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COMPARATIVE CHARACTERISTICS OF BREAK-EVEN POINT DETERMINATION MODELS IN ECONOMICS AND BUSINESS ANALYSIS

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Annotation. The paper examines the comparative characteristics of economics and business analysis models to determine the break-even point. Considerable attention is paid to their peculiarities and the advantages and disadvantages of each method.

Formulation of the problem. Consider the comparative characteristics of economics and business analysis models to determine the break-even point. Determine the features of use, advantages, and disadvantages of common models.

Introduction. Methods and mathematical models in economics and business analysis are very relevant and important. Their scientific novelty is integrating various aspects of product manufacturing, production, logistics, and market behavior into a single optimized system. Such systems are necessary for informed decision-making in economics and business analysis.

Main part. Using a mathematical model of a linear function to determine the break-even point is a fairly common practice. Such a model can be compared to others used in economics and business analysis to understand financial relationships and make decisions. Below are some of these analogs.

The nonlinear optimization model is used to solve problems where the dependence between variables is not linear. These models can be applied to the analysis of the elasticity of demand and optimization of production processes, where scale effects or production limits introduce non-linearity into the relationship between costs and revenues. Unlike linear models, nonlinear models allow more accurate modeling of real business scenarios where the relationships between variables are not a simple proportion. However, nonlinear models are usually more complex to analyze and require specialized software.

Like the linear break-even model, marginal analysis optimizes financial performance. The difference is that it focuses on the marginal figures for each additional unit rather than the overall analysis of income and expenses.

The model for calculating the break-even point for a multi-product company is necessary for companies selling several types of products. Calculating the break-even point is complicated by considering different prices, costs, and margins for each product. Such a model uses aggregated indicators to analyze the company's overall break-even point. It also extends the concept of linear break-even analysis, considering the complexity of a multi-product portfolio. It allows a more flexible approach to assortment planning and pricing.

The "net present value" (NPV) and internal rate of return (IRR) models are used to estimate the benefits of investment projects, taking into account the time value of money. NPV calculates the net worth of future cash flows discounted to the present, while IRR determines the discount rate at which the project's NPV is zero.

Although these models are not directly used to calculate the break-even point, they help evaluate the financial attractiveness of projects and strategies regarding long-term returns and risks, complementing the break-even point analysis. Each of these models has unique applications and can be used in conjunction with the linear model to analyze business strategies and financial planning comprehensively.

Each model is used for specific purposes and has advantages and limitations. The choice of a specific model depends on the situation, the analysis's goals, and the data availability. The nonlinear optimization model is based on a mathematical method to find a function's maximum or minimum value in conditions where nonlinear equations express dependencies between variables or constraints on variables. The main point of using a nonlinear optimization model is the ability to effectively solve complex optimization problems that cannot be adequately represented or solved using linear models. The use of this model is as follows. Many real-world economic, engineering, financial, and management problems are nonlinear, with non-linear relationships between variables. Examples include scale effects and variability in costs or revenues from additional units of products or services. Therefore, this model allows you to find the best solution for maximizing profit, productivity, and efficiency or minimizing costs, losses, risks, etc. Also, nonlinear optimization allows for considering complex constraints expressed by nonlinear equations or inequalities, describing resource constraints, technological parameters, environmental norms, etc.

Nonlinear optimization provides ample opportunities for modeling complex relationships and determining optimal strategies in situations with high uncertainty and dynamic changes. Its application can significantly improve the quality of management decisions, providing a sound basis for choosing between different strategies or actions.

However, nonlinear optimization problems can be challenging, especially for large systems with many variables and constraints. Practical analysis and solutions often require specialized software. Using nonlinear optimization can significantly improve organizations' ability to adapt to complex environments, optimize resources, and strategically plan to achieve their goals.

Thus, the mathematical model of a linear function used to determine the break-even point is a powerful tool for decision-making in production, pricing, and financial planning. It allows companies to better understand the impact of changes in production and sales on their financial sustainability and profitability.

Conclusions. The paper examines the comparative characteristics of economics and business analysis models to determine the break-even point. It determines their features of use and the advantages and disadvantages of standard models.