

PREDICTING CORPORATE FINANCIAL DISTRESS IN THE CASE OF OPERATIONAL PROGRAM ENVIRONMENT

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Abstract. The aim of this paper is to show if the Czech institutions that distribute European money support healthy businesses. The Czech Republic has € 26.7 billion available for the program period of 2007-2013 from the European funds. There are more than twenty financial support programs. Beneficiaries of different support programs are thoroughly chosen according to criteria. Among the criteria, financial health is also monitored. Predicting corporate financial distress or bankruptcy has been a highly discussed topic in the research as well as business circles since 1960's. Bankruptcy models provide a quick answer about the company's financial conditions. They are helpful for business partners, banks as well as for governmental institutions. Cooperation with the ailing partner can be devastating.

For the purpose of this paper, Operational Program Environment has been chosen as one of the biggest programs. The Altman formula is selected as a bankruptcy model which should help to fulfil the main aim, because of its worldwide use. The analysis will be done with the use of a database of beneficiaries and the corporate database Albertina, which provides financial data.

JEL classification: G30, G32, F36.

Keywords: financial distress, bankruptcy prediction models, European funds. Czech Republic, Operational program Environment.

Reikšminiai žodžiai: finansų krizė, bankroto prognozavimo modeliai, Europos fondai, Čekijos Respublika, operacinė programa „Aplinka“.

1. Introduction

Financial health or stability is a crucial issue for every company. Prediction of bankruptcy or probability of default is a research topic which has inspired economists since the 1960's. This paper is focused on the financial health of companies supported by European funds in the Czech Republic. Financial support programs are an impor-

tant source of money for the Czech Republic as well as other European countries that joined the European Union during Eastern enlargement in 2004 or later, as was the case with Romania and Bulgaria. Companies, as well as municipalities, regions, NGOs and others, can ask for non-returnable subsidies. All applicants cannot succeed because money sources are limited and only the best projects are chosen, therefore there are conditions and requirements. The conditions may differ because there are more than 20 different financial support programs in the Czech Republic. On the other hand, among the conditions we can always find financial stability, because support of ailing business units is not appropriate.

Czech financial support programs usually use their own distressed prediction models. The paper uses the Altman Z-Score for evaluating because it is the most famous model worldwide which is globally accepted and still highly used although it was originally published in 1968. As is mentioned, the Czech Republic has plenty of support programs. For the purposes of this paper the Operational Program Environment is selected. This program is one of the most important according to the amount of funds or number of projects. Potential beneficiaries may be many different units as enterprises, non-governmental organizations, regions, municipalities or public companies. Attention is paid only to enterprises and their financial position. Results of specific model used by the OP Environment will be compared with results provided by Altman Z-Score. As the conclusion, a comparison of the specific approach and the Altman formula is presented.

2. Financial support programs

Financial support programs, co-financed from the European Union, can be described as a significant money source. For the running program period of 2007–2013, the Czech Republic has € 26.69 billion available (European Union Funds, Information about EU Funds, 2012). Different projects are supported and therefore the Czech Republic has four major groups programs:

- Thematic Operational Programs;
- Regional Operational Programs;
- Operational Programs Prague;
- European Territorial Cooperation.

These groups consist together of 26 different programs. Unfortunately, the main data set referring to the state of financial drawing contains only 19 Czech operational programs (Objective 1 and 2). Objective 3 is classified separately. It seems to be a limitation of the analysis but we have to take into account that only € 0.39 billion is reserved for territorial cooperation (European Union funds, European Territorial Cooperation). The first two above-mentioned groups follow Objective 1. OP Prague fulfils Objective 2 and the last group of programs supports Objective 3. Detailed information about the content of objectives can be found in Boháčková, Hrabánková (2009). Table 1 displays available funds for different objectives.

Table 1. Money available for the program period 2007-2013 according objectives

	Money amount available	Relative frequency
Objective 1	25.89	0.97
Objective 2	0.42	0.02
Objective 3	0.39	0.01
All objectives	26.7	1.00

Source: *European Union Funds, Programs 2007-2013, 2012*

3. Data set—selected program Operational Program Environment

It is mentioned above that the Czech Republic has altogether 26 different support programs co financed from European money. These programs and projects can vary not only in content but also in geographical location. It is very difficult to analyse such heterogeneous group which contains over 42 000 projects right now (European Union Funds, State of drawing, 2012). For the purposes of this paper one operational program is selected as a representative unit.

Operational program Environment has been selected as a representative unit because of several reasons—the amount of money and number of projects. The most important factor is the amount of financial sources. For OP Environment the amount of EUR 4.92 billion has been available—it means that 18.4% of all Czech financial sources from the EU funds (European Union Funds, Operational Program Environment, 2012). According to finance it is one of the most important programs. A difference could be detected in the number of supported projects. Table 2 displays the number of projects in case of Operational Program Environment compared with all programs fulfilling Objectives 1 and 2.

It is already mentioned that beneficiaries may be very different units. Because our aim is to analyse financial health we narrow the group of beneficiaries. It is not an easy question to evaluate the financial health of business companies and it is even harder task in the case of municipalities or NGOs. Our attention is paid only to enterprises (limited liability companies, joint-stock companies, public companies and cooperatives).

Table 2. Current number of beneficiaries of OP Environment (6th September 2012)

Operational programmes	Number of projects			
	All	Cancelled	Finalized	On-going
Integrated Operational Program	7 436	108	5 881	1 447
OP Czech Republic-Poland	2 271	34	1 346	891
OP Transport	157	2	86	69
OP Human Resources and Employment	3 651	42	599	3 010

Operational programmes	Number of projects			
	All	Cancelled	Finalized	On-going
OP Enterprise and Innovation	8 973	784	3 810	4 379
OP Prague Adaptability	605	15	233	357
OP Prague Competitiveness	226	16	148	62
OP Fishing	726	45	201	480
OP Technical Assistance	120	4	51	65
OP Research and Development for Innovations	112	---	---	112
OP Education for Competitiveness	8 945	15	108	8 822
OP Environment	4 980	4	2 456	2 520
ROP NUTS II South-East	602	9	470	123
ROP NUTS II South-West	628	18	410	200
ROP NUTS II Moravia-Silesia	640	4	417	219
ROP NUTS II North-East	559	10	379	170
ROP NUTS II North-West	337	13	189	135
ROP NUTS II Central Bohemia	657	14	416	227
ROP NUTS II Central Moravia	647	5	536	106
All programmes	42 272	1 142	17 736	23 394

Source: Čámská (2012a)

The Operational Program Environment is important in two criteria. The first one has been already mentioned—the amount of money available for this program. The second one is the number of projects. According of results displayed in Table 2 the Operational Program Environment is not the biggest program because the program does not have the most projects. The program is even on the 4th position among all presented programs. It would be a mistake to assume that the program is becoming less important for further analysis. If we count average size of the supported project the Operational Program Environment supports bigger projects than the rest.

The main aim of this program is to improve the quality of living standards and focus on a healthy environment. The program itself follows 8 priority axes:

- Improvement of the Water Management Infrastructure and Reduction of Floods Risk Programs;
- Improvement of Air Quality and Reduction of Emissions;
- Sustainable Use of Energy Resources;
- Improvement of Waste Management and Removal of Old Environmental Burdens;
- Limitation of Industrial Pollution and Environmental Risks Improvement of Air Quality and Reduction of Emissions;

- Improvement of State of Nature and Landscape;
- Development of Infrastructure for Environmental Education, Consultancy and Awareness;
- Technical Assistance.

The proportion of funds reserved for concrete axes is shown with the help of Fig. 1.

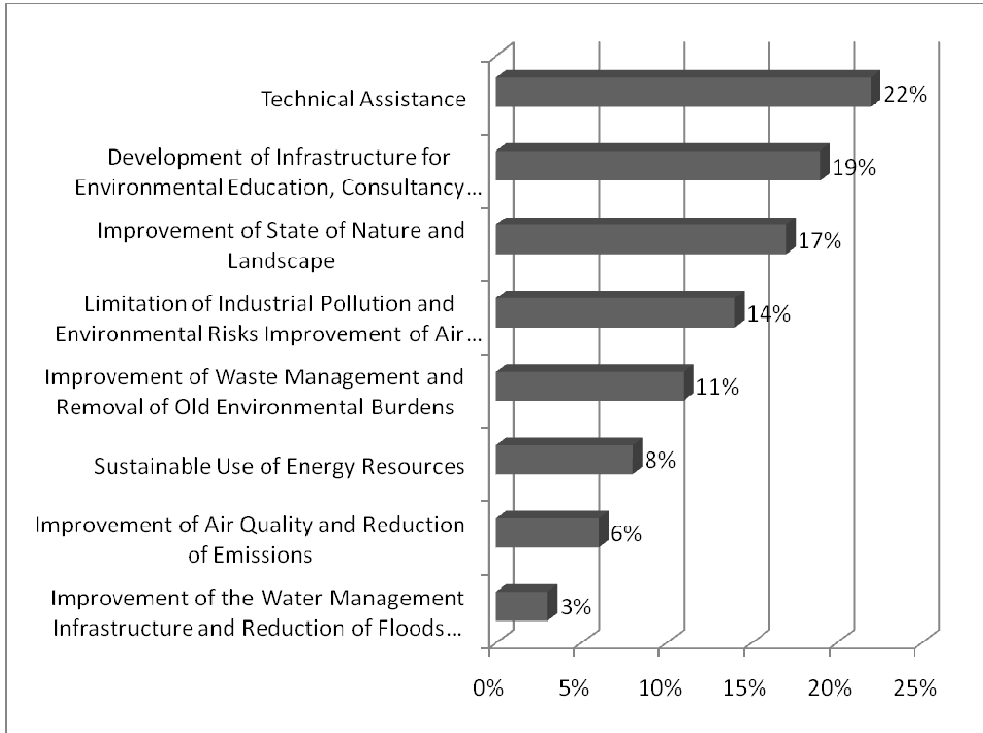


Fig. 1. Proportion of funds according priority axes

Source: own elaboration based on data from European Union Funds, Operational Program Environment (2012)

4. Data set adjustments

The data set contained 4 980 projects at the beginning. Potential beneficiaries could be regions, municipalities, NGOs, business units, individuals etc. There were regions, municipalities, religious organizations etc. which had to be excluded because of the paper's focus. The focus is on the financial health of beneficiaries. It is very complicated to evaluate the financial situation of non-business units because they are supported especially because of impacts public interest. Table 3 displays how the beneficiaries are divided into specific groups.

Table 3. Division of beneficiaries

Type of entity	Number of projects	Relative frequency
Cities, towns and town parts	1 559	0.31
Small municipalities	1 465	0.29
Regions	163	0.03
Associations of municipalities and micro-regions	62	0.01
Companies	596	0.12
Schools	154	0.03
Ministry of the Environment	136	0.03
Others	845	0.17
Total	4 980	1.00

Source: Čámská (2012a)

After the exclusion of non-business units, it gained 596 projects in the years 2008–2012. There were no tenders during the year 2007 which was the starting point of the program period 2007–2013. Most projects were applied during the last three years, with a peak in 2010.

Each unit can ask repeatedly, because the financial support is not determined for the asking unit, but for a concrete purpose. It means that there are fewer beneficiaries than projects because some of them are supported repeatedly. The same unit can even ask more times during one year. The last problem is connected with data availability. For further work, companies' financial statements are needed. Unfortunately, not all companies in the Czech Republic are following the rule of disclosure obligation. The consequence is that we are not able to count the results for all companies in the sample. The financial data of some companies is available in neither the business register nor in corporate databases. This issue is strongly connected with the last year (2012) because less than one fifth of companies had financial statements available during writing of this paper (September 2012). The majority of financial statements are still expected. Table 4 contains a comparison of the number of projects, companies and analysed units according allocation years.

Table 4. Allocation years and number of approved projects and supported companies

	Total	2008	2009	2010	2011	2012
Number of projects	596	22	75	260	130	109
Number of companies	501	18	56	223	108	96
Number of analysed companies	326	12	41	174	83	16

Source: own elaboration based on List of beneficiaries (2012)

The time period 2008–2012 is long in the case of financial health. According to the market conditions and results of projects, the financial situation can change. Table

4 shows that companies are divided according to the year when they became beneficiaries. The year of allocation is crucial for further analysis. If the company asked for monetary support in the year 2010 and got the subsidies, it means that its financial health was evaluated and monitored with the help of historical financial statements by authorities of the operational program. The same assumption is applied in the paper's experimental part—the financial health of the company will be checked one year before the year of allocation. It ensures comparability with the results of the methodology of the operational program. Unfortunately not enough data is available for the allocation year 2012 (see Table 4). The reason is that most financial statements, which refer to the year 2011, exist, but they have not been officially published yet.

The following part introduces methods of evaluation of corporate financial health.

5. Financial health and methods

Financial health and stability is crucial for every company. No business unit is able to survive in the long run period if the stability is not ensured. In reality, the situation is not important for the company itself but rather for other subjects as investors, business partners, employees or government institutions. It sets up a question of why financial health should be monitored and is crucial for the decision of authorities of operational programs.

The answer is very easy: no one wants to support a business unit which is likely to go bankrupt. Money sources are limited and their spending is checked not only by national, but also supranational authorities (EU). From the beginning of an application process all programs have their own requirements and conditions which have to be fulfilled by potential beneficiaries. Among the conditions we can always find the financial health of an organization.

It is answered that financial health is crucial and it should be monitored, but it is not said which methods should be used. Czech financial support programs use their own methodology of how to evaluate the financial health. There can be significant differences. Unfortunately the methodology of the Operational Program Environment is not known publicly, but the authority asks for complete applicant's financial statements. It provides, along with other documents, enough relevant information that support decision making.

6. Approach of the Operational Program Environment

Approaches of operational programs are partly published. Among operational programs we can find different approaches. On the one hand, some of them seem very easy, logical and applicable; on the other hand, several programmes use very sophisticated approaches. Nowadays it is usual that operational programs use the internet platform for communicating with potential beneficiaries in providing information, filling

applications, correcting forms etc. These programs, which are included in the platform, also ask for the financial data of applicants. Unfortunately the ways of how the financial situation is evaluated, is hidden. It could be specific for different programs but also for different priority axes of one operational program and it can differ during the time period. Criteria were changed, for example, because of economic crisis, which means that the criteria have become less strict than in 2007 or 2008.

Approaches of the Operational Program Environment vary according to different types of projects. If municipalities or regions ask for subsidies especially public interest is followed. An opposite decision process is made in the case of projects generating profits. The analysis is focused on the projects and their financial data (costs, revenues, proportion of self-financing etc.). Projects are generally evaluated with the help of classical techniques such as net present value, internal rate of return. The efforts of authorities that decide about the support is welcomed by business economists. Results of research (Švecová, Scholleová, Fotr, 2012) show that companies themselves do not use sophisticated methods evaluated investments. The majority uses statistic methods and do not use dynamic methods of investment evaluation, which are recommended by all textbooks from the area of corporate finance.

It is possible to conclude that the Operational Program Environment mainly focuses on financial data connected to concrete project and financial data, which describes the financial situation/health of the company, is in the background. It seems as a threat that business units which are not healthy can obtain subsidies and they can use them to improve their ratings at least if they do not use them for a purpose other than financing an environmental project.

The space for using methods in evaluating the financial situation of applicants has been detected now.

7. General approaches

The critical question is how to predict financial distress or probability of default in general and if this prediction has sufficient reliability. Predicting corporate financial distress or bankruptcy has been a highly discussed topic in research as well as business circles since the 1960s. Now nobody is able to say how many prediction approaches have been developed since the 60s. In this area, researchers, banks and other institutions, which need it for their functioning, are active. Very popular are bankruptcy models which could be created by one equation, which consists of several financial ratios. Most of these equations have been created as a statistical result of discriminate or regressive analysis.

The most famous model worldwide is the Altman Z-Score which was originally published in 1968 (Altman, 1968). This model is based on discriminate analysis and contains 5 financial ratios (the number can differ according to modification). Although this model was created more than 40 years ago and the importance of the components changed several times, it is still highly used and its accuracy in comparing with

a newer model is still sufficient (Maňasová, 2007). The Altman Z Score used in the experimental part, presented by the equation 1 (Altman, 2012) and its evaluation table is mentioned as well. The calculated value of the Altman Z-Score has to be evaluated according to Table 5.

$$Z \text{ Score} = 3.107 \times \frac{EBIT}{A} + 0.998 \times \frac{S}{A} + 0.42 \times \frac{E}{L} + 0.847 \times \frac{RE}{A} + 0.717 \times \frac{NWC}{A}, (1)$$

where

EBIT	Earnings Before Interest and Tax
A	Total Assets
S	Sales
E	Equity
L	Total Liabilities
RE	Retained Earnings
NWC	Net Working Capital.

Table 5. Evaluation of Z-Score

Evaluation	Z Score
Unhealthy	$Z < 1.23$
Grey Zone	$1.23 < Z < 2.9$
Healthy	$2.9 < Z$

Source: Altman (2012)

8. Results

This chapter contains the results of the experimental part, which are followed by a discussion. The financial health of companies is generally evaluated one year before they became beneficiaries. The Altman Z Score is calculated for each company from a sample using adequate financial data. According to the value of the Z Score, companies are divided into three groups—healthy, grey zone and bankruptcy or distress zone. Final results are summed up in Table 6.

Table 6. Evaluation of Altman Z-Score

Altman	2008	2009	2010	2011	2012
Healthy	5	24	77	28	7
Grey zone	6	12	78	39	8
Bankruptcy	3	5	19	16	1

Source: own elaboration

It is hardly possible to discuss the results of the years 2008 and 2012, because not enough projects have been evaluated. The reasons for this are different every year. The

year 2008 was the starting point and there were neither many applicants nor program calls. The 2012 exception has been already mentioned, there isn't a decrease in the number of projects, but financial statements from the year 2011 still aren't available and we are unable to evaluate the financial health of these beneficiaries right now. In half a year we would be able to evaluate the majority of 2012 projects and beneficiaries.

The three major years are 2009 and mainly 2010 and 2011. In 2009, 12% of companies are evaluated as unhealthy (distress zone). The tendency is the same in 2010 (11%) and there is a slight deterioration in 2011 (19%). The worst result in 2011 can be partly explained by the consequences of economic crisis which had slower impact in the Czech Republic. The financial support programs do not respect only profitable view, but also public interest and general advantages of projects. If we take into account that the analysed sample consisted of liability companies, joint stock companies and also public companies and agriculture cooperatives, the financial health of beneficiaries of the Operational Program Environment is very good. It seems to be a very strong conclusion without any additional data testing, but we are able to compare the financial health of beneficiaries in three different programs. One program is the above-discussed Operational Program Environment, which will be compared with two regional programs—ROP NUTS II Central Moravia and ROP NUTS II North-East.

9. Discussion

Čámská (2012b) tested another hypothesis, and the gained data is comparable. Regional operational programs support Objective 1 as Operational Program Environment. Tables 7 and 8 display the results for the programs ROP NUTS II Central Moravia and ROP NUTS II North-East.

Table 7. ROP NUTS II Central Moravia—results of Altman formula for all companies

Zone	Frequency	Per cent
Safe	14	0.38
Gray	13	0.35
Distress	10	0.27

Source: Čámská (2012b)

Table 8. ROP NUTS II North-East—results of Altman formula for all companies

Zone	Frequency	Per cent
Safe	22	0.44
Gray	10	0.20
Distress	18	0.36

Source: Čámská (2012b)

Tables 7 and 8 show absolute as well as relative frequencies of financial health classification for two regional programs. 27% for Central Moravia and even 36% for North-East are classified as a bankruptcy or distressed zone. Data showed in Table 6 are transformed to the same format as Table 9 displayed. Only 13% are classified as a distressed zone in the case of the Operational Program Environment. It speaks definitely in the favour of evaluation, which is done by authorities of this program. The results are at least two times better than for regional programs.

Table 9. Operational Program Environment—results of Altman formula for all companies

Zone	Frequency	Share
Safe	141	0.43
Gray	143	0.44
Distress	44	0.13

Source: own elaboration

10. Conclusion

This paper evaluated financial health or position of companies that became beneficiaries of the Operational Program Environment. For evaluating the Altman Z Score, a formula was used. Results were suitable, because according to the Altman formula, most supported companies are classified in healthy or grey zone. The importance of distressed zone is not significant, especially if we do a comparison with two regional programs (Central Moravia and North-East) which have very frightening evaluation. Methodology used by Operational Program Environment seems to be successful, although it is not clearly published and it cannot be itself compared with theoretical approaches and recommendations.

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ĮMONIŲ BANKROTO PROGNOZAVIMAS NAUDOJANT OPERACINĘ PROGRAMĄ „APLINKA“

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Santrauka. Straipsnio tikslas yra parodyti, kaip Čekijos Respublikos institucijos paskirsto Europos paramos lėšas, siekdamos paremti geros finansinės būklės verslą. Čekijos Respublika 2007–2013 m. programavimo laikotarpiui iš ES struktūrinių fondų gavo 26,7 mlrd. EUR paramą. Egzistuoja daugiau kaip dvidešimt finansinės paramos programų. Paramos gavėjai yra kruopščiai atrenkami pagal tam tikrus kriterijus. Šalia kitų svarbių kriterijų atsižvelgiama į įmonės finansinę būklę. Finansų krizės arba bankroto prognozavimas ir verslo ciklai yra svarbios temos, plačiai aptariamoms mokslininkų straipsniuose nuo 1960 m. Bankroto modeliai leidžia rasti greitą atsakymą, kokia įmonės finansinė būklė. Jie vertingi tiek verslo partneriams, tiek

bankams ir valdžios institucijoms. Bendradarbiavimas su finansiškai silpnu partneriu gali būti žlugdantis.

Šio straipsnio tikslui pasiekti buvo pasirinkta operacinė programa „Aplinka“, nes ji yra viena iš didžiausių. Altmano formulė buvo parinkta bankroto modeliui prognozuoti, nes ji yra plačiai taikoma visame pasaulyje. Straipsnyje atlikta analizė remiasi paramos gavėjų duomenų baze bei bendrąja baze „Albertina“, kurioje pateikti finansiniai įmonių duomenys.

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