

**Summary of Ph. D. thesis written under scientific guidance of  
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**“Use of additional information in conducting audit”**

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Economic agents need reliable financial information on economic entities. They obtain such information mostly in the form of financial statements. To ensure that a financial statement contains no errors or is not counterfeit and in order to make it credible, independent certified public accountants examine correctness and fairness of data in a financial statement. Such examination and verification of historical data in financial statements is called financial audit. Financial audit is expensive, must be carried out in a strictly defined period of time and populations being examined are very large. Thus examination based on complete enumeration is usually impossible to conduct. Therefore auditors use sampling and based on sample results infer on financial statement. In order to carry out these tasks, statistics, survey sampling can be applied.

The nature of financial audit requires methods and techniques applied by auditors to be as efficient as possible. At the same time, in the process of audit certified public accountants have possibility to use easily accessible, accurate additional information. It can be obtained both during planning phase as well as while conducting tests. The use of additional information can significantly improve efficiency of statistical methods applied in audit. Identified relations between additional information and distribution of errors in financial statements as well as the quality of financial statements can be used while auditing different entities in consecutive years.

The subject of the thesis is the use of additional information in planning and conducting an audit. Within this area, relations between character, the size of errors and the characteristics of audited unit were examined. Analyzed characteristics of audited unit include - among others – the scope of activity, legal form, period of functioning, level of dependency, participation of chief accountant in management board, the number of people employed in accounting department, age of chief accountant, chief accountant period of service, chief accountant education, number of employees, total assets, sales, change of earnings (previous year compared to audited year), return on sales, liquidity ratio. Obtained results show that number of financial statement categories that contain error depends on the level of entity's

independence (independent, subsidiary) and return on sales. The number of errors in specific categories of financial statement depends mostly on return on sales and the scope of activity, while relative value of error (tainting) depends on chief accountant's being a member of management board. No relations were found between the characteristics of audited unit and the ratio value of absolute value of earnings and audit materiality.

Based on annual inventory results conducted in six plants of international corporation, an analysis of character of distribution of errors resulting from incorrect registration of stock quantities was carried out. It was observed that in case of warehouses for which ratio of units containing error was lower, error amounts distribution has a form of distribution mixture consisting of single – point distribution that has mass at zero and distribution of error amounts different than zero. Furthermore the analysis showed that while absolute error amount increases the number of errors decreases. The concentration of error amounts around zero causes a low value of mean error and the median of error amounts. At the same time, stock units containing errors of relatively high absolute value have influence on high level of variability measured by standard deviation.

No dependence of frequency of errors resulting from incorrect registration of stock quantities from unit book value was observed. Analysis results do not prove the existence of relation between error amount and unit book value.

Apart from analysis of frequency of errors and error amounts, examination of distribution of book values before and after stock – taking was conducted.

The thesis also includes the review of estimation methods using additional information applied in audit. Estimation strategies using sampling proportional to book values, auxiliary information estimators, application of additional information to stratification and Bayesian approach were discussed.

The efficiency of specific estimation methods was examined in simulation study. The examination was based on the same populations of stock items that were used for the analysis of error distribution. Additional sets, generated from selected real populations, characterized by lower frequency of errors were also analyzed.

The subject of simulation study was the efficiency of interval estimation. Main evaluation criteria were actual confidence levels compared to nominal confidence levels of confidence intervals for parameters being the subject of estimation (total error amount or total true book amount of population) as well as the average length of confidence intervals compared to population total book amount. The examined interval estimation methods can be divided into two groups: methods using information about frequency of errors in the sample in order to

estimate confidence bounds (combined attributes and variables estimation) and methods according to which confidence bounds are determined as parameter point estimate plus / minus standard deviation estimate multiplied by a given constant.

Obtained results confirm that the use of additional information by an auditor increases the efficiency of statistical inference on error amount or true book amount of financial statement categories. However it must be pointed out that none of examined methods gave satisfactory results for auditors. In case of combined attributes and variables estimation methods, regardless of estimation strategy, actual confidence levels were higher than nominal confidence levels but length of confidence intervals would not allow for their practical application. Methods based on point estimate of parameter and estimate of its standard deviation (mean standard error) did not assure appropriate level of confidence (actual confidence levels were lower than nominal levels). At the same time, quite often, the length of these intervals was also unsatisfactory.

In the thesis a proposition of sample division method between auditors with different level of experience in order to minimize variance (mean standard error) of estimator of total true book amount of financial statement's category, when costs of testing of this category are constrained is proposed. It was assumed that auditors measure the value of particular book balances of accounts or transactions and measurement error model depends on experience of a person who carries out the measurement.

The analysis of survey results conducted among Polish certified public accountants showed that statistical methods are perceived by Polish auditors not as primary but as auxiliary. Majority of certified public accountants use statistics during audits but they do it rarely. At the same time auditors do not have sufficient statistical knowledge and are not able to apply it in practice. The results show also that auditors perceive the need to deepen their knowledge and ability of using statistics but they recognize it as not as important as the need to deepen the knowledge of other methods, procedures and audit techniques.