A Comparative Analysis of the Debt Dynamics of Municipalities and their Municipally Owned Corporations in the EU Member States with a Special Focus on Hungary

Csaba Lentner, László Vasa, Szilárd Hegedűs[1]

Abstract: *The study examines the liabilities as a share of the GDP of the municipal subsystems of public finances and the organisations owned by them in EU Member States between 2013 and 2018. The main goal of the current study is to characterise the EU Member States regarding the examined two areas. Additionally, we analysed the connections between the entities' liabilities, used statistical methods to compare the respective values and to examine the impacts of the local government system models and the geopolitical location on debt. There were three hypotheses formulated during the research, all of which were confirmed. A statistical connection can be perceived between the two areas of economic management of the local system, and it has also been established that the liabilities as a percentage of the GDP of local government owned corporations are significant, particularly in Scandinavian countries and Germany. At the same time, however, it has to be noted that the results of the theoretical division and the statistical analyses differ from each other. At the end of the study, we used a case study to examine how the two areas developed over time and how the regulatory environment affected debt value. In addition, we also considered the debt dynamics of municipalities and their business organisations, subject to a comprehensive fiscal reform after 2010, which represents another unique element of this study.*

Keywords: *territorial local government subsystem, fiscal institutions, debt.*
JEL: *H61, H62, H63, L38*

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Introduction

The European Union places great emphasis on the Member States' gross government debt, its components, and appropriate debt management. The structure of public finances, both of the state budget and that of municipalities, varies from country to country and from region to region, which is determined by historical traditions and the development of the applied public finance management model. The performance of public finance duties in many cases does not happen in a direct way, with the involvement of budgetary institutions, but rather through economic organisations owned by them, that is public utility companies and non-profit organisations, which is especially true for municipalities. This can be explained by the fact that when performing public duties, the local level is capable of establishing a direct relationship with the population, and the quality of public services can be improved through an effective assignment of duties as feedback is more direct. It is a natural part of economic management that organisations performing duties incur liabilities. However, the volume of these liabilities is a factor that determines financial sustainability. The current study examines the related issues present in the local subsystems and the municipally owned economic organisations of the EU countries. That is, the study focuses on the characteristics and trends of the debt influencing municipalities and municipally owned enterprises' performance of public duties, and indirectly on the questions about the chances of the provision and sustainability of their shared public services – of a material nature – to the population.

Literature

It is a general tendency that assuming payment obligations, i.e., borrowing and bond issuance, has acquired a more significant role in financing European local government subsystems. There are numerous options to obtain funding at local level, among which loans are predominant, because it is easier for municipalities to raise funds from local banks[2]. The reason for this is that municipalities are usually capable of providing sufficient coverage, and local units are positively perceived by financial intermediaries.

The 2007 subprime mortgage crises and the subsequent EU debt escalation crisis demonstrated the crucial need for effective debt management according to Denison and Guo (2015)[3]. To achieve it, varying regulatory procedures exist. In Sweden, Spain, Poland, the Netherlands, Italy, and Austria there is control over the municipal budget deficit. Other nations (particularly Romania, France, and Belgium) require authorisation for borrowing. The third technique (as seen in Hungary, Ireland, Denmark, and Germany), utilises and combination of the previous two methods

The debt crisis obviously made a significant impact on municipal debt and – through economic and social variables – on the generally accepted accounting principle of going concern, that is, the sustainability of financial management and the parallel

[2] Vértesy L. [2019]: *Local debt burden at LAU2 level in EU countries*. Proceedings of the 16th International Scientific Conference. Masaryk University ISBN 978-80-210-9337-1; Bethlendi, A. – Lentner Cs. [2018]. *Subnational Fiscal Consolidation: The Hungarian Path from Crisis to Fiscal Sustainability in Light of International Experiences*. in *Sustainability* 10(9), 2978 https://doi.org/10.3390/su10092978.

[3] Denison, D.V., Guo, Z. [2015]. *Local Government Debt Management and Budget Stabilization*. in Yilin Hou ed.: *Local Government Budget Stabilization*. Springer International Publishing. p 121. https://doi.org/10.1007/978-3-319-15186-1_7.

risk of default[4].

Bellot and Martí Silva (2017)[5] studied the factors that influence municipal debt in several European countries (Italy, France, Austria, Germany, Belgium, and Spain). The analysis concluded that there were common features in the central and local practices of the countries studied, and that the budgets of municipal subsystems were anti-cyclical and followed the golden rule of budgeting: investments with longer payback periods are financed from equity and longer-term sources, while investments in current assets are financed from short-term loans. The authors highlighted interesting developments that show that in regions with higher government debt to GDP ratio, the expectable budget deficit is lower in the local subsystems. A paper by Argimón and Hernandez (2008)[6] should also be noted; they revealed a negative connection between local debt and GDP growth. Accordingly, the slower GDP growth is, the higher the value of debt becomes[7].

Plósz (2019)[8] draws attention to the elements of local government budget structure that may assist the "grow out" of municipal debt in the Central and Eastern European countries accessed the European Union after 2004. At its conclusion, the study stated that social contributions and income-type taxes warp the growth of the economy and encumber the process of catching up. The domination of turnover taxes is therefore considered superior by the author. With regards to convergence, the salient characteristics incorporate the kind of local government systems and – with budgetary expenditure – the economic activities, culture, and social care. According to the author, the Hungarian public finances revenue and expenditure structure (especially the revenue structure) assist the catching-up process of the nation. In other words, Hungarian budget sustainability processes exist both on the local and central level.

Therefore, resulting from the stricter control[9] that followed the crisis, a reduction in debt could be observed in the municipal government ecosystems within

[4] Cohen, S., Karatzimas, S., & Naoum, V. [2017]. *The Sticky Cost Phenomenon at the Local Government Level: Empirical Evidence from Greece. Journal of Applied Accounting Research*, 18(4), 445–463; Gardini, S., & Grossi, G. [2018]. *What is Known and what Should be Known about Factors Affecting Financial Sustainability in the Public Sector: A Literature Review*. In M. P. R. Bolívar & M. D. L. Subires (Eds.), *Financial Sustainability and Intergenerational Equity in Local Governments* (pp. 179–205). Hershey: IGI Global Greer, R. A. [2016]. *Local Government Risk Assessment: The Effect of Government Type on Credit Rating Decisions in Texas. Public Budgeting and Finance*, 36(2), 70–90; Buendía-Carrillo, D., Lara-Rubio, J., Navarro-Galera, A. [2020]. *The Impact of Population Size on the Risk of Local Government Default. Int Tax Public Finance*. https://doi.org/10.1007/s10797-020-09591-9; Lara-Rubio, J., Rayo-Canton, S., Navarro-Galera, A., & Buendia-Carrillo, D. [2017]. *Analysing Credit Risk in Large Local Governments: An Empirical Study in Spain. Local Government Studies*, 43(2), 194–217.

[5] Bellot J. N. – Marti Silva M. L..- Garci Menedez L. [2017]: *Determinants of Sub-Central European Government Debt. The Spanish Review of Financial Economics* 15(2) 52-62 DOI: 10.1016/j.srfe.2017.04.001.

[6] Argimón I, and Hernández de Cos, P.,[2008] *The Determinants of Budget Balances of the Regional (Autonomous) Governments Banco de España*, Working Paper No. 0803, Available at SSRN: https://ssrn.com/abstract=1088652 or http://dx.doi.org/10.2139/ssrn.1088652.

[7] The effects of this on convergence is examined in Siljak and Nagy (2019). Siljak D, Nagy S. (2019): *Economic Convergence between the Western Balkans and the New EU Member States (EU-13) Romanian Journal Of European Affairs* 19 (1) 50-65 pp.

[8] Plósz D., J. [2019]: *Helyi önkormányzatok és konvergencia európai perspektívából*. (Local Governments and Convergence from an European Perspective) *Köz-gazdaság*. 14 : 3 pp. 83-98, 16 p.

[9] The stronger and more consistent state control has had a positive effect on the management discipline in both central and local public finance subsystems across Europe. Increased effectiveness of control is capable of reducing general government deficit in both subsystems. See in more details: Sharikova, G.A, Sitenko, D.A, Vasa, L. (2019): *Audit of Efficiency of the Use of Budgetary Funds in the Process of Conducting a State Audit. Bulletin of the Karaganda University*, Economy Series 2 (94), pp. 262-273.

the European Union. Bröthaler et al (2015)[10] considered the effects of this in the case of Austria.

Hungarian and Polish municipal subsystems were analysed by Medve-Bálint and Bohle (2016)[11] in terms of the impact that the European Union cohesion policy had on them.

It was concluded that a link exists between the use of EU funds and the local level. Projects completed with co-financing from the European Union had a noticeable effect on the increase of debt. This was the result of the local governments having to gather their own contributions or pre-financing from outside sources in order to receive EU co-funding. When it comes to funding investments however, it must be pointed out that European settlements have limited capacities. European Union sources, concluded Medve-Bálint and Bohle, increase municipalities' dependence on the central budget while subverting their independence

In her analysis, Pálné Kovács (2019)[12] pointed out that Hungarian municipalities were able to make use of EU sources to a very limited degree. Vasvári (2020)[13] established that – according to his research between 2006 and 2018 – local governments in opposition in Hungary were underfinanced, because they had limited access to the credit market; however, the author's model – in our opinion – had limited explanatory power. The author came to the conclusion that pro-government municipalities had a much higher ability to involve external financial sources, especially for development. Research by Lentner (2014)[14] assert just the opposite. The municipalities' being pro-government or in opposition did not play a significant role either in the processes that led to over-indebtedness between 2004 and 2008 or in the municipal debt consolidation in 2011. The political affiliation of local governments, compared to the political character of the government, was not a significant component either in the processes of over-indebtedness or during or in the degree of the subsequent state consolidation, it was not a significant aspect of the incurrence of liabilities or participation in the government's "bailout" processes. This is especially true if we consider that the central government's political affiliation was different from that of the majority of municipalities at the time of falling into over-indebtedness. In the consolidation period (2011-2014) the overlap of political affiliation of the government and municipalities was close to 90%, and eventually, the central budget assumed the debt of all municipalities. So political selection did hardly play any role, according to Lentner's study. Finance management following the consolidation has been governed by strong normative provisions in Hungary. It is important to note, however, that the drop in GDP due to the COVID-19 crisis and, as a result, reduced state revenues will presumably cause problems in provision of administrative and utility type public services in the administrative areas

10 Bröthaler, J., Getzner, M. & Haber, G. [2015] *Sustainability of Local Government Debt: A Case study of Austrian Municipalities. Empirica* 42, 521–546. https://doi.org/10.1007/s10663-014-9261-3.

11 Medve-Bálint, G. – Bohle, D. [2016]. *Local Government Debt and EU Funds in the Eastern Member States: The Cases of Hungary and Poland. MaXCaP Working Paper Series*. p. 22.

12 Pálné Kovács I. [2019]: *Önkormányzati lehetőségek és korlátok a helyi gazdaságfejlesztésben*. (Opportunities and Obstacles of Municipalities in Local Economic Development) *Tér és Társadalom* 33 (2) 4-21 https://doi.org/10.17649/TET.33.2.3088.

13 Vasvári T.[2020] *Beneficiaries and Cost Bearers: Evidence on Political Clientelism from Hungary. Local Government Studies* 46 pp. 1-28. , 28 p.

14 Lentner Cs. [2014]: *The Debt Consolidation of Hungarian Local Governments. Public Finance Quarterly* 59 : 3 pp. 310-325. , 16 p.

of municipalities, because the Hungarian system has become rather centralised both in the performance of public administrative duties and financing. Additionally, a decrease in municipal tax revenues (business tax) can also be expected. The majority of traditional (administrative) tasks has been removed from municipalities, and central administrative territorial organisations directly belonging to the central government have been set up (district offices, county government agencies). The direct municipal revenues that have decreased due to the crisis will presumably disrupt the operation of municipally owned economic organisations, problems may arise in sharing and performing tasks in the areas of utility-type public services of a financial character. Moreover, a decline in the population's ability to pay for utilities can be counted on, which is probably a general European phenomenon.

Returning to the main focus of our analysis, we would like to point out that another phenomenon important for our area of research is the increased attempts of the public sector to establish businesses, i.e., corporatization. The explanation for this, using examples from the UK, is that these enterprises have more opportunities to obtain funds and financial support, and the managerial qualities of companies are considered as an asset. The analyses of Andrews at al highlighted that mostly municipalities in disadvantaged regions use this opportunity[15]. Several studies have confirmed that providing public services through enterprises is mainly a local level trend[16]. The Hungarian example reinforces the finding that the fact that the State Audit Office did not have control over the municipally owned corporations until 2011, "promoted" the establishment of a high number of municipally owned corporations and the outsourcing of utilities. Thus, behind the veil of insufficient control a loose public utility company practice appeared, and municipalities often hid their losses in their less controlled companies.

Materials and methodology

Research aim

The primary aim of the research was to group the liabilities as a share of the GDP of local government subsystems and municipally owned and controlled economic organisations in the EU Member States based on several aspects.

Research questions:

1. Does a statistical relationship exist between the debts as a share of the GDP of

[15] Andrews, R., Ferry, L., Skelcher, C. and Wegorowski, P. [2020], *Corporatization in the Public Sector: Explaining the Growth of Local Government Companies. Public Admin Rev*, 80: 482-493. doi:10.1111/puar.13052; Ferry, L, Andrews R, Skelcher Ch, and Wegorowski.P [2018]. *New Development: Corporatization of Local Authorities in England in the Wake of Austerity 2010–2016. Public Money & Management* 38 (6): 477–80.

[16] Aars, J., and Ringkjøb H.. [2011]. *Local Democracy Ltd: The Political Control of Local Government Enterprises in Norway. Public Management Review* 13 (6):825–44. doi: 10.1080/14719037.2010.539110; Bergh, Andreas, Gissur Erlingsson, Anders Gustafsson, and Emanuel Wittberg. [2018]. *Municipally Owned Enterprises as Danger Zones for Corruption? How Politicians Having Feet in Two Camps May Undermine Conditions for Accountability. Public Integrity*. doi: 10.1080/10999922.2018.1522182; Grossi, G, and Reichard Ch.. [2008]. *Municipal Corporatization in Germany and Italy. Public Management Review* 10 (5):597–617. doi: 10.1080/14719030802264275; Papenfuß, U Van Genugten M, De Kruijf J, Van Thiel S.. [2018]. *Implementation of EU Initiatives on Gender Diversity and Executive Directors' Pay in Municipally-Owned Enterprises in Germany and The Netherlands. Public Money & Management* 38 (2):87–9; Voorn, B Van Thiel S, and Marieke Van Genugten. [2018]. *Debate: Corporatization as More than a Recent Crisis-Driven Development. Public Money & Management* 38 (7):481–2. doi: 10.1080/09540962; Voorn B. , Borst T. R: & Blom R. [2020]: *Business Techniques as an Explanation of the Autonomy-Performance Link in corporatized Entities: Evidence from Dutch Municipally owned corporations, International Public Management Journal*, DOI: 10.1080/10967494.2020.1802632

local governments and municipally owned organisations?

2. What is the ratio of debts as a share of the GDP of municipal economic organisations to local government liabilities?
3. Can regional differences be detected as far as the examined variables are concerned?
4. Can significant differences be identified among the variables examined concerning the local government system models?

Hypotheses

1. Both municipalities and their municipally owned businesses have significant debt, but within the EU, these volumes vary by country and regulatory environment.
2. There is a correlation between the debts of municipally owned companies and the municipalities that own them.
3. With regards to the examined variables, the regional system/public law model do not match.

Variables, methods

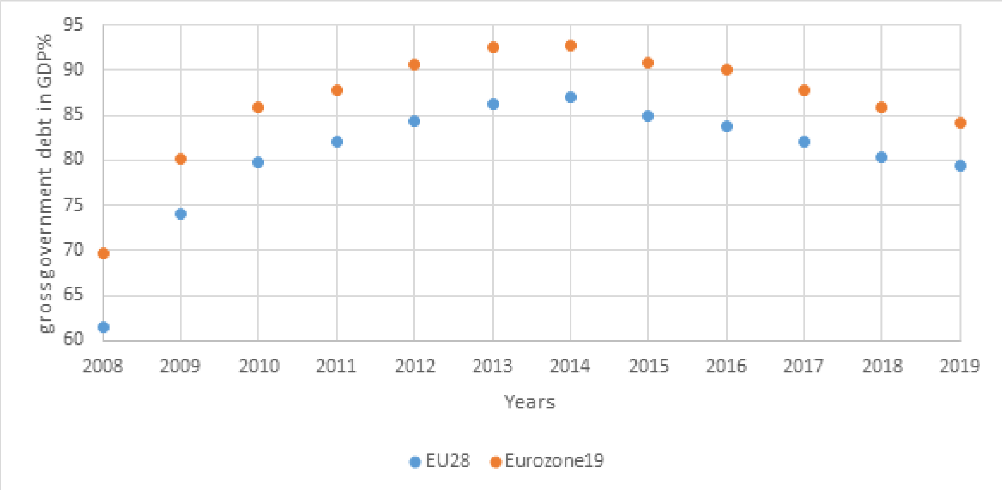
- LGdebt means the average debts as a share of the GDP of local municipal subsystems in EU countries in the years between 2013 and 2018. OECD and Eurostat were the sources of the data. For the purpose of comparability, we only studied the local level debts for each country and did not consider the mid-level local government entities such as regions and provinces.
- LGCEdebt means the average debts as a share of the GDP of municipal subsystem- controlled enterprises among European Union Member States (2013-2018). Eurostat provided the source of the data.
- It can be concluded, based on the two variables examined, that the average value is suitable for debt representation. This is because both variables in the 2013-2018 time series are close to normal distribution. This is supported by the median value being a short distance from the average.
- LGCEshare, stands for the ratio of the average LGCEdebt and the average LGdebt in the time series of 2013-2018, it shows the volume of liabilities as a share of the GDP of local government owned corporations in comparison with the debts as a share of the GDP of local municipalities.

In order to achieve the first aim, to explore the statistical relationship, we completed correlation, then regression analysis. The objective stated in the second aim was achieved by establishing categories and cartographic illustration. The third and fourth research aims were addressed through variance analysis. During the post-hoc tests the Scheffé Test was used. For analysing data, we used the SPSS and MS Office programme packages.

Research results: the “anatomy” of public indebtedness

Before the detailed presentation of our findings, it is worth having a comprehensive overview of the gross government debt as a share of the GDP between 2008 and 2019. This period is exceeding our research period of 2013-2018, focusing on the debts of municipalities and their dependent corporations, primarily because we intend to demonstrate the impacts of the 2008 financial crisis broadly, but apart from that, we will examine the recent conditions only at municipalities and municipally owned corporations[17]. Based on the trend it can be deduced that the volume of public debt grows as a result of the crisis in both the EU 28 and the Member States of the European Monetary Union until 2014, and after that a downward trend can be observed.

Figure 1: General government debt among EU Member States (2008-2019)



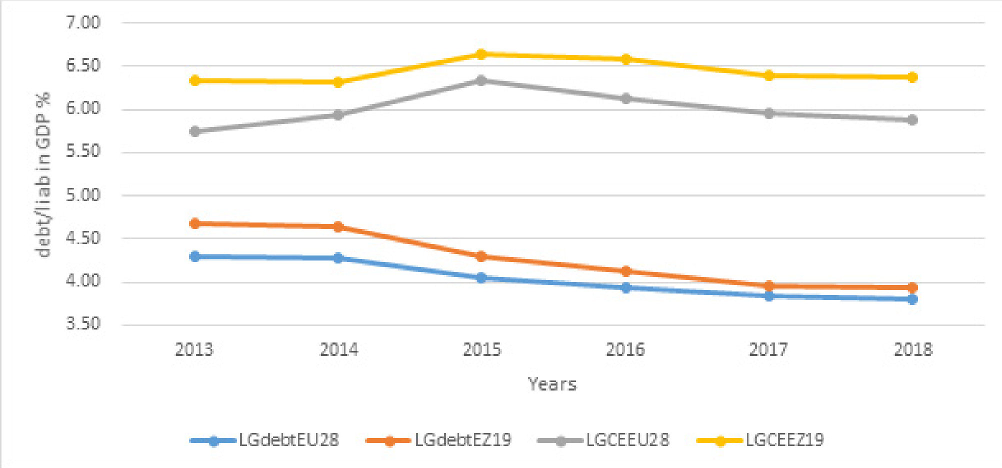
Data source: Eurostat (2020)

Figure 1 shows that debt in the Eurozone exceeds the debt-to-GDP ratio of the EU-28 Member States, and it also exceeds the 60% threshold defined by the Maastricht criteria. Based on the figure we can conclude that the 2008 crisis led to an unfavourable situation in the EU Member States, which was most apparent in debt growth. The decrease after 2014 is due to more stringent fiscal regulations and a growing GDP that was the result of economic recovery. It is important to note, however, that the economic downturn caused by the COVID epidemic will definitely break the favourable trend of decrescent debt in both the short and long term.

The debt as a share of the GDP of the municipal subsystem considerably falls behind the debt of the central budget, but this depends to a large extent on the state system and the local government system models. Data in Figure 2 show that local level debt was decreasing from 2014, therefore similar processes can be detected that were present in connection with gross government debt. Similarly, the debts as a share of the GDP of municipalities in the Eurozone exceeds the value of debt in the EU 28. The dynamics of debt incurred by municipalities and their economic organisations were then compared (also represented by Figure 2) in relation to the EU-28 and the Eurozone as well.

[17] It is important to note that we have not found verified data regarding municipalities and particularly regarding municipally owned economic organisations in the international data series. When outlining the post-2008 (thus the period preceding the study of municipal debts) development of public debt on the global scene and especially when illustrating its effects, we were guided by the base approach.

Figure 2: Local government liabilities and Local government-controlled entities' debts in GDP% among EU members (2013-2018)



Data source: Eurostat, OECD (2020)

In any of the EU Member States, the local subsystem's liabilities as a percentage of the GDP does not go past 11% during the time and background data series.

Sweden holds the highest value of 10.6%. Between 2013 and 2018, the average liabilities of the municipal subsystem were 4.04% of the GDP, and the median was 4%.

From analysing the data, the conclusion was reached that the liabilities of the local government level are greater in those countries where the local level has a bigger part in the performance of public duties in public finances (Lentner et al., 2018; Lentner – Hegedűs, 2020).

Countries where this is the case include Sweden, Italy, the Netherlands, Denmark, Finland, and France.

During the studied time series, we can witness a fall in local government liabilities for the EU. This is because when compared to 2013, we see the local level debt rate decrease by 11% by the year 2018. Between 2013 and 2015 we can see a noticeable reduction in Hungary. This is due to the local government debt consolidation by the central government which assumed the local governments' total debt[18]. In addition, the debt-to-GDP ratio of the municipal subsystems fell when compared with the 2013 values found in Portugal, Ireland, Greece, and Spain, where the fall started typically from a low base. In Sweden, debt increased by 17.7% and in Finland, the figure was 9.43% during the time series.

The European Union statistical system measures the value of gross government debt, the liabilities of the subnational level, and also other, contingent debts that affect the broad view.

Such contingent liabilities include items that develop into actual government liabilities under particular conditions, if the original debtor is unwilling or not able to

[18] Lentner Cs. [2014]: *The Debt Consolidation of Hungarian Local Governments. Public Finance Quarterly* 59 : 3 pp. 310-325., 16 p. It is important to refer to the fact that the main reason for state consolidation was that local governments became practically dysfunctional, especially because of the effects of currency depreciation concerning their debts in foreign currency. There was no chance for them to settle their liabilities taken on between 2004 and 2008.

repay the debt. In accordance with EU methodology, these include:

- Non-performing loans found in the public finances system
- State guarantees
- Debts derived from the operating of state or municipally owned corporations. In our study we evaluate the latter in more detail.

Looking at Figure 2 we can see that the debt as a share of the GDP of municipally owned economic organisations slightly increased between 2013 and 2018, peaked in 2015-2016 and slightly decreased afterwards. Thus, it can be concluded that the observations made on debt are not reflected by the liabilities as a share of the GDP of economic organisations, the only fact deserving attention is that the debt value of the Eurozone exceeds the value of municipalities and even that of municipally owned corporations in the EU-28 Member States. This means that the debt of municipally owned economic organisations in the Eurozone is higher than that in the EU-28, that is, positioning is similar to that of public debt.

The debt of organisations subject to the ownership control of the municipal subsystem exceeds the debt of local governments, because the average of the EU-28 countries is GDP 6%. The median in the examined period was 5.95% of the GDP. It has been concluded that there is one outlier among the values: Germany. The debt of locally owned entities exceeds 10% of the GDP in Finland, Sweden, Denmark and the Netherlands. Compared to 2013, the liabilities as a share of the GDP of municipal organisations rose by 1% by 2018 in the time series. Decrease was experienced in 14 countries, especially in Cyprus and Poland, while there was increase in Denmark, Sweden and the United Kingdom.

Multivariable analyses - Regression

Multivariable statistical analyses have been performed regarding the two variables of the examined time period (2013-2018), namely the average values of debt as a share of the GDP of local subsystems and the liabilities as a share of the GDP of municipally controlled organisations in the EU countries. Using correlation and regression analyses, we are seeking for relationships between the two variables applied in our research. We are going to answer the first research question and evaluate our second hypothesis using the results of our analyses.

Due to its extreme data, Germany isn't included in the regression model. Consequently, the regression model is derived from data from 27 countries. If Germany had been taken into account, then the total value of R2 would have been 0.272.

Table 1: Regression coefficients

Coefficients

		Unstandardized coefficients		Standardized coefficients		
Model		B.	Std. Error	Beta	t	Sig.
1	(Constant)	-2.075	1.190		-1.744	.033
	LGdebt	1.705	.252	.805	6.773	.000

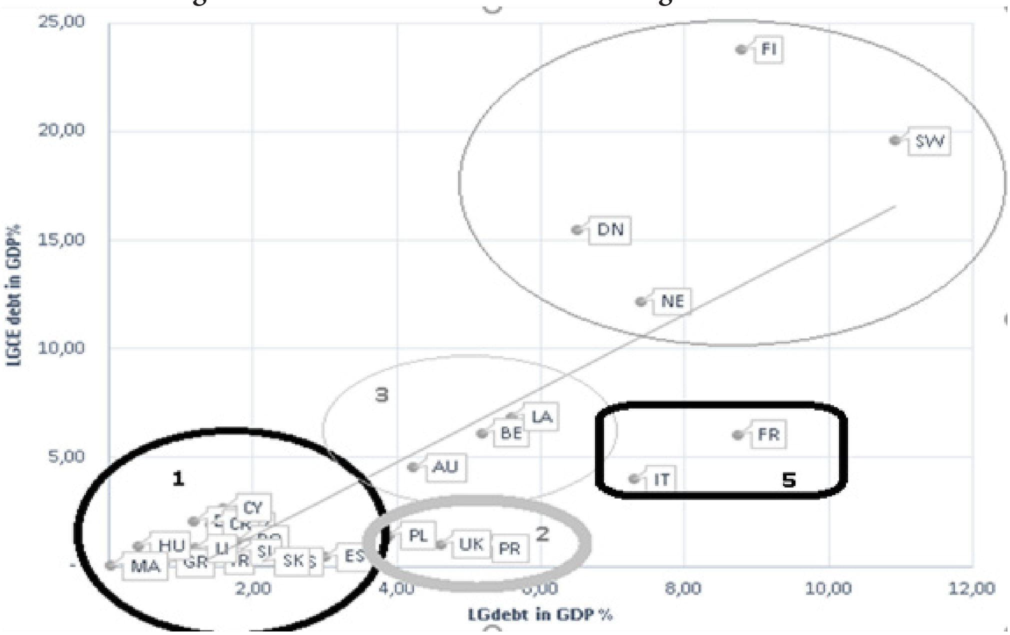
a. Dependent Variable: LGCEdebt

Data source: Authors' own research, 2020

The table 1 shows the value of the regression line. The values of the constant and the dependent variables are both significant, since the significance level of the t-test is below 5%, and the dependent variable is relevant already at 1%. The estimation error gives information on the value we have to calculate the confidence interval with (0.252) if we want to model the expected value, so the equation of the regression line is:

LGCEdebt = -2.075+1.705 LGdebt*

Figure 3. LGCEdebt in GDP% Linear Regression Curve



Data source: Authors' own research, 2020

We indicated the different countries next to the regression line. Based on these data, countries can be grouped in 4 categories. Grouping is based on average values of the examined variables between 2013 and 2018. In case of Group 1 municipal debt is low, and similarly the debt of municipally owned corporations and organisations is also low. These countries include Hungary, Malta, Spain, Greece, Slovakia, Cyprus, Croatia, Romania, Lithuania, Estonia, Slovenia, Ireland, Bulgaria, and the Czech Republic.

In Group 2 the debt of the municipal subsystem is higher, but the liabilities of municipally owned organisational units are relatively lower (Poland, the United Kingdom and Portugal). In connection with Group 3 we can state that it fits the regression line, but the debt levels of the municipal subsystem and that of the municipal organisations are almost the same (Austria, Belgium, Latvia). Group 4 contains countries where the debt of municipal companies is substantially higher than that of the municipalities owning them, these countries are typically situated in Northern and Western Europe (Denmark, the Netherlands, Sweden, Finland). Group 5 is below the regression line, in these countries the debt of municipal level is dominant (Italy, France).

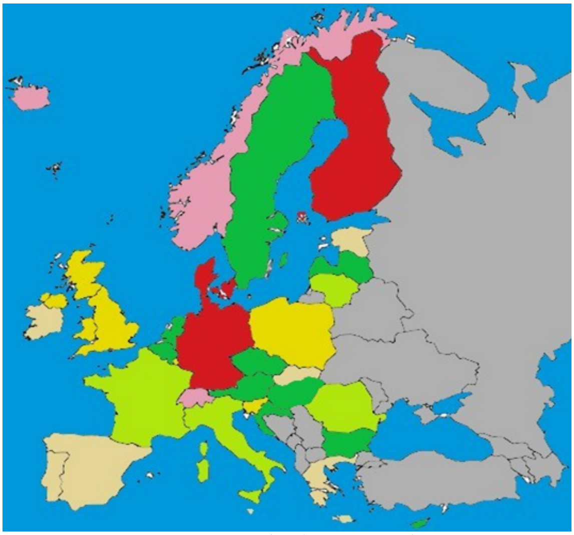
As mentioned earlier, Germany's outstanding data were excluded from this comparison. The liabilities of Germany's municipally owned organisations are the highest among the examined countries, it is over 50% of the GDP in the relevant time series according to Eurostat. In Germany, municipally controlled organisations play a significant role in the performance of public duties, because services are normally provided by organisations with sole or over 50% municipal ownership. By the '90s traditional public plants were reorganised as business associations that usually continued operating as municipal property. Privatisation was not a typical feature of German practices[19]. From the mid-2000s, several market economy operators (e.g., energy sector) were taken over by municipalities and their operation was organised along a complex, comprehensive framework of objectives[20].

Cartographic illustration of the LGCEshare variable

Comparing the ratio of the two segments of municipal economic task performance also provides important information. This is illustrated with the help of a map, where the proportions are grouped along 4 different categories. Apart from volume, the relative weight of liabilities is also decisive, that is, the value of LGCE debt compared to LG debt (LGCEshare variable).

Eurostat does not provide a cartographic illustration; therefore, its graphic presentation is considered a novel result. With the grouping we are searching answers for the third and fourth research questions.

Graph 1: Country grouping based on the ratio of local government owned economic entities' liabilities to that of municipalities (LGCEshare)



Data source: Authors' own research.

gold = 0-20%, yellow = 21-50%, light green 51-100%, dark green = 100-200%, red = over 200%

[19] Horváth M. T. [2013]: *Kiszervezés-visszaszervezés* (Outsourcing - Backsourcing) In: Horváth M. Tamás (2013): *Kilengések - Közszolgáltatási változások*. (Cliff effects – Changes in Public Services) Dialóg Campus Kiadó Budapest p. 239-247; Wackenbauer J [2009]: *Water Sector in Germany*. Working paper CIRIEC N° 2009/11

[20] Wagner, O., Berlo, K. [2017], *Remunicipalisation and Foundation of Municipal Utilities in the German Energy Sector: Details about Newly Established Enterprises*, J. sustain. dev. energy water environ. syst., 5(3), pp 396-407

The countries with the lowest debt are marked with gold. There are 4 countries in this group, the debt level of economic entities does not reach 20% of municipal debt. There are 3 countries with debt between 20% and 50%, so 25% of the countries has 50% debt share. In case of 9 countries municipally owned organisations' debt exceeds municipal debt. One of the highest values, which is double the municipal debt, is in Denmark, and the highest value is in Germany, where LGCE debt is ten times the LG debt.

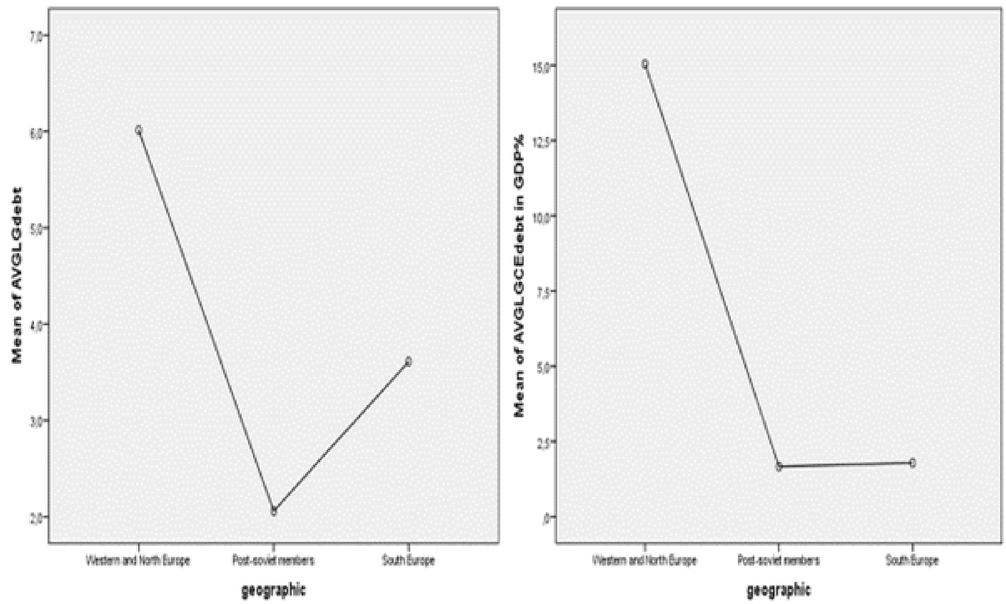
The colouring shows that the examined indicator has no geographical determination, it therefore, does not have a mentionable effect on the examined variable from a public policy aspect. It can be concluded though, that in the majority of countries to the east of the line formed by the UK-France-Italy the debt of municipally owned organisations exceeds the debt of municipalities (Graph 2). Thus, no geographical pattern can be observed either in relation to the geopolitical position (e.g., Western-European countries vs. newly acceded countries) or the municipal system model, because there are differences within each group. It can be concluded that the countries to the east of the UK-France-Italy line have higher debt, but these countries still differ in the values of the indicator.

Variance analysis

Three groups were formed along geographical division. These are: The Southern Europe, which contains Portugal, Italy, Greece, Spain, Cyprus, and Malta; The Western and Northern Europe, which consists of countries to the west of the France-Finland line; and The Post-Soviet group, which is made up of the countries which had planned economy systems before 1990. With the use of variance analysis, we attempt to answer the fourth and fifth research questions and reject or prove the third hypothesis.

Figure 4: Means plot between the examined variables and the geographical divisions

The municipal debt depicted on the left-hand side is the highest in the Western



Data source: Authors' own research, 2020 and Northern European countries, followed by the Southern European group. The countries of the Post-Soviet region have the lowest value of debt in the examined period of time.

A similar inference can be drawn in connection with the debt of municipally controlled organisations, which is illustrated on the right of Figure 4. Nevertheless, it is a remarkable difference that the value of average liabilities is practically identical in the Southern European and the Post-socialist country groups.

Municipal system models categorise the countries along the size of the municipality and the structure of municipal tasks. Accordingly, special literature identifies four main models, such as:

- the Mediterranean model (France, Italy, Greece, Spain, Portugal, Cyprus)
- the Scandinavian model (Finland, Sweden, Denmark, the Netherlands, the United Kingdom)
- the Rhenish model (Belgium, Germany, Austria)
- and the rest of the countries represent a mix of the above models (e.g., Hungary, Slovakia, Poland).

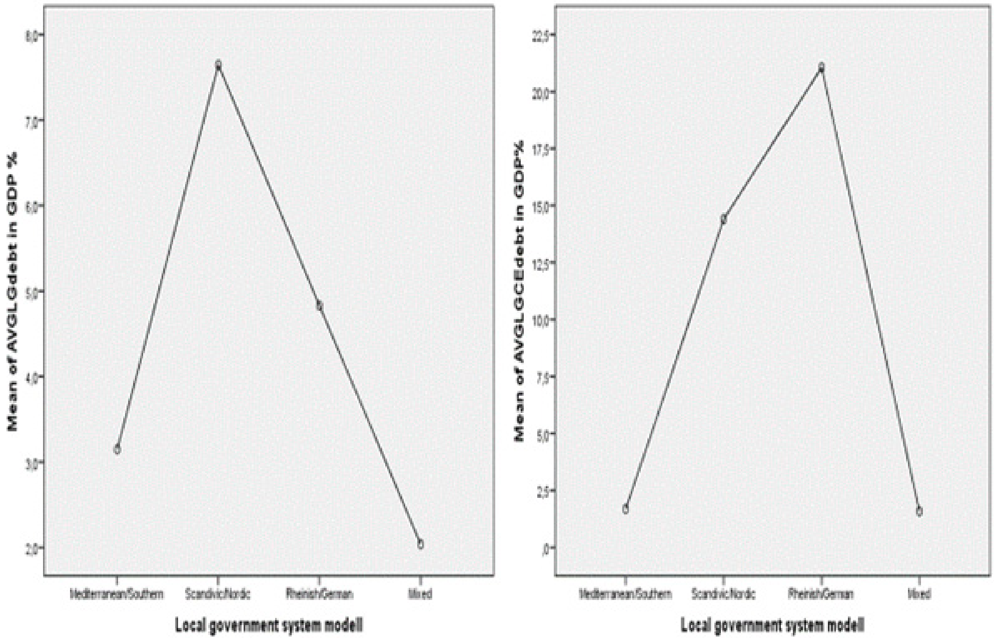
In determining the municipal categories, we applied the typology defined by by Page and Goldsmith (1987), Hesse and Sharpe (1991), and Swianiewicz (2014) and also by the OECD (2017), other references to special literature[21], and our own ideas.

In case of both variables the F-test showed significant difference because the significance level is below 5%. Again, the Scheffé Test was applied for post-hoc test. In relation to the debt of the municipal subsystem variable, the countries with the Scandinavian system model show significant difference from the countries with the Mediterranean model and the mixed type ones.

The debt of municipally owned organisations in Mediterranean countries shows significant difference from the values of countries belonging to the Scandinavian and Rhenish models, while the countries described by the Rhenish municipal model are significantly different from the countries having the Mediterranean or the mixed-type municipal model.

[21] Page, E.C. and Goldsmith, M., eds, [1987]. *Central-Local Government Relations: A Comparative Analysis of West European unitary states*. London: Sage; Hesse, J.J. and Sharpe, L.J., [1991]. *Local Government in International Perspective: some Comparative Observations*. In: J.J. Hesse, ed. *Local Government and Urban Affairs in International Perspective*. Bade-Baden: Nomos Verlagsgesellschaft, 603–621; Swianiewicz P. [2014] *An Empirical Typology of Local Government Systems in Eastern Europe, Local Government Studies*, 40:2, 292-311, DOI: 10.1080/03003930.2013.807807; OECD [2017]. *Subnational Government Country Profiles* for Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Luxembourg, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom; Loughlin, J., Hendriks, F. and Lidström, A., eds, [2010] *The Oxford Handbook of Local and Regional Democracy in Europe*. Oxford: Oxford University Press.

Figure 5: Means plot between the examined variables and the municipal system models



Data source: Authors' own research, 2020

The left-hand side of the figure illustrates municipal debt, the right-hand side illustrates the debt of municipally owned organisations. The figure clearly shows that municipal debt is highest in Scandinavian countries, and as far as the same variable is concerned, the lowest value is in countries with a mixed model. Concerning the debt of municipally owned organisations, the highest average value is reached by the Rhenish type countries, and the difference is obvious if we look at the Mediterranean and the mixed countries (Figure 5).

Hungary: A case study

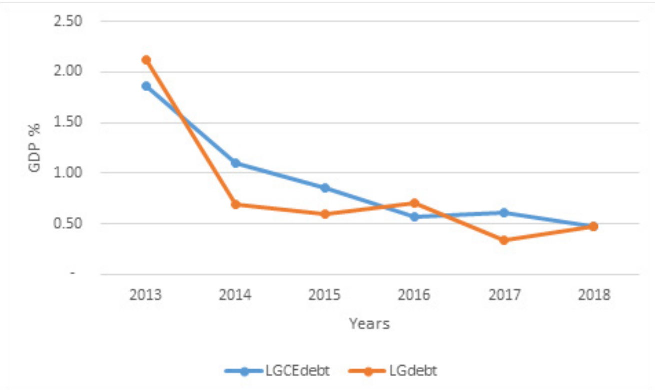
A country of the post-socialist region, Hungary, at the time of transition to a market economy had quite a lax policy in terms of budgetary and municipal management. In the years between 2004 and 2010, substantial growth could be observed in Hungary's municipal debt. The municipalities mainly incurred this debt through the issuance of bonds which were foreign-currency-denominated (CHF and EUR).

All bond, credit and other liabilities were consolidated from 2012 and the total amount was taken over by the Hungarian state. This can be seen in Figure 7 (for more detail, see Lentner, 2015, Kovács-Csillik, 2012, and Fábián, 2017[22]).

Despite being considered a desperate measure in fiscal governance, consolidation has some precedence. Indeed Italy and Germany have both taken similar steps in the past. Csaba László (2013)[23] concluded that the regulatory power of the market cannot be expected to work properly in all cases. This was clearly demonstrated by the situation in which those countries affected by the EU debt crisis found themselves. This factor can be regarded as the cause of the significant lowering of the local level debt in Hungary in comparison to its highest point in 2013. Concurrent to this, a large-scale reconstruction occurred in public financial regulation. The municipalities (from 2011) were restricted by law from achieving over-indebtedness as part of the government-introduced central debt management. The stand-out feature of this management is that investments can be financed from external sources only if the central budget approves them and that they can be expected to be paid off from revenues. In effect, a regulation has been implemented that is even stricter than the golden rule of public finance[24].

The management operates by designating the debt service cap. The yearly debt service ratio can only be a maximum of 50% of the local government's revenues (which are obtained mostly from local taxes). Debt-type fundraising is only in scope by the regulation; it does not extend its focus to the other debt types such as salaries payable or money owed to suppliers

Figure 6: Data showing liabilities of local governments and municipally owned organisations (2013-2018)



Data source: Eurostat, OECD (2020)

[22] Lentner Cs. [2015]: *Önkormányzatok pénzügyi konszolidációja és működőképes állapotban tartásuk eszközrendszere*. (Fiscal Consolidation of Municipalities and the Toolkit of Maintaining their Operability) In Lentner Csaba ed.: *Adózási pénzügytan és államháztartási gazdálkodás. Közpénzügyek és Államháztartástan* II. (Tax and Public Finance Management. Matters of Public Funds and Public Finances Studies II) Budapest, NKE Szolgáltató. pp. 637–656; Kovács L. – Csillik P. [2012]: *Adatok és tendenciák az önkormányzati hitelezés területén*. (Data and Trends in Municipal Lending) *Jegyző és Közigazgatás*, 14.(2). pp. 21–23.; Fábián, A. [2017]: *Local Self-Government in Hungary: The Impact of Crisis*. In Silva, Carlos Nunes – Buček, Ján eds.: *Local Government and Urban Governance in Europe*. Cham, Springer. 71–87.

[23] Csaba, L. [2013]: *Válságkezelés Európában – új gazdaságfilozófia felé?*. (Crisis Management in Europe – Towards a New Economic Philosophy?) KÖZ-GAZDASÁG 8 : 2 pp. 1-15. , 15 p.

[24] The main idea of the above-mentioned golden rule is that tangible assets should be financed only from equity or long term liability, while in the case of current asset investments short term credit is also allowed.

The regulation expands to the municipally owned organisations' borrowing, since it is tied to a positive evaluation of the authorisation request initiated and submitted to the Ministry of Finance by the municipality. The aim of the regulatory mechanism is to prevent the municipality from becoming over-indebted through the organisations in its possession, that is, from generating substantial contingent liabilities. As Figure 8 represents, both municipal debt and the debt of municipally owned organisations have been decreasing from 2014, however in 2016 there was a slight increase due to growing investment activity. It can also be concluded that the debt as a share of the GDP of municipally owned organisations exceeds that of municipalities owning them.

The liabilities of municipalities and municipally owned organisations grew in nominal values from 2016, but the indicators expressed as a share of the GDP decreased. The explanation to this phenomenon is the strong GDP dynamics of the years 2017 and 2018, because in these years the GDP growth rate exceeded the growth rate of liabilities.

Hungary's values regarding both variables are below the average values of the EU-28 and the European Monetary Union. As a result of analyses, it can be concluded that regarding the distribution of data, the country belongs to the lower quartile, which means a low level of debt as a share of the GDP and the liabilities of organisations. The results of the cluster analysis and the variance analysis show that the Hungarian data differ significantly from that of the Scandinavian countries and geographically, from the Northern and Western European countries. As regards characteristics, however, the Hungarian data differ from that of the Post-socialist countries, because in those countries both municipal debt and the debt of municipally owned organisations are higher (Figure 6).

Conclusions

After the early crisis years of 2007 and 2008, public debt had an increasing trend in the European Union's Member States, and this debt dynamics "spread" over the municipal subsystem and its economic entities in the EU-28 countries, which means that the whole general government sector was affected by over-indebtedness. The year 2014 meant a turning point, because from this year on the gross government debt as a share of the GDP, even the debt of the municipal subsystem followed a decreasing trend both in the EU and the Eurozone until the outbreak of the pandemic. It is worth noting that the debt in the Eurozone is higher in respect of all variables. The research has set out that the debt of municipally owned economic organisations exceeds municipal debt throughout the EU in the examined period of time, but it varies considerably from one country to another. It also can be concluded from the analysis that the trend of the debt-to-GDP ratio of municipally owned economic organisations differs from the trend of gross government debt and municipal debt in the EU Member States. No trend reversal has taken place there since 2014, only a slight decrease can be observed in 2017-2018, when there was a strong economic recovery in most of the EU Member States. It can be ascertained that taking contingent liabilities is the highest in Germany and in the Scandinavian countries, which is explained by the fact that in these countries the municipally owned economic entities play a major role in performing public duties besides municipalities.

It can likewise be established that – based on the correlation analysis – a strong, positive connection can be detected between the debt as a share of the GDP of the municipal level and the liabilities of municipal organisations. The regression model and its graph illustrate that the liabilities of the two segments depend on decentralisation. A major percentage of the EU Member States has low levels of both municipal debt and the liabilities of municipally owned organisations. In these countries the degree of municipal involvement in the performance of duties, as a share of the GDP, is also lower.

The analyses conducted on the basis of public law-inspired municipal system models and the geopolitical position point to the same conclusion, according to which Nordic, Scandinavian countries have the highest debt, but the results of the mathematical-statistical categorisation show a difference. The relative weight of debt (LGCEshare) is the highest in Central and Eastern European countries, as the cartographic analysis presents. Taking contingent liabilities is present in municipal economic management, but it is important to draw attention to the going concern principle of accounting, and through that to the continuous provision of public services. In case this principle is not adhered to, the municipal owner has liability, and a substantial off-budget risk is incurred regarding the owner's operations. Accordingly, the debt of municipal organisations has to be continuously monitored at regulatory level, because it can significantly impact the debt of the municipal level, and consequently, if a state consolidation takes place, the level of government debt.

Since the liabilities of municipally owned organisations are not taken into consideration in the Maastricht debt calculations (except if a substantial part of revenue is provided by the owner or the central budget), so the municipalities have the chance to get over-indebted through their organisations, which poses a risk to transparency. Although the EU directives prescribe the presentation of contingent liabilities, reports do not contain a risk analysis, so GCA opinions can be significantly influenced.

The economic crisis brought about by the COVID pandemic will probably present considerable challenge for the public sectors in the EU Member States, including the local government subsystem as well. The expected GDP decline, the presumed increase of both government deficit and public debt will most probably break the trend of decreasing debt. As a result, the liabilities of both municipalities and municipal economic organisations will expand, the social risks should not be neglected.

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