BREAK-EVEN POINT ANALYSIS IN A SELECTED WINERY

Dominika ČERYOVÁ

Institute of Economics and Management, Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Slovakia

Jana LADVENICOVÁ

Institute of Economics and Management, Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Slovakia

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Abstract

Viticulture in Slovakia has a long tradition. The territory of the country is divided into six wine-growing regions. As of 31st of July 2021, 692 active winemakers were registered. The main goal of this paper is to analyze the break-even point of the best-selling products in a selected winery operating in the Central Slovak wine region in the period 2016-2020. This paper will compare the production of the selected company with the break-even point production. The average net profit and average selling price of a bottle of selected wines will be evaluated. Next, we will focus on the quantification of operating leverage and degree of operating leverage, which compares changes in EBIT to the increase in sales. The results show that the company was profitable by selling all four top-selling wines in the period under review because actual production exceeded production at the break-even point. Even the highest profit per bottle of wine may not automatically mean the highest total profit because it is mainly affected by the number of bottles produced and sold. The last result shows that the tremendous difference between the unit price and average variable cost means more substantial operating leverage and degree of operating leverage.

Keywords: break-even point, costs, operating leverage, wine, winery

JEL Classification: M11, M21, M41

Introduction and theoretical background

The tradition of growing wine grape in Slovakia dates to the third century AD, but the first written mention of its cultivation date back to the beginning of the 9th century. The beginnings of wine grape growing in Slovakia are associated with Mark Eurélio Próba, who is considered the founder of European North Pannonian viticulture (Hronský & Pintér, 2009). Grapevine planting, grape production, and

(vine preparation-production) have determined the lifestyle of people living in the agricultural landscape. Agrobiodiversity consists not only of the grapevine but also many other fruit woody plants (species and local and regional cultivars/races) resulting from long-term cultivation and planting/breeding in the vineyard region (Eliáš, 2012). Lieskovský et al. (2013) found that over the past 20 years, almost half the vineyard area in Slovakia has been abandoned or converted to arable land. The import of cheap grape must and wines, increased production costs and insufficient agricultural subsidies have made viticulture unprofitable. Local farmers perceive financial instruments and an inadequate market as limiting factors for farming. Currently, the Slovak viticulture region is divided into six viticultural regions: "Little Carpathians Wine Region", "South Slovak Wine Region", "Nitra Wine Region", "Central Slovak Wine Region", "East Slovak Wine Region", "Tokaj Wine Region". As of 31st July 2021, 692 active winemakers were registered, with the most significant number of producers operating in the "Little Carpathian Wine Region". The total area of vineyards has shown a fluctuating trend over the past five years. In 2020, the total area of vineyards was 11,248 ha, of which 86.7 % were fruiting vineyards. The average harvest in 2020 was 6.07 t/ha (VÚEPP, 2021).

Lombardi et al. (2015) analyze the intra-EU trade of the world's chief wine exporters – Italy, France, and Spain. Estimation results highlight the differences between bulk and bottled wine. Estimates for bottled wine all show a growth tendency. Analyzing pricing policies shows that France does not appear to target an increase in export volumes so much as an increase in average unit price. At the same time, Italy and especially Spain tend to increase export volumes, to the detriment of prices. Small and medium enterprises (SMEs) can play an essential role in the diffusion of wine innovation (Menna & Walsh, 2019).

Wine is a specific product with a high degree of customization of differentiation according to the attributes on which consumers decide to choose it. This attribute includes taste, price, brand, country of origin, and grape variety (Vokounova, 2021). The quality of Slovak wine is at a high level, but the competitiveness of the sector in the EU market has a negative trend. Please choose the appropriate measures to improve this situation we consider for the critical management decision of the Slovak wine industry enterprises (Rogovska, 2018). Managerial decision-making is closely associated with providing basic financial transaction information and its impact on the enterprise's financial situation and economic results. Nowadays, essential tools and methods of every manager include, besides budgets and calculations, effective and efficient usage of information obtained from managerial accounting. The ideal information database is variable cost calculation. Determining the critical capacity utilization and minimum acceptable profit is a fundamental task in managerial decision-making (Potkany & Krajčírová, 2015). Every production manager or procurement engineer faces the dilemma of determining the minimum lot size for producing a particular component so that the revenue received equals the costs associated with producing it at a given price. This is called break-even analysis, which determines the lot size to match the total costs of producing that lot (Kiran, 2022). Most managers will be familiar with the term break-even point. The break-even point is the level of activity that produces neither profit nor loss. In theory, a company can carry on trading at the break-even point forever, with income equal to the expenditure; however, profit needs to be generated to finance new machinery or research into new markets and production (Birchall, 1991).

Leverage is a crucial decision area in financial management (Bhatt Satyaki & Sanghvi, 2018). Many authors have dealt with the measurement of operating leverage (Chen et al., 2022; Jiao et al., 2019; Chen et al., 2022; O'Brien & Vanderheiden, 1987).

Operating leverage is one of the more popular parameters used in management practice and scientific research (Dudycz, 2020). Operating leverage increases profitability and reduces optimal financial leverage. Thus, operating leverage generates a negative relation between profitability and financial leverage that is thought to be inconsistent with the trade theory but is commonly observed in the data (Chen, Harford & Kamara, 2018). Marques et al. (2021) indicate that greater operational leverage is an advantage for companies that present growth opportunities and have yet to reach the point of overinvestment since ROA decreases as less is invested in this scenario.

The results confirm that operating leverage or cost structure, in addition to affecting profitability, also affects the relationship between that profitability and other sources of risk that depend on the country in which the company operates. More specifically, indebtedness, size, innovation specificity, and reputation affect profitability to a greater or lesser extent, depending on the company's operating leverage level (Grau & Reig, 2021). Sarkar (2018) derives a company's optimal degree of operating leverage with flexibility in investment and production. He identifies the essential determinants of DOL, such as costs (fixed, variable, and costs of capacity), demand characteristics, the productivity of capital, and interest rate. The choice of DOL is critical because it impacts the company's risk level, operating, financial performance, and valuation.

Material and methods

The object of this paper is to select a winery operating in the Central Slovak wine region and its four best-selling wines:

- Collection EXCLUSIVE
- Collection CASTLE
- Special MOVINO collection
- Traditional MOVINO collection

The primarily used data is from the internal company accounting of the selected company for the period 2016 - 2020.

This paper is focused on comparing the production of the selected company with the break-even point production, the average net profit and average selling price of a bottle of selected wines, and on the quantification of operating leverage and degree of operating leverage, which compares changes in EBIT to the increase in sales.

$$\textit{contribution for payment per bottle} = \textit{selling price} - \textit{average variable costs} \tag{1}$$

The contribution for the payment is the amount that remains for the company to cover average fixed costs and for the creation of profit after the payment of average variable costs.

$$\textit{profit/loss per one bottle of wine} = \textit{contribution for payment} - \textit{average fixed cost} \tag{2}$$

$$\textit{break-even point} = \frac{\textit{fixed costs}}{\textit{seling-price} - \textit{average variable costs}} \tag{3}$$

The break-even point is the point at which the company shows zero financial results: sales equal costs. The company does not make a profit or a loss.

$$operating\ leverage = \frac{EBIT_1 - EBIT_0}{TR_1 - TR_0} \quad (4)$$

Operating leverage shows how EBIT will change if sales increase by one euro.

$$degree\ of\ operating\ leverage = \frac{\frac{EBIT_1 - EBIT_0}{EBIT_0}}{\frac{sales_1 - sales_0}{sales_0}} \quad (5)$$

Operating leverage shows how EBIT will change if sales increase by one percent.

Results and discussion

Table 1 contains the calculation procedure of the break-even point for Collection EXCLUSIVE.

Table 1 The calculation procedure of the break-even point of Collection EXCLUSIVE

Indicator / Year	2016	2017	2018	2019	2020
Fixed costs (EUR)	36,155.13	28,682.94	45,444.62	55,380.52	59,924.02
Variable costs (EUR)	205,604.01	164,314.69	285,860.48	361,732.33	391,409.39
Production (bottles)	143,277	110,319	174,787	213,002	230,477
Average variable costs (EUR)	1.44	1.49	1.64	1.70	1.70
Selling price (EUR)	2.82	3.12	3.10	3.04	2.69
Contribution (EUR)	198,437.13	179,880.59	255,979.22	285,793.75	228,573.74
Contribution per bottle (EUR)	1.38	1.63	1.46	1.34	0.99
Break-even point production (bottles)	26,105	17,591	31,030	41,275	60,423
Exceeding the break-even point production (%)	448.85	527.13	463.28	416.05	281.44

Source: Author´s editing

Table 1 shows how many bottles of Collection EXCLUSIVE the company must produce to reach the break-even point of this production. The company exceeded the production volume, at which sales revenue covers the total costs of production of this wine in each year of the monitored period. In 2017, the company had to produce and sell 17,591 bottles of this wine to reach the break-even point (with the production and sale of each additional bottle, the company made a profit). In 2019 and 2020, the average variable costs were the highest - EUR 1.70 per bottle of Collection

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EXCLUSIVE. In the last year, the selling price of this product was reduced (from EUR 3.04 in 2019 to EUR 2.69), and overcame of break-even point in comparison with actual production was the lowest among the monitored period - by 281 %. The amount of unit contribution was the highest in 2017. After covering the average variable and fixed costs, the company started to make a net profit of EUR 1.37 per sold bottle - the average net profit of this wine for the monitored five years was EUR 1.10 per bottle.

Table 2 contains the calculation procedure of the break-even point for Collection CASTLE.

Table 2 The calculation procedure of the break-even point of Collection CASTLE

Indicator / Year	2016	2017	2018	2019	2020
Fixed costs (EUR)	32,420.69	30,142.58	42,662.88	25,549.16	17,205.24
Variable costs (EUR)	175,238.43	163,981.49	256,055.89	153,054.99	103,069.84
Production (bottles)	128,478	115,933	164,088	98,266	66,174
Average variable costs (EUR)	1.36	1.41	1.56	1.56	1.56
Selling price (EUR)	2.44	2.56	2.66	2.64	2.66
Contribution (EUR)	138,247.89	132,806.99	180,418.19	106,367.25	72,953.00
Contribution per bottle (EUR)	1.08	1.15	1.10	1.08	1.10
Break-even point production (bottles)	30,130	26,313	38,801	23,603	15,606
Exceeding the break-even point production (%)	326.42	340.60	322.89	316.32	324.02%

Source: Author´s editing

In 2016, the volume of production at which the company covered the costs of wine Collection CASTLE production with its sales was 30,130 bottles. In comparison with 2020, production volume decreased to 15,606 bottles sold - this is mainly because the fixed costs to produce this wine have decreased by EUR 15, 215.45. In every year of the monitored period, the company's production of this wine exceeded the volume of the break-even point production.

Table 3 contains the calculation procedure of the break-even point for the Special MOVINO Collection.

Table 3 The calculation procedure of the break-even point of the Special MOVINO Collection

Indicator / Year	2016	2017	2018	2019	2020
Fixed costs (EUR)	144,391.64	138,574.28	183,588.08	286,430.56	246,194.26
Variable costs (EUR)	618,016.31	617,188.81	875,770.96	1,363,322.34	1,171,809.79
Production (bottles)	572,201	532,978	706,108	1,101,656	946,901
Average variable costs (EUR)	1.08	1.16	1.24	1.24	1.24
Selling price (EUR)	1.85	1.92	1.91	1.84	1.72

Contribution (EUR)	440,555.54	406,128.95	472,895.32	663,724.70	456,859.93
Contribution per bottle (EUR)	0.77	0.76	0.67	0.60	0.48
Break-even point production (bottles)	187,538	181,856	274,126	475,420	510,269
Exceeding the break-even point production (%)	205.11	193.08	157.58	131.72	85.57

Source: Author´s editing

The company reported the highest contribution/contribution per bottle of Special MOVINO Collection in 2016 (approximately EUR 440,000 / EUR 0.77). After paying the fixed costs / average fixed costs from these amounts, the company started to make a net profit. The volume of break-even point production was highest in 2020 (510,269 bottles).

Table 4 contains the calculation procedure of the break-even point for the Traditional MOVINO Collection.

Table 4 The calculation procedure of the break-even point of the Traditional MOVINO Collection

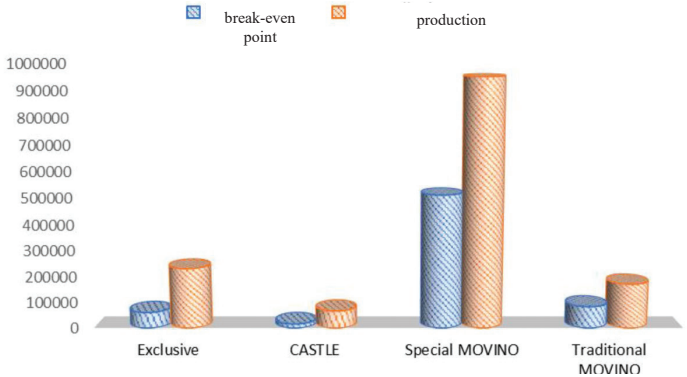
Indicator / Year	2016	2017	2018	2019	2020
Fixed costs (EUR)	17,355.73	33,908.16	65,691.60	61,051.90	44,316.48
Variable costs (EUR)	74,284.95	132,749.21	261,250.20	245,819.16	178,435.72
Production (bottles)	68,778	130,416	252,660	234,815	170,448
Average variable costs (EUR)	1.08	1.02	1.03	1.05	1.05
Selling price (EUR)	1.60	1.62	1.55	1.53	1.58
Contribution (EUR)	35,759.85	78,524.71	130,372.80	113,447.79	90,872.12
Contribution per bottle (EUR)	0.52	0.60	0.52	0.48	0.53
Break-even point production (bottles)	33,381	56,316	127,309	126,366	83,124
Exceeding the break-even point production (%)	106.04	131.58	98.46	85.82	105.05

Source: Author´s editing

The average variable costs of this wine were the lowest among all monitored wines. The company monitored the highest volume of contribution for all bottles of the Traditional MOVINO Collection in 2018 and 2019. After reducing the contribution of this wine production by fixed costs, the company started to make a net profit from selling these products in all monitored years. The volume of break-even point production was highest in 2018 (127,309 bottles). If the company did not want to be unprofitable this year, it could not produce and sell less than 127,309 bottles.

The company was profitable by selling all four top-selling wines in the period under review because actual production exceeded production at the break-even point. We will compare these values for 2020 in the following figure.

Figure 1 Comparison of production and break-even point in 2020



Source: Author´s editing

The company will profit after reducing the contribution per bottle by average fixed costs. Even the highest profit per bottle of wine may not automatically mean the highest total profit because it is affected mainly by the bottles produced and sold. Even though the Special MOVINO wine is third in the ranking in the comparison of the profit per bottle in the monitored period, this wine is produced and sold in an immense amount every year.

Table 5 Net profit per bottle

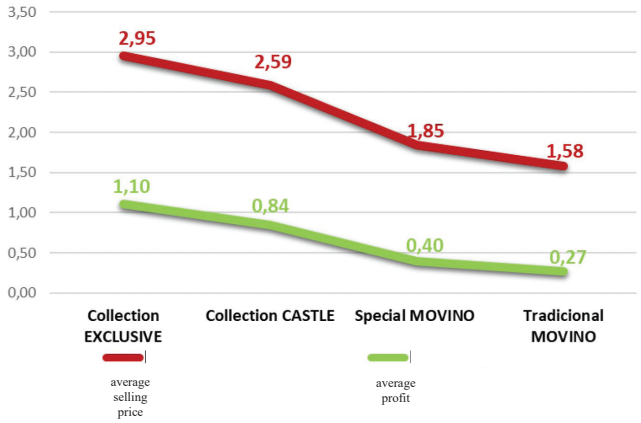
Indicator/year	2016	2017	2018	2019	2020
Collection EXCLUSIVE	1.13	1.37	1.20	1.08	0.73
Collection CASTLE	0.82	0.89	0.84	0.82	0.84
Special MOVINO	0.52	0.50	0.41	0.34	0.22
Traditional MOVINO	0.27	0.34	0.26	0.22	0.27

Source: Author´s editing

The most profitable wine was the Special MOVINO Collection. Although the company achieved the highest net profit per bottle from Collection EXCLUSIVE wine in 2017 (EUR 1.37), this year, the company also produced the smallest number of bottles of this product in the monitored period, which means that the total profit from the sale of this wine was the lowest. After paying the average fixed costs to produce Collection CASTLE wine from the contribution per bottle, the company also started to make the highest profit per bottle in 2017. However, the company made the highest profit from the sale of all bottles of this wine in 2018 (the company produced and sold about 164,088 bottles). The highest profit per bottle of Special MOVINO wine was achieved in 2016. The volume of bottles sold - 1,101,656 units in 2019 meant the highest total profit from the sale of this wine, even though the company started to make a profit after reducing the contribution by fixed costs.

Figure 2 shows the average profit per bottle and its average selling price for the five years under review and four monitored wines.

Figure 2 Average profit per bottle and average selling price for the five years under review and for four monitored wines



Source: Author´s editing

The highest value of operating leverage for Collection EXCLUSIVE wine was recorded in 2020. Based on the calculated value, we conclude that every increase in sales by 1 euro will mean an increase in earnings before interest and taxes by 2.24 euros (Collection CASTLE in 2016 - 0.52 euros, Special MOVINO in 2017 - 0.81 euros, Traditional MOVINO in 2019 - 0.38 euros).

Table 6 Operating leverage

Indicator/year	2016	2017	2018	2019	2020
Collection EXCLUSIVE	0.38	0.19	0.30	0.19	2.24
Collection CASTLE	0.52	0.19	0.25	0.32	0.30
Special MOVINO	0.79	0.81	0.07	0.13	0.42
Traditional MOVINO	0.26	0.26	0.11	0.38	0.06

Source: Author´s editing

The more significant difference between the unit price and average variable cost (contribution per unit) means more substantial operating leverage. The highest degree of operating leverage from the sale of Collection EXCLUSIVE wine was recorded in 2020. When the company's sales from the sale of this wine increase by 1 %, the earnings before interest and taxes from the sale of this wine can increase by 6.30 % (Collection CASTLE in 2016 - 1.44 %, Special MOVINO in 2017 - 2,90 %, Traditional MOVINO in 2019 - 2,30 %).

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Table 7 Degree of operating leverage

Wine/year	2016	2017	2018	2019	2020
Collection EXCLUSIVE	0.96	0.46	0.68	0.48	6.30
Collection CASTLE	1.44	0.56	0.73	1.02	0.96
Special MOVINO	2.59	2.90	0.26	0.60	2.25
Traditional MOVINO	1.33	1.55	0.53	2.30	0.45

Source: Author´s editing

Conclusion

The main aim of the break-even point analysis was to find out how many bottles of a selected wine the company must produce and sell to cover the company's fixed and variable costs for this product by sales. For example: for the Collection EXCLUSIVE in 2017, the company had to produce and sell 17,591 bottles. The company was profitable by selling all four top-selling wines in the period under review because actual production exceeded production at the break-even point. With each additional bottle sold, the company was already on the way to started making a profit from this wine.

Operating leverage/degree of operating leverage shows how EBIT will change if sales increase by one euro / per cent. For example, for Collection EXCLUSIVE in 2020, every euro increase in sales represents an EBIT of 2.24 euros. Collection EXCLUSIVE increases by 1% in 2020; the company could also record an increase in EBIT of this wine up to a rate of 6.30%.

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Correspondence address:

Ing. Dominika Čeryová, PhD., Institute of Economics and Management, Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic, email: *dominika.ceryova@uniag.sk*
ORCID: https://orcid.org/0000-0003-2924-2284

Ing. Jana Ladvenicová, PhD., Institute of Economics and Management, Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Tr. A. Hlinku 2, 949 76 Nitra, Slovak Republic, email: *jana.ladvenicova@uniag.sk*
ORCID: https://orcid.org/0000-0003-1065-4721