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Effect of Break- Even Analysis on Decision Making of Selected Listed Manufacturing Firms in Nigeria

Akinleye G.T.¹, Adebusoje Olaniyi²

Abstract: The study investigated effect of break-even analysis on decision making of listed manufacturing firms in Nigeria, between 2012 and 2021. Specifically, the study investigated the effect of selling price, production cost and sale volume on profit after tax of listed manufacturing firms in Nigeria. The study adopted an ex-post-facto research design and secondary data was gathered to analyze the effect on the variables. The population of the study consist twenty- five (25) consumable goods firms listed on the floor of Nigeria Exchange Group as at 30th May, 2023. The study randomly selected 15 firms out of 25 consumable goods firms. The data were collected from annual reports of 15 sampled listed manufacturing firms covering a period of ten (10) years (2012-2021). The collected data were analyzed using descriptive, correlation analysis and other post estimation techniques. The decision making was measured with return on asset. From the results of the findings, it was revealed that profit after tax is positively affect by the break-even analysis of the listed manufacturing firms in term of selling price and sale volume. Thus, cost of production reported negative effect on profit after tax. The study concluded that break-even analysis has positive effect on decision making of manufacturing firms in Nigeria, especially when measured in term of profit after tax. Based on the findings, it was recommended that management of manufacturing firms in Nigeria needs to put all possible strategies in order to lower the production cost to maximizing profit.

Keywords: Manufacturing companies in Nigeria; break-even analysis; profits after tax

JEL Classification: L66; L25

¹ Professor, Ekiti State University, Ado-Ekiti, Nigeria, Address: 362103, Ado Ekiti, Statul Ekiti, Nigeria, gtakinleye@gmail.com.

² Ekiti State University, Ado-Ekiti, Nigeria, Address: 362103, Ado Ekiti, Statul Ekiti, Nigeria, E-mail: adebusoyeniya@gmail.com

1. Introduction

In a highly competitive commercial environment, a company's ability to generate profit is critical to its long-term survival. Fiscal control is required to do this, and excellent planning for the company's fiscal performance becomes critical for operation. To achieve this goal, colorful tools and tactics must be implemented. The break-even analysis is a comparable approach that is important in determining a company's profitability. The break-even point, where total earnings equals total charges, is an important indicator of a business's financial performance. There is no profit or loss at this moment (Garrison, 2012). Break-even analysis, simple means that depicts the company's entire profit and costs. A break-even analysis entails more than just calculating the volume position at which income equals product costs. It includes a thorough assessment of many elements such as price, costs, and volume, as well as their impact on profitability. Profitability and employee growth are two areas where manufacturing companies choose to focus their efforts. The first objective of every company owner should be the maximizing of profits. Nonetheless, Nigerian firms have suffered substantial failures in recent times, resulting in financial losses (Siyanbola, 2013). Despite increased attention and support from Nigerian institutions, company performance has fallen short of expectations (Adebayo, 2018). Companies must conduct stringent spending control and laboriously seek cost-saving opportunities to alleviate losses and maintain high-quality standards (Lawal, 2017). The purpose of this research is to examine the crucial part of break-even analysis in decision making among a sample of Nigerian manufacturing companies. Specifically, the study determines the effect of selling price; evaluate the effect of cost of production; and ascertain the effect of sales volume on profit after tax of the selected manufacturing firms in Nigeria

2. Literature Review

2.1. Break-Even Point

A company must reach a certain level of sales or income before it can be deemed financially viable. This threshold must be reached before the company's costs can be judged to have been balanced (Wikipedia, 2014). Break- even point is a point in a business cycle when a business reached in its operations where it is no longer turning a profit or a loss? For managers, especially when it comes to defining their point of break-even, break-even analysis may be of immense assistance. A break-even analysis is a method that may be used to assess whether or not the revenue

produced by a product or service is sufficient to cover the expenses connected with its production. This can be accomplished by comparing the amount of revenue generated to the amount of expenditures incurred. This information may be put to use in a variety of ways by managers, some of which include the establishment of pricing, the preparation of bids in competition with other businesses, and the filing of applications for loans (Manishranalkar, 2012).

2.2. Profitability

The basic goal of any business owner is to generate profits. However, before establishing profitability, operations must ensure that the company's operational expenses are covered. If a company spends more money than it receives while developing a product or providing a service, it risks depleting its capital. Although organizations may be able to endure losses for a length of time, it is critical for operations to be wary of areas where losses occur and to have a strategy in place to restore profitability as soon as feasible. The ability to effectively control pricing, packaging, and quality are crucial requirements for the sustainability of any organization today, as stated by Oyerogba, Olaleye, and Solomon (2014). Management must understand not just the point at which individual goods or services cover their expenses, but also the level at which the firm as a whole may be considered profitable. The expectations of guests for excellent service and results continue to rise. A company has to be successful in more ways than one: profit and cost control. When a company has to pay a lot for its operations, it can't make as much money as its competitors. Making a profit is a key performance metric for every business looking to grow and expand. A company that is not making money will eventually fail. So, a company's ability to be cost-effective is crucial to its survival in today's cutthroat business climate. Adebayo and Onyeiwu (2018) state that the end objective of any business that is not a financial institution is to make enough money to survive under the market's existing demand

2.3. Theoretical Framework

2.3.1. Fundamental Theory

The study is grounded on elementary theory. According to Graham and Dodd (2015), the true worth of a security may be calculated by analyzing the company's production cycle in detail, including the cost of manufacturing, selling price, and

ultimate production process. Furthermore, several basic aspects that drive decision making in general impact the true value of the sales volume. The idea states that at every moment in time, the present value of the future payments accruing to the production represents the real or inherent value of each particular security.

2.4. Empirical Review

The influence of cost-volume profit evaluation on manufacturing firm decision-making was studied by Ihomeje, Okereafor, and Bashir (2015). Primary and secondary data were gathered using check exploration and longitudinal exploration techniques. Regression and correlation analysis, among others, were employed to dissect the data. Price and sales volume, as well as manufacturing costs and profits, were all shown to be closely connected to one another in the research. The analysis determined options based on reorder and lucrative order quantities. The study's authors conclude that manufacturing companies should routinely include cost-volume profit analyses into their decision-making processes. The study was not sector-specific but rather focused on generic manufacturing due diligence. Alnasser, Shaban, and Al- Zubi(2018) performed research on the benefits of using the break-even threshold in Jordanian artificial firms' strategy, operation, and decision-making. The research looked at how the break-even threshold affected the strategies used by artificial firms in Jordan when planning, managing, and making decisions. A total of 54 individuals working in Jordanian artificial enterprises' accounting departments were surveyed for the study. The results showed that using the break-even threshold in planning, controlling, and decision-making helped artificial firms in Jordan significantly improve their performance in these areas. The results imply that businesses should think about the break-even threshold as an important, useful, and delicate instrument for decision-making and planning monitoring.

Cloth makers' make-or-buy choices and organizational arrestment led to the closure of fabric stores in Nigeria, say Kenneth, Sunday, Nwajiuba, Osanebi, and Ezemoyih (2019). The research employed a descriptive check approach to survey 714 members of the operation brigades at 12 different active textile enterprises. A total of 403 employees from six different textile mills shared the total check. Validity and reliability of the exploration tool were determined. Both the descriptive and regressive analyses performed on the gathered data were statistically significant at the 5% level. The results showed that the quality check of Nigerian textile retailers was significantly affected by the independent sub-variables of cost, capacity, and

quality assurance. $R = .776$, $R^2 = .721$, $R = .702$, $R = .683$, $R = .658$, and $R^2 = .635$ were all found to have high statistical significance in this research. The study argues that rather than shutting down entirely, directors of textile shops could have looked into working with external suppliers in order to satisfy customer demand, keep their pool intact, protect investors' financial interests, and provide support to frugality.

Oanh, Thuan, and Cong also looked at how public universities in Vietnam apply cost-volume-profit (SVP) analyses (2020). For the study samples, public universities in Vietnam were polled in 2018 and 2019. Data is cleaned and analyzed using SPSS software and techniques including frequency statistics, price statistics, and means following data collection. In order to reduce costs, increase income, and provide the best service to students, public universities in Vietnam must strengthen their governance. Given the circumstances in Vietnam right now, this is essential. Making the best decisions may be aided by flexible use of the SVP analysis by administrators of Vietnamese public universities.

Zanna, Lateef and Samuel (2022) evaluated the effect of breakeven point (BEP) analysis in decision making in some selected block industries within Kaduna Metropolis. Breakeven point was proxied with selling price, sales volume and cost, while decision making was proxied with profit. The sample for the study was drawn from 42 block factories within Kaduna Metropolis. The study collected data through questionnaires. The study employed multiple regression analytical tools. The study found that cost has negative significant effect on Profit at 1% level of significance, while sales volume has positive significance effect on profit of block factories within Kaduna at 5% level of significance. However, sales have positive insignificant impact on profit. The study concluded that cost and sales volume have significant impact, while selling price has insignificant impact on profit. The study recommended that, block industries should use breakeven point analysis as a main tool for profit planning because of its impact.

Given the paucity of studies examining break-even analysis and decision-making in Nigerian businesses, the present study set out to examine the link between deal price, product cost, and transaction volume and the after-tax profitability of Nigeria's non-financial businesses.

3. Methodology

3.1. Sampling and Collection of Data

Ex post facto research methods were utilized in the study since the essential information was already available. Fifteen (15) out of the twenty-five (25) consumable goods firms listed on the Nigerian Exchange Group were included in the sample population. The study covered 10 years (2012 to 2021). The study employed secondary data. The data were collated from annual reports of the selected listed manufacturing firms in Nigeria. The study investigated the nature of the link between the dependent and independent variables using descriptive and regression analysis. The regression method was used to identify the coefficient of the linear equation that most accurately predicted the value of the dependent variation. The significance of the regression model was evaluated using the F-statistics, and the significance of the regression coefficients was evaluated using the t-statistics. Both the t-statistic and the F-statistic were evaluated at a 95% level of confidence. In order to better understand the relationship between break even and decision-making traits, a correlation matrix was also employed.

3.2. Measurement of Variables

This section describes the measurement of the variables of the study, as shown in Table 2.

Table 2. Measurements of Variables

S/N	Variables	Symbol	Measurement	Previous Studies
1.	Dependent Variable			
	Profit After Tax	PAT	Net Profit after Tax/ Total Assets	Zanna et al (2022)
2	Independent Variables			
	Selling Price	SP	Cost Price +Profit Margin	Ihemeje, (2015)
	Cost of Production	CP	Fixed Cost +Variable Cost/ No of Units	Nwajiuba, Osanebi and Ezemoyih (2019)
	Sale volume	SV	Total Fixed Cost +Variable Cost	Oanh et al, (2020)

Source: Data Analysis, (2023).

3.3. Research Model:

This study model was adapted from the work of Zanna et al, (2022) as shown below:

$$PAT = \beta_0 + \beta_1.SP + \beta_2.CP + \beta_3.SV + \epsilon \tag{1}$$

Where: **PAT**= Profit after Tax, **SP**= Selling Price, **CP**= Cost of Production, **SV**= Sale volume,

β_0 = Constant, $\beta_1, \beta_2, \beta_3$ = Slope Coefficient, **YEAR**= Dummy variable of the time under study, ϵ = Error Term.

4. Results and Discussion

4.1. Descriptive Statistic

Table 1. Descriptive Statistics of Variables

Variables	Maximum	Minimum	Mean	SD	Kurtosis	Skewness
PAT	2.72	-6.56	7.85	0.62	6.03	2.62
SP	14.73	2.30	7.91	10.98	3.03	0.29
CP	304.35	-468.09	-3.09	0.21	17.49	1.68
SV	0.89	-1.41	0.14	15.32	119.96	41.66

Source: Data Analysis, (2023).

PAT= Profit after Tax, **SP**= Selling Price, **CP**= Cost of Production, **SV**= Cost of Volume

Descriptive data for the investigated variables are shown in Table 1. The lowest and maximum values as well as the means and standard deviations for each variable are provided; averaged profit after tax stood at 7.85 naira with standard deviation of 0.62 naira coupled with minimum and maximum values of -6.56 naira and 2.72 naira. Average selling price, cost of production and sale volume stood at 7.91 naira, -3.09 naira and 0.14 naira with standard deviations of 10.98 naira, 0.21 naira and 15.32 naira respectively, alongside minimum and maximum values of 2.30 and 14.73 for selling price, -468.09 and 304.35 for cost of production and -1.41 and 0.89 naira for sale volume. The asymmetry around the mean was 2.62 for profit after tax, which also had a lengthy right tail, was one of the variables with the longest right tails. The kurtosis value, which indicates the weakness or flatness of a series, was 6.03, which was higher than the expected value of 3.0 for normally distributed data, implying that profit after tax had peaked relative to normal. Kurtosis values for selling price,

product cost, and sale volume were respectively 3.03, 17.49, and 119.96. This means that all of the variables in the study had high peaks and were favourably disposed.

4.2. Correlation Analysis

Table 2. Pearson Correlation Matrix

Variables	PAT	SP	CP	SV
PAT	1.000			
SP	0.009	1.000		
CP	-0.011	0.006	1.000	
SV	0.773	0.071	0.090	1.000

Source: Data Analysis, (2023).

PAT=Profit after Tax, **SP**= Selling Price, **CP**= Cost of Production **SV**=Sale volume

Table 2 displays the results of the study's correlation analyses for the paired variables. The strength and direction of the relationship between the variables are made clear in these passages. The other factors, including selling price and sale volume are positively correlated with profits after tax at with value 0.009 and 0.773 respectively. This indicates that the profit after tax grows in tandem with the selling price and sale volume. On the other side, there is a negative link between profit after tax and product cost with value of -0.011. This indicates that when the price of a production goes up, the profit made after tax usually goes down. Correlation coefficients between the sale volume and the cost of the production (0.090) and the sale volume and the selling price (0.071) are also included in Table 2. The degree of association between pairs of variables is shown in many chapters. If the correlation measure is positive, then the connection is positive, and if it is negative, then the relationship is negative. Multicollinearity among the explanatory variables in the estimated model of this investigation is not strongly supported by the reported correlation sections in Table 2. This is encouraging since multicollinearity has been shown to amplify and render parameter estimates in regression analysis unreliable. According to the results of the partial correlation analysis, the model's variables seem to be independent of one another and to lack significant multicollinearity.

4.3. Panel Unit Root test of the Variables

Table 3. Panel Unit Root Test

Variable	Statistic	P-Value
PAT	-4.6107	0.0017
SP	-4.4078	0.0024
CP	-13.777	0.0000
SV	-11.932	0.0000

Source: Data Analysis, (2023).

PAT= Profit after Tax, **SP**= Selling Price, **CP**= Cost of Production, **SV**=Sale volume

Stationarity at the 5% level of significance is indicated by all research variables in Table 3. One common approach to testing for unit root and stationarity in time series data is the Levin, Lin, and Chu test. If the test's null hypothesis is rejected, then the variables are not considered to have a unit root and are instead considered to be stationary. Stationarity is a crucial feature in time series analysis since it suggests that the statistical components of variables, such as mean and average, do not change with time. This enables more reliable and meaningful investigation of the variables' relationships. The findings of the Levin, Lin, and Chu tests suggest that the process of producing the study's data for the variables is stationary and unified, pointing to a consistent and well-balanced trend through time. This establishes a firm foundation for doing more research and drawing inferences from the data.

4.4. Discussion of Findings and Implications

The study assessed break-even analysis and decision making of listed non-financial firms in Nigeria. This was achieved by analyzing the effect of selling price, cost of production, and sale volume on profit after tax of listed manufacturing firms in Nigeria. The study employed secondary data and the data were collated from the annual reports of 15 listed manufacturing firms, over a period of 10 years spanning from 2012-2021. Data were analyzed using descriptive statistics and correlation analysis as well as post estimation test. The estimation results revealed that all variables used in the study such as selling price and sale volume has positive correlation with profit after tax. Thus, cost of production has negative correlation with profit after tax. This discovery was in line with the findings of Zanna, Lateef and Samuel (2022) which studied the effect of break-even point analysis in decision making in some selected block industries within Kaduna Metropolis. By implication, this discovery reflected that increasing selling price and sale volume of non-financial

firms in Nigeria led to a substantial increase in profit after tax. Hence, that manufacturing firms needs to be highly sensitive when setting the procedure for break-even point so as not to erode their profitability.

5. Conclusion and Recommendations

The study was able to provide empirical evidence on the link between break-even point analysis and decision making of listed manufacturing firms in Nigeria, by using a robust set of statistical techniques, the estimation results revealed that in relation to the effect of break-even point analysis variables on profit after tax, selling price and sale volume has the significant and positive effect on decision making of listed manufacturing firms in Nigeria, while cost of production has negative effect on decision making, especially when measured terms of profit after tax. This suggested that increase in selling price and sale volume has the capacity to positively improve the profit after tax of manufacturing firms. Therefore, the study provided evidence that break-even variable indicators such as, selling price, sale volume and production cost has a significant effect on decision making of manufacturing firms in Nigeria, especially when measured in terms of profit after tax. Hence, the study recommended that management of manufacturing firms in Nigeria needs to put all possible strategies in order to lower the production cost to maximizing profit.

5.1. Suggestion for Future Research

The essential links between break-even variables and decision choices should be the focus of future empirical study in the field of break-even point analysis and its application to decision making in Nigerian firms. This would enable us to confirm and strengthen the observed static effects of break-even analysis on business decision-making processes.

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