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Do the Financial Statements of Listed Companies on the Ljubljana Stock Exchange Pass the Benford's Law Test?

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Abstract

Currently, we need to think about the risks in using the financial statements. Abroad, for a long time, in the detection of irregularities in the financial statements, Benford's law test has been used, which is a very simple, objective and efficient digital analysis that can help identify controversial areas. Since, in Slovenia, its use is still unknown and in practice, and it is rarely used, we checked whether the financial statements of Slovenian companies listed on the Ljubljana Stock Exchange pass the Benford's law test. Our study is original, as no one has ever tested the company's financial statements on the Ljubljana Stock Exchange with this test. We found that the tested data very well matched the theoretical distribution according to Benford's law. If the deviation of the analysed data from the theoretical distribution is very large, this does not mean that this is a possible fraud in the used financial data. Benford's law helps us identify the controversial areas that require our attention and the decision on how to proceed with the audit or possible investigation of accounting data.

Keywords: auditors, Benford's law, financial statements, forensic accountants, fraud detection

1. Introduction

The business environment is full of various risks, including those where financial statements themselves pose certain information risks. Needles and Power (2007) state that financial statements present a financial position from the view of capital maintenance, performance concern, and liquidity and that they are of high importance to stakeholders. Financial statements are the main source of information on a company's performance (Amor-Tapia & Tascon, 2016). As the basic source of information for managers, financial statements can determine many decisions, such as those regarding the financing of banks, the payment of awards to company management, taxation, auditors' opinion, etc. In addition, financial statements are the primary data source for researchers around the globe, who research financial aspects of a subject. Entering the keyword "Financial statement" into a search engine of written sources (e.g., ScienceDirect) has returned more than 188,000 hits. All this demonstrates how risk is associated with financial statements and how important it is to manage this risk as much as possible, especially for possible fraudulent financial statements (Bokšova, Horak & Randakova, 2015).

Fraudulent financial statements are not new. The problem of fraud in financial statements is explored in many studies, e.g., Kanapickienė and Grundienė 2015, Mohamed and Handley-Schachler 2014, Omar, Johari and Hasman 2015. The auditor (CPA: certified public accountant) is concerned with fraud risk causing incorrect entries in financial statements and is responsible for obtaining reasonable assurance that the financial statements taken are free from misstatements, whether caused by fraud or error. Misstatements arise because of fraudulent financial reporting and misstatements due to asset misappropriation (ISA 240, 2016). The risk that an auditor will not detect a significant misstatement due to an error is less than the risk of not detecting a significant misstatement due to fraud. Fraudulent financial reporting intentionally misrepresents or omits information in the financial statements of companies to mislead the users of financial statements (Nigrini, 2012). Scams in financial statements are not among the most common forms of fraud, but they cause by far the greatest damage (Report to the Nations, 2016). Fraudulent financial statements are an international phenomenon and are not limited to specific areas or the level of development of the state. The most famous examples of such scams are WorldCom, Enron, Tyco and Parmalat (Gava & Vitiello, 2014).

Detecting fraud and other irregularities in accounts dates back to the 13th century, when bookkeeping began in Europe. The pioneer of bookkeeping is Luca Pacioli, who in the 14th century pointed out the importance of accuracy in recorded business transactions. Philip Ford is a famous example of someone who pawned large sums of money with fake financial statements in 1700. Forensic accounting has developed for the purpose of detecting a fraudulent financial statement (Boronico, Harris & Teplitsky, 2014) and is the discipline of investigating crimes by collecting evidence from their existence in accounting.

A wide range of methods exists to detect fraud in financial statements. Larger companies can use more expensive and more complex inductive approaches that are used to analyse large databases. On the other hand, small businesses strive for relatively cheaper and simpler deductive approaches (Moore & Benjamin, 2004).

Traditional methods of detecting fraud usually begin with the detection of anomalies or the indication that something is not right in a set of financial data, using tests of mathematical logic controls. Anomalies are a sign that additional investigations, computer inquiries, and interviews need to be done. To this end, auditors use analytical techniques that allow for them to assess accounting positions without examining individual transactions. Statistical methods have become notably effective in detecting suspicious areas that indicate possible frauds. These methods mostly require advanced knowledge. Benford's law is one possible method that is not too slow and is effective. It can help auditors detect fraud, and the result of its use is time savings and lower audit costs (Asllani, 2014). It can be used as a quick test for verifying whether the information in the financial statements is trustworthy, as it shows the expected frequency distribution of the digits in each financial report. The idea of Benford's law is based on the random selection of many data, with possible deviations leading to further decisions about identifying potential fraud (Henselmann, Scherr & Ditter, 2013). Benford's law test is just one of the possible methods that can be used for detecting fraud in financial statements. Collecting data is crucial in detecting fraud. Today, most companies are using solutions accessible via the Internet. Programs such as Oracle and SAP, for example, allow for companies to perform accounting, financial and human resources activities over the Internet. This allows for greater accessibility of users, as well as greater manipulation of data (Tapp & Burg, 2001). With the continued growth and complexity of businesses and databases and accounting systems, it is becoming increasingly difficult to detect fraud without the help of analytical tools. Benford's law is therefore a powerful tool for assisting auditors and forensic experts in detecting irregularities in financial statements (Warshavsky, 2010). Studies using a Benford's law test on financial statements are few and include Mebane 2008, Judge and Schechter 2009, Mir, Ausloos and Cerqueti 2014.

Our research aims to determine whether the financial statements of companies listed on the Ljubljana Stock Exchange pass the Benford's law test. This will give users of the financial statements of publicly traded companies an answer as to whether they can entrust financial reporting to Slovenian companies and how the quality of their work is assessed by auditors in Slovenia. On the other hand, simply by using financial information from financial statements and using Benford's law test for a final check, the research also demonstrates how useful the Benford's law test is. A similar study was carried out in so-called major developing countries (countries of China, Brazil, India, Russia, Mexico, Indonesia, Turkey and Saudi Arabia) (Shi, Ausloos & Zhu, 2017). Our study is original, as no one has ever tested the company's financial statements on the Ljubljana Stock Exchange with the Benford's law test, and second original contribution of our research is findings, which are differ form other studies before.

The compatibility of the data studied with Benford's law is usually ascertained by testing the hypothesized null assumption (H0). The null assumption (H0) claims that the data are in accordance with Benford's law. Rejecting the null assumption means that it is possible to manipulate data, while accepting it confirms the truth of the data analysed. However, a small statistical deviation cannot be considered as an indicator of poor quality of data. Therefore, a distinction should be made between the statistical and economic meanings of the results (Rauch, Göttsche, Brähler & Engel, 2011). Cleary and Thibodeau (2005) explain that a revision involving analysis using Benford's law can be based on statistical assumptions that dramatically increase the likelihood of Type I error. A Type I error is a rejection of the null assumption when it is true. The null assumption means, as already mentioned, that there are no differences between the actual (theoretical) and the acquired shares. If we accept the null assumption, it means that there was no deception, and if we reject a null assumption, there are four possible explanations:

- the data do not follow Benford's law test because of a randomly selected sample; this is a classical Type I error,
- certain assumptions are not met (an insufficient number of data is studied, the digit 0 cannot appear in the first place in the number, etc.),
- there is a reasonable explanation for converting numbers in numbers,
- some data, in fact, suggests deception; this is a practical alternative assumption.

Based on transient research, such as research by Shrestha (2016) and Shi, Ausloos and Zhu (2017), we set the following hypotheses:

H1: "The financial statements of Slovenian companies listed on the Ljubljana Stock Exchange pass the test of first digits of the Benford's law test"

H2: "The financial statements of Slovenian companies listed on the Ljubljana Stock Exchange pass the test of second digits of the Benford's law test"

2. Method

In business, we often encounter large volumes of data. With the advent of information technology, data processing has become simpler. Benford's law test, as a digital analysis tool, is an increasingly popular tool for detecting maladministration (fraud and error) in the financial reporting of companies and for the use of financial data for the needs of scientific research (Moore & Benjamin, 2004).

Benford's law test is a mathematical phenomenon, a special computerized data analysis method, whereby frauds, deviations, and irregularities can be detected in data sets. All programs or all software tools for database processing (ACL for the Windows environment, dBase, Paradox, Access or Excel which are programs from Microsoft) are used to implement Benford's law. Auditors (CPAs) can successfully apply Benford's law test in their work, but its use is still quite unknown and in practice is rarely ever used (Skitek, 2000). The task of the auditor is to determine the reasons for deviations in the findings of the analysis of the data taken from Benford's law test (Skitek, 2000).

Nigrini (2012) states that the probability of occurrence of the first digit is obtained by means of a mathematical formula:

$$P(d_1) = log_{10}\left(1 + \frac{1}{d_1}\right); \quad d_1 \in (1, 2, 3, 4, 5, 6, 7, 8, 9) \tag{1}$$

Our numerical system uses digits from 0 to 9. If we take the number 582 for example, the first digit is 5, the second digit is 8 and the third digit is 2 in the number (Warshavsky, 2010).

Nigrini argues that the first digit test is best used for larger numbers containing six or more digits (Hickman & Rice, 2010). The likelihood that a digit appears on the first four digits of the number is shown in Table 1.

Table 1. Probability of occurrence of a digit in different places in a number

Count	*in %*			
	1st place	*2nd place*	*3rd place*	*4th place*
0	-	11.968	10.178	10.018
1	30.103	11.389	10.138	10.014
2	17.609	10.882	10.097	10.010
3	12.494	10.433	10.057	10.006
4	9.691	10.031	10.018	10.002
5	7.918	9.668	9.979	9.998
6	6.695	9.337	9.940	9.994
7	5.799	9.035	9.902	9.990
8	5.115	8.757	9.864	9.986
9	4.576	8.500	9.827	9.982
Together	100	100	100	100

Note. Data source: Nigrini, 2012.

Table 1 shows that there is a 30.103 % probability that digit 1 appears in the first place in the number and an 11.389 % probability that digit 1 appears in the second place in the number. For digit 1 to appear in the third place in number, the probability is 10.138 %. There is a 17.609 % probability that digit 2 will appear first in the number and a 10.882 % probability that it will appear in the second place in the number. For digit 2 to appear in the third place in the number, the probability is 10.097 %. If the actual distribution of figures from the set of data studied does not correspond to the distribution under Benford's law, there is reason to suspect that these are manipulative data that are the result of a human intervention in the financial statements. This information requires further investigation and a finding of whether it is a fraud (Asllani, 2014).

Benford's law is much more than a phenomenon of the first digit. It is also not just a mathematical formulation or an interest in the writing of numbers. It is the result of the distribution of various types of financial and scientific phenomena. However, it is not a lie detector, and we cannot always conclude that data that are not in accordance with Benford's law are fraudulent (Nigrini, 2012). There is no miracle to detect fraud, but it is a useful test and a potential indicator of possible further investigations in detecting fraud in data sets (Goulding, 2013). It is an effective analytical tool for detecting irregularities and deviations in the analysis of data, for example, in the company businesses (Karavardar, 2014).

Benford's law posits that the probability of occurrence of digits in different places logarithmically decreases when the digit value increases. This contrasts with intuition, which states that digits are evenly distributed. Therefore, Benford's law is primarily used as a means of identifying falsified data (Tolle, Budzien, & LaViolette, 2000). It is also used as a forensic tool to compare the actual frequency of digits with expected frequencies (Moore & Benjamin, 2004).

The guideline for defining Benford's law was the belief that individuals are inclined to invent numbers and to repeat their actions. Likewise, people and entrepreneurs do not know much about the legality of Benford's law. This finding is based on the recognition that human actions are not accidental (Warshavsky, 2010).

In 1938, physicist Frank Benford published an article on the number analysis. The law was later given his name. It monitored and investigated data from various areas of our life, such as stock market prices, profits of selected companies, financial data and more (Skitek, 2000). Hal Varian stated in 1972 that the law could be used to verify numbers in public planning decisions (Ramaswamy & Leavins, 2007). In 1994, Nigrini proved that Benford's law could be used to detect a fraud. His research finds that individuals create fraudulent numbers due to psychological and limited situations (Özer & Babacan, 2013). It is also assumed that he is the first researcher to introduce and test Benford's law in the field of accounting to detect possible frauds (Durtschi, Hillison, & Pacini, 2004).

Benford's law has thus gradually gained increasing importance in the field of auditing and forensic accounting research (Ramaswamy & Leavins, 2007). Until 1990, it was not recognized as a forensic technique for reviewing accounting data to detect possible fraud. Today, as an analytical technique, it is one of the most popular digital procedures, as it is a unique method of data analysis (Warshavsky, 2010).

Nigrini (2012) classifies Benford's law test into three groups, namely, primary tests, advanced tests and related tests. Some trials use all three tests, but most of them involve the use of various primary test methods.

Primary tests are the most important tests of Benford's law. They are divided into the first digit test, the second digit test, and the first two digits test. They can be used both in positive and negative numbers (Nigrini, 2012). The first digit test is of a high level and is used primarily for large samples. The test of the second digit is also of a high level and is used primarily for detecting bias in the data. The first two digits test gives more information than the test of the first and second digits. It is performed on smaller audit samples. This test is also the most recommended for analysis, except in special situations with small data sets. It is also useful for detecting bias in fake and duplicate figures (Nigrini, 2012).

Goulding (2013) mentions a test of the first three digits. The test is very precise and focuses on a set of data studied. The results are more difficult to explain and can give many false alarms. They are mainly used by those who are more experienced.

Advanced tests can be carried out with or without primary tests (Nigrini, 2012). We know of a total sum test and a second-order test. The total sum test addresses numbers with the first two digits from 10 to 99. Its goal is to detect an abnormally large or medium number of numbers with the same two first digits (Nigrini, 2012). The second-order test is quite new and analyses the differences between the numbers listed in the data set. It can be used for any set of data and is a recommended tool for internal auditors. Both advanced tests are meant to detect irregularities (Nigrini, 2012).

Related tests are not truly bench tests of Benford's law, but tests are associated with patterns of digits and numbers (Nigrini, 2012). We share them in a number-duplicity test, the last two digits test and a model of distorted factors (Nigrini, 2012). The result of the duplication test shows us which numbers appear most frequently and how often they occur. It is built on the first digit and sum test and is suitable for forensic research. The last two digits test is used to detect irregularities in numbers on the right (Nigrini, 2012). It is also used when the perpetrator of fraud deceives the numbers, and thus, the last two digits are 0 and 0 (Warshavsky, 2010). The distorted factor model is aimed at detecting tax evasion and showing whether lower or higher digits are prevalent (Nigrini, 2012).

The most commonly used tests are the first digit test, the second digit test, and the first two digits test. As already mentioned, the test of the first digit compares the actual probability of the occurrence of the digit in the first place in a number with the theoretical probability under Benford's law. This test will guide the forensic accounting expert in the right direction and show the possible anomalies in the data. The test of the second digit is very similar to the first digit test and helps the forensic accounting professional to identify any irregularities in the analysed data. The first two digits test is a somewhat more in-depth investigation, as it checks the likelihood of the first two digits being numbered. The above test identifies any irregularities that are not detected by the first digit test or the test of another digit. It is also possible to use a test of the first three digits in which combinations of numbers from 100 to 999 are possible (Warshavsky, 2010).

The Benford's law test has been successfully used to detect fraud in the field of accounting and taxation. Spectacular examples of counterfeiting in the international research system are also emerging, indicating that dishonesty and fraud also occur in science. Regardless of all of this, Benford's law is a useful instrument in detecting fraud and manipulation in quantitative economic research. Benford's test does not provide preventive evidence of possible irregularities, but it can help identify which documents need to be examined and paid more attention (Tödter, 2009). Boronico, Harris, and Teplitsky (2014) argue that Benford's law can be used to verify claims on an insurance company, corporation tax, employee cost reports, invoices, paid receivables and fixed accounts. Nigrini (2012) believes that the use of Benford's fraud detection law in financial statements can be problematic, as only one or two numbers can change in the entire set of data, which is difficult to detect (Nigrini, 2012).

The analysis using Benford's law can be done directly with Excel. For the successful implementation of Benford's law, relevant data with values formed by a mathematical combination of numbers from multiple distributions, large numbers such as hundreds, thousands, tens of thousands, etc., and a large set of data and data that do not contain minimum and maximum values are used. Data with these characteristics are very commonly used in accounting (Boronico, Harris & Teplitsky, 2014).

Business accounts are publicly available and often subject to auditing to provide an independent and impartial opinion in accordance with professional ethical audit principles and other audit rules. From the website of the Ljubljana Stock Exchange[1] (2004-2010), we obtained a list of securities, that is, the data on which Slovenian companies are listed on the stock exchange. We have imported their financial statements from the GVIN[2] website (for three years – 2011, 2012 and 2013) to Excel. Imported data were then merged into Excel by year, separating balance sheets and income statements. Due to the comparability of the data, only those companies that are active and submitted financial statements with items in them were considered. The surveyed sample thus contains 44 companies listed on the Ljubljana Stock Exchange and have auditors opinion (CPA’s) on financial statements. These companies are:

- Aerodrom Ljubljana, d.d.,
- Intereuropa, globalni logistični servis, d.d.,
- Istrabenz, holdinška družba, d.d.,
- Krka, tovarna zdravil, d.d.,
- Luka Koper, pristaniški in logistični sistem, d.d.,
- Poslovni sistem Mercator, d.d.,
- Nika, investiranje in razvoj, d.d.,
- Petrol, slovenska energetska družba, d.d.,
- Salus, promet s farmacevskimi, medicinskimi in drugimi proizvodi, d.d.,
- Terme Čatež, d.d.,
- Cetis, grafične in dokumentacijske storitve, d.d.,
- Cinkarna, metalurško-kemična industrija Celje, d.d.,
- Gorenje, gospodinjski aparati, d.d.,
- Tovarna olja Gea, d.d.,
- Inles, proizvodnja, itženje in inženiring, d.d.,
- Intertrade Ita, podjetje za zastopanje tujih firm, d.d.,

[1]http://www.ljse.si/

[2]https://www.bisnode.si/produkti/bisnode-gvin/

- Melamin, kemična tovarna, d.d.,
- Tekstina, tekstilna industrija Ajdovščina, d.d.,
- Terme Dobrna, termalno zdravilišče, d.d.,
- Plama-pur, proizvodnja in predelava plastičnih mas, d.d.,
- Union hoteli, d.d.,
- Sava, družba za upravljanje in financiranje, d.d.,
- Pivovarna Laško, d.d.,
- Žito, prehrambena industrija, d.d.,
- Mlinotest, živilska industrija, d.d.,
- Alpetour - potovalna agencija, d.d.,
- Kompas mejni turistični servis, d.d.,
- KD, finančna družba, d.d.,
- KD Group, finančna družba, d.d.,
- Delo prodaja, družba za razširjanje in prodajo časopisov, d.d.,
- Modra linija holding, finančna družba, d.d.,
- Velana, prodaja in storitve, d.d.,
- Hram holding, finančna družba, d.d.,
- Triglav naložbe, finančna družba, d.d.,
- Nama, trgovsko podjetje, d.d.,
- M1, finančna družba, d.d.,
- Telekom Slovenije, d.d.,
- KS Naložbe, finančne naložbe, d.d.,
- Sivent, ustanavljanje, financiranje in upravljanje družb, d.d.,
- Datalab Tehnologije, d.d.,
- AG, družba za investicije, d.d.,
- Zdravilišče Rogaška, zdravstvo, hoteli, turizem in upravljanje holding družb, d.d.,
- Alta Skupina, upravljanje družb, d.d. in
- Unior, kovaška indrustrija, d.d..

We have found that duplicate data are occurring for individual companies. Duplicates are present mainly due to different levels of items in the financial statements. These need not be removed, as this would reduce the effectiveness of further analysis. As we already know, digit 0 cannot appear in the first place in the number since a number never starts with the digit 0. After the data review, we can see that all imported financial statements, both the statement of financial position and the profit and loss accounts, do not contain all items. If an item does not appear for individual companies, the number is 0 in its place. For further analysis of the implementation of Benford's law, all the number 0s, as well as empty cells in Excel, had to be removed.

Goulding (2013) states that the following three statistical methods can be used to analyse the conformity of the data studied by Benford's law:

1. Chi-squared (χ^2),
2. -statistics and
3. average absolute deviation.

Usually, the Chi-squared test is used to check and determine whether the analysed data are in accordance with Benford's law test or whether they are an anomaly, that is, a deviation from the law. The interesting feature of this law is that the results are more reliable if we analyse the entire population, rather than selecting data based on sampling (Ramaswamy & Leavins, 2007). Quick and Wolz (2005) define a significant deviation of the data studied from Benford's law. If this is found, it is important to find the reasons for the deviation. The user of the test can notice that some digits in the number appear more often than others, which may result from the selection of the sample or may indicate fraud (Quick & Wolz, 2005).

To test H1 and H2, we used the Chi-squared test, in which we compared the observed distribution of data with the theoretical distribution. We determine whether there are statistically significant differences in the deviation of the actual frequency from the expected frequencies according to Benford's law.

We determined the level of characteristics and risk level ($\alpha = 0.05$). This means that there is a 5 % probability of a mistake being made if we reject a zero-sum assumption with a statistical decision in favour of a research assumption.

The critical values of the Chi-squared test (theoretical χ^2) are taken from the Chi-squared distribution table, and in addition to the chosen degree of risk, the degrees of freedom (SP) are taken into account. For larger SPs, when setting the critical value χ^2, we help with the CHIINV function in Excel. Degree of freedom (SP) = (number of lines – 1) × (column number – 1).

Based on the actual (empirical) data (f_0) and theoretical frequencies (f_t) in Excel, calculate the risk level (p) and the Chi-squared value (χ^2). The risk level (p) is calculated using the CHIQ.TEST function, and the Chi-squared value is calculated using the following equation.

$$\chi^2 = \Sigma \frac{(f_0 - f_t)^2}{f_t} \quad (2)$$

We carried out Benford's law test, the first digit and the second digit test, and calculated the Chi-squared to verify whether the actual data are in accordance with Benford's law, as shown below.

3. Results

The financial statements of the companies selected in the sample contain 10 108 data. It is a large sample of data, which enables greater reliability of the Benford's law test. At this point, we would like to point out that in the financial statements there are also one-digit numbers that do not contain the second and subsequent digits. Therefore, in the first digit test, all 10 108 data were analysed, while only 10 089 data were analysed in the second digit test. There were 19 numbers that contained only one digit and therefore were excluded at H2.

The test of statistically significant differences between the expected and actual frequency of individual digits is performed in the chapter on the verification of hypotheses. Below, we present only the results of the first test and the test of the second digit.

a) The first digit test

Table 2. The first digit test

Count	*Sample frequency*	*Theoretical shares (in %) –Benford's law*	*Obtained shares (in %)*	*The difference between the acquired shares and theoretical shares*
1	3054	30.103	30.214	0.111
2	1819	17.609	17.996	0.387
3	1316	12.494	13.019	0.526
4	1021	9.691	10.101	0.410
5	767	7.918	7.588	– 0.330
6	636	6.695	6.292	– 0.403
7	556	5.799	5.501	– 0.299
8	483	5.115	4.778	– 0.337
9	456	4.576	4.511	– 0.064
Together	10 108	100	100	

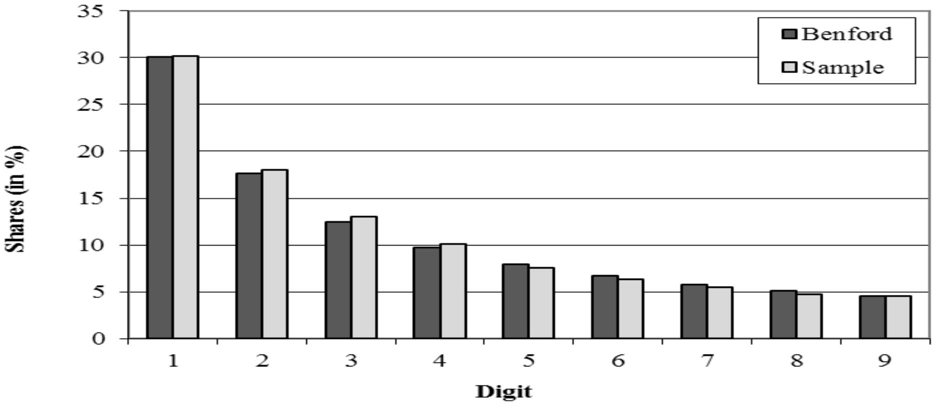

Figure 1. Graphic display of the first digit test

Table 2 and Figure 1 show that during the entire period under study. The largest deviation of accounting data from Benford's law was the digit 3. which was 0.526 % more than expected. Then followed by the digit 4. which starts with 0.410 % more numbers. The minimum deviation from the theoretical distribution can be detected when the first digit 9 occurs. Until the first digit 4 occur. The obtained proportions are slightly higher than the theoretical ones and from the first digit 5. they are slightly smaller. In general, in the whole set of analysed data. No number in the first place in number deviates from Benford's law by more than 1 %, which shows a good match with it.

b) Second digit test

Table 3. The second digit test

Count	*Sample frequency*	*Theoretical shares (in %) - Benford's law*	*Profits received (in %)*	*The difference between the acquired shares and theoretical shares*
0	1232	11.968	12.211	0.243
1	1153	11.389	11.428	0.039
2	1050	10.822	10.407	-0.415
3	1131	10.433	11.210	0.777
4	1004	10.031	9.951	-0.080
5	1035	9.668	10.259	0.591
6	893	9.337	8.851	-0.486
7	874	9.035	8.663	-0.372
8	899	8.757	8.911	0.154
9	818	8.500	8.108	-0.392
Together	10 089	100	100	

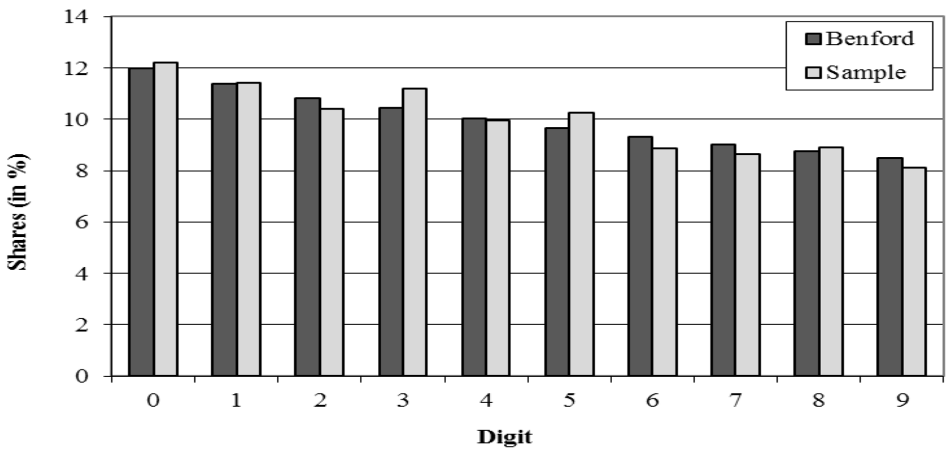

Figure 2. Graphic display of the second digit test

Table 3 and Figure 2 show this deviation of the second digit of the data studied throughout the period from Benford's law. We can see that the deviation is also the highest in the second digit 3 in the numbers. If we consider the findings of the first digit test all the numbers starting with the digit 3 and all the numbers that have the digit 3 in second place also must be studied in greater detail. For example such a number could be 33. The smallest deviation was found in the occurrence of digits 4 at the second place in numbers. This deviation is only 0.080 % which is lower than the theoretical distribution. Similarly no larger deviation of 1 % can be detected in the second digit test.

We tested the following hypotheses:

H1: “The financial statements of Slovenian companies listed on the Ljubljana Stock Exchange pass the test of first digits of the Benford's law test”

H2: “The financial statements of Slovenian companies listed on the Ljubljana Stock Exchange pass the test of second digits of the Benford's law test”

We set the null assumption (H0), which states that the total test data is on average consistent with the first digit test according to Benford's law (there is no statistically significant difference between the empirical and theoretical results). In contrast to the null assumption (H0) the indirect research assumption (H1) says that the entire test data do not pass the first digit test according to Benford's law suggesting the possible manipulation of data (there is a statistically significant difference between empirical and theoretical results). We did the same for the second digit test. The results are shown in the following tables.

Table 4. The results of examining the H1 and H2

	First digit test (H1)	Test of other digits (H2)
Rate of characteristic (α)	0.05	0.05
Theoretical χ^2	15.507	16.919
The degree of freedom	8	9
Calculated χ^2	0.125	0.177
Calculated risk level (p)	1.00	1.00
Findings	Calculated < theoretical and p > 0.05 → we accept the assumption H0	

From Table 4. we can see that in the first digit test and in the second digit test. There is no statistically significant difference between the empirical and theoretical results. The risk of rejecting the H0 presumption in a single test, although it would apply is as much as 100 %; thus. H0 assumption cannot be rejected either in the first digit test or in the second digit test. This means that the analysed data (the financial statements of Slovenian companies on the Ljubljana Stock Exchange within three years – 2011, 2012 and 2013) passed the test of the first digit and the test of the second digit according to Benford's law. Differences arising between tested and theoretical data can be attributed to random influences the variability of the variable. Therefore, we accept the original hypotheses that say that the financial statements of Slovenian companies listed on the Ljubljana Stock Exchange pass the test of the first and test of the second digit under Benford's law.

4. Discussion

Currently, scams are a constant companion in entrepreneurial activity and can occur on a smaller or larger scale. Management has the primary responsibility for preventing and detecting fraud. Internal auditors, external auditors, and forensic accountants are very helpful. There are many different methods for detecting and preventing financial fraud. An effective method and analytical technique, as well as a potential indicator of possible further investigations in fraud detection is Benford's test, which posits that the probability of occurrence of smaller digits is much greater than the likelihood of occurrence of larger digits in individual places in a number. We cannot always claim that data that are not in accordance with Benford's law are fraudulent since further research is needed in this field. The recommended minimum number of data for effective analysis using Benford's law is 1.000, but the minimum sample size is not specified. For the implementation of this law there must be no minimum and maximum number, repetitive numbers and random numbers such as telephone numbers. If a scam occurs only once or for one item in financial statements it cannot be discovered through Benford’s law. It is important to know that the currency of the analysed data is not relevant since Benford's law is valid regardless of the currency.

Using the Benford's law test we analysed the credibility of the financial statements of 44 companies listed on the Ljubljana Stock Exchange that operate and perform their activities. There is also digit 0 in the financial statements of the tested companies which is not relevant for conducting the analysis. The first digit test and the second digit test were carried out on all financial statements of the companies included in the sample. The data pattern contained more than 1.000 numbers which bolsters the reliability of our findings. It turned out that the tested data of Slovenian companies listed on the Ljubljana Stock Exchange passed the test under Benford's law. With the help of a Chi-squared test the hypothesis at the level of 5 % of the risk was confirmed in the introductory part. Regardless of this finding, however a few deviations from the theoretical distribution were revealed which would be worth analysing in more detail. Nevertheless, the financial statements of companies on the Ljubljana Stock Exchange are trustworthy which means that the auditors in Slovenia have done their job well and we can trust them as the statements due to the review of the auditors have been transposed by Benford's test to show if there are any risks in the use of financial statements and hence risk in the confidence of the preparers and supervisors of the financial statements (auditors).

Our research is in accordance with Karavarder’s (2014) and Cinko’s (2014) research in regard to finding no disagreement with Benford's law on the Istanbul Stock Exchange for monthly returns (over 26 years) and for daily returns (over 23 years). Thus the accounting data of listed companies on the Ljubljana Stock Exchange pass the tests of the first and second digits.

In 2016 Shrestha Ivaan carried out the "Validity of Financial Statements: Benford's Law" test where he tested the first digit, the second digit and the third digit test from year 2005 to 2014 for 20 financial statements of large companies, such as for example Amazon, Apple, Cisco, etc. The data were taken from balance sheets, income statement and cash flow statements. His peculiarity was that he also considered the emergence of the digit 0 in the first place in number. On a sufficiently large sample of data, its results are mostly in line with Benford's law. Some deviation can be identified in the execution of tests on a small data set, such as the income statement of Amazon. From the results it is evident that the greater the number of data are the more accurate the tests of Benford's law and the lower the value of the error which also indicates the greater reliability of our results.

In the Czech Republic Bokšova, Horak and Randakova (2015) in an article entitled “Financial Statements of Companies in the Czech Republic” checked compliance with the obligation to publish the financial statements of companies in the automotive industry in connection to Škoda Auto Company for the years 2011, 2012 and 2013. The selected sample was a sample of 174 random companies focusing on domestic suppliers. They considered only those companies that have regulated accounting in accordance with the Czech legislation and are not reported under IFRS and have publicly disclosed financial statements. They found that 25 companies (12.56 %) did not publicly disclose accounting information in the years studied, although this should have been done. The financial statements are the most important source of company information for external users regardless of whether the company is in excellent financial shape or bankrupt. It would be interesting to check the credibility of published financial statements through Benford's law, as well as to determine where the reason for non-disclosure of accounting data is.

To improve further research, we propose the implementation of other Benford's law test in Excel and all tests in other possible programs, with the results being meaningful to compare to our findings. We suggest choosing the largest sample possible and a longer period to study. It also makes sense for auditors who annually audit an individual company to conduct a digital analysis using Benford's law for a long period to get a sample of which areas and documents need to be looked at in more detail. This would reduce the subjective impact of the selection of the audit sample. If, for example, revenue and separate expenditure were observed separately, the probability of detection of an irregularity might increase, but a separate set of data may not satisfy the minimum requirements for the application of Benford's law. Every scam detected contributes to honest and genuine business and accounting reporting. It would be interesting to know whether other companies pass the Benford's law test. So we recommend for anyone who wants to manage the risks associated with trust in financial statements to use this test. First, we must get acquainted with the benefits of using Benford's law which will speed up its use in practice. It is also necessary to realize that Benford's law can only show those areas that require further investigation, who will, how it will be done, and whether it will be for judicial or other purposes is something to be considered later.

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