Testing for Benford's Law as a Response to the Risks of Material Misstatement due to Fraud.

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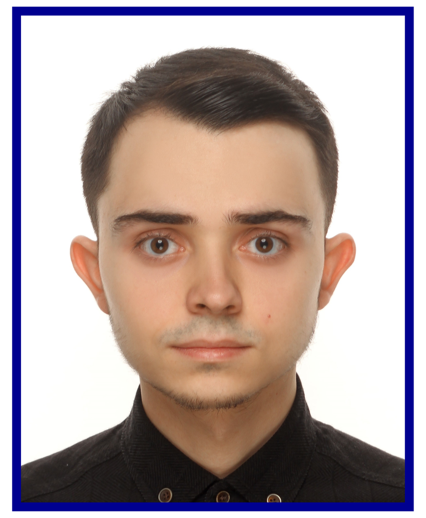

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SUMMARY

We assessed the possibility of applying Benford's Law tests as a response to the risks of material misstatement due to fraud under International Standard on Auditing (ISA) 240. The approach has been applied as part of a comprehensive financial statement audit of a leasing company. Its approbation made it possible to identify fraudulent transactions in accounting resulting from management override of controls, while substantially reducing the labor costs of the audit.

INTRODUCTION

The identification and assessment of risks of material misstatement (RMM) due to fraud is a required procedure in an audit of financial statements. At the same time, international practice shows that the effectiveness of fraud detection by auditors tends to be low.

Due to the fact that the audited entity's accounting data is a large volume array characterized by multiple attributes, manual processing and basic filtering commonly used today do not allow identifying indicators of potential fraud. The use of a statistical method called Benford's Law is relevant in this regard, allowing the detection of implicit patterns and properties present in the data.

APPROACH

We validated the methodology in a series of real financial audits and chose to present the findings from an audit conducted on a leasing company as it is one of the most representative cases. The data to be analyzed was an array of journal entries for the year under review, containing 27 attributes and 1,562,802 records.

METHODS

Benford's Law states that if a data set is randomly generated under the influence of external factors, the leading digits form a discrete exponential distribution. The probability of a digit being the first is measured using the following formula:

$$P(d_1) = log_{10}\left(1 + \frac{1}{d_1}\right);\ d_1 = 1, 2, \dots, 9$$

Based on the Benford distribution, M. Nigrini developed 8 statistical tests to check the natural character of data sets and classified them into primary, advanced and associated. Generally, the tests of each group are applied sequentially.

Conducting the tests also involves calculating statistical characteristics to assess conformity to Benford's law. We used Z-statistic, Mean Absolute Deviation, Bhattacharya coefficient, Kullback-Leibler divergence, Kolmogorov-Smirnov statistic, Chi-square statistic, and Mantissas Test.

RESULTS

Graphical representations of the results of some primary tests are shown in Figures 1.

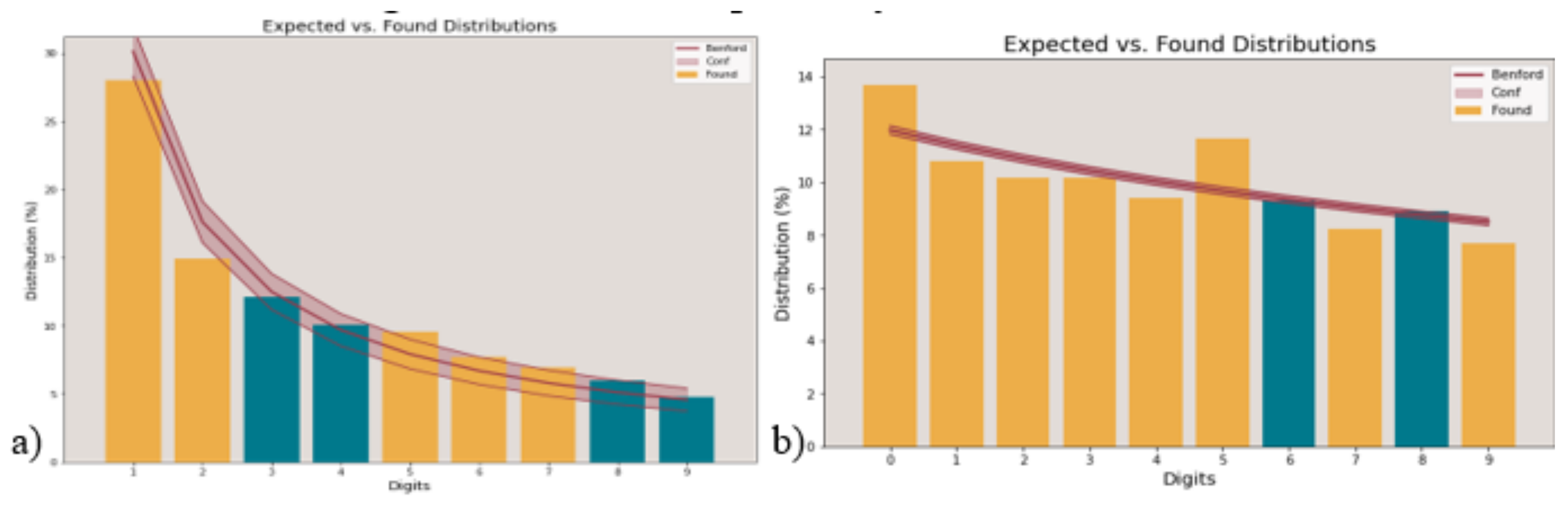

Fig. 1. Results of the a) Second digit test; b) First-order test

Statistical characteristics were calculated for each test. The results of the tests were aggregated. It was found that, firstly, the data does not generally conform to Benford's Law and there is a risk of intentional distortions, excessive rounding and errors in the data. Secondly, the riskiest transaction amounts have certain numerical patterns, as shown in Table 1.

Table 1. Digital templates for the riskiest transaction amounts

Test	Digits
First digits with the highest Z-statistics	2, 5, 7, 1, 6
Second digits with the highest Z-statistics	5, 0, 9, 7, 2, 4
First two digits with the highest Z-statistics	25, 50, 21, 17, 23, 19, 30
First two digits with the largest absolute differences in the sum frequencies	10, 18, 14, 12, 11, 17, 13, 15, 19, 24
Differences from the previous value, whose first two digits have the largest Z-statistics	50, 32, 10, 17, 67, 20, 82, 15, 30, 40
Most frequent	250, 1, 1 500, 1 666.67, 3 000, 10 000, 18 304.02, 500, 15 689.16, 22 697.55
Last two digits with the highest Z-statistics	00, 67, 33, 50, 83, 17

ANALYSIS

The sampling on the basis of these numerical patterns identified 7 groups of suspicious transactions. In each of the groups there are amounts that may indicate the presence of distortions and errors due to nonconformity to Benford's Law.

DISCUSSION

On the basis of the analysis performed, it can be concluded that there were material misstatements in the designated areas of business operations due to potential fraud, which led to obtaining written representations from management and TCWG, questioning the auditor's ability to continue performing the audit, informing external parties and other procedures stipulated by ISA 240. The sample size was reduced by more than 90% (from 1,562,802 to 97,204 journal records), which significantly reduced the audit workload.

CONCLUSIONS

1. The findings demonstrate that Benford's Law as an audit procedure to test the appropriateness of journal entries recorded in the general ledger is an effective audit procedure responsive to assessed RMM due to fraud.
2. The introduction of this methodology into auditing practice is highly recommended and holds significant potential due to the consistent failure of auditors to detect fraudulent practices, as well as the limitations associated with traditional manual detection methods for modern fraudulent schemes.
3. It is worth noting, however, that current application of Benford's Law in financial auditing remains limited and lacks systematic adaptation to meet the specific requirements of the auditing profession.