International Conference at the Brno University of Technology,
Faculty of Business and Management, April 30, 2019 Brno, Czech Republic
**Perspectives of Business and Entrepreneurship Development in Digital
Transformation of Corporate Business**

Typology of Statutory Cities in the Czech Republic from the Perspective of their Indebtedness and Population

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Abstract

Purpose of the article Czech municipalities are public corporations which own property and undertake economic activity based on their approved budgets. The title "statutory city" is awarded to the largest cities of the Czech Republic, which are listed in Act Number 128/2000 Coll. The main purpose of the paper is to examine the relationship between the indebtedness of statutory cities (per capita) and their size (number of inhabitants), and the subsequent typology of these statutory cities based on these two attributes.

Methodology/methods Data were processed via standard methods of descriptive statistics, correlation analysis and cluster analysis.

Scientific aim The aim of the paper is to examine the relationship between the indebtedness of statutory cities (per capita) and their size (number of inhabitants), and the subsequent typology of these statutory cities based on these two attributes. The population factor (number of inhabitants) was selected based on bibliographical sources as well as based on data from the Ministry of Finance of the Czech Republic. The ministry itself assumes that the indebtedness of Czech municipalities is indeed related to their size: while indebtedness is not very common in the smallest municipalities (200–500 inhabitants), nearly all larger cities are indebted (with a handful of exceptions).

Findings Having calculated Spearman's correlation coefficient and the Kendall´s correlation coefficient, we can confirm a statistically significant medium dependency between the indebtedness of statutory cities and their population. Based on these results, we employed cluster analysis to generate a typology of statutory cities based on their indebtedness and size (population): three clusters were determined (S1, S2 and S3).

Conclusion We can cautiously state that the indebtedness of a Czech statutory city is related to its size, even though it is not possible to confirm with absolute certainty a statistically significant relationship based on these results.

Keywords: municipality, statutory city, indebtedness, cluster analysis, region, public administration

JEL Classification: H63, H72

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Introduction

The public administrative sector was among the first to be affected by the important post-1989 reforms; nonetheless, a long and somewhat tortuous journey was required to achieve present-day conditions. Municipalities, being the basic self-governing units, were formed as early as 1990. The form and hierarchy of higher territorial self-governing units were decided several years later (Průcha, 2011). The present-day regions were established pursuant to the Constitutional Act Number 347/1997 Coll., while the activities of regional governments were set out under Act Number 129/2000 Coll.

Pursuant to Articles 99 and 100 of the Constitution of the Czech Republic, municipalities are the basic territorial self-governing unit and every municipality is a part of a region as the higher territorial self-governing unit. The so-called mixed model of public administration established in the Czech Republic allows regions and municipalities to coordinate their respective public administrative activities (Průcha, 2011, p. 23). The status and tasks of municipalities and their authorities are governed by Act Number 128/2000 Coll., on municipalities (the Municipal Order), while the basic framework of economic activities is stipulated by Act Number 250/2000 Coll., on budgetary regulations of territorial budgets.

A municipality with at least three thousand inhabitants is a city as long as the request submitted by the municipality is granted by the Speaker of the Chamber of Deputies of the Parliament of the Czech Republic, subject to the government's concurring statement (pursuant to Section 3 of Act Number 128/2000 Coll.). Statutory cities are the largest cities of the Czech Republic, explicitly listed in Section 4 of the said act. Even though their number is relatively small (statutory cities make up only 0.5% of all Czech municipalities), their total population represents almost one quarter of the population of the Czech Republic (not including Prague). Statutory cities may be divided into districts or boroughs with their own self-governing authorities (assembly). However, only seven of the 25 statutory cities are actually divided in this way.

Pursuant to Act Number 128/2000 Coll., municipalities are public corporations which own property and carry out economic activities under the conditions stipulated by the said act and within the framework of their budgets. In legal relations, municipalities act on their own behalf and bear responsibilities arising from these relations. The state is not responsible for the economic activity or liabilities of municipalities, but it can assume these liabilities on the basis of a contract (Section 38 of Act Number 128/2000 Coll.). Czech municipalities have very limited tax authority: within the framework of the applicable legislation they may only impose real estate tax and local fees. Therefore, they depend to a great extent on transfers from the state budget, in particular receiving their share in so-called shared taxes (value added tax, corporate income tax, individual income tax) (see Section 4 of Act Number 243/2000 Coll.).

The economic activity of a municipality is kept under internal and external review. The highest authority of internal review is the assembly of the municipality, while a mandatory external annual review is carried out by an auditor or the Regional Authority (depending on the size of the municipality). Furthermore, the Ministry of Finance of the Czech Republic monitors the economic activity of municipalities. Every year the ministry calculates a set of information and monitoring indicators for all municipalities and evaluates the results. Should the ministry identify a potential problem in the case of a particular municipality, the municipality in question is first notified by a letter from the minister and, subsequently, offered assistance with an analysis of the problem. In other words, the Ministry of Finance of the Czech Republic does not have leverage enabling it to limit ineffective economic management of municipalities, or to regulate their indebtedness, as the legislation of the Czech Republic does not stipulate or establish procedures in the event of municipal insolvency. An attempt to regulate the indebtedness of municipalities can be seen in the form of the adoption, after heated debate, of Act Number 23/2017 Coll., on the rules of budgetary responsibility, effective as of January 2018.

1 Survey of the relevant literature

In fact, public economy theorists do not oppose indebtedness, whether in terms of the state, regions or municipalities (Buchanan, 1998), (Stiglitz, 1997), (Musgrave and Musgrave, 1994); they do, however, recommend that regular expenditure be financed from current income (mainly from taxes, of course), while capital expenditure is financed from capital revenue – including loans or revenue from bonds issued. That being said, indebtedness (in the form of a loan or issued bonds) is generally admissible only during a recession or in relation to investment. Moreover, it is recommended that public investments are financed from a loan extended over a longer period (the debt is being repaid while the investment is being used) (Musgrave and Musgrave, 1994, p. 513). A similar opinion, i.e. that local investment projects ought to be financed via debts, is voiced e.g. by Holtz-Eakin (1991) and Cropf

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and Wendel (1998). Some authors (Stavins et al., 2003) also mention debt sustainability. Even though this term is admittedly somewhat vague, it can be understood as the ability and willingness of (local) governments to repay the debt and to refrain from increasing it in future (Botoc et al., 2011).

Many authors have researched factors affecting the indebtedness of regions and municipalities. With respect to conditions in the United States, Kiewiet and Szakaty (1996) write that the level of indebtedness of municipalities is affected by personal income per capita and the left-leaning government. Other authors take into consideration more socio-economic factors (e.g. population, percentage of immigrants, transfers and tax revenue etc.) (Guillamón et al., 2011). The same authors once again confirm the correlation between population and expenditure, but they also acknowledge the fact that such expenditure always increases one year prior to municipal elections (Guillamón et al., 2013). Increasing demands in the public sector (and the resulting indebtedness) stemming from population growth is mentioned by Rivers and Yates (1997), or by Wei-Te (1995) in the case of cities with a strong focus on tourism (although tourism stimulates economic growth, it also causes an increased burden on the local public sector).

In the Czech Republic, one inspiring text has focused on factors affecting indebtedness in the villages of the Pardubice Region (Hájek and Hájková, 2009). Its authors identified the effect of several factors as statistically significant, including population, fiscal autonomy (own sources of revenue), government supervision and a variety of local political factors. In contrast, the correlation between personal income and indebtedness proved to be statistically irrelevant.

2 Purpose of the paper, data source and methodology

The subject matter of this work is the indebtedness of 25 statutory cities in the Czech Republic. Prague was not included in the data set due to its very specific nature and size, which would have compromised the results (besides, it is both a city and a region).

The main purpose of the paper is to examine the relationship between the indebtedness of statutory cities (per capita) and their size (number of inhabitants), and the subsequent typology of these statutory cities based on these two attributes. The population factor (number of inhabitants) was selected based on bibliographical sources (Guillamón et al., 2011), (Guillamón et al., 2013), (Hájek and Hájková, 2009), (Rivers and Yates, 1997), as well as based on data from the Ministry of Finance of the Czech Republic. The ministry itself assumes that the indebtedness of Czech municipalities is indeed related to their size: while indebtedness is not very com-mon in the smallest municipalities (200–500 inhabitants), nearly all larger cities are indebted (with a handful of exceptions) (https://mfcr.cz).

Due to the nature of the topic under review, only secondary data sources were available: data on the number of inhabitants and indebtedness of statutory cities was obtained from monitoring conducted by the Ministry of Finance of the Czech Republic (https://monitor.statnipokladna.cz). As indebtedness may fluctuate year-on-year, the analysis is based (in the case of all statutory cities) on the average indebtedness per capita over the period of 2010–2017. The selection of this period was not accidental: it was chosen since this was the period in which the effects of economic recession manifested in the form of problems for municipalities due to lower transfers from the state budget, i.e. from national tax revenue. Furthermore, in 2012, changes in appropriation rules came into effect, resulting in a lower share of national VAT revenue going to municipalities.

Averages from the years 2010–2017 were once again used as data for the number of inhabitants of statutory cities. These data were processed via standard methods of descriptive statistics, correlation analysis and cluster analysis.

3 Results and discussion

Of the total number of municipalities in the Czech Republic, 3,262 of them were in debt (i.e. 52.2%). Pursuant to Section 17 of Act Number 23/2017 Coll., on the rules of budgetary responsibility (which stipulates that the debt of a territorial self-governing unit may not exceed 60% of the average amount of its revenue over the last four years), 456 municipalities did not meet the criteria. Based on the monitoring conducted by the Ministry of Finance of the Czech Republic, only six municipalities carried out their economic activities at higher risk levels in 2017 (see https://mfcr.cz). The overall indicators of indebtedness are presented in Table 1.

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Table 1 Summary of indicators of indebtedness of Czech municipalities

	2006	2008	2010	2012	2014	2016	2017
Total indebtedness (bln CZK)	80.9	80.1	83.3	90.0	88.9	71.9	69.0
Share of the four largest cities (%)	58.6	57.2	48.1	50.6	51.0	46.3	45.1

Source: Ministry of Finance of the Czech Republic

The highest level of indebtedness is shown for the period of 2012–2015, since which time it has been falling. Between 2012 and 2014, the Czech Republic experienced a lengthy economic crisis whose effects included lower tax revenue for public budgets. Furthermore, an amendment to the Act on Budgetary Allocation of Revenues came into force, which granted municipalities a smaller share in the national revenue from VAT. Even carrying out minor infrastructural renovations meant that municipalities were forced into greater indebtedness.

Traditionally, the four largest Czech cities (Prague, Brno, Plzeň and Ostrava) represent the highest proportion of overall indebtedness. Even though their contribution to overall indebtedness has been decreasing over the last few years, it is still significant. The largest share of total indebtedness is represented by bank loans (in 2017, 49.5%) and municipal bonds (in 2017, 10.4%). It should be noted, however, that only two cities issued bonds (Prague and Liberec), while other cities found it more convenient to take out "standard" loans or to apply for refundable financial assistance (e.g. from the state's extra-budgetary funds).

Loans from banks are typically used for renovation and building technical infrastructure, for pre-financing investment projects co-financed from European funds, or for the renovation and development of public housing. Other purposes include renovation of schools or sporting and other public facilities. These loans carry a relatively low interest rate and offer long maturity periods, which is why they are so convenient for municipalities in every respect.

3.1 Results of descriptive statistics

The basic results of the descriptive statistics for the 25 statutory cities in the Czech Republic are as follows:

Table 2 Descriptive statistics results

	Indebtedness per capita (CZK)	Average population
MIN	0	44,255
MAX	20,459	376,331
Median	7,477	67,161
Standard deviation	5,087	79,646
Coef. of variation	64.23	86.37
Top quartile	4,801	50,360
Bottom quartile	8,558	93,798

Source: Own calculation based on data from the Ministry of Finance

Here we can see significant differences among Czech statutory cities in terms of their indebtedness per capita: on one hand is the City of Teplice, with long-term zero indebtedness (the "0" figure in the table), on the other is the City of Liberec, with a debt of CZK 20,459 per capita (the MAX value in the table). The value of the coefficient of variation is interesting, as it suggests significant inhomogeneity of Czech statutory cities in terms of indebtedness per capita. In fact, even the value of standard deviation suggests the same: the absolute variability of cities from the perspective of indebtedness per capita is very high. This is even more significant in the case of figures related to average population levels: the minimum and maximum values, the values of the coefficient of variation and standard deviation all show that the set of statutory cities is inhomogeneous. There are smaller cities – the MIN value is that of Mladá Boleslav, as well as the largest cities (not including Prague) – the MAX value is that of Brno.

3.2 Results of correlation analysis

We used Spearman's rank correlation coefficient to determine the relationship between the rankings of individual variables. The result is as follows (Table 3):

Table 3 Spearman's rank correlation coefficient

	Indebtedness per capita	Number of inhabitants
Indebtedness per capita	1.000000	0.607692
Number of inhabitants	0.607692	1.000000

Note: The significance of these correlations is $p < 0.05$

Source: Own calculation based on data from the Ministry of Finance

Based on the values of Spearman's rank correlation coefficient, we can declare a statistically significant medium strength correlation between indebtedness per capita and the size of a city (population). These results for Czech statutory cities correspond to theories according to which the size of a city is a factor of its indebtedness (Guillamón et al., 2013), (Hájek and Hájková, 2009), (Rivers and Yates, 1997).

To complete the picture, in our analysis we also calculated the Kendall´s rank correlation coefficient. The results (see Table 4) only supported the aforementioned conclusion: there is a medium strength statistical significance for the correlation between the paired variables of indebtedness per capita and the size (population) of a city.

Table 4 Kendall´s rank correlation coefficient

	Indebtedness per capita	Number of inhabitants
Indebtedness per capita	1.000000	0.433333
Number of inhabitants	0.433333	1.000000

Note: The significance of these correlations is $p < 0.05$

Source: Own calculation based on data from the Ministry of Finance

3.3 Results of cluster analysis

To be included in the cluster analysis, variables must have shown at least medium strength dependence. Based on the results of the correlation analysis, we can still work with both variables, i.e. indebtedness per capita and population. As data are given in different units (Czech crowns, number of inhabitants) and show different levels and variability, we carried out standardisation to make sure that both variables had the same effect on the results of clustering. The Euclidean distance square was chosen as the measure of distance; Ward's method was applied to construct the clusters.

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Three clusters were determined based on evaluating the clustering results:

Table 5 Cluster analysis results

Cluster	Number of cities	Cities
S1	6	Ostrava, Brno, Liberec, Olomouc, Ústí nad Labem, Plzeň
S2	6	Prostějov, Teplice, Most, Děčín, Jihlava, Pardubice
S3	13	Frýdek-Místek, Zlín, Havířov, Hradec Králové, České Budějovice, Přerov, Mladá Boleslav, Jablonec nad Nisou, Karviná, Karlovy Vary, Opava, Chomutov, Kladno

Source: cluster analysis

Cities in cluster S1 are very different from the rest: these are the largest Czech cities with the highest indebtedness per capita. Three of these cities (Brno, Ostrava, Plzeň) are among the four (the fourth being Prague, which is not included in the analysis) cities whose total indebtedness represents approximately 50% of the total indebtedness of towns and villages in the Czech Republic. Liberec is the city with the highest indebtedness per capita, followed by Olomouc and Ústí nad Labem. All of these cities, with the exception of Olomouc, are divided into boroughs or self-governed districts. All of these cities have a significant share of student population (living in the city only a part of the year with no permanent residence).

Cities in cluster S2 are generally medium-sized cities with an average population of 58,830 (if Pardubice is not included, the average population is only 52,636) and show a low level of indebtedness (with Teplice as the only statutory city with zero indebtedness). It is definitely worth noting that three of the cities (Most, Teplice and Děčín) in this cluster are located in the Ústí Region, which shows above-average values of indebtedness per capita compared with other regions.

Cities in cluster S3 are larger, on average, than the cities in cluster S2 (with 62,500 inhabitants), but their indebtedness is significantly above average. This cluster is the largest of the three, but also the most homogenous.

From the results we can cautiously conclude that a correlation exists between the size of a city (number of inhabitants) and its indebtedness. Indeed, the highest indebtedness is found in the largest Czech cities and below-average indebtedness in small and medium-sized cities. However, the set does contain some anomalies: e.g. Pardubice (cluster S2), one of the larger cities (almost 90,000 inhabitants), shows a low degree of indebtedness, whereas Karlovy Vary or Jablonec nad Nisou, which are somewhat smaller (50,000 or 45,000, respectively), show very high indebtedness per capita. Therefore, other individual factors, rooted in the past decisions of the cities' assemblies, are still playing a role.

Conclusion

First it is necessary to note that indebtedness of municipalities in the Czech Republic is not an exceptionally urgent economic problem. According to data from the Ministry of Finance of the Czech Republic 52.2 % of the total number of municipalities are indebted, but only six municipalities carried out their economic activities at higher risk levels. So it can be said that the economic management of the municipalities is relatively prudent.

The conclusions from our analysis vis-à-vis the purpose of this paper can be summarised as follows: based on a correlation analysis, we have cautiously concluded that a relatively close relation may exist between indebtedness per capita and the size of a city. Having calculated Spearman's correlation coefficient and the Kendall´s correlation coefficient, we can confirm a statistically significant medium dependency between the indebtedness of statutory cities and their population. Based on these results, we employed cluster analysis to generate a typology of statutory cities based on their indebtedness and size (population). In line with the results of other studies (Guillamón et al., 2013; Hájek and Hájková, 2009; Rivers and Yates, 1997), we can conclude that, in the Czech Republic, the size of a Czech statutory city is one of the factors affecting indebtedness.

Ultimately, however, it should be noted that these results are not particularly conclusive. This may be due to the low number of cities in the sample – because we wanted to retain a compact sample, we restricted the analysis to only statutory cities (the taxonomy of statutory cities is defined pursuant to Act Number 128/2000 Coll.). It would therefore be interesting to see this analysis done on a larger sample, one which would include so-called municipalities with extended powers or municipalities with an authorised municipal office.

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