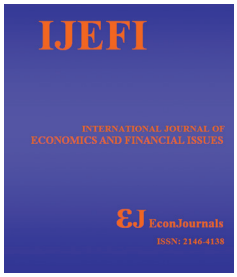

International Journal of Economics and Financial Issues

ISSN: 2146-4138

available at http: www.econjournals.com

International Journal of Economics and Financial Issues, 2017, 7(3), 20-30.

Evidence on the Extent of Cosmetic Earnings and Revenues Management by Jordanian Companies

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ABSTRACT

This study investigates anomaly and rounds up or down in financial accounting numbers (sales, net income, and comprehensive net income) by applying Benford's law to first and second digit numbers of 164 Jordanian firms, for period from (2000 to 2014). Furthermore, Jordanian firms classified into two groups (positive and negative net income), the first digit testing shows Jordanian companies to have inaccurate financial accounting numbers for sales accounts, regardless of their profit or loss results, and companies with positive net income have low evidence for manipulating net income, but firms with negative net incomes don't manipulate it, and negative net income firms have evidence to manipulate comprehensive net income where positive net income firms don't do such manipulation, for testing second digit there are no significant evidences for rounds up or down sales, net income, and comprehensive net income accounts, so effective acts to reducing cosmetic earning management are needed.

Keywords: Benford's Law, Cosmetic Earning Management, Cosmetic Revenues Managements
JEL Classifications: L66, M41

1. INTRODUCTION

Many companies are manipulating revenues and profits for many reasons, for instance they makes income smooth by viewing the earning in stable manner to stakeholders (Jordan et al., 2008). This manipulations by managers produces fake financial statements to their users, hence the creditors, investors, or anyone have interests in these statements will be making wrong decisions according to the manipulations of financial statements. Actively, juggler's managers contravenes the fundamental quality of accounting numbers which are faithful representation that emphasize on competency, neutrally, and accurately of accounting numbers according to the International Accounting Standards number 1 (IAS1). Actually, the patterns of rounds up earnings done by firms managers calls cosmetic earning management (Jordan et al., 2014), so it will be useful to detects if there are such patterns to fix the errors that done by them on the financial statements by authorities or investors. This paper investigates the possible manipulation by Jordanian firms to their financial statements for the three accounts: Revenues, net income, and comprehensive net income. Many papers investigate the rounds up or down in incomes such as, (Nigrini, 2005; Al-Darayseh and Jahmani, 1999; Al-Darayseh et al., 2000; Kinnunen and Koskela, 2003; Jordan et al., 2008; Yang and Wang, 2008; Darayseh et al., 2010; Jordan and Clark, 2011). Also some researchers examine manipulation on sales revenue (Jordan et al., 2009). This paper will adds to the work of authors by investigating manipulation phenomenon in comprehensive net income reported in financial statements of Jordanian firms, such as investigating if there are any manipulation in comprehensive net income, which is important because some of the account includes in it, like fair value adjustments comes from revaluation that made by managers and some subjectivity are subject to it (Siam and Abdullatif, 2011), so it will be useful to see if there are anomalies within this account.

Benford's Law applied in many areas, and also this law used in accounting and auditing to detect frauds, Benford's law says the frequencies of first numbers like one, two, etc., occurs more than last numbers like 7, 8th, and 9 for the first digit in any numbers and we have positive skewness (Lin and Wu, 2015). For example, in number 29587, the first number 2 called first digit, number 9 is second digit, number 5 third digit, number 8 fourth digit, and so on. Some companies' rounds up the second digit to increase the first digit by one, so if the second digit rounded up by adding

one to it, will be more attractive to stakeholder. Representing the previous number as 30,000 will be more attractive than 29,000, and doing such rounding will lead to differences in actual frequencies more than the expected frequencies based on Benford's law. This research will show if there are any anomalies in second digit for sales, net income, and comprehensive net income compared to expected frequencies presented in Benfords table for the second digit.

This paper will extend work of (Al-Darayseh and Jahmani, 1999) were the authors examine the frequencies of first and second digit of income reported in annual report of the Jordanian listed companies, and numbers of companies tested were 74 for the period from January 1990 until December 1994. The authors also excluded the negative income from the sample, so the differences between this research and (Al-Darayseh and Jahmani) research were in the size of the sample of this survey which examine 164 companies from different sectors (financial, services, and industrial), so all of the sectors are covered, and the time for sales and net income from (2000 to 2014), and for comprehensive income from (2009 to 2014). The reason behind starting from 2009, that most companies started reporting comprehensive income in 2009, and so there are no data available before 2009 for comprehensive income, and the last difference where this paper examine also the negative numbers of net income (Kinnunen and Koskela, 2003), and lastly testing anomalies in comprehensive net income.

So this paper benefits literature by examine the anomalies of comprehensive income in developing countries like Jordan, and also provide stakeholders with information about rounds up or down in Jordanian companies listed in Amman stock exchange. If there are no rounds of financial numbers, this will be a good point for Jordanian companies and that gives evidence of low risk for financial manipulation and enhances the sound of faithful representation that mentioned in IAS1.

The results reveals that Jordanian firms have inaccurate accounting numbers especially in sales accounts, and for net income the manipulation is only for firms that reported positive net income. Furthermore, the surprising issue has to do with firms reporting loss in their income manipulating comprehensive net income but was not in companies with profitable results. Lastly, there is no significant evidence of rounds up or down on sales, net income, and comprehensive net income accounts except for net income accounts within negative net income firms is partly significant.

The results of this research may be important to investors, creditors, lenders, and stakeholders. It is also important for Jordanian authorities to produce acts that reduce anomalies in financial accounting numbers for Jordanian firms listed in Amman stock exchange.

2. IMPORTANCE OF RESEARCH

There are one research studied the anomalies of income first and second digit (Al-Darayseh and Jahmani, 1999), and their results for the first digit where there are no deviations based on Benford's law, but for second digit there is small deviation. The authors concludes there are accurate financial numbers presented in the annual report of Jordanian firms, and so it is useful to assert on the accuracy of financial numbers within companies listed in Amman stock exchange for the period from (2000 to 2014). This paper extended the work done by (Al-Darayseh and Jahmani, 1999), which was conduct for the period from (1990 until 1994) to see if there are any changes on this phenomenon today, and also this research covers companies from different sectors such as industrial, services, and financials. Assessing all sectors are important to stakeholders, especially for investors because they have different preference in their investments and also some of investors make diversifications, so covering all sectors are important to them in adding to their knowledge about anomalies in financial accounting numbers produced by Jordanian firms listed in Amman stock exchange. The third aspect which distinguishes this research from other researches where in studying comprehensive net income, so based on researches published in this field, this paper covers this account. The reason behind examining this account is the nature of items included in it like fair value items, so the fair values in some cases are subject to fraud (Siam and Abdullatif, 2011). This paper will benefits the authorities by adding to their knowledge about the existence of fraud within Jordanian companies, and how to take some actions to enhance the accuracy of accounting numbers that produced by firms, and investigating manipulations are also important to creditors or lenders because some of creditors or lenders analyze financial statements of borrowers or business customers before taking the decision of lending them. The results of this paper may have some effects on such judgments by knowing that Jordanian firms are manipulating their accounting numbers or not.

At present time, and to the best of researcher knowledge, no previous studies examine comprehensive net income accounts to see if there any manipulation by Jordanian firms or not based on their results (loss or profit) and to see if there are differences between them.

3. LITERATURE REVIEW

Benford's law in 1938, investigate occurrence of numbers for first digit from 1 to 9. He uses logarithm to calculate the frequencies of different set of numbers such as book pages, reverse lengths, people street addresses, and population numbers in the U.S states (Hassan, 2003; Nigrini, 2005), and also to second digit, third digit, and fourth digit. Benford's law concludes that the occurrence of first numbers, for instance zero and 1 more likely to occurs than last numbers such as 9. In Table 1 (Nigrini, 2005) presents the frequencies for numbers based on Benford's law.

Table 1 presents the frequencies of numbers in each position, many of researchers uses Benford's law to detect fraud, manipulation, and rounding of accounting numbers, so this law applies for different accounts in different countries, whether are developed or not. In Jordan (Al-Darayseh and Jahmani, 1999) tested if the occurrences of numbers appears in first and second digit for income account confirms the expected random distribution presented by Benford's law too. The authors covers the period from (1990 until 1994) for 74 Jordanian companies. The authors also excludes firms

Table 1: Benford's law: Expected digital frequencies

Digit	Position in number			
	First digit	Second digit	Third digit	Fourth digit
0		0.11968	0.10178	0.10018
1	0.30103	0.11389	0.10138	0.10014
2	0.17609	0.10882	0.10097	0.10010
3	0.12494	0.10433	0.10057	0.10006
4	0.09691	0.10031	0.10018	0.10002
5	0.07918	0.09668	0.09979	0.09998
6	0.06695	0.09337	0.09940	0.09994
7	0.05799	0.09035	0.09902	0.09990
8	0.05115	0.08757	0.09864	0.09986
9	0.04576	0.08500	0.09827	0.09982

Source: (Nigrini, 2005), based on Nigrini 1996 this is the original source insert it

that reported loss in income, and uses as well, Z-score and Chi-square to test the conformity with expected frequencies. Accordingly, the results for first digit not widely deviated from expected distribution, for second digit there are small deviations, but in general, income numbers are accurate. In 2000, Al-Darayseh conducted research with other authors, (Al-Darayseh et al., 2000), for Turkish firms listed in Istanbul stock market with same methodology used by Al-Darayseh and Jahmani in 1999, and they test the same account income for the period (1991-1995), and arrived to the result that the first and second digit don't deviated widely from Benford's law. Some researchers like (Kinnunen and Koskela, 2003) investigates cosmetic earning management across 18 countries (Australia, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Italy, Japan, Singapore, Spain, Sweden, Switzerland, The Netherlands, Norway, United Kingdom, and the United States of America), they examine net income for profit or loss and net sales too, and they gathers data for the 5 years from (1995 to 1999), and their findings shows 50% of the countries observed significant manipulations for tested accounts. Actually, the highest manipulations were in Spain, Hong Kong, and Singapore, and the lowest were in Finland, Denmark, Sweden, and Norway, but United Kingdom manipulation was small and not significant. Kinnunen and Koskela proves that anomalies phenomenon varies between countries so some countries have high cosmetic earning management while others have low, and some other countries don't have. Some researchers conduct research on U.S firms like (Jordan et al., 2008), they select 1002 publicly trading companies in U.S for financial statement data in 2006, and they also took income accounts to investigate if managers manage earnings to reach cognitive reference points in both cases (profit and loss). In addition, authors excluded firms that reported extraordinary and discontinued items from sample to keep income account free of stir, and they also investigate if companies characteristic (firm size, debt leverage, and operating performance) relates to phenomenon of reacting cognitive reference points, but in this issue which the authors excluded firms that reported loss, the results shows firms with profit manipulating second digit to reach cognitive reference point and the opposite for companies that reported loss. For firm size, they present small firms that tends to manipulate income more than large firms, low-leverage firms rounds the second earnings digit over a wider range than the high-leverage firms, and lastly the authors took returns on assets as proxy for operating performance variable and they found high ROA firms have limited rounding compared to low ROA firms which seems more aggressive in manipulations. Some researchers, like (Yang, and Wang, 2008) argues that the rounding of earning numbers is not the subject of first and second digit only but also the subject of third, fourth and fifth digit, and so they test this proposition. They investigate ownership structure factors, examine the phenomenon on Taiwan companies for period from (2002 to 2006), and uses pre-tax income account. They found positive pre-tax earnings if number nine in second or third or fourth digit it rounded by added one to it, for negative pre-tax income there are low 0 and high 9 occurrences in second digit, but for third, fourth and fifth there were no deviation from the expected, which means that the rounding in negative income is lower than positive income. Lastly, they found the firms with low degree of insider ownership are more likely to manipulate earnings numbers than firms that have high degree of insider ownership. In 2009 Jordan point out that the importance of sale revenues to investors is assessing firm quality by measuring growth percentage in sales (Jordan et al., 2009). Hence any manipulation in sales will result in net income, and their sample consist of 1002 companies listed in U.S for year 2006, and the result shows U.S firms manipulating sales account so numbers zero have high frequencies and number 7 have low frequencies based on Benford's law. In 2010 Darayseh conduct a research with others on companies working at gulf cooperation council (UAE, Qatar, Oman, Saudi Arabia, Kuwait, and Bahrain) (Darayseh et al., 2010), they tested the second digit frequencies for 310 firms for the period (2002-2006), and the results shows income numbers are not accurate. Some researchers study the differences before and after Sarbanes-Oxley act (SOX) of 2002 like (Jordan and Clark, 2011) in income numbers for second digit. The period before SOX was from (1997 to 2000) and for period after it was from (2003 to 2006), and the result shows rounding for zero and nine with statically significance, but for the period after SOX it show rounding but not statically significant, which means that some legislations like SOX have effects in reducing manipulations that made by firms. (Wilson, 2012) assert on the finding of Jordan and Clark in 2011, and they gathered the results for 2009 for net sales and net incomes, and their result shows that SOX act plays a good rule in reducing manipulation by U.S firms. Some researchers like (Geyer, 2012) extended the job of others to investigate if sales accounts are rounded by U.S firms for 2008, and the author didn't stop there, but he extend his investigation by testing if the type of industries sectors have more manipulation than others, and his finding shows the companies to manipulate their sales, and the industries which have this phenomenon was industrial, health care, and financial sectors. The authors also show the larger firms to manipulate sales more than smaller one. Some researchers like (Cox et al., 2012), tries to investigate inappropriate rounding in earning but they didn't take the hole U.S firms as the previous researchers, they investigate the phenomenon for each companies and collected data from (1955 to 2010) for each companies, and they conduct test for 6593 firms individually and found 13 companies of them manipulating their earning accounts. It's useful to see if the rounding in revenue and earning differs from the companies that have loss or profit, so (He et al., 2013), conducts research that investigate this phenomenon for the period of (1950-2010) for 193788 revenue observations, 153994 positive earnings and 39794 negative earnings observation. The results of their research that

the companies are rounding both accounts of revenues and earnings, so rounding earnings is significantly greater than revenues for profitable companies, and the opposite for companies which have loss. Some researchers like (Johnson and Wigginman, 2013), uses Benford's Law on the following three account: Total general revenues of the primary government, total fund balance of the general fund, and total fund balance of the governmental funds for the 50 state in U.S for the period of 3 years. They also used mean absolute deviation model (MAD) which was developed by them, and (MAD) is better for the small sample set, and found the following results: For the total fund balance of the governmental funds account there is nonconformity for using Benford's law, but for total general revenues of the primary government and total fund balance of the general fund both of them have acceptable conformity. In 2013, two researchers (Kang and Jin, 2013), made a research close to the job done by Jordan with other researchers in 2008, they examine if Korean firms has rounded the second digit and also they investigate the relationship between firm characteristics and rounding phenomenon. This phenomenon pointed for high levered firm than low one, and if the levered firms have loss they don't involve in such phenomenon. For companies having positive earning, it seems that smaller companies involve in rounding numbers more than larger companies, and the opposite when firms have negative earning the larger firms are more manipulating than smaller one. The effect of loss leads firms that audited from Big-4 audit firms to manipulate more than firms audited by non Big-4 audit institutions. Other researchers like (Özarı and Ocak, 2013) tested not only sales and revenues but also other accounts such as cost of goods sold (COGS) and operating expenses for first digit until fourth digit. The sample is for Turkish companies for the period form (2005 to 2010) for five industries that consist of 181 companies, and their results are: For first digit of both companies that reports profit or loss, there are no significant difference from Benford's distribution to sales, income, (COGS), and operating expenses, the result also for the second, third, and fourth digit same as the first digit, and there is no evidence on manipulation. Some researchers like (Geyer and Drechsler, 2014) investigate if long term debt accounts are manipulated by U.S firms and results shows there are aberration for observed account compared to Benford's law. yet, another research conducted for the first time at Japanese companies by (He and Guan, 2014), they aims to investigate Benford's law for revenues and earning accounts, and their results shows that Japanese managers are tampering with their revenues and earning accounts and this tampering differs from industry to another, and also the managers are manipulating their earnings more than revenues. In 2014, He and Tian conducted research to see if research and development expenses (R and D) account obeys Benford's Law or not by U.S firms for the period (1950-2012), (He and Tian, 2014), and they divided the period to two parts first one from (1950 to 1974) and the second one from (1975 to 2012) before and after statement of financial accounting standards No. 2, which was forcible after 1974. Their results were that U.S firms are rounding R and D account for both periods, and they says that companies conceive R and D as investment account so if it larger that's mean a good signal for investors and also to reduces their profit. Jordan again with other researchers (Jordan et al., 2014) investigates the effect of corporate governance legislation like SOX, but in this research they test if cosmetic earning management decreased after Ontario Bill (198) and also the other corporate governance legislations in 2002. For the period before that legislation from (1990 to 1999), manipulations happened by Canadian firms, and for the period after legislation from (2003 to 2012) there was no sign of rounding financial numbers. In Indian country (Shette and Kuntluru, 2014) conducted paper to see if Indian firms are rounding up profits after taxes and earnings per shares (EPS) for 1707 listed Indian firms for the period (1991-2012) they found firms to round up there reported income, they found high deviations of numbers occurrences in companies with high income, and also after fraud investigation in Croatian firms by (Slijepčević and Blašković, 2014) they found some signs of fraud, like the one in the correlation between reports and their net income losses. Some researchers like (Garza-Gomez et al., 2015) investigate if segment earnings reports are rounded up to reach cognitive reference points for public U.S firms and they found the managers of segments to round up their earnings. The authors collected data from (1998 to 2011) using Benford's law so their research added to literature knowledge, and also the segment reports manipulated, so the auditor should take in their consideration the risks of auditing such accounts. In 2015 Jordan with other researchers (Jordan et al., 2015) conducted research to see if EPS rounding phenomenon changed after SOX. They found companies rounding the EPS before SOX but after SOX there is no sign of it, so their research assure on the effectiveness of SOX in reducing firms earning management. Benford's law also used to detect fraud in covered bonds (Kienle, 2015) by using that law to detect if assets covered by bond manipulated or not and his result shows the numbers in assets covered by bond following Benford's law. Therefore, Benford's law is an effective tool to detect rounding phenomenon not only for earnings accounts, but also for all accounts. Some researchers like (Lin and Wu, 2015) investigate if corporate governance legislations has reduce rounding up phenomenon by Taiwan firms but the results shows that Taiwan's companies are rounding earnings account despite of corporate governance legislations.

Many studies conducted recognize Benford's Law to be a useful tool in detecting fraud or earning management and they used it for different financial accounting numbers. Their results presents rounding phenomenon to be widespread in different regions whether in developed or undeveloped countries. Lastly, literature shows some of legislations like SOX to have good results in reducing earning management.

4. RESEARCH HYPOTHESES

This paper will examine the anomalies in first digit and in rounding up or down in second digit for three accounts which are sales, net income, and comprehensive net income that reported by Jordanian firms in their annual reports. This research tests the following hypotheses:

Hypothesis 1: The frequency of first digits for sales, net income and comprehensive net income accounts within Jordanians companies reported positive net income following Benford's Law digit frequencies.

Hypothesis 2: The frequency of first digits for sales, net income and comprehensive net income accounts within Jordanians companies reported negative net income following Benford's Law digit frequencies.

By testing both of the first and the second hypothesis we will obtain evidence if Jordanian firms manipulating first digit for the three accounts: Sales, net income, and comprehensive net income. Actually, some researchers shows a relation between earnings and share price, where the positive earnings have higher relation than the negative earnings with share price, which means that the mangers of profitable firms have more incentives to manipulate earning numbers than firms that reported loss (Yang, and Wang, 2008), so it's useful to compare between firms with positive income and the ones with negative net income that tested in first and second hypothesis. The phenomenon of rounding up negative earnings numbers is less significant than firms with positive earnings.

Hypothesis 3: The frequency of 0 as the second digits of sales, net income and comprehensive net income accounts within Jordanians companies reported positive net income higher than expected, and the frequency of 9 is lower than expected.

Hypothesis 4: The frequency of 0 as the second digits of sales, net income and comprehensive net income accounts within Jordanians companies reported negative net income is lower than expected and the frequency of 9 are higher than expected.

By testing both of the third and fourth hypotheses we will show if Jordanian firms are rounding up their financial numbers for companies having positive net income, and also to see if firms with negative net income are rounding down the three accounts chosen in this study.

5. METHODOLOGY AND DATA ANALYSIS

5.1. Methodology

Data are collected from annual reports of Jordanian firms listed in Amman stock exchange, for sales and net income accounts data collected from (2000 to 2014) annually, and for comprehensive net account data collected from (2009 to 2014) because most of companies start publishing their comprehensive net income in 2009. Companies with zero sales excluded from sample, so the number of observation of firms which have positive net income to sales and net income accounts comes to 1395 observations for both, and for firms that reported negative net income 542 observations for both accounts, and number of observations for comprehensive net income account which also classified as positive net income and negative net income were 602 and 371 observations respectively.

At the beginning, collected datasets tested whether Benford's law can be applied on them or not, so if mean of observed digits larger than the median, and the skewness value is positive, (Özarı and Ocak, 2013), then Benford's law can applied.

Secondly, Chi-squared test used to know if observed frequencies for first and second digit to all numbers of 1, 2,……9 confirms frequencies on Benford's law, so if calculated Chi-squared is larger than tabulated Chi-squared, this mean there are anomalies, and therefore, Chi-squared calculated based on the following equations, (Lin and Wu, 2015):

1. First Chi-squared equation used for first digit to all of accounts for numbers from (1 to 9):

$$\chi^2 = \sum_{i=1}^{9} \frac{[nP_0 - nP_e]}{nP_0}$$

2. Second Chi-squared equation used for second digit to all accounts for numbers from (0 to 9):

$$\chi^2 = \sum_{i=1}^{9} \frac{[nP_0 - nP_e]^2}{nP_0}$$

Where: P_0 is expected proportions; P_e is observed proportions; and n is number of observations.

3. Thirdly MAD used to test first digit for all accounts based on (Nigrini, 2011) to overcome the problems arise from small dataset "conclusion of nonconformity when the data are not biased, and therefore in conformity," (Johnson and Wigginman, 2013), so it is useful to use (MAD) test to give more evidence on conformity and to overcomes the problems presented previously, so (MAD) calculated in the following equation, (Johnson and Wigginman, 2013):

$$MAD = \frac{1}{N} \sum_{1}^{N} f_i |x_i - \bar{x}|$$

Where N is the sample size; x_i is the sample value; $\bar{x}$ is expected value, f is the frequency.

And therefore, the results of calculated (MAD) interpreted based on Nigrini. There are four types of result: (Close conformity, acceptable conformity, marginally acceptable conformity, and nonconformity), presented in (Table 2) as the following Table 2.

4. Lastly, z-statistic test used to shed more lights on the number like 0, 1, 2 … 9 in first and second digit if it confirms expected frequencies based on Benford's law, so this test go more deeper than Chi-squared and (MAD) tests, so z-value calculated on the following equation, (He and Guan, 2014):

$$Z = \frac{|p - p_0| - (1/2n)}{\sqrt{p_0(1 - p_0/n)}}$$

Where: P is observed proportions; P_0 is expected proportions, and sample size is represented by n.

And (1/2n) applied only when it smaller than absolute value of $P\text{-}P_0$.

Table 2: Nigrini (2011) mean absolute deviation model for 1st digit location

Rate of MAD	First digits
Close conformity	0.000-0.006
Acceptable conformity	0.006-0.012
Marginally acceptable conformity	0.012-0.015
Nonconformity	>0.015

Source: http://www.nigrini.com/ForensicAnalytics.htm, MAD: Mean absolute deviation

And z-value tested at 95% confidence level, so if value of significance <5% for z-value that's mean the deviation between observed and expected frequency is significant, and the digit observed is deviated from Benford's law.

5.2. Data Analysis

5.2.1. Descriptive statistic

In Table 3 the results of descriptive measure are presented for all accounts as follow Table 3.

Based on the results presented Benford's law can applied to dataset for all accounts, where mean is larger than median to all accounts, and for negative numbers it calculated after taking the absolute numbers to remove the effect of negative sign (Özarı and Ocak, 2013).

5.2.2. Results of Chi-square, (MAD), and Z-statistic tests

In Table 4 the results show (Chi-square test) for companies which have positive net income don't confirms Benford's law distribution where is Chi-square calculated 25.333 larger than Chi-square tabulated 15.507, and (MAD) results show the distribution of first digit as marginally accepted. This means sales accounts not accurate, and some companies are rounding some digits. To shed more lights, for numbers which don't obey expected distribution z-value for number 2 is low occurrence than expected and number 6 has higher occurrence than expected and both of them are significantly differs at 5% where is there significance 0.0012 and 0.0072 respectively, so the final result shows companies with positive net income don't have accurate sales numbers.

As with firms that have negative results, Table 5 shows (Chi-square test) don't confirms Benford's frequency when the calculated Chi-square is larger than tabulated, also (MAD) test confirms the finding of Chi-square with results of nonconformity. For negative net income results companies don't confirms its expected frequency by comparing it with sales accounts for companies that have positive net income nonconformity is lower than unprofitable firms, also z-value for numbers 2 is rounded down and it differs significantly. This result is same for profitable and unprofitable firms, and for digit number 4 companies reported loss rounding it down also at significant level, and lastly firms with loss have also inaccurate numbers more than firms with profit based on (MAD) test.

For second digit of firms that have profit the results for Chi-square test presented in (Table 6), and shows companies following Benford's law where the calculated Chi-square of 8.407 is less than it tabulated 16.919. Form the table the frequency of 0 numbers is higher than the expected and number 9 is lower than expected, so this sign that firms rounding up sales account but z-vale test are not significant at 5%, which means companies don't rounding up its sales accounts.

In Table 7 the results of calculated Chi-square is 10.164, which it is smaller than tabulated 16.919, and this result means companies following expected frequencies based on Benford's law, rounding numbers down. For companies reported loss where portions of number 0 should be smaller than expected and for numbers 9 should be higher than expected because in previous study companies tend to round down their revenues and net income accounts. In Table 7 the frequencies of number 0 is larger than expected, and also number 9 has higher frequencies than expected, so number zero restrict the role of rounding down and also the frequencies is not significant, therefore firms which reported loss don't round down their sales numbers.

Table 3: Descriptive statistic for sales, net income, and comprehensive net income

Companies group	Statistic	Sales	Net income	Comprehensive net income
Companies reported positive net income	Mean	67,494,349	9,842,260	12,221,962
	Median	9,775,076	1,234,959	1,378,726
	Skewness	10.72341	6.7283	11.44306
	Minimum	2,665	249	1,721
	Maximum	4,624,127,707	360,174,000	886,627,681
	Number of observation	1395	1395	602
Companies reported Negative net income (absolute)	Mean	17,530,117	2,183,864	1,900,297
	Median	3,272,997	520,183	595,819
	Skewness	8.77709	6.72514	7.27742
	Minimum	3,255	1,695	2,664
	Maximum	769,257,468	68,855,313	58,113,000
	Number of observation	542	542	371

Table 4: Distribution of first digit for sales at companies which have positive net income

Number	1	2	3	4	5	6	7	8	9
Observed proportion (%)	28.674	14.265	11.541	10.824	8.387	8.530	7.025	5.735	5.018
Expected proportion (%)	30.103	17.609	12.494	9.691	7.918	6.695	5.799	5.115	4.576
Deviation rate (%)	−1.429	−3.344	−0.953	1.133	0.469	1.835	1.226	0.620	0.442
Z statistics	1.135	3.244	1.036	1.386	0.6	2.689	1.902	0.99	0.726
P value	0.257	0.001*	0.3	0.166	0.55	0.007*	0.057	0.322	0.468

Number of observation (N)=1395, Chi-square calculated to all of digit 25.333, where Chi-square tabulated 15.507 at 8 degree of freedom MAD is 0.012724 (Marginally acceptable conformity). *Significance at 5% two-tailed test, MAD: Mean absolute deviation

Table 8 present the results for first digit with companies having profit, firstly Chi-square tests show that numbers don't confirms Benford's law when calculated Chi-square 18.486 higher than tabulated at 15.507, and the next test conducted is (MAD) and the result is 0.0106. When the result of (MAD) between 0.006 and 0.012 that means digit frequencies is acceptable conformity, hence number 5 has frequency more than expected with P-value (1.71%), and number 6 has less occurrence than expected with P = 3.3%, so both numbers differs significantly, which mean profitable Jordanian firms have anomalies in their net income accounts for first digit.

Table 9 shows Chi-square tests is confirms Benford's law when calculated Chi-square less than tabulated one, (MAD) test also shows frequencies of digit as acceptable conformity, and z-value tests also has no significant difference between observed and expected, therefore companies reporting loss don't have anomalies compared with firms reporting profit that have anomalies in first digit numbers.

In Table 10 Chi-square reveals there are confirmation to Benford's law when calculated is 13.911 and when tabulated 16.919, and frequencies of observed 0 is higher than expected and also number 9 occurs less than expected. Such phenomenon may indicate firms which are rounding up their net income as having no significant differences. The numbers 7 has negative deviation −1.723% with P = 2.793%, this may indicate anomalies, but in general companies don't make rounding phenomenon.

Table 5: Distribution of first digit for sales for companies which have negative net income

Number	1	2	3	4	5	6	7	8	9
Observed proportion (%)	33.579	14.022	13.469	6.089	6.089	8.487	7.380	5.351	5.535
Expected proportion (%)	30.103	17.609	12.494	9.691	7.918	6.695	5.799	5.115	4.576
Deviation rate (%)	3.476	−3.587	0.975	−3.602	−1.829	1.792	1.581	0.236	0.959
Z statistics	1.718	2.136	0.621	2.762	1.498	1.583	1.483	0.151	0.965
P value	0.086	0.032*	0.535	0.005*	0.134	0.113	0.138	0.880	0.334

Number of observation (N)=541 Chi-square calculated to all of digit 22.18162259, where Chi-square tabulated 15.507 at 8 degree of freedom MAD is 0.02004164 (Nonconformity). *Significance at 5% two-tailed test, MAD: Mean absolute deviation

Table 6: Distribution of second digit for sales for companies that have positive net income

Number	0	1	2	3	4	5	6	7	8	9
Observed proportion (%)	13.405	11.111	9.749	9.892	9.892	9.821	8.530	9.319	10.036	8.244
Expected proportion (%)	11.968	11.389	10.882	10.433	10.031	9.668	9.337	9.035	8.757	8.500
Deviation rate (%)	1.437	−0.278	−1.133	−0.541	−0.139	0.153	−0.807	0.284	1.279	−0.256
Z statistics	1.612	0.284	1.316	0.617	0.128	0.148	0.989	0.323	1.642	0.295
P value	0.107	0.776	0.188	0.537	0.898	0.883	0.323	0.746	0.329	0.762

Number of observation (N)=1395 Chi-square calculated to all of digit 8.40738928, where Chi-square tabulated 16.919 at 9 degree of freedom.

Table 7: Distribution of second digit for sales account - for companies which have negative net income

Number	0	1	2	3	4	5	6	7	8	9
Observed proportion (%)	14.945	10.148	12.177	10.517	9.779	9.225	6.827	9.225	7.934	9.225
Expected proportion (%)	11.968	11.389	10.882	10.433	10.031	9.668	9.337	9.035	8.757	8.500
Deviation rate (%)	2.977	−1.241	1.295	0.084	−0.252	−0.443	−2.510	0.190	−0.823	0.725
Z statistics	2.069	0.842	0.899	0.064	0.124	0.276	1.935	0.079	0.602	0.528
P value	0.038*	0.399	0.368	0.949	0.901	0.782	0.053	0.936	0.547	0.597

Number of observation (N)=542 Chi-square calculated to all of digit 10.16447476, where Chi-square tabulated 16.919 at 9 degree of freedom. *Significance at 5% two-tailed test

Table 8: Distribution of first digit for companies which have positive net income

Number	1	2	3	4	5	6	7	8	9
Observed proportion (%)	28.387	18.710	12.832	10.538	9.677	5.233	5.161	4.158	5.305
Expected proportion (%)	30.103	17.609	12.494	9.691	7.918	6.695	5.799	5.115	4.576
Deviation rate (%)	−1.716	1.101	0.338	0.847	1.759	−1.462	−0.638	−0.957	0.729
Z statistics	1.368	1.044	0.341	1.024	2.384	2.131	0.962	1.562	1.238
P value	0.171	0.296	0.733	0.306	0.017*	0.033*	0.336	0.118	0.216

Number of observation (N)=1395 Chi-square calculated to all of digit 18.48698512, where Chi-square tabulated 15.507 at 8 degree of freedom MAD is 0.010606515 (acceptable conformity). *Significance at 5% two-tailed test, MAD: Mean absolute deviation

Table 9: Distribution of first digit for companies which have negative net income

Number	1	2	3	4	5	6	7	8	9
Observed proportion (%)	30.074	16.605	14.945	8.303	8.672	7.011	5.166	3.690	5.535
Expected proportion (%)	30.103	17.609	12.494	9.691	7.918	6.695	5.799	5.115	4.576
Deviation rate (%)	−0.029	−1.004	2.451	−1.388	0.754	0.316	−0.633	−1.425	0.959
Z statistics	0.015	0.557	1.660	1.020	0.570	0.208	0.539	1.408	0.966
P value	0.988	0.5779	0.096	0.307	0.568	0.834	0.590	0.159	0.334

Number of observation (N)=542 Chi-square calculated to all of digit 8.078836013, where Chi-square tabulated 15.507 at 8 degree of freedom MAD is 0.009954137 (acceptable conformity). MAD: Mean absolute deviation

In Table 11 the result of testing second digit for companies which reported loss, the Chi-square tests reveals companies obey Benford's law when calculated Chi-square is 11.933 which is less than tabulated one 16.919 at 9 degree of freedom. As mentioned earlier companies with loss has more 9 and less 0 occurrence, the result shows less zero numbers than expected but not significant and more of number nine but here the difference is significant, so companies somewhat rounding dawn their net loss. This means Jordanian firms tend partially to round down their net income if reporting net loss should decrees their bad results. For example, showing loss in 1.9 million is better than 2 million to their investor because the nature of human looks at the first numbers in general. This phenomenon is confirmed by many researchers (Kinnunen and Koskela, 2003).

Tables 12-15 present the results of testing first and second digit for comprehensive net income for both firms result (profit or loss). Table 12 shows calculated Chi-square at 11.633 and its less than the tabulated which is 15.507, and that means Jordanian firms following Benford's law frequencies to all digits from 1 to 9, and also the same confirmation is asserted by (MAD) test where it was 0.009 and fill within an acceptable conformity. Z-statistic reveals that number 9 occurs more than expected with P-value at 1.9%, which means that first digit, to some extent is not accurate for firms with profit in their comprehensive net income.

In Table 13 the test of conformity based on Chi-square confirm the following for one digit at Benford's law where calculated Chi-square is lower than tabulated one, but (MAD) test shows there is nonconformity to Benford's law, so in this test there is difference between profitable and unprofitable one. Firms reporting loss tend to manipulate comprehensive net income unlike profitable one, and companies that have low occurrences in number one, their deviation are −5.305% and their z-value are significant.

For second digit test, companies which have positive comprehensive net income, Chi-square test present companies that confirms Benford's law to have the calculated at 8.706 and it is smaller than the tabulated of 16.919. Number 0 has high occurrences than expected but its value not significant, and number 9 has positive difference 0.47% and also not significant. This means profitable companies don't have rounds up phenomenon to their comprehensive net income account.

In Table 15 the result of Chi-square reveals nonconformity to Benford's law where its calculated value at 29.60 and its larger

Table 10: Distribution of second digit for companies which have positive net income

Number	0	1	2	3	4	5	6	7	8	9
Observed proportion (%)	12.688	12.688	10.896	10.394	8.961	10.538	10.609	7.312	8.244	7.670
Expected proportion (%)	11.968	11.389	10.882	10.433	10.031	9.668	9.337	9.035	8.757	8.500
Deviation rate (%)	0.720	1.299	0.014	−0.039	−1.070	0.870	1.272	−1.723	−0.513	−0.830
Z statistics	0.787	1.485	0.017	0.047	1.286	1.054	1.587	2.198	0.630	1.063
P value	0.431	0.137	0.986	0.962	0.198	0.292	0.112	0.027*	0.528	0.287

Number of observation (N)=1395 Chi-square calculated to all of digit 13.911664, where Chi-square tabulated 16.919 at 9 degree of freedom. *Significance at 5% two-tailed test

Table 11: Second digit distribution for companies which has negative net income

Number	0	1	2	3	4	5	6	7	8	9
Observed proportion (%)	11.439	9.041	9.041	9.779	10.701	8.672	10.517	10.517	9.225	11.070
Expected proportion (%)	11.968	11.389	10.882	10.433	10.031	9.668	9.337	9.035	8.757	8.500
Deviation rate (%)	−0.529	−2.348	−1.841	−0.654	0.670	−0.996	1.180	1.482	0.468	2.570
Z statistics	0.313	1.653	1.377	0.498	0.448	0.712	0.870	1.128	0.309	2.068
P value	0.754	0.098	0.168	0.618	0.654	0.476	0.384	0.259	0.756	0.038*

Number of observation (N)=542 Chi-square calculated to all of digit 11.93397039, where Chi-square tabulated 16.919 at 9 degree of freedom. *Significance at 5% two-tailed test

Table 12: First digit distribution for companies which has positive comprehensive net income

Number	1	2	3	4	5	6	7	8	9
Observed proportion (%)	28.571	18.106	12.625	9.635	9.635	5.648	5.316	3.821	6.645
Expected proportion (%)	30.103	17.609	12.494	9.691	7.918	6.695	5.799	5.115	4.576
Deviation rate (%)	−1.532	0.497	0.131	−0.056	1.717	−1.047	−0.483	−1.294	2.069
Z statistics	0.775	0.267	0.035	0.047	1.484	0.946	0.420	1.349	2.331
P value	0.438	0.789	0.971	0.962	0.137	0.343	0.674	0.177	0.019*

Number of observation (N)=602 Chi-square calculated to all of digit 11.63353023, where Chi-square tabulated 15.507 at 8 degree of freedom MAD is 0.009806593 (Acceptable conformity). *Significance at 5% two-tailed test, MAD: Mean absolute deviation

Table 13: First digit distribution for companies which have negative comprehensive net income

Number	1	2	3	4	5	6	7	8	9
Observed proportion (%)	24.798	18.329	15.903	9.704	9.973	7.547	5.391	4.582	3.774
Expected proportion (%)	30.103	17.609	12.494	9.691	7.918	6.695	5.799	5.115	4.576
Deviation rate (%)	−5.305	0.720	3.409	0.013	2.055	0.852	−0.408	−0.533	−0.802
Z statistics	2.171	0.295	1.907	0.008	1.369	0.552	0.225	0.347	0.615
P value	0.029*	0.767	0.056	0.993	0.170	0.580	0.821	0.727	0.538

Number of observation (N)=371 Chi-square calculated to all of digit 10.24437, where Chi-square tabulated 15.507 at 8 degree of freedom MAD is 0.01566339 (nonconformity). *Significance at 5% two-tailed test, MAD: Mean absolute deviation

Table 14: Distribution of second digit for companies which have positive comprehensive net income

Number	0	1	2	3	4	5	6	7	8	9
Observed proportion (%)	13.123	13.289	8.970	9.635	9.801	9.468	7.641	8.804	10.299	8.970
Expected proportion (%)	11.968	11.389	10.882	10.433	10.031	9.668	9.337	9.035	8.757	8.500
Deviation rate (%)	1.155	1.900	−1.912	−0.798	−0.230	−0.200	−1.696	−0.231	1.542	0.470
Z statistics	0.810	1.403	1.506	0.640	0.120	0.096	1.360	0.126	1.266	0.340
P value	0.417	0.160	0.131	0.521	0.904	0.922	0.173	0.899	0.205	0.733

Number of observation (N)=602 Chi-square calculated to all of digit 8.706659945, where Chi-square tabulated 16.919 at 9 degree of freedom.

Table 15: Second digit distribution for companies which have negative comprehensive net income

Number	0	1	2	3	4	5	6	7	8	9
Observed proportion (%)	15.094	10.782	7.817	8.086	10.512	6.739	8.625	12.129	11.051	9.164
Expected proportion (%)	11.968	11.389	10.882	10.433	10.031	9.668	9.337	9.035	8.757	8.500
Deviation rate (%)	3.126	−0.607	−3.065	−2.347	0.481	−2.929	−0.712	3.094	2.294	0.664
Z statistics	1.775	0.286	1.895	1.478	0.222	1.821	0.381	1.988	1.471	0.365
P value	0.075	0.774	0.057	0.139	0.824	0.068	0.702	0.046*	0.141	0.714

Number of observation (N)=371 Chi-square calculated to all of digit 29.60702073, where Chi-square tabulated 16.919 at 9 degree of freedom. *Significance at 5% two-tailed test

than the tabulated one of 16.919 for negative comprehensive net income, and by testing the rounding down phenomenon, number 0 has a high occurrence which restrict rounding down phenomenon, number 9 has higher occurrence with positive deviation of 0.66% and both numbers are insignificant, and number 7 has low occurrence as expected and this difference is significantly. This means inaccurate reported financial number s, but no sign of rounding down phenomenon.

6. DISCUSSION AND CONCLUSION

Many researchers are using Benford's law to detect if companies have manipulated their financial numbers. This paper was conducted to see if companies have inaccurate financial numbers, to see if there are rounding up phenomenon in profitable firms, and also to see if there are rounding down phenomenon in losing firms. This investigation was conducted about the following three accounts: Sales, net income, and comprehensive net income.

The result of testing first hypothesis, which investigate the first group that reported positive net income, to see if the first digit is following Benford's law or not. For sales account the result shows companies which don't follow Benford's law, the numbers 2 and 6 have higher occurrences than expected, so this results asserted by (Jordan et al., 2009) where they conclude that U.S firms are manipulating sales account, which is opposite to (Özarı and Ocak, 2013) conducted in Turkish firms which are following Benford's law. Firms with net income accounts also don't follow Benford's law with number 5 have higher occurrences than expected and number 6 have lower occurrences than expected. This result is in contrary to (Al-Darayseh and Jahmani, 1999; Özarı and Ocak, 2013) where they conclude net income account is confirms Benford's law. Lastly, comprehensive net income companies confirms with Benford's law, which means sales and net income accounts inaccurate based on Benford's law, in contrast to comprehensive net income.

For hypothesis number two which investigate the second group, the companies that have negative net income to see if first digit are following Benford's law or not, for sales account the results show Jordanian companies don't follow Benford's law, number 2 and 4 have low occurrences significantly, and this result is in contrary to (Özarı and Ocak, 2013) and the same with (He et al., 2013) which his results reveals this account manipulated. The result for net income account shows conformity to Benford's law and this results not confirms either by (He et al., 2013) or by (Özarı and Ocak, 2013), and for comprehensive net income based on (MAD) tests is nonconformity.

So far, sales account for both groups (profitable and unprofitable) have manipulated first digit. Based on (MAD) test profitable companies are less significant to manipulate and this finding same as (He et al., 2013; He and Guan, 2014) where profitable firms have less incentives to manipulate their revenues. For net income, profitable firms have nonconformity but losing firms confirm Benford's law. This means profitable companies have more incentives to cosmetic their incomes and that results confirms by (He et al., 2013; He and Guan, 2014) which showed profitable firms having incentives to manipulate their earnings more than losing firms. Lastly, for comprehensive net income comparison based on (MAD) tests where Chi-square is same for both of them, so profitable companies have acceptable conformity where losing firms have nonconformity. This means losing firms have more incentives to manipulate their accounts than profitable one, therefore this account shows that it's more important to unprofitable firms than profitable one in decreasing their bad results.

The result for testing third hypothesis: If profitable firms has more zero and few nine occurrence of numbers, for sales account there are more zero and few nines but this phenomenon is not significant. Secondly, for net income there are more zeros and few nines occurrence but also this difference is not significant and this result agrees with the results of (Al-Darayseh and Jahmani, 1999; Özarı and Ocak, 2013). Lastly, for comprehensive net income there are more zero numbers and more nines also, this account restrict rounding up phenomenon and also it's not significant.

Lastly for hypothesis number four, which supposed that losing firms has rounded down their loss with few zeros and more nines occurrence than expected by Benford's law. For sales account, there are more zeros and more nine so this account doesn't round

down, for net income, number zero has low frequency and high occurrence for number nine and this phenomenon is partially significant from the nine's side and results asserted by (Özarı and Ocak, 2013), and for the last account net comprehensive income, for number zero and nines they have more frequencies than expected which mean this account doesn't have rounding down phenomenon.

The result for testing third and fourth hypothesis which related to second digit, presents sales account for profitable companies has rounding up phenomenon, but it's not significant, and for unprofitable firms rounding down phenomenon is not present. This means chance of rounding is more for profitable companies.

For both net income accounts (profitable and unprofitable), firms results have showed rounding up and down respectively, but for firms which have profit this phenomenon is not significant in contrast to firms that have losses with rounding down phenomenon to be partly significant. Lastly, for comprehensive net income there is no sign of rounding up or down for both groups (companies having profit results, and firms having loss results), and in general the results is same with (Özarı and Ocak, 2013).

The main findings show Jordanian companies to have inaccurate financial numbers, companies with positive net income to have less incentives to manipulating sales account compared to unprofitable firms, profitable firms have manipulating net income where firms with negative net income don't manipulate their net income, and in contrast negative net income firms care about manipulating comprehensive net income, where positive net income companies don't care about manipulating this account.

There is also no significant evidence of rounding up or down sales, net income, and comprehensive net income accounts except net income accounts within negative net income firms group is partly significant.

7. RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCHES

It's useful to use Benford's law by Jordanian authorities to detect if the financial numbers produced by companies are manipulated or not, to ensure the accuracy of annual report at Jordanian firms. Such action will give stakeholders some confidants of Jordanian firms. The result shows some financial accounts to be not accurate, and so Jordanian authorities and their corporate governances should play more effective roles to ensure more accuracy of financial accounting numbers produced by Jordanian listed firms. For example, SOX plays important rule to reduce manipulating financial numbers (Jordan and Clark, 2011; Wilson, 2012), and accordingly, Jordanian authorities should develop a corporate governance act like SOX and Ontario Bill 198 (Jordan et al., 2014).

Also it's useful to investigate in future research the reasons behind Jordanians companies that reporting loss in their bottom line of net income to manipulating their first digit of comprehensive net income where that phenomenon in firms reported positive net income is not happened, in other words what are the catalysts or incentives to do such manipulating by unprofitable firms where manipulating is not a concern of profitable firms for comprehensive net income, and also to find out whether if this phenomenon happen in other countries or not to generalize this findings.

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