and organization of additional food programs. We define organization of food provision as centralized if prices for lunches and breakfasts in three or more schools in the municipality are equal. The municipality makes this decision, according to 223 Federal law. Now we use the simplest ways to determine outsourcing and centralization. We measure outsourcing as the use of external labor forces to organizing school meals, namely, when the school does not have employed cooks. We measure centralization as situation when prices of both lunches and breakfasts are equal for at least three schools in the municipality.

Table 1

Description: selected school characteristics

| Basic information | | | | | |
|------------------------------|--|-----------|-----------|-----|----------|
| VARIABLE | Description | Mean | St. Dev. | Min | Max |
| Dependent variables | | | | | |
| price | total price of school meal | 47.55634 | 37.91654 | 15 | 155 |
| p_breakf | price of breakfast | 27.56564 | 16.11002 | 6 | 75 |
| p_lunch | price of lunch | 43.46951 | 18.86981 | 14 | 110 |
| satisfy | level of food satisfaction in school | 92.7071 | 10.4296 | 22 | 100 |
| coverage | share of students provided with free meals (breakfast + lunch) | 0.1001114 | 0.2288852 | 0 | 1.040816 |
| Independent variables | | | | | |
| central_out | 1 if school meals are outsourced centrally, 0 otherwise | 0.173913 | 0.3792703 | 0 | 1 |
| decentral_out | 1 if school meals are outsourced decentrally, 0 otherwise | 0.0881988 | 0.28376 | 0 | 1 |
| in-house | 1 if school uses in-house provision of school meals, 0 otherwise | 0.7259615 | 0.4462967 | 0 | 1 |
| students | number of students | 368.3291 | 377.2028 | 11 | 2009 |
| equipment | 1 if school has modern technological equipment for organization of food, 0 otherwise | 0.8180662 | 0.3860356 | 0 | 1 |
| central heating | 1 if school has central heating, 0 otherwise | 0.6679389 | 0.4712526 | 0 | 1 |

The preliminary results are the following. Prices of hot school meals are negatively correlated with the level of food satisfaction in school (-0.2757, p-value<0.001). This reflects the general assumption of higher prices for higher-quality products. Also we obtain preliminary confirmations of our hypotheses. First, prices of hot school meals are the highest in the case of centralized outsourcing (pairwise correlation is 0.4568 for breakfasts and 0.2432 for lunches, p-value<0.001) and the lowest in the case of in-house production (pairwise correlation equals -0.5890 for breakfasts and -0.3704 for lunches, p-value<0.001). Two-sample t tests show that there is no significant difference between prices of breakfasts under centralized and decentralized outsourcing, but prices of lunches are significantly lower in the case of decentralized outsourcing ($\Pr(T > t) = 0.0002$). Second, level of food satisfaction in school is the lowest in the case of centralized outsourcing (pairwise correlation is -0.2918, p-value<0.001) and the highest in the case of in-house production (pairwise correlation equals 0.2985, p-value<0.001).

References

Anderson, M. L., Gallagher, J., & Ritchie, E. R. (2017). School Lunch Quality and Academic Performance (No. w23218). National Bureau of Economic Research.

Belot, M., & James, J. (2011). Healthy school meals and educational outcomes. *Journal of health economics*, 30(3), 489-504.

Johnson, D. M., & Graman, G. A. (2015). Outsourcing practices of Midwest US public universities. *International Journal of Business Excellence*, 8(3), 268-297

Maietta, O. W., & Gorgitano, M. T. (2016). School meals and pupil satisfaction. Evidence from Italian primary schools. *Food Policy*, 62, 41-55.

Olivares, M., Weintraub, G. Y., Epstein, R., & Yung, D. (2012). Combinatorial auctions for procurement: An empirical study of the chilean school meals auction. *Management Science*, 58(8), 1458-1481.