Municipality Size and Local Public Services: Do Economies of Scale Exist?

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Abstract

Economies of scale are a standard topic in economic theory, frequently applied, for example, in the analysis of monopolies. They exist when a firm optimising its production costs while facing some fixed costs enjoys lower per-unit production costs as the production increases. Similarly to other production units municipalities have to be large enough to minimise average costs. We analysed the local public services in 205 municipalities with extended powers in the Czech Republic for the first time in this context, using regression analysis, a correlation diagram of local public services and statistical analysis. The paper examines this issue using data from 2008 to 2012. Our analysis showed that economies of scale cannot be clearly identified for local services in municipalities with extended powers in the Czech Republic and that the size of a municipality is not a key factor influencing the provision of local services.

Keywords: economies of scale, municipality, public services

1. Introduction

The Czech Republic has one of the highest territorial fragmentations of municipalities in Europe, also because the issue of decentralisation has been overemphasised in local government policy since 1989. Although decentralisation represents one basic and almost universally used reform, with important potential especially for local democracy, it has some limitations, for example from the point of view of the economic performance of local governments. One frequently discussed problem related to this is the search for economies of scale in small decentralised municipalities.

The Czech municipal sector is currently divided into 6,248 municipalities that vary considerably with respect to tax base, population size, age structure and in-

dustrial structure, and mainly with respect to their independent competence. The independent competence of a municipality includes, in particular, the matters stipulated under sections 84, 85 and 102 of Act No. 128/2000 Coll., on municipalities, with the exception of municipal ordinances. The municipality is also responsible for fostering the development of social care and satisfying the needs of its citizens. This includes, in particular, meeting the needs for housing, health care, transportation, communication, education and training, general cultural development and protecting public order. The scope of the municipal powers in terms of delegated powers are defined in s. 11(2), s. 61(1)(c), s. 66, and other sections of Act No. 128/2000 Coll., on municipalities. Specific areas of the delegated powers of municipalities are defined in further related special acts. Municipalities in the Czech Republic are divided in terms of the scope of their delegated powers into:

• Municipalities (sometimes called "type-I municipalities") – 6,249 municipalities;

• Municipalities with authorised municipal offices (sometimes called "type-II municipalities") – 388 municipalities[1];

• Municipalities with extended powers (sometimes called "type-III municipalities") – 205 municipalities.

Municipalities with extended powers are defined by Act No. 314/2002 Coll., on municipalities with authorised municipal offices and on municipalities with extended powers of 13 June 2002.[2] Municipalities with extended powers (ORPs) took over about 80 % of the competences that previously lay with the districts.

1.1 Economies of scale in the public sector

Economies of scale exist in the private sector when a firm optimising its production costs while facing some fixed costs enjoys lower per-unit production costs as production increases. This idea was among the first economic phenomena to be discussed by scholars (as early as Thomas Aquinas). This concept is also applicable to the public sector and to local governments: from a production point of view, local governments, especially municipalities, could be seen as production units (Hirsch 1959; Sawyer 1991; Boyne 1995; Houlberg 2010; Faulk and Hicks 2011). The nature of the production processes carried out by organisations that create goods and services determines scale economies, size economies and scope economies (Varian

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1 Municipalities with authorised municipal offices are defined by Act No. 314/2002 Coll. of 13 June 2002. Municipalities are assigned to the category of municipalities with authorised municipal offices by the Ministry of the Interior Decree No. 388/2004 of 24 June 2004, amending Decree 388/2002 Coll. on the establishment of "administrative districts of municipalities with authorised municipal offices".

2 Municipalities are assigned to the category of municipalities with extended powers by the Ministry of the Interior's Decree No 388/2004 of 24 June 2004, amending Decree No. 388/2002 Coll. on the establishment of "administrative districts of municipalities with extended powers".

1992; Ferguson 2008). Production normally combines various input factors, such as capital, labour, land, materials and technical knowledge in varying proportions and results in a certain quantity of output. In economic theory, the different types of relationship between inputs and outputs are expressed in terms of returns to scale. In essence, returns to scale refers to how output reacts to increases or decreases in all inputs taken together (Dollery et al. 2008).

Whereas returns to scale refer to the physical relationship between factor inputs and outputs, economies of scale transform this relationship into monetary values. Increasing returns to scale translates into increasing economies of scale, constant returns to scale into constant economies of scale, and decreasing returns to scale into diseconomies of scale. In short, changes in economies of scale occur when changes in output alter the unit cost of output. (Dollery and Fleming 2006). The normal average cost curve is U-shaped.

In the context of local governments, economies of scale have a wide application. Their advantages usually reinforce the arguments for structural reforms, such as amalgamating small municipalities into one larger municipality. The main argument is that if each municipality produces relatively comparable services and there are substantial aggregate economies of scale, then a system of numerous small municipalities will result in higher expenditures for the same level and composition of output than a system of fewer larger local governments (Dollery and Fleming 2006). It must be stressed that each output has its own production function. In other words, scale economies will not be uniform across the range of services provided by an individual local government. No single size of municipality will be able to produce all services at the minimum possible cost for each service. The theory says nothing about the exact location of the vertex of the U-shaped cost curve. Relatively large samples of studies have focused on verifying the existence of economies of scale in principle at the local-government level. Most of these studies used expenditure models with per-capita expenditure as the dependent variable. The first studies were initiated in the 1970s and 1980s (e.g. Gabler 1971; Bodkin and Conklin 1971; Appelbaum and Follett 1978; Newton 1982; Oakerson 1987). Byrnes and Dollery (2002) reviewed previous studies in order to determine if there was an empirical basis for the greater economic efficiencies of larger municipalities. They did not find any strong evidence of significant economies of scale in the provision of municipal services. They concluded that, overall, 29 % of the research papers found evidence of a U-shape, 39 % found no statistical relationship between per-capita expenditure and size, 8 % identified economies of scale, and 24 % identified diseconomies of scale.

Boyne (2003) presented a review of eighteen studies that tested for a linear relationship between the organisational size of local governments and performance. The measures of size included population, number of staff or capacity (like number of hospital beds) and number of service users (like school pupils). The results pro-

vide little comfort to advocates of either large or small local governments. The impact of size does not appear to be linked systematically to types of service or specific dimensions of performance. Holzer (2009) shows that even this discussion of the U-shaped nature of the relationship between size and economies of scale have variations. The consensus among researchers who have studied consolidation efforts is that nearly 80 % of municipal services and activities do not possess economies of scale beyond a population of approximately 20,000 inhabitants (Katsuyama 2003).

Many separate analyses of particular municipal services have arisen in the last few years: e.g. water (Picazo-Tadeo et al. 2009; Byrnes et al. 2010), public libraries (De Witte and Geys 2011), public transportation (Walter and Cullmann 2008) and pre-school education (Montén and Thater 2011). However, these analyses lead to different conclusions depending on the assumptions and indicators used in the model. Only a few studies were conducted in the CEE region. Administrative costs of local taxation in the Czech Republic were calculated by Vítek et al. (2002) based on a random sample of several municipalities. Their figures clearly present the problem of relatively high administrative costs for any activity in the smaller municipalities. In Slovakia, Pompura (2012) confirmed the same patterns. Soukopová (2011) tested the relation between the size of municipalities and the costs of municipal waste management per inhabitant; the results do not show any clear existence of economies of scale. An empirical efficiency analysis of local governments cannot answer the question of whether the quantity of services provided is Pareto efficient.

The aim of this paper is to determine whether economies of scale can be identified for individual municipal services in municipalities with extended powers in the Czech Republic. Our core research question is: "Do economies of scale exist in the provision of municipal services in the Czech Republic (in our research sample of municipalities with extended powers?"

Municipalities with extended powers provide in particular the following services: administration (e.g. registry office and register of inhabitants, passports and ID cards, driving licenses, trade licence; etc.), education, social services, environmental protection (e.g. water management, waste management, etc.), culture, health care, transportation, and road management. The services with the largest impact on the budgets of municipalities with extended powers were chosen for the analysis: sports and leisure activities; culture, church, and media; environmental protection; housing, municipal services, development, and education. Public administration and police are also budget-significant expenditures that will be analysed in future research.

2. Data and Methodology

The sample for analysis included 205 municipalities with extended powers in the Czech Republic. These municipalities cover more than 55 % of the total population of the Czech Republic.

We used open linked government data of the Czech Republic. Population data were acquired from the Czech Statistical Office (CZSO)[3]; and financial data are from the Automated Budget Information System (ARIS)[4] and the Accounting and Financial Information System (ÚFIS)[5] administered by the Ministry of Finance. These data are based on the Czech budget classifications, i.e. all data are recorded on the cash principle, and we used current prices. We sorted data according to the Czech classification of sector budget structures, class 3 – Services for citizens. Services are sorted according to their impact on the budgets of municipalities with extended powers, see Table 1.

Table 1
Structure of expenditures of local self-governments by service-delivery areas

Public-service expenditure area	Year		
	2008	**2010**	**2012**
Sports and Leisure Activities	8.02 %	8.02 %	8.94 %
Culture, Church, Media	15.92 %	15.56 %	14.98 %
Environmental Protection	17.08 %	17.69 %	17.45 %
Housing, Municipal Services, Development	20.43 %	19.35 %	18.22 %
Education	35.80 %	36.57 %	38.02 %
Rest	2.75 %	2.81 %	2.39 %

The basic variable selected for the analysis and comparison of individual municipalities in the Czech Republic was expenditure per capita. The research was performed with data collected for the five-year period from 2008 to 2012. Analysis was performed for 2008, 2010 and 2012, and results were then compared. Since the results for all years did not differ, only the results for 2012 are presented and discussed.

For the analysis of the economies of scale we used the log-linear (polynomial) regression model and trend comparison in correlation diagrams. The dependent variable was expenditures per capita, and the independent variable was municipality size (number of inhabitants). For setting a trend of the expenditures per capita,

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3   http://www.czso.cz/
4   http://wwwinfo.mfcr.cz/aris/
5   http://wwwinfo.mfcr.cz/ufis/

we used a polynomial (quadratic) function of the first order, which complies with the theory of economies of scale (U-shaped curve). This approach can capture a range of scale effects, such as one in which expenditure per capita fall initially, but then rise after some threshold number of inhabitants are served. Population was set as an explanatory variable for exploring whether the municipality size affects the expenditure level for the examined public services. This variable (population) was unevenly distributed and therefore has been transformed into a log form in order to be used in a correlation diagram, as well as for more sensitive trend identification (see Table 2).

Table 2
Municipality-size log transformation

Logarithm	Population	Logarithm	Population	Logarithm	Population
Log 3.00	1,000	Log 4.25	17,800	Log 5.50	316,200
Log 3.25	1,800	Log 4.50	31,600	Log 5.75	562,300
Log 3.50	3,200	Log 4.75	56,200	Log 6.00	1,000,000
Log 3.75	5,600	Log 5.00	100,000	Log 6.25	1,778,000
Log 4.00	10,000	Log 5.25	177,800		

Log-linear analysis is accompanied by a statistical analysis, in which we use descriptive statistics in order to comment on values of expenditures per capita in the groups of municipalities according to the size categories.

3. Results

The results of the economies of scale analysis of public services are shown in Figure 1. Population levels (municipality size) and their log transformations needed for understanding the figure are shown in Table 2 above.

Figure 1
Expenditures per capita on municipal public services in CZK, 2012
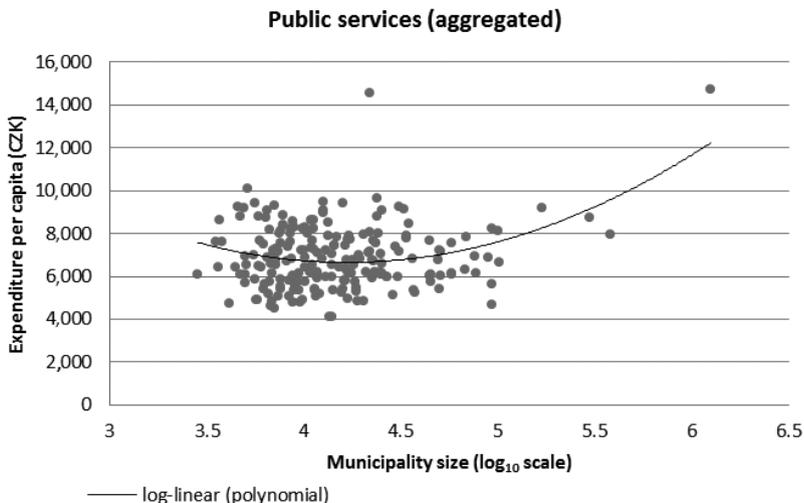
Results of the log-linear regression analysis show that economies of scale are relevant in the provision of all municipal services. It is interesting that the expenditures in almost all of the municipalities below 50,000 inhabitants are in the 4,500 to 10,000 CZK/capita range, while larger municipalities have expenditures in the 4,500 to 8,000 CZK/capita range. If we analyse average expenditure per capita according to the municipality-size category, we see higher expenditures only in smaller municipalities (7,167 CZK/capita) and the largest cities (9,443 CZK/capita), see Table 3.

Table 3
Expenditures per capita on municipal public services
by population size categories, 2012

Municipality size	Average (CZK)	Median (CZK)	Standard deviation (CZK)	Count
<5,600	7,166.91	6,732.22	1,482.85	18
5,600–10,000	6,687.24	6,708.09	1,344.68	63
10,000–17,800	6,791.94	6,525.42	1,277.54	55
17,800–31,600	7,016.97	6,759.62	6,759.62	37
31,600–56,200	6,796.56	6,797.16	1,135.69	16
56,200–100,000	6,714.91	6,607.60	1,036.22	12
>100,000	9,442.82	8,715.28	2,767.56	5

However, on the basis of global data we still feel that it is improper to state that the size of a municipality affects the level of expenditure on services. Variance of expenditure can be explained by heterogeneity of services, which was confirmed by the above-mentioned studies. For this reason, we analyse each service separately.

3.1 Sports and leisure activities

Results of the analysis show that economies of scale are not present in expenditures on sports and leisure activities. On the contrary: diseconomies of scale might be considered (see Figure 2). The results of the analysis show that with increasing sizes of type-III municipalities, the per-capita expenditure on sport and leisure activities tends to increase. On the other hand, in the largest municipalities (Prague, Brno and Plzeň) the expenditures per capita are lowest (500 CZK/capita). This is confirmed by the results of the analysis of the average expenditure per capita (see Table 4).

Figure 2
Expenditures per capita on sports and leisure activities in CZK, 2012
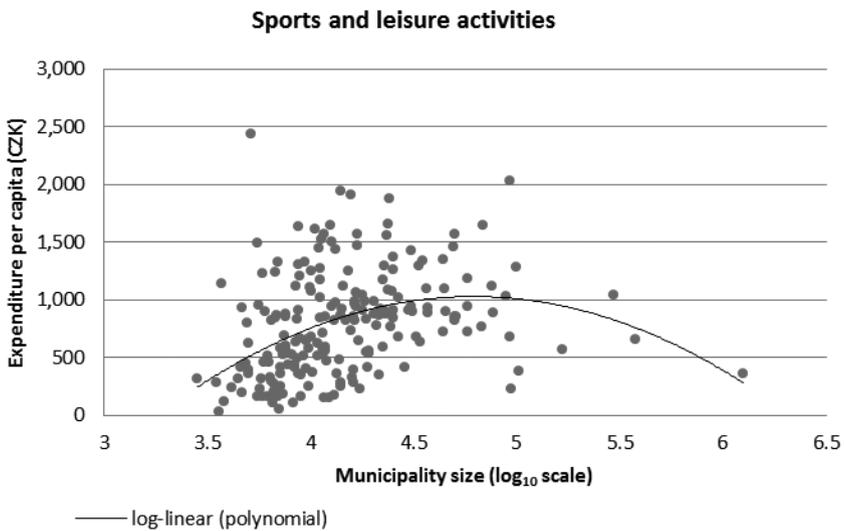
This might be explained by greater participation of sponsors and donors in larger municipalities. Even though there is no evidence of economies of scale in the area of sports and leisure activities, we can say that municipality size has an inversely proportional effect on expenditures per capita.

Table 4

Expenditures per capita on sports and leisure activities
by population-size categories, 2012

Municipality size	Average (CZK)	Median (CZK)	Standard deviation (CZK)	Count
<5,600	593.54	372.20	579.34	18
5,600–10,000	579.68	515.32	368.15	63
10,000–17,800	880.60	853.82	466.76	55
17,800–31,600	944.72	907.84	336.25	37
31,600–56,200	1,028.91	915.93	282.16	16
56,200–100,000	1,040.33	980.97	451.11	12
>100,000	602.40	564.72	246.47	5

3.2 Culture, church, media

In contrast, economies of scale are visible in expenditures on culture, church and media, see Figure 3 and Table 5. There is a connection between expenditures and municipality size, confirming the theory of a U-shaped relationship. However, the results of the analysis show that these expenditures have a greater dispersion of values, which means that there are significant differences in expenditure-per-capita levels among municipalities of similar sizes.

This might be due to the aggregation of three expenditure areas – culture, church, and media – into one.

Figure 3
Expenditures per capita on culture, church and media in CZK, 2012

Culture, church, media

log-linear (polynomial)
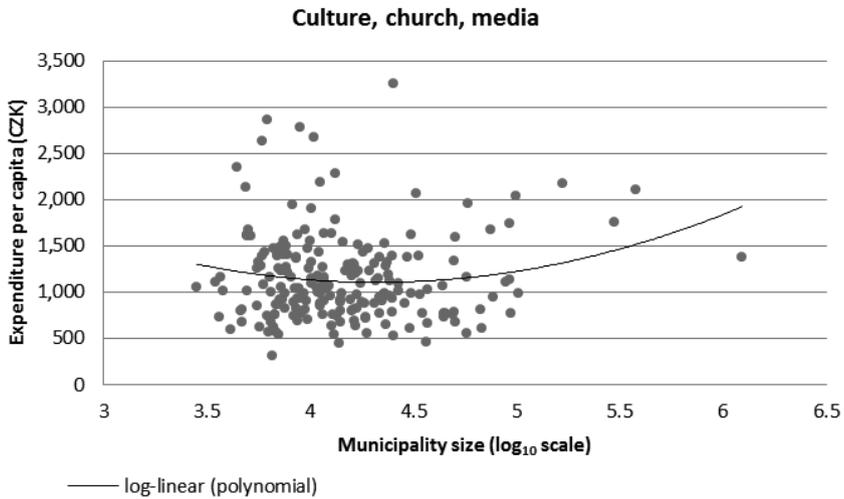
Table 5
Expenditures per capita on culture, church and media
by population size categories, 2012

Municipality size	Average (CZK)	Median (CZK)	Standard deviation (CZK)	Count
<5,600	1,226.00	1,082.78	489.51	18
5,600–10,000	1,159.62	1,048.28	491.56	63
10,000–17,800	1,139.34	1,074.52	426.84	55
17,800–31,600	1,105.51	993.79	454.49	37
31,600–56,200	989.35	776.83	404.16	16
56,200–100,000	1,211.06	1,120.30	499.16	12
>100,000	1,679.74	1,752.51	448.69	5

Although expenditures on culture account for the largest part of these expenditures, they are very heterogeneous (e.g. theatres, musical activities, libraries, museums and galleries, expositions, protection of historical sites), and some could be less sensitive to population variations and more influenced by other factors, such as the mode of service provision or even the simple presence of relevant facilities in the municipality.

3.3 Environmental protection

Environmental-protection expenditures (EPE) show an almost linear growth trend in the examined years, and of all the services show the largest deviation from the trend, as well as dispersion, see Figure 4 and Table 6.

Figure 4

Expenditures per capita on environmental protection in CZK, 2012

Environmental protection

— log-linear (polynomial)
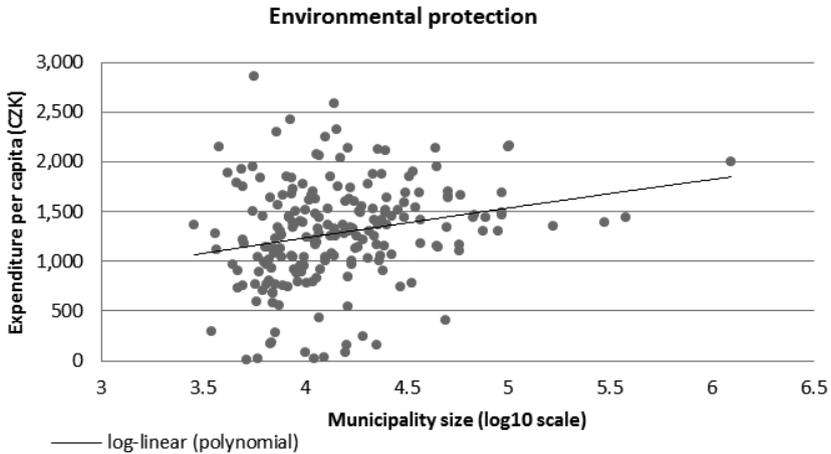
Table 6

Expenditures per capita on environmental protection
by population size categories, 2012

Municipality size	Average (CZK)	Median (CZK)	Standard deviation (CZK)	Count
<5,600	1,264.77	1,241.26	575.54	18
5,600–10,000	1,147.48	1,051.13	515.94	63
10,000–17,800	1,278.78	1,300.07	573.05	55
17,800–31,600	1,338.99	1,409.14	408.27	37
31,600–56,200	1,465.32	1,587.53	437.51	16
56,200–100,000	1,470.92	1,451.85	265.12	12
>100,000	1,665.15	1,435.05	343.28	5

EPE expenditures vary between 1,071 and 1,595 CZK/capita/year, in Prague around 2,100 CZK/capita. The average value is 1,354 CZK/capita/year, and the median value is 1,368 CZK/capita/year. Larger municipalities tend to have higher ex-

penditures per capita than smaller municipalities, and EPE tends to grow over time. The linear growth trend of EPE might be due to the heterogeneous composition of this expenditure category, consisting of protection of ambient air and climate; wastewater management; waste management; protection and remediation of soil, groundwater and surface water; noise and vibration abatement (excluding workplace protection); protection of biodiversity and landscapes; protection against radiation (excluding external safety); and other environmental-protection activities. A major part of these expenditures are part of the waste management and the protection of biodiversity and landscapes, see Table 7.

Table 7
Environmental-protection expenditures, 2012

Areas of environmental protection	EPE per capita (CZK)	EPE (mil. CZK)	Ratios on the whole sum of EPE
Waste Management	803.25	5,089.37	53.32 %
Biodiversity	479.82	3,908.18	40.95 %
Wastewater	90.31	431.88	4.52 %
Remaining areas	10.97	115.06	1.21 %

EPE expenditures on items other than waste management, biodiversity and wastewater are rather marginal.

3.4 Housing, municipal services, development

Expenditures on housing, communal services and territorial development also do not show economies of scale, see Figure 5.

Figure 5
Expenditures per capita on housing, municipal services
and development in CZK, 2012

Housing, municipal services, development

log-linear (polynomial)
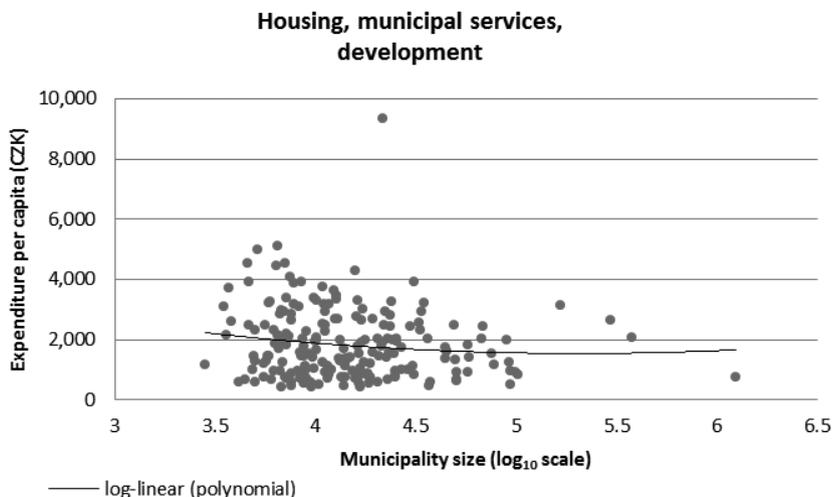
If the size of a municipality increases, the expenditures per capita decrease (see Table 8). This is because these expenditures, excluding expenditures on housing, mainly include expenditures on public lighting, funeral services, local heat supply and the management of flats which the municipality owns. The shape of the trend may also result from the fact that these expenditures are not mandatory spending. They depend on the decisions of political authorities of the municipality.

Table 8
Expenditures per capita on culture, church and media
by population-size categories, 2012

Municipality size	Average (CZK)	Median (CZK)	Standard deviation (CZK)	Count
<5,600	2,142.22	1,805.64	1,373.06	18
5,600–10,000	1,886.64	1,691.30	1,166.25	63
10,000–17,800	1,780.07	1,384.19	1,014.64	55
17,800–31,600	1,866.57	1,586.36	1,487.09	37
31,600–56,200	1,652.82	1,603.76	850.35	16
56,200–100,000	1,403.47	1,324.49	548.04	12
>100,000	1,887.57	2,075.48	942.55	5

3.5 Education

The results of the log-linear regression analysis show that economies of scale can be clearly demonstrated in expenditure on education. Figure 6 shows that the number of inhabitants is the key independent variable affecting expenditure on education. The existence of economies of scale in this area is associated with the fact that municipalities with extended powers ensure education only at the primary-school level, where there is less fluctuation of pupils than at the secondary-school and university levels. This expenditure has a minimum variance.

Figure 6
Expenditures per capita on education in CZK, 2012
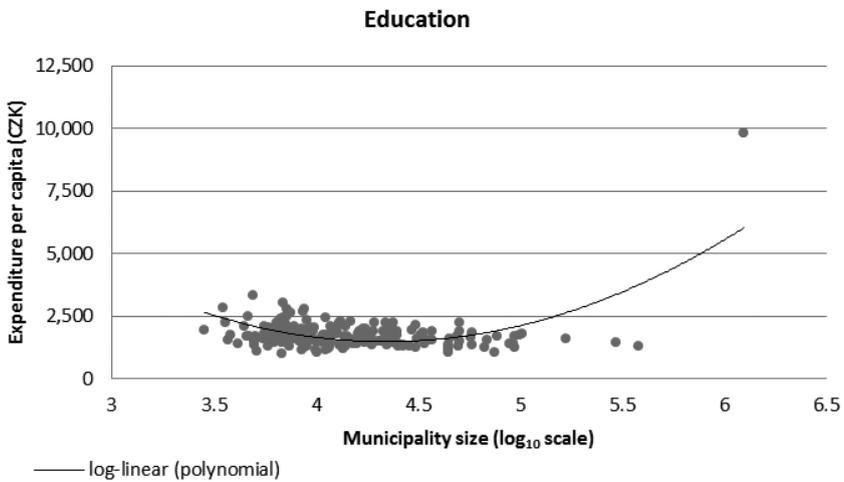
The existence of economies of scale can be confirmed for expenditure on education. This analysis was therefore extended to search for the effective size of the municipality for the service. The analysis of economies of scale determines the interval for effective provision of educational services to be between 19,600 and 22,000 inhabitants, and the most effective municipality size is 19,966 citizens, see Table 9.

It is interesting that the lowest average expenditures per capita are in regional capitals except for Prague. This contradicts the results of the effective municipality size.

If the analysis were extended to include a more detailed analysis of the provision of this particular public service – education – then it would be possible to focus on whether these municipalities provide similar services. In the Czech Republic, the municipalities finance preschool education, elementary schools (1–5 grade), middle schools (6–9 grade), elementary art schools and special schools (Tables 10 and 11).

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Table 9

Expenditures per capita on education by population size categories, 2012

Municipality size	Average (CZK)	Median (CZK)	Standard deviation (CZK)	Count
<5,600	1,872.14	1,697.37	542.88	18
5,600–10,000	1,829.75	1,707.32	423.61	63
10,000–17,800	1,637.07	1,600.44	301.55	55
17,800–31,600	1,665.76	1,637.82	286.10	37
31,600–56,200	1,573.48	1,542.89	291.43	16
56,200–100,000	1,480.01	1,466.74	234.39	12
>100,000	3,189.05	1,606.60	3,307.85	5

Table 10

The scope of education services in municipalities in the interval effective size of the municipality and expenditure on them

Name of municipal-ity	Pop.	Expenses per capita	Pre-school education	Elementary schools (1–5 grade)	Elementary schools (1–9 grade)	Elementary art schools	Special schools (practical, language)
Mělník	19,346	2,244.76	5	1	4	1	0
Žatec	19,203	1,874.78	7	0	6	1	1
Hranice	19,745	1,333.10	9	1	5	1	1
Blansko	20,841	1,499.21	7	0	6	2	0
Náchod	20,434	1,492.87	7	3	4	1	0
Kutná Hora	20,470	1,484.47	3	0	5	1	1
Vyškov	21,496	1,886.04	11	1	6	1	0

According to the results presented in Tables 10 and 11, population is not a key factor in the economies of scale. A more relevant variable seems to be the number of students under 14 years of age whose education is financed from the municipal budget.

Table 11

The scope of education services in regional capitals and expenditure on them

Name of municipality (type A)	Pop.	Expenses per capita (CZK)	Pre-school education	Elementary schools (1–5 grade)	Elementary schools (1–9 grade)	Elementary art schools	Special schools (social, language)
Karlovy Vary	50,172	1,309.06	5	2	10	2	0
Jihlava	50,598	1,903.11	3	0	13	1	2
Zlín	75,555	1,042.73	26	0	17	4	3
Pardubice	89,467	1.373,24	32	2	19	3	2
Hr. Králové	93,035	1,408.94	24	1	24	4	3
Č. Budějovice	93,467	1,699.34	25	2	18	6	4
Ústí n. Labem	93,747	1,234.17	33	1	21	4	3
Olomouc	99,471	1,730.46	30	1	25	4	3
Liberec	102,113	1,782.63	43	0	28	2	2
Plzeň	167,472	1,606.60	51	5	30	7	3
Ostrava	297,421	1,444.01	75	5	73	10	8
Brno	378,327	1,314.73	148	12	74	20	6

4. Discussion

In the analytical part of this paper, we investigated the relationship between the size of a municipality and economies of scale in the provision of municipal services (sports and leisure activities; culture, church and media; environmental protection; housing, municipal services and development; and education) in a sample of 205 municipalities with extended powers in the Czech Republic. We used the open-linked government data of the Czech Republic. Data was collected for three years (2008, 2010, and 2012) but presented only for 2012[6], as the bulk does not show any significant relationship or trend.

The results from the analysis of the economies of scale in all public expenditure areas are really interesting and do not correspond to the outcomes of foreign studies (e.g. De Witte and Geys 2011; Bönisch et al. 2011; Dollery and Fleming

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6   Since the results for all years did not differ, we have presented only the results for 2012.

2006; Montén 2009; Bel et al. 2010; Houlberg 2010; Parthan et al. 2012; Mikusova Merickova et al. 2014).

The results for the area of culture, church and media suggest economies of scale, but the variance of the values is too great, and it cannot be concluded that municipality size has an impact on the level of expenditure per capita. This contradicts some other studies that analysed economies of scale in culture (Taalas 1997; De Witte and Geys 2011; Bönisch et al. 2011). This difference might lie in the fact that these studies examined only one public service – De Witte and Geys (2011) and Bönisch et al. (2011) looked at public libraries and Taalas (1997) at theatres. Public libraries and theatres are probably closely connected with municipal budgets, and expenditure on them is more dependent on the number of inhabitants in the municipality. The combined scope of culture, church and media as public services might be too broad to examine expenditures as a whole, and it might be more effective to examine them separately (e.g. theatres, musical activities, libraries, museums and galleries, expositions and protection of historical sites).

Environmental-protection expenditures show similar results to expenditures on culture, church, and media This is again the result of a large heterogeneity in the area. There is an assumption that fixed costs are higher in more capital-intensive production. Thus, economies of scale are likely to be found in capital-intensive municipal services such as waste management and wastewater (Dollery and Fleming 2006; Bel et al. 2010; Parthan et al. 2012; Mikusova Merickova et al. 2014). However, this area includes 40 % expenditures on biodiversity, which includes nurturing the natural environment of a municipality, which is neither capital- nor labour-intensive and thus might explain the results of our analysis.

The results of the education-services analysis are very interesting. Overall it is possible to say that economies of scale are clearly present in expenditures on education, but detailed analysis rejects this. The results do not correspond to the outcomes of foreign studies. The data indicate that regional capitals have the lowest average expenses. One reason for this might be that the scale-economies theory holds true in this group of municipalities, where the structure of the provided services is essentially homogeneous, so the dataset can be used to seek the optimal municipality size with respect to the expenditure per capita. As Tables 9 and 10 show, the structure of the provided services is not entirely homogeneous. Obviously, it is not possible to examine the expenditures on education as a whole; they must be examined separately as individual services (preschool education, elementary schools (1–5 grade), middle schools (6–9 grade), elementary art schools and special schools). The possible existence of economies of scale was already suggested by studies by Bradley and Taylor (1998), Kirjavainen and Loikkanent (1998), Meier and Bohte (2000), Blom-Hansen (2004), Montén (2009), Houlberg (2010) and Montén and Thater (2010). We will continue to analyse this area in our future research.

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5. Conclusion

According to the existing research, potential economies of scale at the municipal level are primarily related to public administration and the costs of political representation. The expenditures per capita for having a local council may decrease as the number of inhabitants increases, as well as the costs for having a chief executive officer and other administrative personnel. Every municipality will need a minimum amount of personnel, buildings and machinery to even start "production", and this also includes having a minimum of administration (Houlberg 2010). If we focus on the individual services provided by municipalities (education; culture, church and media; sports and leisure activities; health care; housing, municipal services, development; and environmental protection), the existence of economies of scale can be partially demonstrated only for expenditure on education, but this conclusion is questioned by a detailed analysis, which shows that regional capitals have lower expenditure per capita and thus rejects the possible presence of economies of scale.

Overall, it can be said that economies of scale cannot be clearly identified for local services in municipalities with extended powers in the Czech Republic and that the size of a municipality is not a key factor influencing the provision of individual local services. This might be because these services are significantly heterogeneous and affected by various factors, even at the level of the individual type of service (mode of service provision, level of capital intensity of service, level of labour intensity of service, etc.).

Results of the analysis can also be affected by the quality of available data, especially the limited reliability of data provided by municipalities.

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