PERFORMANCE OF SLOVAK MUNICIPALITIES AND THEIR SERVICE PROVISION IN THE AREA OF CHILD CARE

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ABSTRACT

The paper analyzes a performace in the provision of child care services at the municipal level and factors of political, socio – economic and competition features potentially affecting it. The analysis is based on a dataset from the year 2014 on the local child care expenditures of 1672 municipalities. The first stage of the analysis measures the technical efficiency by using nonparametric approach - Data Envelopment Analysis (DEA). Besides the benchmark of relative efficiency scores, it uncovers if the municipalities benefit from economies of scale or not. In the second stage, we consider exogenous variables and analyze them by tobit regression to identify the determinants of efficiency. The results confirm high potental for rising returns to scale in majority of small municipalities. Another significant impact on efficiency level were identified for municipalities with high rate of inhabitans over 65 years old, higher concentration of facilities and the share of childre in private centers.

JEL: *H42, H72, J13*

KEYWORDS: *Child care, scale efficiency, technical efficiency, municipal service, DEA*

INTRODUCTION

The current economic and financial context, together with long-term social, demographic and environmental issues, requires governments to provide more and better services with fewer resources, to improve their performance constantly (Peters et al. 2011; Boyle and MacCarthaigh 2011, Accenture, 2013 and others). According to Bartlett (2009), for the next decade the most urgent public policy question will be: how can public services achieve more for less, providing services that meet people's needs - achieving effectiveness, while costing less, achieving economy and efficiency?

Central and Eastern European countries suffer from the heritage of the old regime, "from limited economic performance in these countries, and where the public sector has much fewer resources compared to more developed countries" (Nemec, Wright, 2013). However, this "performance gap" and public sector efficiency is high on the administrative and politicical agenda both in Europe and United States today.

Assessing efficiency helps to determine the course of action the decision maker should take for improving the performance of all the inefficient units (Melao, 2005), and public management in its modern and developed form has a great potential to make the use of public resources more economic, effective, efficient and transparent (Nemec, Wright, 2013).

Local governments are responsible for plenty of public services today and manage significant share of public finance. Not only their powers and number of responsibilities given by law have increased, growing financial constraints came hand in hand with the decentralisation processes. One of the sources of these constraints in Slovakia, as we assume, is the very high rate of administrative fragmentation with around 2 thirds of small municipalities under 2000 inhabitans. This feature unables them to profit from potential economies of scale.

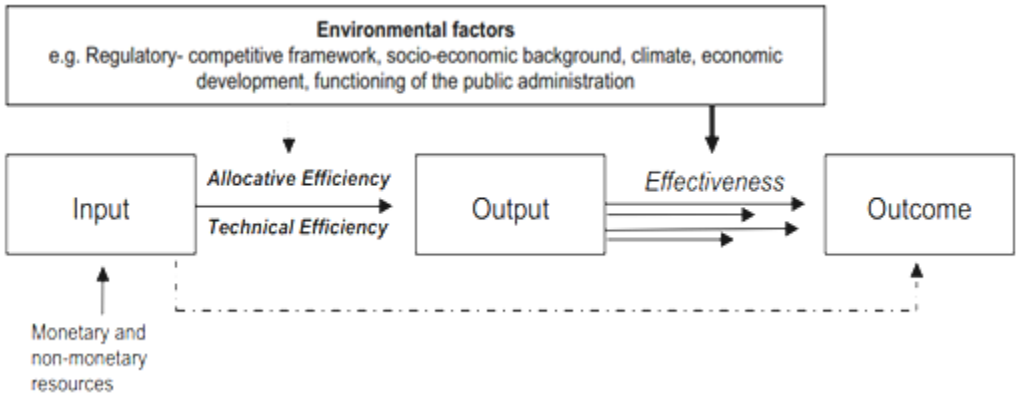
Holzer (2009) assumes a U – shape relation between population size and expenses per capita. Katsuyama (2003) speaks about consensus among researchers who have studied consolidation efforts, that nearly 80 percent of municipal services and activities do not possess economies of scale beyond a population of approximately 20,000 residents. Besides the size, attention is increasingly paid to other external factors of various economic, socio-economic, demography factors and factors such as competition ownership or the type of governance influence in the roots of New Public Management, or Public choice theory (see Montén and Thater, 2009).

In this paper we focus on testing the theoretical assumptions of inverted U – shape relationship between efficiency scores gained by the municipality in the area of child care service and municipality size, accompanied by another possible factors affecting it. Consolidation in the area of education and child care is currently a very discussed topic. Underperforming system of child care centers and schools with worsening outcome indicators needs to be put back on a track of efficiency in order to save some more resources for the adequate investments.

1 PUBLIC SECTOR EFFICIENCY IN THE BROADER CONTEX

The public sector production process is handled by the resources used (inputs), the activities (or processes) carried out, the goods and services produced (outputs) and the effects achieved (outcomes). These relationships between them are respectively, economy, efficiency and (cost) effectiveness (Bouckaert and Auwers 1998 in: Stroobants & Geert Bouckaert, 2012), which all together create the conceptual and analytical framework for the performance assessment.

Figure 1 Conceptual framework of efficiency and effectiveness



Source: Mandl, U., Dierx, A., Ilzkovitz, F. (2008)

In this paper we focus on the efficiency only, which is the ratio of output and input, or weighted sum of outputs and inputs simultanously. Efficiency in public sector, these days, is very strongly connected to budgetary issues, facing the aging population, or other socio – economic and environmental challenges. At the same time, there are tax payers, having higher expectation and tending not to trust the government to provide the services sufficiently (IPSOS mori, 2012). There is a rising preasure on governments to take action.

It is also essential to keep in mind that efficiency does not simply mean implementing cuts in public services, or departments. It needs to stand in relationship with effectiveness and quality of service delivery, and in this way being part of a broader 'Value for Money' perspective. 'Value for Money' is high when there is an optimum balance between successful outcomes, high efficiency and productivity, keeping relatively low costs (Audit Commission 2005 in: Stroobants & Geert Bouckaert, 2012).

2 PREVIOUS STUDIES

In the literature, there are two branches recognized for the municipal efficiency research. The first one focuses on overall efficiency assessment of local governments (see Ferreira da Cruz, Marques, 2013; Dong, 2007; Drew, Kortt, Dollery, 2015). The reason was usually connected with evaluating the consequences of administrative reforms or territorial consolidation (e.g. Australia, Brazil, Belgium), while methods used are usually based on frontier analysis (DEA, SFA, FDH) using tobit or bootstrapping methods in the second stage. The second branch is focused on the evaluation of single service. In the area of education and school districts efficiency, which is analogic to our municipal child care service provision, for example Duncombe, Miner, and Ruggiero (1995), Duncombe and Yinger (2007) analyze the scale effects and district consolidation, acoompanied by potential savings (Dodson and Garrett, 2004). Interesting is the work of Gronberg, Jansen, Karakaplan, Taylor (2015) who apply stochastic cost frontier simulation, to study benefits of consolidation and effect of school market competition. They found a less competitive market structure is associated with greater cost inefficiency, and thus, with higher expenditures per pupil. After comprehensive literature review, authors Andrews, Duncombe and Yinger (2002) concluded, that „the costminimizing scale for districts is in the 2000–5000 pupil range, with costs sharply higher for very small districts with fewer than 300 pupils", which definitelly creates a U-shape curve. This paper, however, mostly follows the study of Montén and Thater (2010) evaluating efficiency of German local government in child care service provision, using Data Envelompent analysis and testing for nondiscretionary or external variables.

2.1 Sample and methods

The analysis in this paper consists of 2 stages. In the first stage we conducted an efficiency evaluation based on Data Envelopment Analsis (DEA). The second stage was devoted to regression analysis of external factors, while the gained efficiency score serves as a dependent

variable. We used two different samples, both of them came out of the data set, in its original form of 1686 municipalities, expressing the municipal expenditures for the child care – providing a child care service. After cleaning the dataset from missing or inconsistent data, we came to the first sample of 1672 municipalities. The second sample was created in order to better suit for Data Envelopment Analysis (DEA) weaknesses, such as high sensitivity to extreme values. Hence, the second sample was reduced from the outliers in the area of expenditures, personnel or number of children, which could potentially affect the efficiency frontier. The second sample thus was reduced to 1629 municipalities. Most of the municipalities are very small, up to 2 000 inhabitans (78 %). Within the hypothetically most effective group (50 000 – 99 999 inhabitants) there are 8 municipalities. The second sample was left without municipalities bigger than 50 000 inhabitans and less of those in the category of 20 000 – 49 999 inabitans.

Table 1 Number of municipalities in size categories within the sample

	Total nr.	With possible outliers			Without outliers		
size cathegories	muni	Nr.	ratio	Cum.	Nr.	ratio	Cum.
199 or less	392	7	2%	0%	7	2%	0%
from 200 to 499	742	254	34%	16%	254	34%	16%
from 500 to 999	765	563	74%	49%	563	74%	51%
from 1 000 to 1 999	574	478	83%	78%	478	83%	80%
from 2 000 to 4 999	283	242	86%	92%	242	86%	95%
from 5 000 to 9 999	61	57	93%	96%	57	93%	98%
from 10 000 to 19 999	34	28	82%	97%	24	71%	99,8%
from 20 000 to 49 999	34	34	100%	99,5%	4	12%	100%
from 50 000 to 99 999	8	8	100%	99,9%	0	0%	
100 000 and more	2	1	50%	100%	0	0%	

Several techniques have been developed to analyze potential, output, and outcome efficiency, including ratio analysis, unit cost analysis, cluster analysis, risk adjustment, regression or multi-level analysis. Frontier analysis is another type that aims to evaluate the cost (production) frontier of units in the considered sample and finds the distance from this cost frontier for each DMU. The most common methods of frontier analysis are stochastic frontier analysis (SFA), which is a stochastic and parametric method and data envelopment analysis (DEA), a deterministic, non-parametric method (Reiljan et al., 2015). All of them, including frontier analysis methods, that were chosen in this paper, have their strengths and weaknesses.

DEA was originally introduced as a „new Management Science tool for technical efficiency analyses of public sector decision making units (Charnes, Cooper, Lewin and Seiford, 1994), and however, beeing considered as powerful linear programming technique, discussion

and applicatiion of DEA is not found as often as other decision-making techniques in mainstream literature (Yang, Miller, 2008).

DEA was chosen for several reasons. The technique is ideal for use in the public sector, because (as explained by Charnes, Cooper and Rhodes (CCR) in their seminal paper 1978 article) the public sector managers are not free to divert resources to other programmes for their profitability or attractiveness. Comparing to ratio analysis, the main benefit is the possibility to include more inputs and output simultanously. Regression models (unless they are corrected) for example do not really finds an inefficient units, they only compare the unit to the average Decision making unit (DMU) rather than to the best performer (de Lancer Julnes, 2000) and comparing to SFA, an assumption is needed about the functional shape of the analysis, while in DEA not (Reiljan et al., 2015). Another thing that makes DEA appropriate is non-parametric approach. Therefore it does not depend on specific population distributions and does not reqire samples from normally distributed populations. Yang and Miller (2008) therefore say the advantage is its generalizability. The drawbacks are connected with weighting the importance of inputs/outpus, or sensitivity about outliers and data errors, however, there are some methods for minimizing the risks.

DEA Measures the „relative efficiency" of DMUs because a hypothetical composite DMU is constructed based on all the DMUs in the reference group. The other DMUs are then evaluated relative to this efficient DMU. In the economic theory of optimization, an organization is considered to be technically inefficient „if it can not increase the amount of one of its outputs without reducing other outputs or increasing inputs" (Hughes and Edwards, 2000, p. 653). The efficiency rating is relative to some maximum possibility so that always efficiency (E) > 0 but <=1. This condition, Pareto efficiency, implies that in order an organization to be considered efficient in producing its outputs, no other DMU or a combination of organizations in the reference set can produce more of an output without producing less of any other output and without using more resources (Bessent and Bessent, 1980 in: Yang, Miller, 2008)

There are two kinds of analysis DEA offers, considering output or input orientation. In this paper we concentrate on savings rather than increasing the outcome. Another decision, which is allowed by DEA is the choice between constant or variable returns to scale. Based on the theory on optimal municipality size and efficiency, we chose the model for Variable returns to scale.

In Table 2 there are inputs and outputs for the estimation of the technical efficiency score, which are used in 4 constructed models. Child care expenditures (x1) represent operational costs for one year budget of the municipality, cleaned from capital investments.

Personnel (x2) is a sum of all teachers – pedagogic staff (x3) and non-pedagogic staff working in the area of child care. Facility density is the number of facilities per km^2. Since the municipalities can control how many facilities they operate, this variable accounts for sized differences and differences in fixed costs from having multiple units (Montén, Thater, 2013).

Table 2 DEA Inputs and outputs

Inputs	**Category**	**DMU**	**mean**	**stdev**	**min**	**max**
Child care expenditures		x1	134239,8	382878,4	26,8	5441601
Personel		x2	9,983134	29,172	0,7	426,1
Number of teachers		x3	7,518421	21,571	0,2	332,1
Number of non-pedagogic personnel		x4	2,564713	7,8181	0,1	146,7
Facility density		x5	1,96317	1,258075	0,08	9,35
Outputs	**Category**	**DMU**	**mean**	**stdev**	**min**	**max**
Number of children together	Efficiency	y1	77,448	219,67	3	3194
Number of children less than 3 years old	Efficiency	y2	4,7362	12,331	1	269
Number of children 3-4 years old	Efficiency	y3	41,166	117,60	1	1620
Number of children 5-6 years old and more	Efficiency	y4	35,141	94,003	1	1308
Number of children with special educational needs	Efficiency	y5	1,3163	1,2405	1	23
Demand for child care	Quality	y6	1,3157	1,0208	1	10

There are 6 outputs representing efficiency and one indicator representing quality indicators. Number of children together (y1) is sum of all children, regardless the age or type of the preschool facility they visit.[1] Following indicators (x2, x3, x4) are sorted according to age group and indicator (y5) identifies number of children with special needs. The logic of this division lies in different conditions and standards connected with each group (e.g. number of teachers, material) and might have an influence in DEA estimation. Demand for child care (y6) is the indicator which stands for outstanding (rejected) requests. We assume, that higher number of rejected request means higher demand, that way increase quality and higher motivation to maintain the facility. It was coded from 1 to 10 (1 – zero rejected, 10 – 100% and more rejected requests).

In the following table (Table 3), there are 4 models and four uniqe combinations of variables we estimate. DEA is very sensitive about inputs and outputs, therefore the score of technical efficiency might vary. First three models use only the output indicators of efficiency. Model 4 incorporates 2 indicators of quality, which makes it a bit different. Model 1 is the simples, using 2 inputs and 1 agregated output. Model 2 distingueshes among different groups of children,

[1] Preschool education is an original competence of local government in Slovakia. Accordying to law 596 and 597/2003 and their amendments, not only public preschools are financed by local government, since 2007 also private and church facilities receive a same payment for operational expenditures. The amount of money is negotiated and launched in a form of generally binding decision of the city council

according to age or special needs at the output side and between pedagogic and non-pedagogic personnel at the input side. Model 3 incorporates, as the only one, the variable of Density of facilities.

Table 3: Inputs and Output variables in different models

Inputs	**Var.**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Child care expenditures	x1	x	x	x	x
Personel	x2	x		x	x
Number of teachers	x3		x		
Number of non-pedagogic personnel	x4		x		
Facility density (number of facilities per km2)	x5			x	
Outputs					
Number of children together	y1	x		x	x
Number of children less than 3 years old	y2		x		
Number of children 3-4 years old	y3		x		
Number of children 5-6 years old and more	y4		x		
Number of children with special educational needs	y5		x		
Demand for child care	y6				x
Student Teacher Ratio	y7				x

For the purpose of this paper we have created three hypotheses. The first and the second one are based on works of authors deploying the theories of economies of scale (Alesina and Spolaore, 2004) and unit costs in public sector. Holzer et al. (2009) conducted a literature review related to optimal municipality size and efficiency. According to him, the findings are „somewhat inconsistent", and two main substantive conclusions and one technical point stand out: **„**There is an inverted U-shaped relationship between size and efficiency on a general level. Efficiency increases with population size up to about 25,000 inhabitants, at which point it is stable until about 250,000 inhabitans, and declines with population after that. In essence, the curve states that the smallest and largest municipalities are least efficient. The (inverted) U-shaped relationship is not consistent when evaluating specific service types", and „there are many distorting influences on cost per capita as a measure of efficiency, leading to a serious lack of comparability between jurisdictions" We form the first hypothesis as follows:

H1: The relationship between the efficiency and size of population in a form of U-shape curve is confirmed (efficiency score rises by the size categhory)

The analyst using DEA may choose between assumption of constant return to scale (CRS), when the organization is able to linearly scale the inputs and outputs without increasing or decreasing efficiency, or variable returns to scale (VRS), increasing or decreasing returns to scale. While

CRS tends to lower the efficiency score while VRS tends to raise efficiency it. Small municipalities, which present around 80% of the sample, according to theory, function under condition of rising returns to scale, which is causing the inefficiency and there is still space for better results. Analogically, decreasing or constant returns to scale are present at the bigger size categories. We formulate second hypothesis as follows:

H2: Majority of the sample express rising returns to scale

Same like choosing correct inputs and outputs, there are factors of environment that may play a significant role in affecting the performance level. Besides the size of the municipality, there are other internal or external factors. In this paper we test for three kinds of variables, political, socio-economic and of competition nature, while being inspired by Montén and Thater (2009)

Table 4 External variables

	External variables	**DMU**	**mean**	**stdev**	**min**	**max**	
political	*HHI political party concentration*	e1	0,458	0,181	0,012	1	+
	New mayor (non re-elected)	e2	0,648	0,477	0	1	-
Socio-economic	*Ratio 3-5 years old*	e3	1,141	0,516	0,208	8,66	+
	Population ratio 65+	e4	14,09	3,347	1,248	29,3	+
	Current account balance	e5	-0,01	2,238	-65,1	0,72	+
competition	*Concentration of facilities per 1000 inhabitants*	e6	1,21	0,849	0,049	6,84	-
	Ratio: children in private facilities	e7	0,003	0,028	0	0,534	+
	HHI schools type of founder concentration	e8	0,98	0,056	0,441	1	-

H3: External factors are statistically significant

Herfindahl-Hirschman Index (HHI) of the political concentration, tells us about the concentration of parties in the local governments. It is computed as a sum of squares of percentual participation on power:

$$H = \sum_{i=1}^{n} s^2 i$$

Si is % ratio of seats (votes) during election of party *i*, N is number of political parties (coalitions), HHi score ranges from 0 to 1, higher the concentration is, higher higher efficiency is expected. Another political external variable is ***new mayor (no re-election),*** a dummy variable (1 for re-elected mayor, 0 for the new mayor) after the communal election in 2010. Our assumption is that the change in governance tends to lowering efficiency.

Socio-economic variables are represented by two demographic variables and one indicatior of financial stability of the municipality. Demographic changes are one of the biggest challenges mainly smaller municipalities face. Koziol (2015) studies impact of shrinking regions to technical infrastructure, one of the impacts is increasing unit costs for their inhabitans. First demography indicator is ***ratio of 3 – 5 years old children*** in years 2014 and 2004. It represents a new environment condition, they need to adapt for. Decreased number of children may cause the rising inefficiency, analogically, an increase should cause more efficient service provision. The score lower than 1 represents an increase, and higher than 1 a decrease of 3-5 year olds population. Second demographic variable is the **share of 65+**, which is a ratio of inhabitants older than 65 years towards total population of the municipality. If the share of population is higher, then interests and investments focus rather on specific areas, such as social or health care services. In other words, child care is not a priority, therefore the allocation of resources decreases. On the other hand, analogically, there is an assumption, that by lower expenditures, the level of efficiency may rise. Indicator **Current account balance** is a variable expressing financial health of the municipality. It is constructed as a ratio of current income extracted from current expenditures, devided by current income (INEKO, 2016). It informs if a municipality creates surplus or deficit. There is an assuption of positive relationship between the level of efficiency and financial health.

Another set of indicators is of competition type. **Concentration of facilities**, computed as number of facilities on 1000 inhabitans, informs about possibility for returns to scale, but on the facility level. We assume that lower number of bigger facilities will bring higher chances for effectivenes.

Privatisation is an indicator, which puts public and church facilities into one group, and private facilities in the second group; expecting municipalities with higher ratio of students visiting the private facility to be more effective.

In order to compute **Herfindahl-Hirschman Index (HHI)** for the founder concentration, similarly like in the political concentration, we sum up the squares according to the type of founder, while taking into consideration the number of students visiting public, private or church facilities. Causality of this variable is following: the lower the index of centrality is, the higher efficiency is expected, since more competition is present. This kind of indicator was used for example by Gronberg, Jansen, Karakaplan, Taylor (2015).

Because DEA efficiency score takes on the form of interval <0,1>, which does not support the requeirement for normal distribution, it is neccessary in the second stage to use nonparametric mothods, such as censored regression model. For testing the relationship we use

Tobit regression analysis. It is designed to test the linear relationship between variables when there is either left (bellow) or right (above) censorring in the dependent variable.

$$\hat{\delta}_i = z_i\beta + \varepsilon_i$$

Efficiency scores (δ) are regressed on non-discretionary factor (z):

2.2 Results

In the table we may see the correlation coeficients among models. What is interesting, there is a very strong correlation between models 1 and 4, despite the fact that in the model 4, the quality indicator was also included. It means that efficient units are at the same time those that are demanded. On the other hand, between model 2 and 3 there is only a weak correlation.

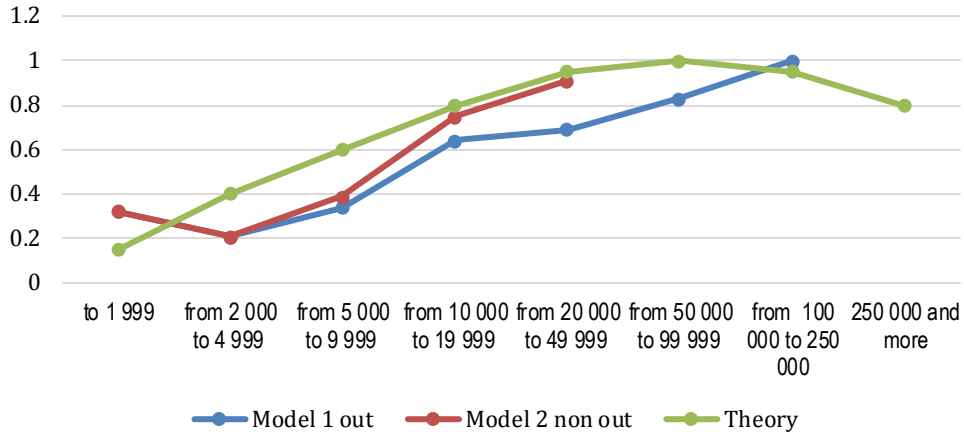
Table 5 Bivariate relation between models

	model 1	*model 2*	*model 3*	*model 4*
model 1	1			
model 2	0,577235	1		
model 3	0,530476	0,277329	1	
model 4	0,951121	0,559867	0,505405	1

Next we have compared the levels of efficiency in different DEA models. CRS model tends to be stricter than the VRS model, because it does not suggest a convex shape of the frontier. On average, the highest levels of efficiency, and so the best performing rusults were gained by the municipalities in combination of model indicators in all CRS, VRS and model 4 in Scale efficiency. The lowest performance on average was gained in the model 1 in VRS and CRS, and lowest scale efficiencies in the model 3. Model 2 had the highest share of efficient units (17%), while others only 1% and 2% (Table 6). Importantly, there were no significant changes in the sample without outliers, so even despite their higher values of input or output indicators, they were not building the efficiency frontier.

After computing the average level of efficiency in the specific size categories and comparing it with the theoretical inverted U shape curve of the efficiency (based on Holzer, 2009), we may not confirm the assumption. The efficiency level is rising by the size, expect of small size municipalities under 1999 inahabitans category. They achieve the efficiency level equal to municipalities from 5 000 – 9 000 inhabitans. The other side of the curve is not visible for Slovak municipalities since none of the cities in the sample exceed the size of 250 000 (see Holzer, 2009).

Chart 1: *Comparison of Model 1 with theoretical shape of inverted U shape of efficiency*



Results of the analysis of returns to scale are shown in Table 6. In each of the model, there is a majority of the municipalities performing on increasing returns to scale, while there is only 1% on performing on decreasing returns to scale (DRS) in Model 3 (without outliers), up to 11% in Model 4. After closer look at the municipalities with decreasing and increasing returns to scale, we may confirm the hypothesis that majority of small municipalities work inefficiently – not using the scale potential.

Table 6 Scale efficiency and returns to scale

	Model 1		Model 2		Model 3		Model 4	
	out	**no_out**	**out**	**no_out**	**out**	**no_out**	**out**	**no_out**
efficient	12	14	289	285	38	36	21	23
%	1%	1%	17%	17%	2%	2%	1%	1%
DRS	173	131	116	82	36	20	186	144
%	10%	8%	7%	5%	2%	1%	11%	9%
IRS	1495	1494	1536	1529	1624	1601	1477	1476
%	89%	92%	92%	94%	97%	98%	88%	91%

The second stage of the analysis was based on Tobit regression, where the dependent variable was the VRS efficiency score from the input oriented Model 1, and independent variables were the factors of the environment. Due to the results we discovered high correlation between indicator (e7) and (e8), we excluded HHI school concentration (e8). In Table 7 we may see the the results of the regression. For discrete models log likelihood it is the log of the probability of observing the data that has been observed given the model. The likelihood ratio chi-square of 465, 56 (df=7) with a p-value of 0.0000 tells us that our model as a whole fits significantly better than an empty model (i.e. a model with no predictors). Tobit regression coefficients are interpreted in the similiar manner to OLS regression coefficients; however, the linear effect is on the uncensored latent variable, not the observed outcome.

Table 7 Tobit Regression results

	Variable	**coeficient, (std.Err)**
e1	HHI political concentration	.0190597 (.0273368)
e2	Mayor re-election	-.0040577 (.0098306)
e3	Ratio 3-5 years old	-.003399 (.0091525)
e4	**Population ratio 65+**	.0031982 (.001441)**
e5	Current account balance	.0000641 (.0020875)
e6	**Concentration of facilities**	.0623321 (0059204)**
e7	**Children in private facilities**	1.219552 (.1517407)**
	_cons	.1949546 (.0261685)
	/sigma	.1536136 (.0033345)
	Log likelihood	(465.56473)

** (*) denotes a 5% (10%) level of significance.

Table 7 shows the coefficients (standard deviation in parenthesis) of the tobit regression model. A negative sign is interpreted as reducing efficiency (or increasing inefficiency). The coefficients of Population ratio 65+ (e4), Concentration of facilities (e6) and the share of private facilities (e7) were significant. An increase of 65+ population ratio by 1 unit increases the efficiency level by 0,003 units, which means our assumption might be correct. An increase in number of facilities per inhabitant (opposite of concentration, i.e. fragmentation of facilities) by 1 unit, is associated with an increase of efficiency level by 0,062 units. This means that our assumption about the economies of scale at the facility level were not confirmed. In case of an increase of ratio of children in private child care centers on total population by 1 unit, the efficiency would rise by 1.21 units. It means that presence of private facilities rises the efficiency. Other variables are not significant, however, political concentration, was close to support our assumption.

CONCLUSION

In this paper we have formulated three hypotheses we tried to test. Only one of them was confirmed, and it was the one about increasing returns to scale in majority of small municipalities. Analogically, decreasing returns to scale in bigger size cathegories supports the idea that small municipalities are far from the optimal size. The shape of the relationship between efficiency

score and the size of population was only partly following the expected theoretical inverted U-shape curve, which opens a new question about the way that small municipaliries provide or facilitate the service. It seems that very small municipalities are doing better than those of the size category 2 000 – 5 000 of inhabitans. We need to make further investigation whether the municipalities share the service with other municipalities or if they manage better with the energy savings. Closer look must be also taken on the factors of the environment and processes inside the government, such as management, leadership, human resources. For example an exogenous factor, the share of private facilities, seems to benefit municipal efficiency. In real life, there is a problem, because there is a huge demand for cheaper service, provided by local government compared to private child care centers complemented by parents' payments. If we look at the problem from the other side, there is high rate of rejected requests for placing the child, which supports this argument, because it translates into huge number of unsatisfied citizens. Unfortunatelly measuring the quality in a proper way is currently impossible because of lacking data. The demographic indicator change in the group of children 3 – 5 years old, was not significant, which may mean that the municipalities do probably adapt to the changes from the efficiency point of view. It was supported also by the significant factor of the share of elderly population over 65 years old, which decreases financial resources for children and that way increases the efficiency. The last significant factor was concentration of facilities, measured as the number of facilities per 1 000 inhabitants. The lower the number is, the higher the returns to scale at the facility level were expected. Results, however, show the opposite trend, which also needs more research. We think it might be caused by sharing the buildings between child care centers and primary schools, which is quite common in Slovakia.

A challenge for the future is to conduct the analysis on a facility level, which would enable better insight into consolidation possibilities. Last but not least, it must be taken into consideration that this paper analyses only the efficiency part of the "puzzle", therefore all the results must be interpreted very carefully, and for the decision making purposes only accompanied by evaluation of quality and effectiveness, so in a broader context of performance.

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