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ANALYSIS OF THE BREAK-EVEN POINT IN SELECTED COMPANIES IN CRISIS CIRCUMSTANCES

Abstract: The research is based on the break-even analysis. The sample consists of three selected companies in the Republic of Srpska, whose financial reports are publicly published on the Banja Luka Stock Exchange website. The analysis covers the period from 2018 to 2022. The aim is to examine how companies operated and covered fixed costs during a period characterized by increased levels of uncertainty, risk, and challenges. Therefore, it is necessary to determine the break-even point (BEP-break-even point) for each year individually in each of the three companies, to determine the financial performance of the company in the crisis period. The obtained results indicate that the companies performed positively in the entire analyzed period, but worse financial performance was observed in the period 2020-2024 in all three companies.

Keywords: break-even point, rate of contribution margin, Republic of Srpska, crisis period.

1. INTRODUCTION

In the Republic of Srpska, in addition to thermal power plants, hydroelectric power plants have significant importance in electricity production and play a crucial role in the country's energy sector. However, due to exposure to dynamic economic and environmental situations, hydroelectric power plants face various challenges and crises that can affect the overall efficiency of their existence. Based on this, the subject of this research will be focused on analyzing the breakeven point of profitability of hydroelectric power plants in the Republic of Srpska during crisis periods. The aim is to examine how the breakeven point of profitability in hydroelectric power plants for the period 2018-2022 behaves under conditions of increased instability and uncertainty in business. This research can serve as a starting point for the development of effective management strategies and policies to maintain stability and sustainability in the energy sector of the Republic of Srpska.

The paper is divided into four parts. The first part presents a literature review, which includes research that deals with the analysis of the break-even point of profitability in a company. The second part of the paper presents the methodological framework of the research, as well as a description of the sample. The third part represents the analysis of the break-even point of profitability on a sample of three companies in the Republic of Srpska for the period 2018-2022. The fourth part provides concluding remarks.

2. LITERATURE REVIEW

In the study by Rizki & Sukoco (2019, February), a break-even analysis was applied to a group of small and medium enterprises in Indonesia. A qualitative research method was applied through a case study, and a quantitative method through calculating the break-even point using the contribution margin. The results showed that the break-even point of profitability was achieved after 7 months and 3 days. Additionally, authors Arfianti & Reswanda (2020) examined the break-even point of profitability of the batik writing center 'Reliable Insan Sentosa'. This center has been a guardian of

the tradition and artistic value of Indonesian culture for many years. In this research, the author utilized qualitative descriptive analysis as well as quantitative analysis by calculating the break-even point and safety margin to determine the financial status of this center. The results display the break-even point of profitability and safety margin for the mentioned center.

Jamaludin (2020) analyzed the break-even point of profitability in Indonesia using the example of one company's balance sheet for the year 2018. This analysis aimed to determine the financial capability of the company, which could serve as a basis for decision-making within the company. The research method involved visiting the company and conducting interviews, as well as descriptive analysis of the balance sheet, profit and loss statement, and sales data of the company. Khanifah & Septiana (2019) drew conclusions based on the break-even point of profitability and safety margin analysis using the balance sheet of the company 'Berkah Jaya'. The research results for the year 2016 showed that the mentioned company can generate a profit and efficiently conduct its activities. Through the obtained safety margin, it was concluded that this company has a higher level of risk protection and a lower risk of losses. Based on the analysis of unit costs and break-even analysis for the restaurant 'Bistro RHA', authors Angsoka & Aliludin (2020) identified and classified all unit costs and calculated the break-even point for each product. The results of this study indicate that all products have successfully reached the break-even point, and this analysis can serve as a basis for decision-making for the company in the future. The break-even point analysis of profitability is a valuable tool in the agricultural sector, so Syřůček, Bartoř, and Burdych (2022) conducted a study on the break-even point analysis of profitability in the Czech Republic and the European Union. This analysis was conducted due to unstable conditions in the milk markets of these countries. The research results revealed significant differences between the Czech Republic, selected EU countries, and the EU average regarding the break-even point for milk yield and price. These differences stem from substantial variations in total costs and milk yields. Utami and Mubarok (2021) emphasize the importance of understanding fixed and variable costs to accurately assess the scope of production and sales, which will ultimately result in a certain profit. In other words, knowing these costs enables companies to plan their activities based on realistic expectations. Through break-even point analysis, it is possible to assess these cost categories and determine the optimal sales volume to avoid potential losses. This approach enables companies to make informed decisions and allocate their resources where they will have the greatest impact on profitability.

3. RESEARCH APPROACH AND METHODOLOGY

The analysis of the break-even point of profitability was conducted through descriptive analysis and by calculating the marginal or contribution profit rate. The sample consists of three companies from the Republic of Srpska, whose financial reports are publicly available on the Banja Luka Stock Exchange. The following companies were included in the research: 'Hidroelektrana na Drini' A.D. Trebinje, 'ERS' MP Mixed Holding A.D. Hidroelektrana na Trebiřnjici, and ZP 'Hidroelektrane na Vrbasu' A.D. Mrkonjić Grad.

The analysis spans the period from 2018 to 2022, notably marked by the global COVID-19 pandemic, as well as the recent crisis initiated by unrest and conflict between Ukraine and Russia. These significant events have had far-reaching effects worldwide, prompting economic turbulence and uncertainty across various sectors. The data were collected from the financial statements of the mentioned hydroelectric power plants for the period from 2018 to 2022, sourced from the website of the Banja Luka Stock Exchange.

The reason for choosing this sample is that hydroelectric power plants worldwide play a crucial role in the energy mix, providing sustainable energy sources and promoting social responsibility. Considering that hydroelectric power plants typically have stable long-term prospects, especially during periods of economic instability and crises, the author intended to analyze their break-even point of profitability. The aim was to demonstrate how sustainable and profitable hydroelectric power plants are even in crisis circumstances. Additionally, the availability of detailed data on the website of the Banja Luka Stock Exchange further facilitated the analysis of these companies.

The analysis of the break-even point of profitability proceeded in the following manner: Firstly, total costs were segmented into fixed costs, which remained constant, and predominantly fixed costs, along with variable costs for each company and each year under scrutiny. Subsequently, the contribution profit rate was computed for each company across the entire duration of the analysis. Finally, the break-even point of profitability was determined for all companies throughout the entire analysis period, utilizing the contribution profit rate.

4. THE CONCEPT OF BREAK-EVEN POINT ANALYSIS

The break-even point represents the lower threshold of profitability, the point at which financial result equals zero. When the financial result is zero, it is said to be neutral, as the company's revenues are equal to its expenses. Therefore, this is the boundary for exiting the loss zone for the company (Maleřević & Starčević, 2010). Break-even point analysis determines the production level at which the company neither incurs losses nor earns profits. Thus, this approach identifies the sales level that the company needs to achieve to reach this break-even point (Tsorakidis, Papadoulus,

Zerres, & Zerres, 2014). This analysis can assist the company in choosing various alternatives to achieve maximum profit (Khanifah & Septiana, 2019).

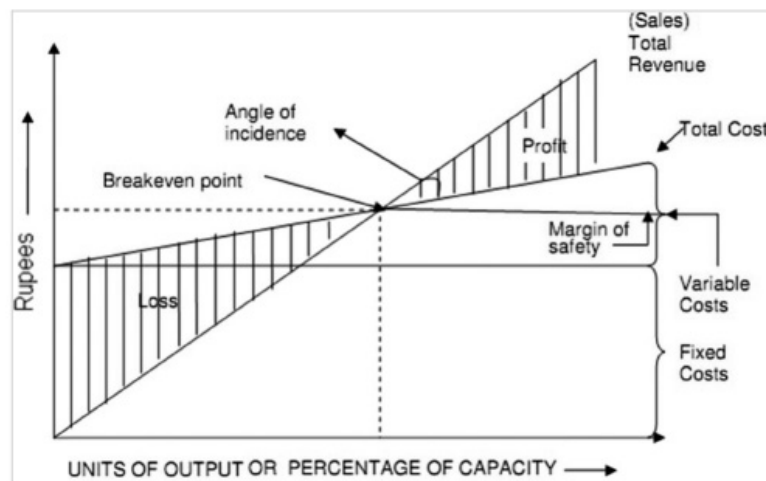


Figure 1. Break-even point
Source: (Kampf, Majerčák, & Švagr, 2016, p. 127)

The concept of this analysis relies on the theory of marginal costs. According to this, there is a necessity to divide total production or service costs into fixed and variable costs. Fixed costs remain constant at the same level of production volume, while variable costs change with changes in production volume (Ndaliman & Bala, 2007). The purpose of this analysis is to assist in human resource management and aid in decisions regarding whether to allocate resources to planned investments and projects or not (Ndaliman & Suleiman, November 2011). Therefore, when the break-even point is determined, it can serve as a useful tool for predicting when a specific project or investment will yield a positive return (Kampf, Majerčák, & Švagr, 2016). The break-even point can also be graphically represented (Figure 1).

5. ANALYSIS OF THE BREAK-EVEN POINT OF PROFITABILITY IN SELECTED COMPANIES IN THE REPUBLIC OF SRPSKA

For this analysis, data were collected from the financial reports of selected companies in the Republic of Srpska, namely: 'Hidroelektrana na Drini' A.D. Trebinje, 'ERS' MP Mixed Holding A.D. Hidroelektrana na Trebišnjici, and ZP 'Hidroelektrane na Vrbasu' A.D. Mrkonjić Grad. The financial reports of these companies are publicly available on the website of the Banja Luka Stock Exchange (Banja Luka Stock Exchange, 2024), and the analysis was conducted for the period 2018-2022.

4.1. Cost categorization

Based on the income statements of selected companies for the period 2018-2022, total company expenses were divided into fixed and predominantly fixed costs and variable costs.

Table 1. Cost breakdown in BAM (Convertible Marks) for the company HEDR (2018-2022)

	2018	2019	2020	2021	2022
Total costs	31.108.184	30.118.961	28.111.412	32.728.814	33.725.903
Variable costs	21.188.517	19.325.173	17.967.505	21.384.596	21.867.301
Fixed and predominantly fixed costs	9.919.667	10.793.788	10.143.907	11.344.218	11.858.602

Source: Author based on data from the financial reports of the company "Hidroelektrana na Drini" A.D. Trebinje, for the period 2018-2022.

*Note: HEDR - "Hidroelektrana na Drini" A.D. Trebinje.

According to the presented Table 1, it can be observed that in the company HEDR for the period 2018-2022, variable costs have the highest share in the category of total expenses. Additionally, variations in the movement of total costs are noted, with a tendency to increase until the end of 2022. In the structure of total costs during the analyzed period, there is an increase in the share of fixed and predominantly fixed costs.

Table 2. Cost breakdown in BAM (Convertible Marks) for the company HELV (2018-2022)

	2018	2019	2020	2021	2022
Total costs	15.083.382	15.919.685	14.689.030	16.152.925	16.519.637
Variable costs	4.531.463	4.798.696	3.660.520	5.001.468	6.211.442
Fixed and predominantly fixed costs	10.561.919	11.120.989	11.028.510	11.151.457	10.308.195

Source: Author based on data from the financial reports of the company "Hidroelektrana na Vrbasu" A.D., for the period 2018-2022.
*Note: HELV - "Hidroelektrana na Vrbasu" A.D.

In the case of the company HELV, during the period 2018-2022, there is a trend of increasing total costs. Additionally, fixed and predominantly fixed costs have a higher share in the structure of total costs, but in the last year, there has been a notable increase in variable costs compared to fixed and predominantly fixed costs.

Table 3. Cost breakdown in BAM (Convertible Marks) for the company HETR (2018-2022)

	2018	2019	2020	2021	2022
Total costs	59.970.555	51.368.185	49.883.587	53.839.422	64.484.404
Variable costs	20.465.926	6.740.833	8.840.374	11.629.359	18.500.615
Fixed and predominantly fixed costs	39.504.629	44.627.352	41.043.213	42.210.063	45.983.789

Source: Author based on data from the financial reports of the company "Hidroelektrana na Trebišnjici" A.D., for the period 2018-2022.
*Note: HETR - "Hidroelektrana na Trebišnjici" A.D.

For the company HETR, during the period 2018-2022, there was a notable increase in total costs, particularly highlighted in 2022. In the structure of total costs, fixed and predominantly fixed costs have the largest share. Variable costs have fluctuated in amount during the analyzed period, showing a decreasing trend, while fixed and predominantly fixed costs have experienced a rising trend with slight fluctuations throughout 2018-2022.

4.2. Marginal profit rate and break-even point

The marginal profit rate is calculated according to the following formula (Malešević & Starčević, 2010):

$$1 - \text{Variable costs} / \text{Sales revenue}$$

By calculating this rate, information is obtained about how much additional pre-tax revenue helps the company's profit and covers fixed costs after covering variable costs. The higher the rate, the greater the management's confidence in achieving set goals.

Table 4. Marginal profit rate in selected companies in % (2018-2022)

	2018	2019	2020	2021	2022
HEDR	45,4	45,4	23,0	45,4	39,67
HELV	73,02	76,54	73,48	74,01	71,82
HETR	69,2	81,81	80,41	79,76	79,5

Source: Author's calculation.

In the first observed company, HEDR, for the period 2018-2022, the lowest contribution profit rate was recorded in 2020 at 23%, with an increase in the following year to 45.4%. However, in 2022, there is a slight decline in the marginal profit rate from 45.4% to 39.67%.

In the company HELV, for the period 2018-2022, there are fluctuations in the movement of the marginal profit rate. The highest rate is observed in 2019 at 76.54%, and the lowest in the last analyzed year, 2022, at 71.82%.

The marginal profit rate in the company HETR was lowest in 2018 at 69.2% and highest in 2019 at 81.81%. There has been a downward trend in this rate by the end of the analyzed period.

In all three analyzed companies, the marginal profit rate increased in 2021 compared to 2020, except for the HETR company. In 2022, there was a decrease in the marginal profit rate in all three analyzed companies.

Table 5. Break-even point in selected companies in BAM (Convertible Marks) (2018-2022)

	2018	2019	2020	2021	2022
HEDR	21,849,486.78	23,774,863.43	44,103,943.47	24,987,264.31	29,893,123.26
HELV	14,464,419.33	14,529,643.32	15,008,859.55	15,067,500.33	14,352,819.54
HETR	57,087,614.16	54,549,996.33	51,042,423.82	52,921,342.77	57,841,244.02

Source: Author's calculation.

The break-even point represents the lower threshold of profitability, necessary for achieving a zero business result. The break-even point is obtained through the relationship between fixed and predominantly fixed costs and the calculated marginal profit rate (Malešević & Starčević, 2010).

According to the obtained results, in the company HEDR, the highest revenue to achieve a zero business result was in 2020, amounting to 44,103,943.47 KM, while the lowest was in 2018, at 21,849,486.78 KM. For the company HELV, the break-even point did not fluctuate much, but it can be observed that it was lower in 2022 compared to 2021, meanwhile, in the case of the break-even point for the company HETR, the highest amount was recorded in the last year, 2022, at 57,841,244.02 KM.

CONCLUSION

The results of the break-even point analysis for the period 2018-2022, based on the financial statements of the companies: "Hidroelektrana na Drini" A.D. Trebinje (HEDR), "ERS" MP Mixed Holding A.D. Hidroelektrana na Trebišnjici (HETR), and ZP "Hidroelektrane na Vrbasu" A.D. Mrkonjić Grad (HELV) indicate a slight decline in activity in all three observed companies in 2020 and again in 2022. The contribution profit margin in the HEDR company fluctuated, with the lowest recorded in 2020 at 23%. In the HETR company, the marginal profit rate was lowest in the first year of 2018 at 69.2%, while in the HELV company, the lowest rate was in 2022 at 71.82%. However, when interpreting the contribution profit rate, consideration should also be given to the structure of total costs and the management's set goals. According to the break-even point analysis, it can be concluded that the analyzed companies faced minor difficulties in business operations since 2020, but the achieved profit exceeded the break-even point. In the last year of 2022, a decline in business results is observed in all three companies, as the increase in total costs has caught up with the increase in total revenues.

REFERENCES

- Angsoka, R., & Aliludin, A. (2020). Unit Cost and Break-even Point Analysis in "RHA" Bistro. *Asian Journal of Accounting and Finance*, 2(2), 90-103.
- Arfianti, U., & Reswanda, R. (2020). Break Even Point Analysis As A Basic of Profit Planning In Handal Insan Sentosa Batik Business. *Quantitative Economics and Management Studies*, 1(3), 187-193.
- Banjalučka berza. (2024, 3 5). Banjalučka berza. Retrieved from <https://www.blberza.com/Pages/FinRepCompany.aspx?code=BOKS>
- Jamaludin, A. (2020). Analysis of break-even point in CV Bata Cikarang Indonesia. *International Journal of Research-Granthaalayah*, 7(9), 259-267.
- Kampf, R., Majerčák, P., & Švagr, P. (2016). Application of break-even point analysis. *NAŠE MORE: znanstveni časopis za more i pomorstvo*, 63(3 Special Issue), 126-128.
- Khanifah, K., & Septiana, N. (2019). PROFIT PLANNING ANALYSIS WITH BREAK EVEN POINT APPROACH (BEP) ON BANANA CHIPS BUSINESS œBERKAH JAYAœ IN METRO CITY. *Fidusia: Jurnal Keuangan dan Perbankan*, 2(2).
- Malešević, Đ., & Starčević, V. (2010). Poslovna analiza, Ekonomsko finansijski aspekti. *Bijeljina: Fakultet poslovne ekonomije Bijeljina, Univerzitet u Istočnom Sarajevu*.
- Ndaliman, M., & Bala, K. (2007). Practical limitations of break-even theory. *Australian Journal of Technology*, 11(1), 58-61.
- Ndaliman, M., & Suleiman, U. (November 2011). An economic model for break-even analysis. *Proceedings of the 2nd International Conference on Mechanical and Manufacturing Engineering (ICME)* (pp. 23-25). Putrajaya, Malaysia : PICC.

- Rizki, N., & Sukoco, A. (2019, February). Break-even point analysis as a tool for profit and sales planning on Otak-Otak Bandeng Kang Wahab SME. *Journal of World Conference (JWC)*, 1(1), 220-224.
- Syrůček, J., Bartoň, L., & Burdych, J. (2022). Break-even point analysis for milk production--Selected EU countries. *Agricultural Economics/Zemědělská Ekonomika*, 68(6).
- Tsorakidis, N., Papadoulus, S., Zerres, M., & Zerres, C. (2014). *Break-even analysis*. Bookboon.
- Utami, Y., & Mubarak, A. (2021). Determining products or services pricing on msme using the break-even point analysis method. *International Journal of Economics, Business and Accounting Research (IJEBAAR)*, 5(2).