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## POSSIBILITIES OF USING IN POLAND THE FOREIGN MODELS OF PREDICTING THE FISCAL DISTRESS IN LOCAL GOVERNMENT UNITS

### Summary

The aim of the paper is to analyze the usefulness of foreign models of assessing financial condition for predicting financial distress in local governments and to verify whether they may be applied to Polish local government units. The selection of models and indicators was based on a review of foreign literature. Next, a quantitative survey was conducted to verify the assessments resulting from the theoretical analysis of the examined models. The studied group comprised municipalities with populations under 100,000 and the research covered the years 2010-2016. The study uses data from budget reports and consolidated balance sheets of local government units.

**Keywords:** fiscal distress, financial condition of local government units, ratio analysis

**JEL classification:** H72, H74

### 1. Introduction

The appropriate functioning of a local government unit (LGU) can be affected when financial problems appear.<sup>1</sup> In the English-language literature, such a situation is termed as *fiscal (financial) distress* or *fiscal stress*. In general, this concept refers to an LGU's inability to settle its obligations in a timely manner. Taking into consideration the specific character of LGUs, it should be noted that these obligations are not only of financial nature. The primary responsibility of LGUs is to perform tasks, most frequently – to provide public services, for the benefit of the local population. Financial insecurity, therefore, does not only threaten the ability to cope with financial commitments, but also to provide inhabitants with services of adequate standard, not worse than that recommended by established guidelines. This,

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<sup>1</sup> The paper presents the results of the statutory research entitled *Przewidywanie trudności finansowych jednostek samorządu terytorialnego* (KZiF/S/34/17). The research supervisor: Malinowska-Misiąg E., PhD co-author: Tłaczala A., PhD.

however, is associated with further problems. First of all, such standards are not set for all the public services, and secondly, data on the subject are not always available.

To sum up, fiscal distress occurs when local governments are not able to function in accordance with adopted financial standards and when quality the public services provided by them falls below the expected level [Kloha, Weissert, Kleine, 2005].

The notion of fiscal distress is inextricably linked with the concept of financial condition. The financial condition of LGU is most frequently associated with the unit's capability to settle its financial obligations and fulfill its commitments related to the provided services [Jacob, Hendrick, 2013, p. 11]. It is necessary to take into account both the temporal and material scope of these commitments and the impact of the used financial instruments on the unit's long-term financial condition, the changes of preferences regarding the provided public services, as well as factors which are independent of LGUs, but which may affect their financial [Marlowe, 2015, p. 9].

Financial problems affect local government units for a number of reasons, both of external and internal origin. The former include, for instance, the economic situation. The problem of fiscal distress in an LGU might also be caused by improper management, and particularly by inaccurate estimation of revenues and expenditures, or by unreliable bookkeeping. Reasons for fiscal distress can also be sought in low level of incomes resulting from inefficient efforts to obtain additional revenues and decreasing collection of own revenues. Other hazards for the finances of LGUs include increasing scopes of investment and the inability to adjust their value to a unit's financial possibilities, excessive increases in remunerations and lack of control over dependent entities, which, as a consequence, can make it necessary to provide them with financial backing.

It is possible to identify several warning signals which indicate a worsening of the financial condition of an LGU. Since, unlike enterprises, LGUs are not oriented towards attaining financial goals, models dedicated for commercial entities should not be applied to them. Local government units may monitor the state of their finances, either using their own instruments or instruments developed by other LGUs or external institutions.

The models designed to predict difficulties which LGUs might face have been thoroughly analyzed in the foreign literature. In the United States, studies into the issue have been conducted since 1980s. Also in other countries, increasing attention has been paid to this subject, especially after the eruption of the financial crisis in 2007. The paper makes an attempt to verify the legitimacy of using foreign models (after suitable modifications) to predict financial difficulties in Polish local government units.

## 2. Foreign models

The models used for evaluating the financial condition of LGUs and predicting fiscal distress can be divided into those based on relative measures and those

constructed on absolute measures. In the first case, the evaluation of a given unit depends on the results achieved by the entire analyzed population, whereas in the second – assessment is dependent mainly on the values of the indicators concerning the studied unit.

Brown's "10-Point Test" [Brown, 1993] is one of the best known models from the first group. The test is used for analysis of American cities with more than 100,000 inhabitants. However, for better comparability of data, the entire population of analyzed units is additionally divided into four subgroups (according to the number of inhabitants). In fact, Brown's model serves the evaluation of the financial situation of units, but its results may also be used for monitoring this situation for potential financial instability.

In Brown's model, evaluation of an LGU's financial situation consists of three stages. The first involves calculation of the values of ten indicators (regarding such aspects as revenues, expenditures, operating position, and debt structure) for each unit. Next, their values are compared with the indicators of units similar in terms of size. Finally, their financial condition is evaluated on the basis of the conducted comparison.

In order to compare the indicators, Brown used the quartile method. The first quartile group comprises units with the worst indicators, the last one – with the best indicators. It should be noted that in the case of some indicators the best result is the lowest value, in other cases – the highest value.

A different number of points is assigned to each quartile. For example, if the result of a given unit falls in the first quartile, it is awarded one negative point. If it is in the fourth quartile – it is graded two positive points. The sum of the awarded points determines the assessment of the unit's financial condition. Brown does not favour any indicator – they are of equal importance. Under Brown's classification, those units which obtain a score of 5 negative points or lower are in the worst financial situation.

Brown's model is frequently used for analyzing the financial situation of LGUs and has undergone numerous modifications. For instance, Maher and Nollenberger [2009] presented a modified version of Brown's method, adjusting indicators to changes related to financial crisis. The model includes, among other things, the ratio of the operating result to the operating revenues of the general fund and the ratio of the actuarial value of pension benefits to pension liabilities.

Brown's idea also constitutes a starting point for models used in other countries. A model predicting fiscal distress in local government units was developed, e.g., by Spanish researchers [Zafra-Gomez, López-Hernández, Hernández-Bastida, 2009]. In the first stage, uniform subgroups of units are identified; in the second – certain values of financial indicators are awarded points, whose sum reflects the financial condition of the analyzed LGU.

The model also takes into consideration non-financial factors which may have an influence on the situation of an LGU (e.g. registered unemployment or net migration index).

The financial indicators employed by the Spanish authors include, among others: the cash surplus index, the liquidity index, the net savings index, and current financial independence index. On the basis of the values of these measures, the aggregate index of a given unit's financial condition is calculated. The indicator's value depends on the results of the entire analyzed population. For example, when the value of a given LGU's indicator is among 25% lowest values in the sample (falls below the 25<sup>th</sup> percentile) – it receives one point. In the other percentile groups, the units can be awarded: 0.5 points, 0.25 points, or 0 points, respectively. The score from 3.6 to 5 points indicates an alert state and the necessity to implement corrective activities, while the grade of 5.1 to 7 points denotes the state of financial hazard and an urgent need to undertake remedial action.

Following the universally accepted assumption that no single indicator reflects the entire financial situation of an LGU, Kloha, Weissert, Kleine [2005] constructed a 10-point scale of fiscal distress, using nine indicators. Not all of these indicators refer directly to the state of LGUs' finances. The authors assumed that also such factors as a drop in the number of inhabitants or decrease in the real taxable value have an impact on the possibility of the occurrence of fiscal distress. The remaining indicators include, among others: general fund expenditures as a percentage of the taxable value or the general fund operating deficit (current and two previous years.

It is an absolute model, and the scale of fiscal distress is as follows:

- 1) each variable is assigned a standard which distinguishes indicators reflecting a good situation of the unit from those indicating a bad situation;
- 2) "good" values of indicators are awarded 0 points, whereas "bad" ones minus 1 point (or – in the case of one of the indicators – minus 2 points);
- 3) the points are added and the higher their sum, the worse the situation of the unit.

One of the difficulties with developing the scale is how to define the level of indicators which distinguish a good situation from a bad one. While it was not complicated for some variables (e.g. indicators related to deficit), in the case of others, statistical methods were employed, usually the standard deviation approach.

According to the authors, on the basis of the aforementioned indicators and values assigned to them it is possible to predict the phenomenon known as fiscal distress before it occurs. They assume that financial problems begin when a unit obtains 4 points and more.

Evaluation of both the financial condition of a local government unit and the possibility of the occurrence of fiscal distress is made not only on the basis of models using aggregated values, but also through analyzing individual indicators. American local government units frequently use a method developed by the International City Management Association, and known as Financial Trend Monitoring System. The system uses various types of indicators which are calculated for five-year periods in order to identify warning trends [Honadle, Costa, Cigler, 2004, p. 160]. A regularly updated methodology of the system of monitoring financial hazards is also published by the Comptroller of the State of New York [www 3].

Empirical verification of indicators which prove useful for the prediction of serious financial problems of local government units was conducted, for instance, in the city of Detroit, which declared bankruptcy in 2013. An *ex post* analysis was made for various indicators which, as a consequence, were divided into those that did not predict the forthcoming financial crisis, those which signaled a continual worsening of the financial situation, and those which had substantially changed directly prior to filing for bankruptcy [Stone et al., 2015].

### 3. Research methodology

On the basis of the models presented above and taking into consideration also other relevant publications [e.g. Carmeli, 2003; Shamsub, Akoto, 2004; Jones, Walker, 2007; Trussel, Patrick, 2009; García-Sánchez et al., 2012; Gorina, Maher, Joffe, 2017] a quantitative study was conducted in order to confirm whether it is justified to use foreign models to predict the financial difficulties of local government units in Poland.

The author decided to analyze indicators in an aggregated perspective, using a relative model based on the solution proposed by Brown [1993]. When using relative models it should be remembered that they have their drawbacks. They require the specification of the values of indicators of all LGUs in order to define a benchmark for particular units. This benchmark is dependent on the activities of other units, which may mean that, in practice, the evaluation of a unit might change even though the values of its indicators have not changed, but because the financial situation of other units has either improved or deteriorated [Kloha, Weissert, Kleine, 2005]. However, in a relative model one has to precisely define the level of indicators that determine the classification of units into particular classes, which, in fact, also entails referring these values to the results of the entire analyzed population. The second signaled problem (change of unit's evaluation despite unchanged level of its indicators) may be eliminated after final verification of the results of particular units.

The research comprised municipalities with more than 100,000 inhabitants, which constitutes more than 98% of the entire population of municipalities in Poland. The analysis concerned municipalities which functioned in all the studied years (2010-2016). Based on foreign experiences, the first stage of the research involved dividing the municipalities into four groups – according to the number of inhabitants. After a preliminary analysis, it was decided that this criterion differentiates municipalities better than the criterion based on unit type, especially in view of the fact that the smallest municipality in Poland (in terms of the number of inhabitants) is not a rural municipality, but has the status of a town.

The division into groups was as follows:

- group I – municipalities with fewer than 5,000 inhabitants (624 units);
- group II – municipalities with 5,000-10,000 inhabitants (968 units);
- group III – municipalities with 10,000-20,000 inhabitants (544 units);
- group IV – municipalities with 20,000-100,000 inhabitants (300 units).

Next, the indicators were selected. In Poland, most analyses of the financial situation of LGUs are based on indicators developed by the Ministry of Finance [www 1]. Filipiak et al. have presented their own approach to the evaluation of the financial condition of LGUs [*Metodyka kompleksowej oceny ...*, 2009; Dylewski, Filipiak, Gorzalczyńska-Koczkodaj, 2010; Filipiak Dylewski, Gorzalczyńska-Koczkodaj, 2011].

The financial situation of LGUs is usually assessed on the basis of data from budget reports made in accordance with the requirements of the Act on Public Finances [Ustawa 2009]. The financial reports published by LGUs as required by the Accounting Law [Ustawa 2004] remain hardly accessible and are not particularly useful for analyses – both because they are not made public, but also because of the form in which (in rare cases) they are made available (non-editable scans of documents), as well as owing to an almost complete lack of explanations or comments. Nevertheless, there has been a slight improvement recently. In 2017, the Ministry of Finance began to publish, on its website, consolidated balance sheets of LGUs – the editable database covers the period from 2006 [www 2]. Therefore, the author decided to use indicators based both on the budget reports and balance reports.

The selection of indicators resulted both from the possibility of adapting them to the Polish conditions and from the availability of data. Indicators whose interpretation might be ambiguous were abandoned (e.g. Brown's model preferred lower values of the indicator 'revenues *per capita*').

TABLE 1

## Indicators used in the research

Budget indicators	Balance-sheet indicators
$X_1 = \frac{\text{operating surplus}}{\text{total revenues}}$	$Y_1 = \frac{\text{funds and investments}}{\text{total liabilities}}$
$X_2 = \frac{\text{expenditures on remunerations and related expenses}}{\text{running costs}}$	$Y_2 = \frac{\text{current assets}}{\text{short-term liabilities}}$
$X_3 = \frac{\text{total liabilities}}{\text{total revenues}}$	$Y_3 = \frac{\text{long-term liabilities}}{\text{total assets}}$
$X_4 = \frac{\text{interest and capital installments}}{\text{total revenues}}$	$Y_4 = \frac{\text{long-term liabilities}}{\text{population}}$

Source: author's own work.

Ultimately, eight indicators were selected. Four of them are used in the documents published by the Ministry of Finance, calculated on the basis of budget forms (further on referred to as: budget indicators). The second half comprises indicators based on data from financial reporting – consolidated balance sheets of LGUs (further on referred to as: balance-sheet indicators).

For each year, for each group of municipalities and for each indicator, quartile groups were selected. The first quartile group includes LGUs with the worst results,

whereas the last one – with the best results. The units from the first quartile group were awarded 0 pts, from the second group – 1 pt., from third group – 2 pts, and from the fourth group – 3 pts. The research was conducted separately for budget indicators and separately for balance-sheet indicators. For indicators  $X_1$ ,  $Y_1$ ,  $Y_2$ , the worst result was the lowest value, while for the other indicators – the highest value.

After the results had been summed up, units with the lowest number points were identified. The units which have obtained low results for a number of years can be considered to be at serious risk of financial instability and, consequently, likely to lose their ability to perform public tasks in an efficient manner.

#### 4. Results

Using foreign models for predicting fiscal distress in Polish local government units requires (for analytical purposes) making a distinction between units in good financial condition and those whose financial security is unstable. LGUs' inability to declare bankruptcy makes it difficult to indicate units in the worst financial situation. Nevertheless, other objective criteria can be used to indicate serious financial difficulties. In this study, units which implemented corrective procedures are regarded as those in the worst financial condition. This is not, however, the only existing method of identifying LGUs likely to experience financial problems. In accordance with data from the Ministry of Finance from November 2017, the procedure was implemented in 37 municipalities, including 23 rural municipalities, 12 urban-rural municipalities, and two urban municipalities [www 4]. Most municipalities with corrective procedures had 5,000-10,000 inhabitants (20 units).

The results of the conducted calculations for the selected budget indicators and balance-sheet indicators are presented in tables 2 and 3. The presented data shows what percentage of municipalities from each group obtained fewer than 2 pts in each analyzed year. Separately there are shown the results of municipalities which received 0 pts. Analysis of the values presented below proves that worse results were observed in the case of balance-sheet indicators.

A separate analysis was made for the municipalities characterized by the lowest total number of points in all the analyzed years (for both types of indicators). In the case of budget indicators, 12 units with more than 10 points were identified. For balance-sheet indicators, the number was much higher – 108 municipalities in total.

**TABLE 2****Percentage of municipalities with the worst results of budget indicators**

No. of points	2010	2011	2012	2013	2014	2015	2016
Group I – municipalities with fewer than 5,000 inhabitants							
0 pts – 0.2 pts	11.7	9.9	8.1	7.5	8.8	6.7	7.8
0 pts	1.6	0.5	0.5	0.8	0.6	0.2	0.8
Group II – municipalities with 5,000-10,000 inhabitants							
0 pts – 0.2 pts	8.7	8.7	8.4	9.9	7.9	7.1	9.3
0 pts	0.7	0.8	0.7	1.0	0.6	0.4	0.7
Group III – municipalities with 10,000-20,000 inhabitants							
0 pts – 0.2 pts	8.5	9.7	11.2	10.5	7.4	7.2	6.4
0 pts	0.6	1.8	1.5	0.6	1.1	0.4	0.9
Group IV – municipalities with 20,000-100,000 inhabitants							
0 pts – 0.2 pts	9.3	9.3	10.7	10.7	5.0	7.0	8.3
0 pts	1.3	1.0	1.3	2.3	0.7	0.0	0.3

Source: author's own work.

**TABLE 3****The percentage of municipalities with the worst results of balance-sheet indicators**

No. of points	2010	2011	2012	2013	2014	2015	2016
Group I – municipalities with fewer than 5,000 inhabitants							
0 pts – 0.2 pts	14.2	15.5	18.4	17.4	19.0	20.1	20.3
0 pkt	2.1	3.0	3.4	3.8	4.8	5.4	5.9
Group II – municipalities with 5,000-10,000 inhabitants							
0 pts – 0.2 pts	16.5	15.6	17.4	19.0	17.5	19.8	20.6
0 pts	3.6	2.4	4.1	3.9	3.5	4.3	5.0
Group III – municipalities with 10,000-20,000 inhabitants							
0 pts – 0.2 pts	16.2	15.8	15.1	15.6	15.6	18.2	17.3
0 pts	2.4	1.7	2.2	2.8	2.9	4.4	5.3
Group IV – municipalities with 20,000-100,000 inhabitants							
0 pts – 0.2 pts	15.7	12.3	15.0	15.0	14.0	18.0	18.7
0 pts	2.7	3.0	2.0	3.3	3.0	3.7	5.0

Source: author's own work.

Next, it was checked whether the units which had implemented corrective procedures were in the group of units with the lowest number of points. The results proved to be inconclusive.



In the case of budget indicators, the average score of municipalities with corrective procedures amounted to 34 points. Among units with fewer than 20 points there were 5 such municipalities.

Balance-sheet indicators proved to be more useful for identification of financial problems. Even though the average number of points of all the municipalities with corrective procedures was relatively high (25 pts), the group with the lowest number of points (fewer than 10) was composed of 9 municipalities where corrective procedure had been implemented.

Therefore, application of foreign models in Polish LGUs should be approached with great caution. Naturally, the obtained results depend, to a large extent, on the subjective selection of indicators which are possible to be acquired in Poland. Models based on other indicators (from various sources, frequently not made public, including profit and loss accounts), better reflecting the specific features of the Polish system of self-government finances, could probably prove to be more useful. Additionally, it should be mentioned that matching the values of the indicators with particular quartile groups was far from easy. In many cases (owing to very similar values of indicators) it was difficult to precisely indicate the "cut-off" values for these groups. Importantly, the methods involving assigning points for belonging to quartile or decile groups do not take into consideration the diversification scale of the values of particular indicators. In practice, this means that it is necessary to avoid using indicators whose values (in the entire population) are not particularly diversified. This situation also regards other methods of analyzing the financial condition of local government units.

## 5. Conclusions

Foreign literature mentions many indicators whose certain values or trends may predict local fiscal distress. The selection of these indicators is governed by many factors which ought to take into consideration both the specific character of a given unit and the legislative regulations with which it is obliged to comply. It is thus difficult to determine an optimal set of indicators suitable for every LGU because they should reflect the most important problems. Meanwhile, it should be remembered that problems vary from one unit to another and can change over time. In order to monitor the financial condition of local government units, it is equally important to identify an appropriate set of indicators and define a secure and desirable level of the values of observed indicators.

It should also be stressed that applying indicators and models which were developed abroad to Polish LGUs is associated with numerous difficulties. They result mainly from differences in legal systems, including different principles of accounting and reporting. In Poland, budget documentation is prepared cash basis. Accrual-based accounting is rarely employed for evaluating the financial situation of LGUs. However, recent changes, including new implementing acts, may change this situation. This is particularly important as the conducted research indicates that

using balance-sheet indicators for predicting financial difficulties in LGUs is more justified.

However, application of financial indicators frequently proves to be inefficient, because the effectiveness of local governments should not be measured with their financial results, but with their ability to satisfy the needs of the local community, complying at the same time with the principles of public financial management. Fiscal health of an LGU does not necessarily mean effective management of the unit's financial resources. It is crucial to assess whether the improvement of financial indicators is not accompanied by a worsening of the standard of provided public services. However, access to qualitative data is limited, not only in Poland, but also in other countries.

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