# EVOLUTION OF THE BANKRUPTCY RATE INDICATOR IN THE CHEMICAL SEGMENT IN SLOVAKIA IN THE CONTEXT OF THE PANDEMIC

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**Abstract**

The pandemic has forced many businesses to shut down or reduce their operations, leading to a decline in revenue and profits. The aim of this research is to analyze the financial health of selected companies in Slovakia using Altman Z-score and to determine how the COVID-19 epidemic has affected their financial stability, and to provide insights into the companies' financial conditions and to help investors and other stakeholders make informed decisions. The Altman Z-score is a financial ratio that is used to predict a company's likelihood of bankruptcy. It provides a practical tool for companies to measure their financial health and take appropriate action to address any issues that may arise. The COVID-19 pandemic did have an impact on the financial health of companies, but it was not significant enough to cause a bankruptcy risk for any of them. This research highlights the importance of regular financial analysis for businesses to maintain financial health and avoid the risk of bankruptcy.

*Keywords: bankruptcy, bankruptcy rate indicator, chemical segment, pandemic*

**JEL Classification: A10, G33, L65**

## Introduction and theoretical background

COVID-19 is a global pandemic caused by the novel corona virus, which was first identified in late 2019 in Wuhan, China. The pandemic has had a significant impact on the world economy, with many countries experiencing sharp declines in GDP growth and increased unemployment rates. The COVID-19 pandemic has created unprecedented economic challenges for firms across various sectors of the economy. The pandemic has forced many businesses to shut down or reduce their operations,

leading to a decline in revenue and profits. The travel and tourism industries have been hit particularly hard, with airlines, hotels, and restaurants experiencing significant losses due to reduced travel and social distancing measures. Similarly, retail businesses have been impacted by lockdowns and social distancing measures, which have led to reduced foot traffic and sales. The pandemic has also caused disruptions to global supply chains, leading to shortages of critical goods and materials. This has affected firms across various industries, including automotive, electronics, and healthcare, among others. Governments have responded to the pandemic by implementing fiscal and monetary policies to support businesses and individuals. These measures have included tax relief, grants, loans, and stimulus packages. However, the pandemic's economic impact has been uneven, with some businesses and industries faring better than others. In this research, we will look at this and the preceding period from the perspective of big companies in the chemicals segment using Altman's Z score.

Proportional financial ratios represent a special type of relationship between two variables and are frequently used in finance and have been the subject of research by many researchers (Brown, 2011; Simoens & Vennet, 2020; Husna & Satria, 2019; Sriram, 2020; Husain & Sunardi, 2020; Gill et al., 2010; Agrrawal et al., 2010; Musallam, 2018). Pelita states that the use of ratios in financial analysis is characterized by its simplicity, leads to the display of data that are not directly disclosed in the final financial statements, and, in addition, allows for year-on-year comparisons (Pelita, 2017). The use of ratio ratios is important in indicating and identifying weaknesses and strengths in a company's operations and in forecasting cash flows. The better the financial performance of a company, the higher the value of the company. The higher the value of the company, the higher the returns achieved and the higher the return on shares, the more prosperous the shareholders. The financial decisions made by financial managers aim to increase the prosperity of business owners which is indicated by increasing the value of companies (Thakur & Workman, 2016).

**Literature review**

In developing a balancing plan, the company's managers - especially purchasing, sales and finance - must plan what investments the company will need to make to reach the stated sales volume and what depreciation rate will be used to amortize it, i.e., what the depreciation will be. In the evolution of the purchasing function and its changing environment, the configuration of knowledge, skills, and competencies of purchasing professionals has always played a significant role (Giunipero & Pearcy, 2000). The internal legitimacy of purchasing is linked to the expertise of purchasing practices. Exploratory knowledge provision has an effect on the supply and performance of the purchasing firm, whereas exploitative knowledge requires fewer internal resources to achieve cost reductions (Kilpi et al., 2018). This stat increase requires a new set of knowledge including supplier development, market research, outsourcing activities, cost analysis, risk management, as well as commodity and supply strategies. In the era of digitalization, knowledge development and dissemination are further enhanced by interactive technologies and big data analytics that increase the efficiency and effectiveness of knowledge creation and sharing. The ABC study made specific recommendations for designing interventions to digitize the purchasing function along value drivers and procurement practices (Srai & Lorentz, 2019). In summary, the role of purchasing knowledge is important for strategic purchasing and its effects are well documented. However, the literature uses a wide and divergent range of often very detailed taxonomies.

On the other hand, the impact of investment and sales volumes on inventory levels and the company's future bargaining position with customers and suppliers are also important issues as they have a significant impact on the company's working capital needs and affect its liquidity. It has long been established that we can better understand firm behaviour and cyclical fluctuations in output if we examine changes in inventory investment (Metzler, 1941; Abramovitz, 1950; Blinder & Maccini, 1991). During the business cycle, inventories represent the most volatile component of GDP because they are the first in line to absorb shocks. However, companies that do not invest do not achieve sustainable growth and may even struggle to maintain survival in highly turbulent and competitive markets (Gupta, Barzotto & Khorasgani, 2018).

Thirdly, the company's sources of funding to finance the investment are also a non-negligible issue. In order to finance investment projects, the company has basically two financing options, namely internal and external (own and foreign sources). Only when internal funds are not sufficient, firms start looking for external sources to secure their investment opportunities (Myers, 1984). However, formal external financing is not always available, especially for small firms in less developed economies, due to problems related to market failures. Market failures include moral hazard and adverse selection caused by agency costs. Moral hazard arises when the actions of entrepreneurs are not observable to outside investors but benefit entrepreneurs at the expense of investors. Adverse selection arises when entrepreneurs have more information than investors, making it difficult for investors to distinguish "good" projects from "bad" projects (Hechavarria et al., 2016). It is important to understand the relationship between funding sources and corporate investment because more recent literature has pointed out some contradictory conclusions to traditional theories on internal and external financing (Lai et al., 2022; Bhandari et al., 2022; Byunggeor, 2022; Nguyen, 2022).

For example, Nguyen argues that external funding may be more preferred to internal funding in an uncertain institutional environment with high risks of appropriation and corruption (Nguyen, 2019). In such a situation, entrepreneurs tend to channel their firms' internally generated funds into safer investment channels (such as savings) and rely heavily on loans for investment. In general, evidence from the literature seems to suggest that enterprises that do not use external financing may not raise sufficient capital to finance their investment projects. Whereas firms that successfully access external credit may overcome cognitive constraints and have more scope to finance their desired investment projects.

In order to assess the situation and development of an organization, we need to be able to assess its performance from time to time. This performance must be assessed not only by the managers of the organization, but also by those in contact with the organization (stakeholders). It can therefore be stated that the users of financial information can be divided into internal and external users. These two main categories have also been discussed in more detail by others (Schweisfurth, 2017; Dahlander & Magnusson, 2008; Hienerth et al., 2014; Hippel, 2017; Bradonjic et al., 2019;).

External users are persons who are interested in the organization's information but are not part of the organization's administrative process, like creditors, investors, government, journalists, etc. Lenders and investors are the most common example of external users among many other external users. Anyone who is outside the management radar of an economic entity and has an interest in its financial information is defined as an external user. Wahlen and Wieland believe that in today's global world, where markets are more interconnected than ever, information about the financial position and performance of companies is increasingly important (Wahlen

& Wieland, 2011). According to Lev (2010), if capital providers want to decide which company to invest their resources in, they must compare the current financial situation and performance of selected companies and try to predict their future development. In order to select the 'right company' to invest in, an analysis and comparison of the possible players must be carried out. Candidate companies could be estimated by means of a financial analysis, by comparing selected financial ratios of these businesses. Analysis using financial ratios is particularly suitable for external users of financial information, as they do not have access to the company's internal data. Albright and Ingram have previously said that there is a need to ensure that the financial documents provide a true picture of the economic activities of the organization (Albright & Ingram, 2007).

Can we predict high growth of firms using financial indicators? Srhoj tries to answer this question by trying to predict HGFs (high growth firms) using financial ratios (Srhoj, 2022). However, attempts to predict HGF have been quite challenging. Although financial ratios improve the prediction of HGF, the prediction remains modest. The study suggests that it is difficult to predict a very good forecast from financial ratios alone; therefore, a recommendation for researchers building models to predict HGF is to include non-financial ratio variables such as intangible variables related to innovation and teams.

Internal users are the people who manage, administer, and operate the day-to-day activities inside an organization (Sherman, 2019), for example: owners, directors, managers, officers, employees, internal auditors. The purpose of financial ratios is to provide the necessary information for management, or they can also be defined as internal users. Since the members of management must make decisions for the company, it is necessary to look deeper into financial ratios. An important area in which the management must make decisions is the amount of cash in the company. In recent years, corporate cash holdings have become the subject of extensive investigation by researchers (Deb et al., 2017; Li & Luo, 2020) as well as practitioners and corporate governance activists (Burgess, 2020; Powell, 2019). The debate revolves around two main motives for cash accumulation: precautionary and opportunistic. On the one hand, scholars argue that cash accumulated based on precautionary motivations can serve as a critical resource for the firm, especially in the context of uncertainty and changing market conditions (Brown and Petersen, 2011). On the other hand, proponents of the free cash flow theory (Jensen, 1986) warn of the risks of increasing cash due to possible opportunistic expropriation by managers (Bammens et al., 2011). As a means of reconciling these divergent perspectives, other scholars propose a curvilinear relationship between cash holdings and a firm's value, in which both too little and too much cash can hurt performance (Kim & Bettis, 2014).

Nowadays, the solvency of companies is receiving increasing attention. Predicting the future solvency of enterprises has a long history as a research area. More than half a century after Beaver (Beaver, 1966) laid the scientific foundations of the topic, and over the decades the research community's interest has increased, as evidenced by a steady increase in the number of relevant publications. In this regard, it is likely that there will be no change in the future as both the pandemic and war situation in the world reinforces the importance of this topic. The direct and indirect costs of corporate insolvency are significant and need to be avoided and minimizing them is important for all stakeholders. Therefore, Kim and Kang identify bankruptcy warning as one of the most important areas in financial literature (Kim & Kang, 2012).

## Aim, material and methods

The aim of this research is to analyze the financial health of selected companies in Slovakia using the Altman Z-score and to determine how the COVID-19 epidemic has affected their financial stability. The study aims to provide insights into the companies' financial conditions and to help investors and other stakeholders make informed decisions.

The methodology for this research involves collecting Altman Z-score results for five companies - Slovnaft, Meroco, Duslo, Enviral, and GSK Consumer Healthcare Levice - from the years 2017 to 2021. The data will be analyzed to determine the trend of each company's financial health, with a focus on the impact of the COVID-19 pandemic in 2020 and 2021. The Altman Z-score formula will be used to assess each company's bankruptcy risk, with a score of below 1.8 indicating a high risk of bankruptcy. Altman's bankruptcy calculation method, also known as the Altman Z-score, is a mathematical model that predicts the likelihood of a company's bankruptcy. It uses financial ratios and other accounting data to assess the financial health of a company and determine its level of bankruptcy risk. The Altman Z-score is based on five financial ratios: working capital/total assets, retained earnings/total assets, earnings before interest and taxes/ total assets, market value of equity/book value of total liabilities, and sales/total assets. Each ratio is weighted and combined to generate a single score that is used to classify a company into one of three categories: safe, gray, or distressed. A score below 1.8 indicates a high risk of bankruptcy, while a score above 3.0 indicates a low risk of bankruptcy. The Altman Z-score has been shown to be a reliable predictor of bankruptcy and is widely used by financial analysts and investors to assess the creditworthiness of a company. Additionally, a literature review will be conducted to gather information on each company's industry and any external factors that may have influenced their financial performance during the study period. The results will be presented in a report format, highlighting any interesting correlations or patterns observed in the data. The goal of this research is to provide a better understanding of the financial health of these companies and to identify any potential risks or opportunities for investors or stakeholders.

## Results and discussion

The following companies were selected for analysis from the chemical sector, with sales greater than 150 million in 2021.
1. SLOVNAFT, a.s.: It is an oil refining company based in Bratislava, Slovakia. It produces and distributes a range of oil-based products, including fuels, lubricants, and bitumen.
2. MEROCO, a.s.: It is a Slovakian company that operates in the oil and gas industry, specifically in the exploration and production of hydrocarbons.
3. Duslo, a.s.: It is a chemical company that produces and sells fertilizers, ammonia, and other chemical products. They are based in Slovakia.
4. ENVIRAL, a.s.: ENVIRAL, a.s. is a Slovakian company that is active in the production of bioethanol, as well as other renewable energy products such as biogas and green electricity. They are based in Slovakia and operate in several European countries.
5. GSK Consumer Healthcare Levice, s.r.o.: The business is a subsidiary of the global healthcare company GlaxoSmithKline, which produces and sells over-the-counter healthcare products such as pain relievers, cold and flu medications, and oral care products. The company is based in Slovakia.

These are the firms on which, with our current data (2022 is not yet known), we have performed the Altman bankruptcy analysis for the last 5 years, and the results are shown in the following graph.

*Chart 1 Altman Z score in the Slovak chemical sector 2017-2021*

## Altman's Z-score for large Slovak chemical companies
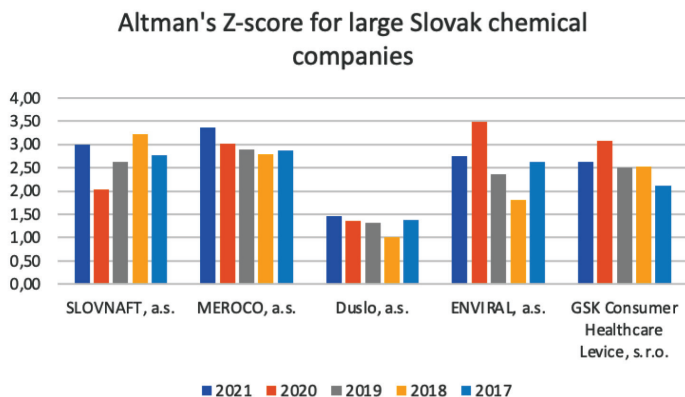


*Source: own work based on finstat*

The Altman Z-score is a financial ratio that is used to predict a company's likelihood of bankruptcy. Higher scores indicate that a company is financially stable and has a lower probability of bankruptcy, while lower scores indicate that the company is financially distressed and has a higher probability of bankruptcy. Looking at the results achieved by the 5 companies, we can observe that they have different levels of financial stability.

Starting with Slovnaft, a.s., which operates in the oil and gas industry, we can see that its Altman Z-score has been fluctuating over the years but has been relatively stable. The score dropped slightly in 2020 during the COVID-19 pandemic, but it recovered in 2021. This might be explained by the fact that the oil and gas industry was affected by the pandemic, but Slovnaft was able to weather the storm and maintain its financial stability.

Meroco, a.s., which is engaged in the production of chemicals, saw a slight increase in its Altman Z-score from 2017 to 2021. This indicates that the company's financial stability has been improving over time. Interestingly, despite the pandemic in 2020 and 2021, the company was able to maintain its financial stability and even achieved its highest Altman Z-score in 2021. The COVID-19 pandemic in 2020 did not seem to have a significant impact on the company's Z-score.

On the other hand, Duslo, a.s., a chemical manufacturing company, has consistently had a low Altman Z-score over the years, indicating a high risk of bankruptcy. The company has been struggling financially, and its score has not improved significantly since 2017. The pandemic seems to have exacerbated the company's financial difficulties, as its score has decreased slightly since 2019. The company's Z-score has fluctuated over the past five years, with no clear trend.

Enviral, a.s., a biotechnology company, saw a significant drop in its Altman Z-score in 2020, during the pandemic. This could be due to the fact that the company's operations were disrupted by the pandemic, causing financial difficulties. However, the company was able to improve its score in 2021, indicating that it has recovered from the pandemic's impact.

Lastly, GSK Consumer Healthcare Levice, s.r.o., a pharmaceutical company, has maintained a relatively stable Altman Z-score over the years, with a slight increase from 2017 to 2019, followed by a slight decrease in 2020 and 2021. The company has remained financially stable, but the pandemic seems to have had a small negative impact on its financials. The COVID-19 pandemic in 2020 and 2021 did not seem to have a significant impact on the company's Z-score.

In summary, we can see that the Altman Z-score is a useful tool to analyze a company's financial stability and predict bankruptcy risk. While some companies, such as Slovnaft and Meroco, have been able to maintain or improve their scores over time, others, such as Duslo, have struggled with financial difficulties. The pandemic has had a mixed impact on the companies, with some, such as Enviral, experiencing a significant drop in their scores, while others, such as GSK Consumer Healthcare Levice, s.r.o. experiencing only a small negative impact.

## Conclusion

In conclusion, the aim of this research was to analyze the financial health of five companies operating in Slovakia's energy and healthcare sectors. The methodology employed in this research involved calculating the Altman Z-Score to assess the risk of bankruptcy for each company based on their financial statements from 2017 to 2021. The literature review provided an overview of the financial analysis.

The results of this research show that all five companies had varying levels of financial health over the five-year period. SLOVNAFT a. s. had the highest Z-score in 2021, indicating a lower risk of bankruptcy compared to the other companies. Meanwhile, Duslo a. s. had the lowest Z-score in all five years, indicating a higher risk of bankruptcy. Overall, the research findings suggest that financial health varies across different companies, and it is essential to assess the risk of bankruptcy regularly. The Altman Z-Score model proved to be a useful tool in analyzing the financial health of the companies studied. The COVID-19 pandemic did have an impact on the financial health of the companies, but it was not significant enough to cause a bankruptcy risk for any of them.

In summary, this research highlights the importance of regular financial analyses for businesses to maintain their financial health and avoid bankruptcy risks. The Altman Z-Score model provides a practical tool for companies to measure their financial health and take appropriate actions to address any issues that may arise.

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