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Fiscal Distress of Hungarian Local Governments in the Light of the Debt Consolidation and the Reorganisation of the Municipal System

SUMMARY: The consolidation of the debt of the municipalities and the reorganisation of their tasks and funding were significant reforms of the Hungarian public sector. In this study, we examined the differences in the financial parameters of the period of 2005-2008 among the local governments which took part in the debt consolidation and which are remained out. We applied logistic regression on a sample of 230 local governments. The study also aims to examine how the reorganisation of the tasks and funding affects the differences between the two groups. Our results confirm that there were significant differences in their own revenues and operating balance. In the post-consolidation period, we found that the two groups are converged to each other, so the changes in the operation of the local governments reduced the previously existing differences. Besides that, our results show that the local governments of the sample improved their financial conditions, generally.

KEYWORDS: fiscal distress, municipality finances, logistic regression

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The democratic transformation after the political transition caused major changes also in the municipal system. The large-scale decentralisation was accompanied by vertical imbalances, which led to the indebtedness of the local governments. This trend was also exacerbated by the tightening measures of the central government from 2005 (Bethlendi,

Lentner, 2019). As a result, the 2007-2008 crisis had hit the Hungarian local government sector as well in a vulnerable condition. The total debt (and particularly foreign currency debt) started to grow dynamically, jeopardising the functioning of the municipal sector. One of the most critical signs of this was that local governments' overdue trade payables rose by 69 percent in total between 2007 and 2010 (Halmosi, 2013). The problems of the local government sub-sector, which

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emerged gradually after the political transition, jeopardised the general government as a whole, and thus central intervention has become unavoidable (Lentner, 2014), just like the entire reorganisation of the sector (Báger, 2010). The purpose of this paper is to assess whether prior to the debt consolidation any significant difference could be identified between the local governments involved in the debt consolidation and those left out of it.¹ Furthermore, it is the objective of the research to examine how the financial characteristics of local governments and the previously developed differences between local governments have been transformed by the reorganisation of the tasks and funding of the municipal system. The next section of this paper examines the theoretical background related to fiscal distress, together with the experiences of the Hungarian municipal system. This is followed by the presentation of the research methodology and results of the research. Finally, the paper is closed by summarising our conclusions.

THEORETICAL BACKGROUND

In this section we survey the possibilities of interpreting fiscal distress and the causes of its development. In addition, we present the former problems of the Hungarian local government sub-sector, the revision of funding and tasks as well as the debt consolidation.

What may be regarded as fiscal distress and why does it develop?

Instead of the models applicable to the operation of enterprises, special models – better conforming to the nature of the local governments’ operation – should be used. This is due to the fact that in most countries bankruptcy proceedings may only

be regarded by central governments as a last resort; regulations encourage the prevention of such situations. Local governments may not automatically file for bankruptcy, when they are unable to discharge any of their obligations (Halmosi, 2018). Continuous fulfilment of the local governments’ duties is of utmost importance; accordingly, it is not possible to adopt the bankruptcy regulations applied to the economic organisations of the private sector (Gyirán, 2014). The classification of local governments in two categories (bankrupt and non-bankrupt) is not fully adequate, as latent bankruptcy – when local governments may be regarded as insolvent in the traditional sense – should be also taken into consideration (Jones, Walker, 2007; Halmosi, 2018).

Accordingly, fiscal distress includes not only the situation when the respective organisation is unable to discharge its financial obligations, but also when the local government is unable to render the services expected by the public in adequate quality. In their paper, *Kloha, Weissert and Kleine* (2005) regarded a situation as fiscal distress when a local government was unable to realise its objectives related to its operation and debt in several consecutive years, and failed to meet public requirements. The cut-back of the level of public services appeared in several researches (Trussel, Patrick, 2013; Jones, Walker, 2007). The assessment of public services is also rather relevant if we assume that when a local government wants to avoid late payment or non-payment, it may easily reallocate funds from certain tasks. Accordingly, financial problems may be traced already earlier, albeit indirectly. However, the measurement of public services has several disadvantages. The operationalisation of variables and the availability of data related to services may be problematic. It may represent another obstacle that demand for public services changes over time and it is difficult to assess whether the level of the given public

service or the number of people reached by it have changed due to the change in demand or due to the status of supply.

What is the reason for the formation of fiscal distress? *Trussel and Patrick* (2013) regarded the imbalance between the funds potentially available to local governments and the cost of the duties to be performed as the source of problems, while *Skidmore and Scorson* (2011) differentiated external (e.g. market events) and internal (e.g. weak financial management) factors. *Carmelli and Cohen* (2001) regarded the organisations' shortage of funds and the capabilities of their management as the reason for fiscal problems, due to which the organisation is unable to provide proper services and adjust to the changing environment.

Fiscal distress at Hungarian municipalities

In Hungary, the indebtedness of local governments is meant to be prevented by central regulations (Gál, 2011). Such safeguard was implemented during the operation of the Act of 1995 regulating the functioning of local governments (Section 88), which provides that the annual debt commitment of local governments may not exceed 70 percent of the revenues less current liabilities. Act XXV of 1996 on the Debt Settlement Procedure of Local Governments also regulates over-indebtedness and the mandatory tasks to be fulfilled during debt settlement; in addition, it also regulates the way of ensuring the continuity of local public services after reforming local government management. The Act also emphasises that the central budget provides no surety to local governments (Gál, 2011).

The local governments' scope of action has continuously contracted in the twenty years after the political transition. The provision

of local public services required increasing efforts. Larger and larger part of policy duties were delegated to local level, while the value of funds provided for them decreased in real terms. Normative subsidies covered part of the current expenses, but provided no funding for the replacement of assets, although local governments also used the assets to be replaced for the fulfilment of the tasks outsourced to them. The dependency of local governments on local business tax also represented a major problem, which made most of the local governments overly exposed to business activity. The perplexity of the regulation of funding as well as the centralised tenders, which ignored local requirements, also pointed to unsustainable management (Schlett, 2017). No differentiation between settlements of various level and size was made during the allocation of duties and competences (Vígvári, 2009). As a result, major operating deficit accumulated already by the turn of the millennium. It has become a frequent phenomenon that local governments used their funds earmarked for development to cover operational expenditures (Lentner, 2014). In addition, EU tenders also overheated investments, the purpose of which was often other than to improve the conditions of the performance of mandatory tasks and increase the efficiency of assets (Domokos, 2012). The development opportunities that became available after the EU accession increased willingness to invest; however, the required own resources were typically not available, which was replaced by loans and foreign currency bonds. Moreover, these related to non-productive investments, and thus no direct loan collateral could be taken into consideration, and these projects often entailed an increase in operational expenditures (Lentner, Hegedűs, 2019). There was no institutional control over finances, and hidden borrowing has also spread through the lease and PPP schemes. These increased the non-

transparency of local governments' financial risks (Vígvári, 2010). In addition to the foregoing, the internal audit regulation was also unable to provide an appropriate environment (Sepsey, 2011). By 2011 it has become apparent that Act XXV of 1996 was unable to fulfil its original purpose in its existing form.

Prior to 2010, outstanding local government loans and bonds have been steadily rising, and the loan-to-deposit position of the local government sectors also deteriorated almost continuously (Gál, 2011). Local governments' current fiscal balance continuously deteriorated, while the supplementary subsidies for maintaining viability not only failed to ensure long-term equilibrium but proved to be insufficient even in the short run. Additional problems included that the permanent operating deficit and capital shortfall was often financed by liquidity loans (Domokos, 2012).

The tasks delegated to local governments were typically underfunded (Hegedűs, Novoszáth, 2018). The problems of the local sub-sector were also confirmed by the audits performed by the State Audit Office, identifying simultaneous shortfall in operating and accumulation funds, where local governments did not have the assets necessary for the fulfilment of obligations (Lentner, 2014). The government in power was able to manage the contradictions characterising the system by fiscal policy, the effect of which was increasingly destructive (Vígvári, 2010).

Considering the Hungarian experiences, we can identify similar reasons: underfunding, outlined by Trussel and Patrick (2013), can be traced here as well. According to the categorisation applied by Skidmore and Scorsone (2011), there are external (inadequate central funding, revenues exposed to economic activity, unfavourable market environment, inappropriate tendering system) and internal reasons (wasteful management, ill-considered investments). Of the reasons

presented by Kloha, Weissert and Kleine (2005), decreasing tax bases, increasing local government expenditures and – through the false management decisions – the management of the local governments may be also mentioned as the source of the problems. In addition to foregoing, the internal control deficiency, characterising the local government system (Sepsey, 2011; Benedek, Szenténé Tubak, Béres, 2014) may be regarded as the manifestation of poor management. Though, as it is also emphasised by *Lentner* (2014), the primary reasons for the indebtedness of the local government sub-sector include the absence of governmental regulation and control, poor fiscal policy forced to decentralise and the neoliberal core philosophy – providing local governments with substantial independence, but tightening funding – supplemented with irresponsible fiscal practice.

Reform of the municipal system and debt consolidation in 2011-2014

The need for the reorganisation of the local government sub-sector became undisputable. With a view to preventing the repeated development of similar situation, several measures have been adopted. In addition to strengthening controls (which has become one of the key instruments to prevent repeated indebtedness) other changes were also implemented in the regulation. These include, for example, the prohibition of financing operating expenses from loan, effective from 2013. The range of duties to be fulfilled by local governments has also changed significantly. In-patient care and the operation of schools have been transferred to the state from 2012 and 2013, respectively. In addition, as a result of establishing district offices, several public administration duties have been also removed from the local governments' obligations (Hegedűs, Novoszáth, 2018). The

operation and maintenance of kindergartens and children’s catering remained a local duty, while part of the employees’ wage is financed centrally. Equitable allowance, primary services and benefits, day care and temporary care for the homeless remained at local level (Lentner, 2019).

The debt consolidation was implemented between 2011 and 2014 in several phases (*see Table 1*)

After 2010, the duties of the State Audit Office of Hungary (SAO) related to ensuring proper local government management also increased. The measures of the SAO supported the penetration of good practices and the development of a legislative environment that supports proper internal audit (Sepsey, 2011). The development of internal control systems support the fostering of proper, profitable and efficient management (Benedek, Szenténé Tubak, Béres, 2014). The role of the State Audit Office in spreading the culture of integrity also made positive contribution to the foregoing (Domokos et al., 2015). The measures of the State Audit Office facilitate the keeping of operating deficit under control, the assessment of investments and the mitigation of risks. In addition, the Stability Act and the rules laid down in the

Act on Hungary’s Local Governments made borrowing by local governments subject to authorisation. The legislator maintained the possibility of providing co-financing for EU-funded projects through borrowing, subject to major restrictions (Hegedűs, Lentner, Molnár, 2019). Since 2013 local governments are not allowed to plan an operating loss in their budget, and according to the conditions mentioned in the regulation they could only take liquidity loans in addition to funds for development purposes (Lentner, 2019).

In addition to restricting the freedom of management, the principle of funding has also changed, since the financing of local governments already takes place within the framework of task-based funding. Within the framework of this, the Parliament supports the operational expenditures related to the mandatory tasks by task-based funding, providing support for the duties to be performed corresponding to the statutory public service level. (Lentner, 2019). After harmonising the tasks and the related funding, and the completion of debt consolidation, local governments could start off with a clean slate (Hegedűs, Novoszáth, 2018). The expenditures of the local government system fell to 11-12 percent of the general government

Table 1

STEPS OF DEBT CONSOLIDATION

Year	Local governments involved	Number of local governments	Consolidated amount, HUF billions
2011	County governments and Municipality of Budapest	20	198
2012	Local governments with fewer than 5,000 inhabitants – Phase I	1700	74
2013	Local governments with fewer than 5,000 inhabitants – Phase II	14	10
2013	Local governments with more than 5,000 inhabitants – Phase I	305	685
2014	Local governments with more than 5,000 inhabitants – Phase II	305	420

Source: Own edit based on Hegedűs, Novoszáth (2018)

expenditures from the previous 20 percent (Lentner, 2019).

Based on the changes presented above, the following hypotheses may be formulated:

- H1: prior to the debt consolidation, the financial parameters of local governments in fiscal distress significantly differed from those of sound local governments.
- H2: following the debt consolidation and regulatory reform the differences between the two groups' financial indicators decreased on the whole.
- H3: the previously problematic financial parameters of local governments improved after the debt consolidation.

DATA AND METHODOLOGY

For the purposes of sampling we took into consideration the debt consolidation of local governments, the degree of extraordinary subsidies and the population of the settlements. When selecting the variables involved in the analysis we had to bear in mind that only hard variables were available (financial data, demographic data). Since the logistic regression model is sensitive to multicollinearity, in order to prevent this, we performed the analysis at two levels (financial balances, individual financial indicators).

Selecting sound local governments and those in fiscal distress

The group of sound institutions includes local governments not involved in debt consolidation. For this purpose we used a minister's decision adopted in October 2015, in which the government granted development aid to 115 local governments not involved in the debt consolidation (mostly due to the lack of debt).² For creating the other group, in fiscal distress, we took

into consideration the extraordinary subsidies of local governments.³ Those 115 local governments were classified as ones in fiscal distress that have similar population as the local governments not involved in the debt consolidation, and had received the highest extraordinary subsidies per person in 2014. It was necessary to use the population as a filter, because the population of sound local governments belongs to a relatively narrow interval compared to all settlements (*see Figure 1*).

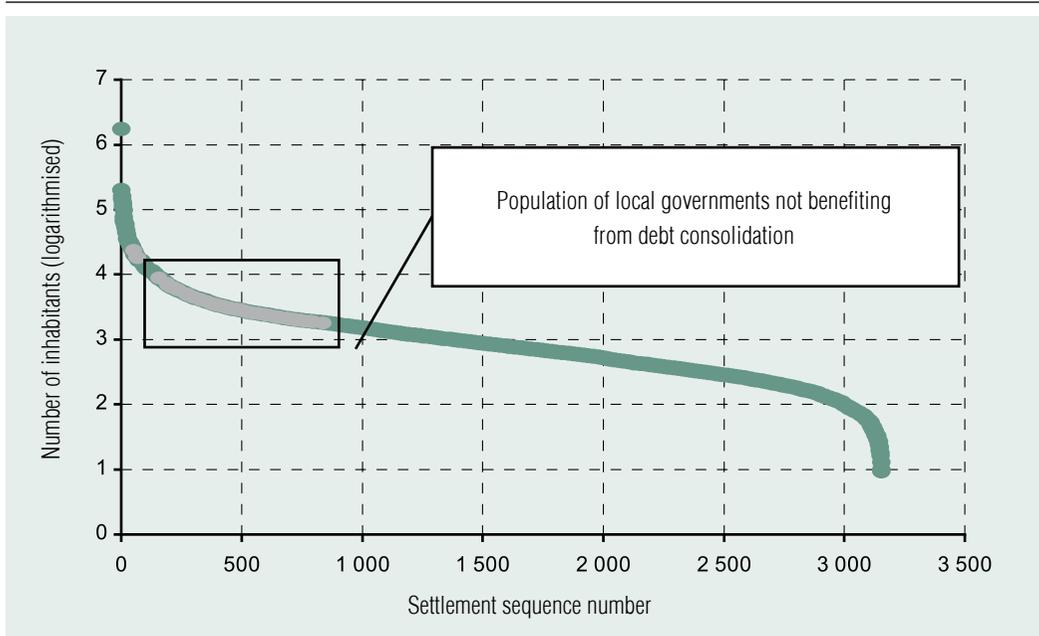
Bethlendi, Lentner and Nagy (2020) also emphasised this in their paper, where they allocated Hungarian settlements to five categories relying on cluster analyses. For the purposes of the analyses, in addition to the local governments' financial parameters, they also took into consideration other economic indicators of the settlements, and they found that the local governments not involved in debt consolidation belong to one of the dominant clusters among the clusters thus obtained. This cluster mostly comprised smaller settlements, which in the period under review had favourable financial, asset and liquidity indicators. Accordingly, we selected the group classified as local governments in fiscal distress also from among the settlement with population between 1,800 and 10,000 persons, typical for sound local governments. We selected 115 local governments in this case as well, since the optimal case for the purposes of the logistic regression procedure's interpretability is the distribution of the two subsamples in equal proportions. Finally, we selected 2014 due to the completion of the debt consolidations and the availability of the data.

Variables

Among the dependent variables of our model we tried to indicate the factors that according to the presented specialist literature may explain the development of distress.

Figure 1

POPULATION OF HUNGARIAN SETTLEMENTS, IN DESCENDING ORDER OF THE NUMBER OF INHABITANTS



Source: own edited

Table 2

STRUCTURE OF THE CREDIT LOCAL FRANCE (CLF) METHOD

1. Operating revenues	7. Current year's revenues
2. Operational expenditures	8. Current year's expenditures
3. Operating income (1 – 2)	9. GFS position (7 – 8)
4. Capital formation revenues	10. Balance of funding operations
5. Capital expenditures	11. Current year's position (9+10)
6. Capital formation budget balance (4 – 5)	12. Loan repayment, redemption of securities
13. Net operating income (3 – 12)	

Source: Lentner (2019)

For the analysis we used the annual settlement statistical data of the Hungarian Central Statistical Office's (HCSO) Information Database. We determined the key financial balances and the local governments' financial position relying on the Credit Local France (CLF) method (Table 2)

The method follows the logic of cash flow statements, separating recurrent and capital budget. The positive value of the operating income implies that the local government uses the funds appropriately and efficiently (Lentner, 2019). The capital formation balance is the difference of the various capital formation

revenues (investment target subsidies, real property sales) and expenditures (investments, funds transferred for investment) (Vasvári, 2013). A positive balance is advantageous in terms of cash flow, but a negative value does not necessarily represent a problem either, if it develops due to properly funded investments returning in the future. Current year's balance (GFS position) is the difference of current year's revenues and expenditures, showing the primary position of the budget net of the financing items. The balance of funding operations represents the borrowings and repayments as well as the budget carry-over, as the absorption of internal source of finance. Current year's position shows whether the year under review was characterised by cash inflow or outflow, i.e. it serves as kind of profitability indicator. Although in the case of major investments it is not a problem if the indicator is negative, if it is persistently negative, for years, it signals a condition that is not sustainable financially (Lentner, 2019).

As regards the variables, we performed the analysis based on the average values of two 4-year periods, i.e. based on the pre-crisis period of 2005-2008 and the post-debt consolidation period of 2015-2018. We have set the pre-debt consolidation period to an earlier date, because some of the indicators of certain local governments reflected fiscal distress as early as from 2009, and the purpose of this paper is to survey the general changes in local government management in the light of debt consolidation and reorganisation rather than to present the struggle of local governments with the crisis. The second period was selected because the annual data between 2012 and 2014 in the HCSO Information database are incomplete.

Following this we verified whether the sub-samples are suitable for the drawing of conclusions. The obtained results may be largely distorted if the two categories of local

governments significantly differ from each other also apart from the financial parameters. To this end, we compared the groups – in addition to the number of inhabitants – also in terms of the available funds as well as capital expenditures. It was important to verify the first to ensure that both categories include local governments of similar size also in terms of budget. The distorting effects of the difference in capital expenditures were highlighted by Bethlendi, Lentner and Nagy (2020). According to their paper, the financial and economic features of Hungarian settlements significantly differ in periods when they implement major investments. *Table 3* clearly reflects the similarity of the two sub-samples not only in terms of size, but also in terms of investment activity. In addition to the averages, this is also evidenced by the Mann-Whitney U tests suitable for testing the identical distribution of the two samples in the case of the number of inhabitants and capital expenditure (Nachar, 2008). By contrast, although the distribution of the samples differs in the case of available funds and the average value of the group in fiscal distress is significantly higher, we believe that this difference of 18 percent does not undermine our conclusions drawn from the analyses. The larger standard deviations are attributable to the fact that the sample also includes a few outliers.

Methodology

In order to assess the separation of sound local governments and those in fiscal distress we used logistic regressions. There are several reasons for choosing this procedure. On the one hand, we intended to capture with these exact indices the changes occurred in the two periods and the position of two groups relative to each other (converging to or diverging from

Table 3

STATISTICS OF THE INDICES CHARACTERISING THE ANALOGY OF THE TWO GROUPS (2005–2008)

Variable	Group	Average	Standard deviation	Median	Mann–Whitney U test
Population (persons)	Sound	3,630.1	3,055.1	2,855.5	0.132
	Fiscal distress	3,662.3	1,673.9	3,010.0	
Available funds (HUF thousands/person)	Sound	203.1	112.5	173.3	0.002
	Fiscal distress	239.7	125.9	215.6	
Capital formation and capital expenditures (HUF thousands/person)	Sound	31.8	56.1	20.1	0.388
	Fiscal distress	37.0	71.1	21.7	

Source: own edited

each other). This can be illustrated in a simple and easy-to-understand form relying on the pseudo R-squared obtained from the logistic regression procedures, the classification tables created from the estimated probability variables and the related ROC curves. On the other hand, the structure of the logistic regression and the conclusion that may be drawn from the results can be captured more easily than in the case of e.g. a neural network. Furthermore, although the procedure is sensitive to outliers and multicollinearity, it does not prescribe the normal distribution of variables and its results are distorted to a lesser degree by the heteroscedasticity existing between the variables, and thus it is not absolutely necessary to perform more complex mathematical transformations on the variables.

The general equation of the binary logistic regression can be represented by the following formula:

$$p(x_j) = P(y_i = 1 | x_j) = \frac{\exp(\beta_0 + \sum_{j=1}^p \beta_j x_{ji})}{1 + \exp(\beta_0 + \sum_{j=1}^p \beta_j x_{ji})}$$

Where:

$p(x_j)$ = probability of fiscal distress of the local government⁴

β_0 = constant value

β_j = estimation of the independent variable's regression parameter

x_{ij} = value of the local government's dependent variable

The increase of the regression parameters belonging to each dependent variable to a natural base shows the effects of a change of one unit in the variables on the odds ratio. (Hardle, Simar, 2015). In the results these values are indicated as *Exp(B)*.

We addressed the differences in the size of local governments by dividing the indicators by the number of inhabitants. Due to this, the measurement unit of our variables should be always interpreted as HUF thousands per person. In order to reduce the outliers, we used the natural logarithms of the variables.⁵ We addressed multicollinearity by not including in the same equations the variables closely related to each other, obtainable from each other's linear combination. Accordingly, in respect of the period of 2005-2008 we examined the balances in the CLF model, with the exception of the net operating income (being the difference of the operating balance and the loan repayments also appearing in the financing balance). By contrast, due to the accounting and methodological changes in

2014, it was not possible to separate financing revenues based on the data of the Information Database, and due to this these were not included in the analysis of this period. The variables included in the analysis and their preliminarily expected effects – based on the literature – on the probability of being allocated to the group in fiscal distress are shown in *Table 4*.

In the logistic regression we verified the potential existence of multicollinearity using the variance inflation factors (VIF). We performed the analyses in the SPSS software, and for the testing of the effects we used Wald tests.

RESULTS

Based on the results we may draw two conclusions. On the one hand, based on their operating and financing balance, the sound local governments not involved in the debt consolidation and the local governments in fiscal distress, involved in the debt consolidation indeed significantly differed

from each other in the pre-debt consolidation period. On the other hand, in the years after the debt consolidation – although their own operating revenues and expenditures still considerably differed from each other – due to the subsidies, there was no significant difference between the two groups.

Separation of the two groups

Table 5 clearly evidences that in the period of 2005-2008 the two groups were separated from each other primarily based on the operating and financing balances. The higher operating balance reduced the probability of fiscal distress, while the higher financing balance already forewarned of the problems. The degree of the separation was also rather significant, indicated by the high pseudo R-squared value and the area under the ROC curve, while the estimation of the logistic regression model was able to allocate local governments to the appropriate group with a hit accuracy of 79.6 percent, under a cut-off value of 50 percent.

Table 4

VARIABLES INCLUDED IN THE ANALYSIS AND THEIR PRELIMINARILY EXPECTED EFFECTS – BASED ON THE LITERATURE – ON THE PROBABILITY OF BEING ALLOCATED TO THE GROUP IN FISCAL DISTRESS

Period	Variable (HUF thousands/person)	Designation	Expected sign
2005–2008	Operating balance	MJ	Negative
	Capital formation balance	FE	–
	Financing balance	FI	Positive
	Current year’s balance	GFS	Negative
2015–2018	Operating balance	MJ	Negative
	Capital formation balance	FE	–
	Current year’s balance	GFS	Negative

Source: own edited

Table 5

LOGISTIC REGRESSION MODEL IN THE PERIOD OF 2005–2008

Variable	B	S.E.	Wald	Sig.	Exp(B)	VIF
Operating balance	-0.938	0.198	22.395	0.000	0.392	1.631
Capital formation balance	-0.250	0.203	1.512	0.219	0.779	1.339
Financing balance	0.454	0.140	10.477	0.001	1.575	1.413
Current year's balance	-0.159	0.131	1.474	0.225	0.853	1.336
Constant	-3.447	0.813	17.963	0.000	0.032	

Hit rate: 79.6%; Nagelkerke pseudo R-squared: 0.429; area under the ROC curve: 0.849

Source: own edited

Classification table		Estimated based on model		Correct classification ratio (%)
		Sound	Fiscal distress	
Actual	Sound	89	26	77.39
	Fiscal distress	21	94	81.74
Total				79.56

Source: own edited

In the period after the debt consolidation the two groups came significantly closer to each other in terms of operating income. In this period significant difference could be observed between the two groups in the capital formation balance. The balance of local governments not involved in debt consolidation was usually lower than that of local government in fiscal distress (Table 6). However, the difference in the capital formation balance was by far not so large that it could be used for the efficient separation of the two groups. Based on the estimates of the regression model, contrary to the previous period, it could be decided at a much lower – 64.8 percent – hit rate which group the local governments used to belong to earlier. In line with this, the degree of pseudo R-squared and the area under the ROC curve are both much lower compared to the previous period. And, as mentioned earlier, the lower capital formation balance alone is

not necessarily a problem. Moreover, these settlements also benefited from major state subsidy in 2014 due to the fact that formerly it was not necessary to rescue them.

Gap in the operating balances of local governments

When examining the impacts of the key factors within the operating and financing balance in the first period, it is obvious that within operating revenues there was substantial shortfall in own recurrent revenues of local governments involved in debt consolidation. As you can see in Figure 2, own operating revenues per person were usually lower in the group in fiscal distress. This is largely due to the local tax revenues, which usually fell short of that of sound local governments. In addition, major difference could be observed

Table 6

LOGISTIC REGRESSION MODEL IN THE PERIOD OF 2015–2018

Variable	B	S.E.	Wald	Sig.	Exp(B)	VIF
Operating balance	0.184	0.115	2.567	0.109	1.202	1.515
Capital formation balance	0.350	0.073	22.906	0.000	1.420	1.728
Current year's balance	-0.169	0.107	2.481	0.115	0.845	1.928
Constant	-0.516	0.350	2.170	0.141	0.597	

Hit rate: 64.8%; Nagelkerke pseudo R-squared: 0.171; area under the ROC curve: 0.717

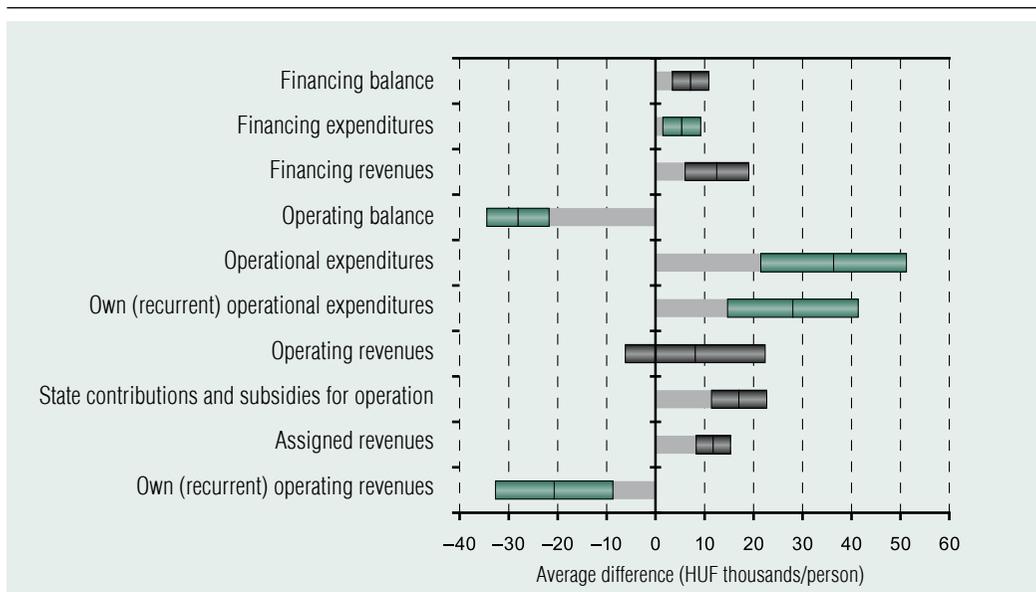
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Classification table		Estimated based on model		Correct classification ratio (%)
		Sound	Fiscal distress	
Actual	Sound	67	48	58.26
	Fiscal distress	33	82	71.30
Total				64.78

Source: own edited

Figure 2

AVERAGE DIFFERENCES OF LOCAL GOVERNMENTS IN FISCAL DISTRESS COMPARED TO SOUND LOCAL GOVERNMENTS (2005–2008)



Note: The 95-percent confidence intervals belonging to the average are presented in green (difference disadvantageous for operation) and in black (difference advantageous for operation).

Source: own edited

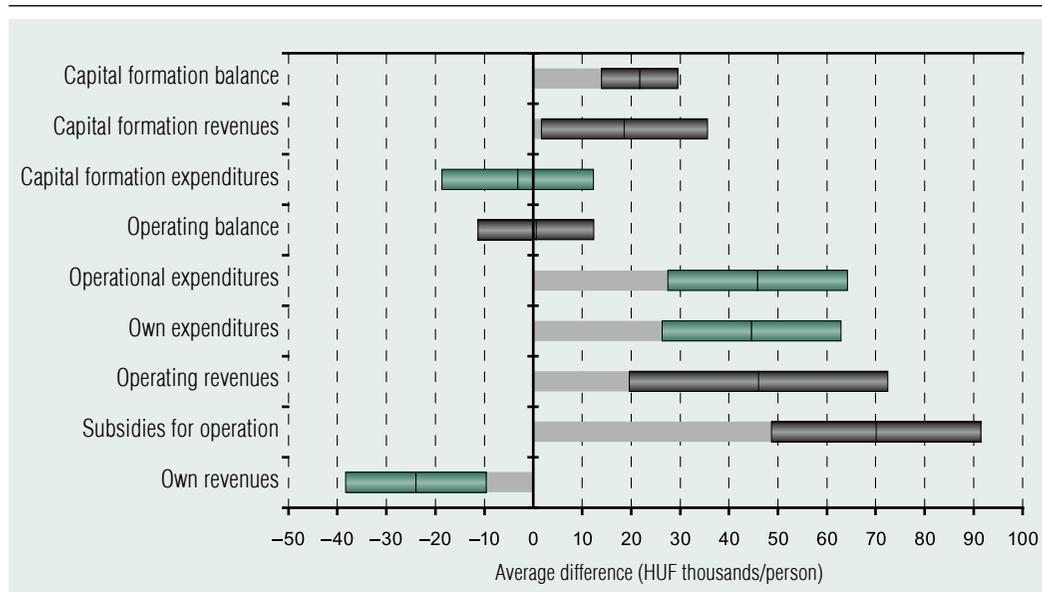
also on the expenditure side, mostly caused by personnel expenditures. Operating subsidies offset the difference in own operating balance, resulting from these differences only partially. As a result, major gap developed between the two groups. This may also be attributable to the fact that the local governments that later on had to resort to major debt consolidation usually took larger loans or relied on their internal carry-overs, which positively increased their financing balance.

Similarly, when breaking down the operating and capital formation balance to their components in the second period, we find that the average difference in own operating revenues did not change significantly. The difference is still attributable to the difference in the own source of income, i.e. local tax revenues; however, the difference increased

on the expenditure side, which indicates widening gap (*Figure 3*). A large part of the difference developed due to personnel benefits in this period as well. The question may arise as to the reason for the development of such large difference at local governments of almost identical size. In a previous pilot research the model also included demographic factors such as unemployment rate or the ratio of working age population, but none of these proved to be a significant variable. This implies that unemployment rate is kept at a lower level by local governments in fiscal distress by public employment. This statement is corroborated by the fact that on the average of 2017 and 2018 the ratio of public employees was much higher at local governments that earlier had been involved in debt consolidation. The average unemployment rate at sound local

Figure 3

AVERAGE DIFFERENCES OF LOCAL GOVERNMENTS IN FISCAL DISTRESS COMPARED TO SOUND LOCAL GOVERNMENTS (2015–2018)



Note: The 95-percent confidence intervals belonging to the average are presented in green (difference disadvantageous for operation) and in black (difference advantageous for operation).

Source: own edited

governments is 3.30 percent, while the ratio of public employees within the total population was 1.91 percent. By contrast, the average unemployment rate of local governments with financial problems was higher by 1.17 percentage points, while the ratio of public employees was almost twice as high, i.e. by 2.14 percentage points.⁶ Thus indirectly the impacts of demographic factors may be also proved.

Following the debt consolidation, in addition to the increasing differences in operating income, the scheme of assigned revenues and normative subsidies was replaced by task-based financing, which offset these differences by larger amounts, to a more adequate degree. The average difference in the operating revenues of local governments previously in fiscal distress was already much higher in this period than 10 years earlier. As a result, their operating balance was almost levelled out. In addition, their capital formation balances also largely increased. This is not necessarily attributable to large-scale investments implemented by local governments, as no major difference could be observed on the expenditure side. It can be observed on the revenue side that the local governments that previously were involved in

debt consolidation also benefited from much larger capital formation subsidies.

Changed role of subsidies

In order to illustrate the changed role of subsidies we performed logistic regression for both periods ignoring the subsidies in the balances. Based on this, it is shown in *Table 7* that it would have been possible to separate the two groups of local government in both periods with similar efficiency. However, while in the first period subsidies were unable to bridge the gap between the operating balances of the sound and problematic local governments, 10 years later they succeeded substantially better. In the post-debt consolidation period the hit rate of the model prepared considering the subsidies declined by more than 8 percentage points, while the pseudo R-squared value fell almost to its half.

In *Figures 4 and 5*⁷ it can be well illustrated by a dot chart that previously the rate of the subsidies rose not in direct proportion to the size of the operating deficit. Until such time as the deficit per person reached the value of almost HUF 100,000, the rate of subsidies usually exceeded the deficit, while thereafter

Table 7

LOGISTIC REGRESSION RESULTS FOR BOTH PERIODS BOTH WITH AND WITHOUT SUBSIDIES

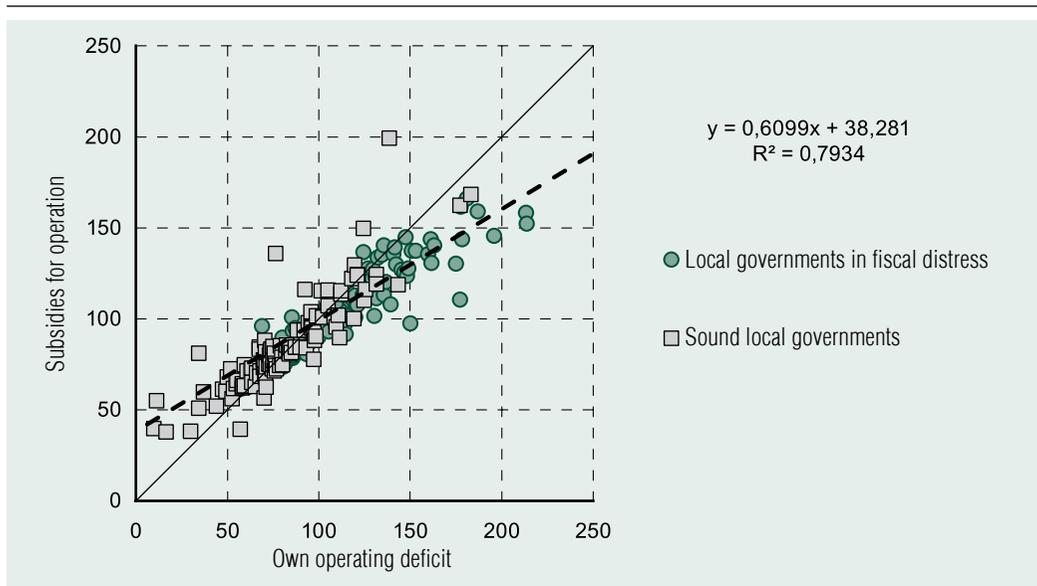
Goodness of fit	2005–2008		2015–2018	
	Without subsidy	With subsidy	Without subsidy	With subsidy
Nagelkerke R-squared	0.46	0.43	0.33	0.17
Hit rate (%)	77.4	79.6	73.0	64.8
Area under the ROC curve	0.85	0.85	0.81	0.72

Note: For the detailed results of the models run without subsidies see the Annex.

Source: own edited

Figure 4

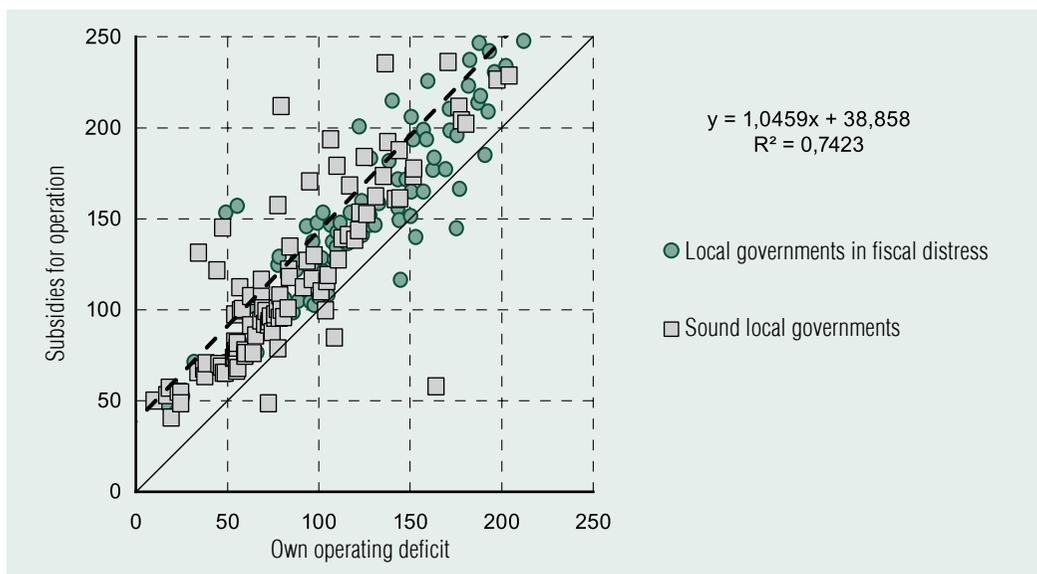
**RELATION BETWEEN OWN OPERATING DEFICIT AND OPERATING SUBSIDIES
(2005–2008, HUF THOUSANDS/PERSON)**



Source: own edited

Figure 5

**RELATION BETWEEN OWN OPERATING DEFICIT AND OPERATING SUBSIDIES
(2015–2018, HUF THOUSANDS/PERSON)**



Source: own edited

the rate of subsidies usually fell short of the deficit rate. By contrast, in the post-debt consolidation period, own operating deficits were accompanied by larger operating subsidies, and these amounts deviated to a much larger extent compared to previous periods.

SUMMARY

In the post-crisis years the problems of the local government system were also revealed. As a result of the inappropriately allocated tasks and funds, the underdeveloped control schemes and irresponsible funding decisions, the local governments of most settlements were faced with financial problems, which could be resolved only with government assistance. In addition to the assumption and supporting the repayment of debts, the improvement of the quality of regulation also gained importance, to prevent the reoccurrence of the situation.

We regard our first hypothesis, according to which prior to the debt consolidation, the financial parameters of local governments in fiscal distress and those of the sound local governments significantly differed from each other, as confirmed. Based on the results of the logistic regression the operating income of local governments involved in debt consolidation materially fell short of that of local governments not involved in debt consolidation, which is primarily attributable to lower own revenues. By contrast, due to taking loans, their financing balances were significantly higher. The results confirm the findings of others, according to which in the pre-crisis years major differences developed due to the unbalanced allocation of funding and tasks. The regulation failed to encourage economical and efficient management, which was supplemented by the irresponsible lending.

Based on our second hypothesis, after the debt consolidation the two groups should have converged to each other. In view of the fact that in this period it was not really possible to separate the local governments included in the sample based on the model, we also may deem this hypothesis confirmed. Namely, the changing of the regulation may be deemed effective in the sense that it reduced the difference between the 'sound' and 'problematic' local governments.

We may also declare our third hypothesis proven, according to which the regulation had positive effect on the entirety of the local government system, since the financial parameters of both the 'problematic' and 'sound' local governments improved, which is primarily attributable to the revenue side changes.

Our results point to similar conclusions as the previously published papers. On the whole, major change and improvement can be traced in financial balances, i.e. in the factor also recommended by the CLF method for the assessment of the local governments' management. This is primarily attributable to the generally higher and more differentiated subsidies, which presumably are adjusted to the operating features of the individual local governments to a greater degree. On the revenue side the measures and Acts (Stability Act, Act on Hungary's local governments) preventing repeated indebtedness had major effect, in addition to the emergence of the integrity approach, the audits performed and guidance provided by the State Audit Office and the regulations aimed at the enhancement of internal control. On the other hand, it gives cause for concern that although no major change occurred on the revenue side, the gap between the formerly sound local governments and those involved in debt consolidation significantly increased on the expenditure side. There are still many open

questions related to the topic, which may be subject to further research. The integration of the qualifications related to internal control in the models or the involvement of various

demographic variables, the application of other target variables or the assessment of the distress using other approaches could yield interesting results.

ANNEXES

Table 1

LOGISTIC REGRESSION MODEL WITHOUT STATE AIDS IN THE PERIOD OF 2005–2008

	B	S.E.	Wald	Sig.	Exp(B)	VIF
Operating balance	-3.149	0.532	35.099	0.000	0.043	1.339
Capital formation balance	-0.088	0.189	0.219	0.640	0.915	1.226
Financing balance	0.471	0.137	11.736	0.001	1.601	1.335
Current year's balance	-0.239	0.124	3.711	0.054	0.788	1.185
Constant	-15.315	2.563	35.701	0.000	0.000	

Source: own edited

Classification table		Estimated based on model		Correct classification ratio (%)
		Sound	Fiscal distress	
Actual	Sound	88	27	76.52
	Fiscal distress	25	90	78.26
Total				77.39

Source: own edited

Table 2

LOGISTIC REGRESSION MODEL WITHOUT OPERATIONAL SUBSIDIES IN THE PERIOD OF 2015–2018

	B	S.E.	Wald	Sig.	Exp(B)	VIF
Operating balance	-1.921	0.330	33.865	0.000	0.146	1.013
Capital formation balance	0.260	0.183	2.032	0.154	1.297	1.001
Current year's balance	0.084	0.084	0.989	0.320	1.087	1.013
Constant	-8.027	1.544	27.031	0.000	0.000	

Source: own edited

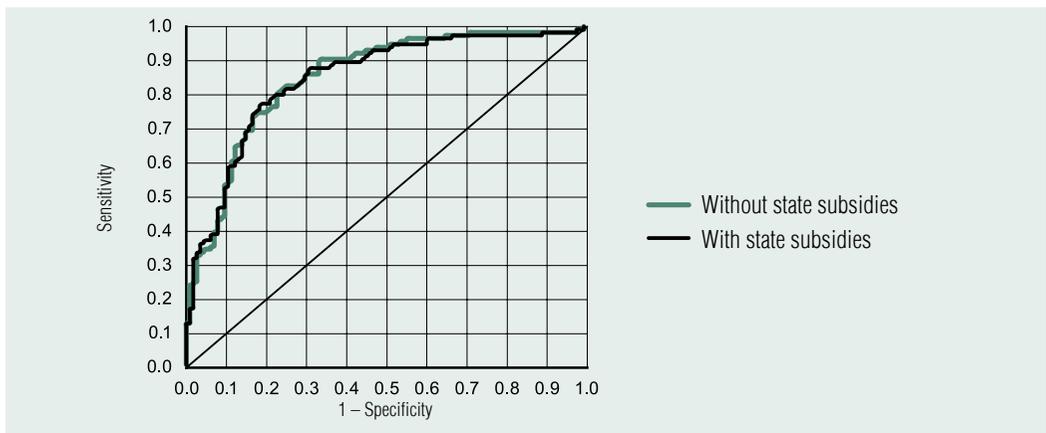
Continuation of Table 2

Classification table		Estimated based on model		Correct classification ratio (%)
		Sound	Fiscal distress	
Actual	Sound	71	44	61.74
	Fiscal distress	18	97	84.35
Total				73.04

Source: own edited

Figure I

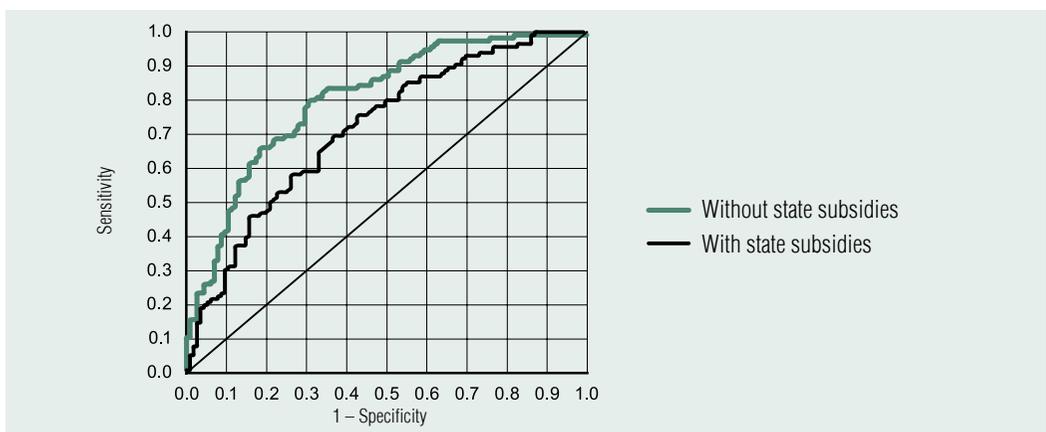
ROC CURVES BELONGING THE LOGISTIC REGRESSIONS OF THE 2005–2008 PERIOD



Source: own edited

Figure II

ROC CURVES BELONGING THE LOGISTIC REGRESSIONS OF THE 2015–2018 PERIOD



Source: own edited

NOTES

- ¹ In the news underlying the categorisation, the respective settlements were referred to as ‘left out of the debt consolidation’. For the sake of easier reference, the authors also adopted this label. <https://2015-2019.kormany.hu/hu/belugyminiszterium/onkormanyzati-allamtitkarsag/hirek/9-5-milliardot-kapnak-az-adossagkonszolidaciobol-kimaradt-onkormanyzatok>
- ² <https://2015-2019.kormany.hu/hu/belugyminiszterium/onkormanyzati-allamtitkarsag/hirek/9-5-milliardot-kapnak-az-adossagkonszolidaciobol-kimaradt-onkormanyzatok>
- ³ Pursuant to the minister’s decision on budget support provided to local governments for operation, local governments may benefit from extraordinary subsidies in the following cases: *a)* The local governments of settlements may apply for extraordinary subsidies in exceptional cases through tenders in order to preserve their viability or to prevent any situation that jeopardises the fulfilment of their tasks. Or, *b)* The appropriation serves as onerous interest subsidy for borrowing aimed at the debt settlement of permanently insolvent local governments and as the fee of the administrator; <http://www.allamkincstar.gov.hu/hu/nem-lakossagi-ugyfelek/helyi-onkormanyzatok-mukodesi-celu-koltsegvetesi-tamogatasai>
- ⁴ Otherwise $1-p(x_i)$ indicates the significance of the proper functioning of municipality *i*.
- ⁵ Since the balance may take both positive and negative values, we calculated with absolute values. As most of them are close to 0, we increased each value by 1 to prevent their becoming outliers. Accordingly, the simple equation of the transformation may be set up in the following form depending on the sign of the original value: $+/- \ln(|x_i|+1)$.
- ⁶ The HCSO Information Database contains information on the number of public employees only for 2017 and 2018.
- ⁷ Local governments with positive own recurrent balance even without subsidies and with per capita deficit exceeding HUF 250,000, taken into consideration for the purposes of the calculations, but not shown in the figure for more graphic illustration.

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