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## **Preface**

This book presents the results of Polish-Ukrainian scientific cooperation. It contains the papers prepared for the 10th international conference “Quantitative Methods in Accounting and Finance”. Accounting and finance face nowadays many challenges. They require both an international and local approach, they need to be considered from the theoretical and practical point of view, and they also encourage general and specific analysis.

Support from quantitative methods is needed in order to discover, implement and verify new finance and accounting trends, methods and instruments. The research papers which are part of this book present different aspects of accounting and finance combined with a quantitative, in particular Econometric, approach.

Some of the papers focus on methodology of measurement, estimation and forecasting of financial phenomena, especially those related to investment processes. Others address specific problems of accounting such as accounting solutions for different branches, legal issues of accounting, responsibility and reporting. An alternative approach was also undertaken and the roles of a narrative and culture in accounting were presented.

The variety of papers selected for this issue ensures the complexity of the book. It provides theoretical as well as empirical material which can be used in further research and in business practice, particularly in accounting and finance. We hope that the content of the book provides a starting point for scientific discussion and practical changes.

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**DEVIATION ANALYSIS AS AN INSTRUMENT  
OF COST CONTROL IN AN ORGANIZATION**

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**ANALIZA ODCHYLEŃ JAKO INSTRUMENT  
KONTROLI KOSZTÓW PRZEDSIĘBIORSTWA**

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**Summary:** The paper presents the use of analyses of deviation as an instrument for cost controlling processes. The significance of deviation analysis is presented in the context of control of the economic results on company level. Problems and dilemmas are discussed in the determination of reference values to be used as basis for the analyses of actual cost of operation. Identification of cost deviation categories is discussed, followed by evaluations of their significance for cost controlling processes. Classification of deviations by a range of different criteria is presented. The final section presents the potential for influencing the cost levels on the basis of information on deviations from target values. The deliberations contained herein suggest that deviation analysis may be an important instrument for cost control and the management of company results designed to rationalise the use of available resources.

**Keywords:** cost control, cost deviation analysis, benchmark cost, cost deviation testing

**Streszczenie:** Artykuł jest poświęcony wykorzystaniu analizy odchyleń kosztów w kontroli ponoszonych kosztów. Na początku omówiono znaczenie analizy odchyleń od kosztów wzorcowych w kontroli rezultatów działalności przedsiębiorstwa. W dalszej części zajęto się problemem ustalania kosztów wzorcowych jako podstawy odniesienia kosztów faktycznie poniesionych. Następnie omówiono identyfikację odchyleń kosztów z punktu widzenia ich znaczenia w kontroli kosztów. W tym zakresie przedstawiono klasyfikację odchyleń według różnych kryteriów. Ukazano także możliwość wpływania na poziom kosztów przy wykorzystaniu informacji dotyczących odchyleń. Rozważania przeprowadzone w artykule dowodzą, że analiza odchyleń może być ważnym instrumentem kontroli kosztów oraz sterowania działalnością przedsiębiorstwa ukierunkowanego na doprowadzeniu do racjonalnego poziomu kosztów.

**Słowa kluczowe:** kontrola kosztów, analiza odchyleń kosztów, koszty wzorcowe, testowanie odchyleń kosztów.

## 1. Introduction

Cost incurred by a business remains one of the most important parameters to describe company operating results, since the cost of a business operation is a good measure of its effectiveness in the use and allocation of its resources: material, human and financial. The volume of cost incurred by a business is directly related to the company financial result. In addition, the cost itself can be employed by economic entities as a criterion in various decision-making processes. Reports of business cost incurred in company operation are also an important element of business performance evaluation. As a result, cost is an essential area of managerial influence and, as such, subject to controlling processes.

To obtain and retain control over the level of cost incurred in business operation, companies must first identify a target value that describes a rational cost level required to achieve a given business objective. Such target values are set *ex ante* and serve as benchmarks to control the associated cost before it is incurred. This value is then utilised in regular business operation as the basis for the evaluation of actual cost of the process at hand. This type of evaluation involves a determination of deviations between the two values.

Analysis of deviations between the actual and the target levels of cost is an instrument widely used in cost controlling applications. Cost deviation analysis is also a useful tool for managing the company operating cost, i.e. for keeping the company cost within a tolerable range established at the planning phase for a given aspect of company operation. It is the latter use that is the central focus of this paper.

This study aims to present the role and the usefulness of analyses of deviations of actual cost from the cost estimated at planning in cost controlling processes of business entities. The central thesis of the paper can be expressed as follows: cost deviation analysis offers the potential for cost management applications designed to improve the company's resource use effectiveness. The above thesis was examined based on critical reviews of professional publications on cost accounting, management accounting, and controlling.

## 2. The main assumptions of deviation analysis in cost controlling

Cost controlling is regarded as an effective instrument for results management in company setting. It represents one of the crucial tasks delegated to the company controlling system [Nowak 2013, pp. 34-36]. Narrowing the concept of controlling to reflect only cost control procedures is also viewed as a specific approach to company management [Strobel 1978], since company operating cost can be effectively managed and controlled, as long as it is properly determined and analysed by segment of operation. For this approach to be effective, it is important to assign centres of responsibility for any part of the cost incurred [Mehlan 2009, p. 157].

To gain effective control over the cost incurred in a business operation, a company must first determine a point of reference to be used in analyses of actual cost – a model value of cost to be expected under the given operational conditions. Analyses of deviations of actual cost from the benchmark value are of great usefulness for the controlling purposes, since they facilitate the identification of areas for which further cost reduction can be obtained.

The main purpose of deviation analyses based on differences between actual cost and benchmark cost is to improve the resource effectiveness of the economic entity in question. The usefulness of this approach lies mainly in its potential to examine and control the cost incurred, arranged by segment of the company internal structure, i.e. by cost responsibility centres. It is also important to determine the precise points of reference for any cost planned in the subsequent evaluation periods. Another important requirement of this approach is the provision of accurate and relevant economic information (data) to serve as the basis for rational economic decisions designed to improve the company economic result.

Another important use of the deviation analysis as a cost controlling instrument is the identification of cost-generating factors. These represent certain activities, occurrences and tasks which add to the cost incurred in the course of operation [Doyle 2002, pp. 119-120]. Cost-generating factors are reflected in the level and the structure of the company's operating cost, overall. Business activities typically involve a number of actions, tasks and occurrences in various correlational patterns. Deviation analysis should help the decision-makers identify those cost-generating factors that have the greatest impact on the level and the structure of cost incurred by the company, since – in a typical business setting – only a selected few of such factors have a measurable effect of generating a significant deviation of actual cost from the predefined reference cost.

Analysis of deviations should also help identify those activities and tasks that impose a particularly severe load upon the company's overall cost structure. It may also be used to determine any occurrences that corresponded with excessive cost. Tasks and activities found to be too costly and of relatively lesser value for the realisation of the company business objectives should be eliminated or otherwise addressed. The remaining tasks and operations should be streamlined and improved to reduce their associated cost to a rational level.

In the evaluation of activities, tasks and occurrences and their impact on the deviation of actual cost from the benchmark cost, it may be useful to emphasise the relationship between the cost itself and the benefits offered by the associated expenditure. The cost-benefit analysis involves a comparison of cost incurred and the benefits offered by the associated activities and tasks or under the associated occurrence, in various operating scenarios. This approach can be used to identify the most effective variant of operation, i.e. one that offers the lowest possible cost-to-benefit ratio [Nowak 2016, p. 72].

The analysis of deviations of actual cost from the benchmark cost can be used as the basis for the construction of regulative measures intended to bring the cost

down to a rational level. Thus, negative deviations can be used to stimulate corrective and remedial measures designed to eliminate or reduce the negative impact in the foreseeable future. Positive deviation, on the other hand, may serve as the stimuli for measures designed to reinforce the desired effect. This approach makes the deviation analysis a powerful instrument for the management of business activities, offering good potential for the optimisation of company results.

### **3. Benchmark cost as point of reference for the analysis of actual cost incurred in a business operation**

Cost control typically involves a comparison of actual costs against their corresponding benchmark values (points of reference). Without a pre-determined value of reference, actual cost incurred in a business operation cannot be analysed. By having a point of reference for any cost item, companies may manage and influence the associated cost even before it is incurred. In this approach, cost control is subordinate to the realisation of economic activities and business objectives. Effective cost control should enable the use of measures designed to keep the cost at a rational level.

Setting a proper base of reference for cost analyses in cost control applications is not an easy task. Professional literature on cost accounting and management accounting provides a number of procedures for the calculation of cost reference (benchmark) values. Such benchmarks are calculated *a priori* and reflect the values considered necessary or appropriate under the given operating conditions. The postulated methods represent various levels of precision and strain – the latter representing benchmark achievability under the given operating conditions.

The most popular category of reference costs is the standard cost accounting, a variant of the model of postulated costing. Postulated costs are determined *ex ante* and represent cost items to be incurred in the future. For standard costing, cost postulates take the form of directives to be met in business operation [Jarugowa, Malc, Sawicki 1983, pp. 209-210].

Normative costing offers the best available precision. This type of costing is determined based on estimations of technical norms of depletion for various production factors: materials, labour, energy for technological processes. Costing norms are dictated by technological requirements and reflect the minimum expenditure per manufactured unit.

Planned cost, another variant of the standard costing method, represents the anticipated cost of future production, as determined at the planning phase of the endeavour. Planned cost represents a cost range to be expected under rational conditions of resource use. In other words, it describes a cost threshold based on justified economic conditions.

Postulated cost can also be determined based on the examination of actual expenditure data for past periods. This method, often referred to as normal costing, yields its values based on trends observed in past expenditure patterns. These are

typically analysed using statistical and econometric methods and may be presented in the form of predictive cost.

Another widely popular category of costing based on reference points is target costing [Monden 1995]. Target costing represents the desired level of product cost which is deemed adequate to yield target sales profitability in all stages of the product's lifespan. Target cost value is determined on the basis of specific conditions of production and potential for cost reduction. At the same time, the target cost should not exceed the admissible cost level, i.e. the level of cost per unit which yields the expected profit at the given sales price.

Benchmarking is another approach to reference-based pricing, offering good potential in practical applications. The benchmarking method involves comparisons of costs against industry standards and best practices in the field. In the case of reference-based costing, such comparisons are applied to product cost per unit. Here, the reference point is determined to be equal to the value of the lowest reported per-unit cost. The comparison may be done against industry-wide standards (external benchmarking) or among the individual departments or segments of the company (internal benchmarking).

The cost optimal method, in some cases, can also be regarded as a variant of reference-based costing. Cost optimal values are determined at the decision-making phase, and involve the determination of the most optimal solution from the pool of available costing variants, in accordance with any predetermined limitations that may apply. The optimum value is chosen based on a specific criterion, in this case the cost. In this approach, the optimisation process can be based on a simple minimisation of cost involved in the given undertaking.

The reference-based costing methods presented in this section of the paper do not exhaust the full range of instruments available to companies. Regardless of the method, it seems important to adopt such a value of reference cost which will stimulate the cost reduction efforts. At the same time, the value should represent a feasible target that can be reached under the given operating conditions. In addition, the task of reaching the reference point or target within the established planning horizon can be staggered, based on the observed strain levels.

#### **4. Identification of deviations from reference cost**

Control of company operating results involves a systematic comparison of actual results against a predetermined target value or range, to ensure they fall within the acceptable margin. It also involves a number of potential curative measures designed to improve the effectiveness of resource use and facilitate the realisation of company objectives [Mockler 1970, pp. 14-17]. Based on the wording of the above definition, three fundamental features of effective control can be established: the systematic nature of analyses, verification against the adopted targets or reference values, and prevention of past error recurrence.

In company practice, cost controlling based on reference cost values is performed using information on the deviations of actual cost from the predetermined reference point. To effectively compare these two categories, one must ensure that they are comparable in the first place. Thus, both the actual cost and the reference cost should apply to the same range and scale of activities, since the actual range or scale may differ from the ones adopted in the determination of reference cost values. If this is the case, the two categories should be normalised.

**Table 1.** Classification of deviations from reference cost value

No.	Classification criterion	Deviation type
1.	Deviation character	Significant deviation
		Insignificant deviation
2.	Potential to control the deviation	Controllable deviation
		Uncontrollable deviation
3.	Deviation significance	Positive deviation
		Negative deviation
4.	Systematicity of deviations	Systematic deviation
		Random/sporadic deviation
5.	Deviation persistence	Durable deviation
		Transitory deviation
6.	Deviation trend	Increasing deviation
		Decreasing deviation
7.	Deviation range	Partial deviation
		Joint deviation
		Mixed deviation
8.	Deviation measurement unit	Deviation in quantity
		Deviation in price
9.	Deviation tolerance	Maximum deviation
		Minimum deviation
10.	Reference to target cost value	Correction of target cost values
		Defaulted target cost values
11.	Potential for deviation planning	Planned deviation
		Unintended deviation
12.	Determination of deviation	Documented deviation
		Non-documented deviation

Source: [Jarugowa, Malc, Sawicki 1983, pp. 211-212; Nowak, Wierzbński 2010, pp. 101-103].

The practical application of deviations from reference cost value for controlling the company result requires an accurate identification of deviations. To help identify

them, it may be useful to present a formal classification of deviations based on selected criteria. Proper identification of the type and the character of actual cost deviation from the reference value will facilitate the determination of the best possible curative measures and responses. Table 1 presents a formal classification of deviations from reference cost values.

Deviations of actual cost from pre-established cost thresholds should be subject to detailed analyses. The most important task here is to recognise their character and significance for the processes at hand from the costing perspective. Due to the large variety of categories, it may be useful to adopt a hierarchical order of deviations from reference cost.

Deviations of actual cost from pre-established thresholds should be categorised by their origin. This serves to facilitate the task of associating the observed deviations with specific cost responsibility centres. This is of particular value for the controlling process, since it helps identify persons and segments responsible for their occurrence or detect the cause of the problem. At the same time, it is important to examine the effects of any such deviations upon the final economic result.

Analyses of deviations of actual cost from reference values should also be utilised in their preventive capacity, to control the recurrence of any negative-type deviations in the future operation. In this context, it is important to keep a running stock of actual cost and to continuously monitor any deviations from the reference values. This approach greatly facilitates the detection and early response to any errors or irregularities, or even mismanagement practices. It also helps in concerting the activities designed to improve company operating capacity by rationalising the use of available resources.

## 5. Conclusions

The use of reference values in cost controlling processes is closely associated with the distributional approach to reporting and presenting the volume of actual cost. In this approach, the actual cost is compartmentalised into two values: the reference value (determined *a priori*) and the deviation from such value. For the analysis of actual cost, this method should be applied by segment of operation, in accordance with the segmentation principles used in controlling of company results. This should also include segmentation of cost by item, by objective, and by process.

Deviations of actual cost from the pre-established reference values are to be expected in the operating practice of any company, since every economic endeavour is inherently burdened with risk. Cost items are just another of the many economic parameters adding to the risk of operation. Therefore, analyses of deviations from reference cost values can be used as instruments not only for cost controlling purposes, but also for risk management. This is based on the assumption that the more pronounced the deviations of actual cost from their associated reference values, the greater the risk of the economic operation.

Cost control based on analyses of deviations of actual cost from the pre-established reference cost value may also be integrated as part of the managerial information system at all levels, to help detect any departures from the adopted objectives [Kes 2015]. Managers responsible for individual segments of company operation should be equipped not only with information on the tasks assigned to them, but also on any departures from the pre-established targets or plans of operation. After all, the most important task of cost controlling processes is to make sure that the actual cost of operation is kept well within the pre-defined limit of expenditure.

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