

Effect of Readability and Complexity on Naive Investors Decisions: An Experimental Study in an Emerging Economy

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Abstract

Purpose of this paper: The purpose of this paper is to investigate the impact of the readability and complexity levels of financial disclosures on naïve investors' willingness to invest and their stock valuation judgements.

Design/methodology/approach: Two experiments were conducted during the study. The first experiment is a between subject experimental design and is conducted to investigate the impact of different readability levels (less readable Vs more readable) on naïve investors' investment judgements. The second experiment is a within subject experimental design and is conducted to test the impact of different complexity levels (more complex Vs less complex) on naïve investors' judgements. Non-parametric statistical tests were used to test the research hypotheses.

Findings: The impact of readability level on investors' comfort and willingness to invest was clear and significant in the case of more complex negative information (options case) as investors' willingness to invest was lower in case of more readable negative information on options, but that was not the result in case of the less complex negative information (convertible bonds case). Readability levels affected investors' stock valuation whether the information presented is less complex or more complex. Investors' stock valuation was lower in case of less readable information than that in the case of more readable information. As for the impact of complexity, the results didn't show significant impact of the complexity levels on the investors' willingness to invest and their stock valuation.

Research limitations/implications: This paper uses undergraduate students registered in the English section in the faculty of commerce of Alexandria University as a proxy for naive investors. Those students passed three courses of accounting and have basic knowledge in financial disclosures. Real investors were difficult to recruit as subjects for the experiment conducted.

Social and Practical implications: The results of the study imply that different readability levels can have a significant impact on investors' willingness to invest in case the information presented is more complex and their stock valuation, whether the information presented is less complex or more complex.

What is original/value of paper? This paper is the first to examine the impact of readability and complexity separately. The paper contributes to the existing literature examining the readability and complexity of financial disclosures on investors' decisions and judgements.

Keywords: Naive investors' decisions; Readability; Complexity; Egypt

Introduction

Based on the simple and obvious assumption that more readable disclosures increase investors comfort and confidence in understanding the disclosures and thus their willingness to make investment decisions, the SEC in 1998 passed Rule 421 (d) that requires issuers to prepare firm disclosures in plain English and accordingly issued its "A Plain English Handbook" to stress on the importance of having disclosures more readable and informative for different users with different levels of financial sophistication [1]. In

the plain English handbook, the SEC provided some tips on how to make documents prepared in plain English. These tips include avoiding the common problems of long sentences, passive voice, weak verbs, superfluous words, unreadable design and layout, unnecessary details, abstract words and numerous defined terms. In addition, documents are to be designed in a way that makes them more readable and easier to understand; otherwise they will be difficult to communicate [1]. Since the issuance of the plain English handbook, empirical accounting research has started picking up on the topic and several studies have been conducted to investigate and present evidences regarding the impact of the readability level of different disclosures; such as analysts' reports and the annual financial reports on the different beneficiaries and users of these disclosures.

Prior theoretical and empirical research suggests that market reactions are likely to be less favorable (more unfavorable) when information is more difficult to extract [2-6]. This is the result of investors' lack of comfort analyzing the information when making investments' decisions. In this study, two experiments were conducted to investigate how disclosures' readability and task complexity influence naive investors' willingness to invest and their valuation judgements. In other words, the investor's comfort in analyzing the information by changing the readability level of the disclosures (more versus less readable) and their willingness to invest and the complexity of the decision setting that they are trying to analyze (more versus less complex) were being manipulated.

This study contributes to the existing literature on two main aspects. First, this paper provide evidences supporting that readability of financial disclosures influence investments judgements in emerging capital markets as is the case in more developed capital markets. Second, the effect of readability of the disclosures versus the complexity of the analyzed setting was being independently examined by separately manipulating each of these factors on investors' judgement. Most of the existing literature handles readability as an indicator of complexity. In other words existing literature manipulates readability level to indicate how complicated would be the process of extracting the information. What is unique in this paper is the ability to separate both factors and test each of their effects on investors' investment judgements independently by focusing on:

- Naive investors (consistently with the assertion of SEC that disclosures should be clear and understandable to help the least sophisticated investors), and
- A decision setting that our subjects are very familiar with (a loss resulting from a convertible bonds) (less complex) versus a setting that they were not familiar with (a loss resulting from the exercise of stock options) (more complex).

The results indicate that although readability level made a significant difference in investors' investments judgements in case of complex information, more complex decision setting did not seem to have the expected effect on investors' decisions.

The remainder of this study is organized as follows: In the next section, both existing related research and the theoretical framework were being outlined and reviewed and the research hypotheses were thus developed. In section three the experimental design, including choosing the participants, the experimental manipulations, and the basic experimental procedures were discussed. Then the results of the experiments were summarized in section four, and the analysis for the test of the research hypotheses was provided. Finally, conclusions reached were illustrated in section five.

Literature Review and Hypotheses Development

In response to the SEC's call for easier to understand disclosures, recent research has examined the topic from two main angles. Basically this stream of recent line of research focused on addressing the following two questions. First, how can disclosures be formulated to be more readable and understandable by various users? Second, what would be the effect of communicating easier to understand disclosures on different decision makers? In the next few paragraphs, some of the major work conducted relating to the second question will be outlined as this is the focus of our study.

Task complexity and decision making

With respect to investigating the impact of annual report readability on different users (analysts and investors), prior literature provide evidence that the readability level have a considerable impact on analysts. Leheavy et al. investigated the effect of readability of 10-K reports on analysts' efforts and information content of their reports and also the level of forecast dispersion [7]. This study found that less readable reports will increase the demand for analysts' services; that exert more effort and take longer time to present their reports. In addition, the study found that analyst reports of firms with less readable 10-K reports are more informative from the investors' point of view, but that the earnings forecasts of such firms have greater analyst dispersion, are less accurate, and are associated with greater levels of uncertainty.

Additionally, prior literature provides evidence that changing the level of readability will have an impact on the level of investment efficiency. Biddle et al. provided evidence that financial reporting quality measured by more readable reports tend to reduce information asymmetries and in turn increasing investment efficiency [8]. This was evident through increasing under investment and reducing over investment or both. Particularly on investors; the main users of financial reports and disclosures, Miller found that longer and less readable filings have a negative impact on the level of trading volume around the 10-K filing date, especially on small investors, who don't have enough investment expertise and find it costly to process complex information [4]. Even in case of trading, complex filings will result in low consensus among small investors.

In line with Miller, Loughran and McDonald found same evidence regarding the impact of readability level on trading volume [4,9]. Based on a large sample of 10-Ks during the period of 1994-2007, Loughran and McDonald found that firms use Plain English to enhance the readability of their annual reports and reduce information asymmetries between their managers and outside investors [9]. Increasing readability level made disclosures more informative and prices reflecting the information contained in such disclosures. In addition, increasing the readability level had an obvious impact on investors which was obvious in the form of increasing trading volume among small investors and on managers which was clear in the increase in seasoned equity issuance.

In the same context, You and Zhang focused on the information content and complexity of 10-K filings on investors' reaction, and found that changes in market price and investors' reaction were sluggish after presenting detailed and length annual reports [3]. Using different types of investors to investigate the impact of readability level of financial disclosures on individual shareholdings, Bystrom provided evidence that individual investments increase with clear and concise financial disclosures, however this impact is less pronounced for high frequency, financially literate and speculative traders [2].

Focusing on the level of financial literacy, Cui provided evidence that the level of financial literacy interact with the readability level to affect investors' reliance on disclosures [10]. Financially illiterate investors are more sensitive to the readability level of earnings disclosure because they depend on their processing fluency only and so they show lower degree of reliance on less readable disclosures. On the contrary, financially literate investors are not that sensitive because they depend on their processing fluency and understanding.

Without changing the length of the report as was the case in Miller and focusing on the impact of readability level on investors' reaction,

Rennekamp designed a 2x2 between subjects design on 234 recruited from Amazon's Mechanical Turk platform, and found that small investors react more strongly in case they are presented with more readable reports [4,5]. They react more favorably in case of good news and more unfavorably in case of bad news when they read more readable reports. In addition, investors predict that managers will release more readable disclosures in case of good news and less readable ones in case of bad news. Even when presenting good or bad news, Koonce et al. designed a 2x2x2 experiment and found that the effect of different readability levels on investors' valuation will differ according to whether there is a cautionary notice around management discretion over language choices presented to them before valuation or not [11]. This cautionary notice will make investors more skeptical and will reduce their reliance on the disclosure and also their valuation and investment judgment in case of disclosure language used strategically and consistently with management incentives.

Using the same experimental design as in Rennekamp, but in this case using another manipulated variable, Elliott et al. investigated the impact of readability level on the investors' comfort and willingness to invest [5,12]. This study found that more readable reports increase investors' comfort regarding their valuation of firms and increase their reliance on the reports and their willingness to invest, especially when they are geographically or psychologically distant from the firm. Focusing on a different moderating variable that might affect the relationship between readability and investors' judgements, Tan et al. investigated the impact of language sentiment together with the level of investor sophistication on the relationship between readability level and investors' valuation of future earnings [13]. Based on an experiment on MBA students, the study found evidence that less readable disclosures increase the information processing difficulty and increase people engagement in heuristic processing. In addition the paper concluded that less sophisticated investors are affected by the positive language of the less readable earnings release and evaluated future earnings more positively. However, more sophisticated investors lower their earnings judgements because they find that earnings release is of lower credibility when its content is not supportive. Another factor that might mediate the impact of readability level on investors' judgement is the benchmark performance consistency, Tan et al. provided evidence that in case there is inconsistency between two benchmark performance (trend performance and guidance performance), more readable disclosure will lead to more favorable investors' performance judgement and better understanding of the current performance [13]. This impact will be undermined in case of consistency.

Extending this line of research beyond the firm accounting disclosures, [14-16] are examples of the studies that focused their efforts on studying how would the readability of analysts' reports impact investors' decisions. Twedt and Rees provided evidence that analysts' reports have an impact on the market and their information content is significant, and their complexity level can explain cross-sectional variation in the market's response to the recommendations included in the reports [14]. In the same context, De Franco et al. investigated the impact of readability of analysts' reports on the trading volume and concluded that analysts of higher abilities issue more readable reports which have a positive effect on the trading volume [15]. Hsieh et al. confirmed these results and assumed that more readable analysts' reports reduce the level of uncertainty concerning the future profitability of firms [17]. Investors who depend on more readable analysts' reports will find it less costly to process its information and will depend on the forecast revisions of the analysts to

take their trading decisions. Accordingly, it concluded that the readability of such reports affected the market prices positively and also the trading volume of investors.

Through a laboratory experiment on undergraduate students in the first, second and third year in Germany, Wojahn et al. investigated the impact of analyst reports complexity on the trading decision of investors [16]. However, they didn't find a significant relationship between them; analyst report complexity wasn't an indicator of analyst's competence or the ambiguity of the report of the firm.

Accordingly, it is clear from the prior literature that the readability level has an impact on investors' comfort and willingness to invest. In addition, the readability level of reporting has an impact on investors' decisions concerning their valuation of various firms. This impact might differ according to the type and size of investors and their level of financial literacy, type of news presented in the disclosures, benchmark performance consistency, psychological and geographical distance from the firm.

Based on aforementioned prior literature, the first two research hypotheses were formulated as follow:

H1: Investors' willingness to invest will be more unfavorable when presented with less readable negative disclosures versus more readable negative disclosures.

H2: Investors' stock valuation judgements will be more unfavorable when presented with less readable negative disclosures versus more readable negative disclosures.

Task complexity and decision making

Prior literature gave special attention to complex tasks and their impact on decision makers and the decision making process. Task complexity is considered an important task characteristic and can impact and predict the performance and behavior of people [18]. Regarding task complexity, prior literature has presented several definitions and models of task complexity; both objective and subjective ones.

Objectively, tasks can be defined as a function of task components (component complexity), the interaction between the task inputs and products (coordinative complexity) and the impact of external factors on the task (dynamic complexity) and by the number of unknown factors, where the level of perceived task complexity decrease with the increase of number of known factors [2,19]. Also, it can be defined by certain factors such as the number of paths to arrive the desired end, the presence of several desired outcomes, the presence of conflicting interdependence between the paths leading to the multiple desired ends, and the presence of multiple linkages between the paths and ends [20]. Here, task complexity is tied to three human processing factors (information load, diversity and rate of change) which place cognitive load on the task performers [20].

Subjectively, task complexity can be defined from the task performers' point of view. Here, task complexity is determined based on the interaction between the task and the characteristics of the task performer [18]. It depends on both the context and the persons performing the tasks and can be defined based on the prior knowledge of the task performers towards the case presented to them and the requirements needed [2].

Regarding the impact of task complexity on the decision making process, Bonner focused on the decision making process in complex

situations by reviewing the German literature over twenty years [21]. The author identified certain qualities in the three components of the decision making behavior; the decision problem, the decision maker, and the decision making process. For the interest of this study, the author identified certain attributes relating to the decision problem, one of them is the complexity of the problem. The author pointed that complexity is a central characteristic of management decisions. Problems requiring decisions are considered complex when they result from innovative or novative issues and when the decision maker is confronted with a first time issue, unlike the everyday decisions. In this case, decision makers lack knowledge of content matter to deal with the problem and don't have experience to go through the decision making process. In addition, there is a strong relationship between information and information sources, Bystrom found evidence regarding this relation [2]. Therefore, he concluded that upon facing complex tasks, task doers searched for expert advice more than other people and other documentary sources of information.

In the same regard, Speier addressed the impact of information presentation and task complexity on the decision making process using the cognitive fit theory [22,23]. The author found that prior literature has focused on simpler tasks without giving the required attention to complex tasks. The author found evidence that spatial presentation formats will increase the decision accuracy and reduce the time needed for decision making for both simple and complex spatial tasks. However for symbolic tasks, using graphs will not affect the time needed for decision making.

Accordingly, it is clear from the previous literature that task complexity has a considerable impact on the decision making process. It appears when the task doer or the decision maker is confronted with a new issue, on which he lacks knowledge and experience. In this case, the decision maker will be under pressure and this may result in inaccurate decisions and more time to take such decisions and also, he may search for other sources of information or experts to help them.

Based on aforementioned prior literature, the next two research hypotheses are formulated as follow:

H3: Investors' willingness to invest will be more unfavorable when presented with more complex negative disclosures versus less complex negative disclosures.

H4: Investors' stock valuation judgements will be more unfavorable when presented with more complex negative disclosures versus less complex negative disclosures.

Method

Participants

The participants were 310 students who are registered in the second year in the faculty of commerce of Alexandria University. Those students passed three courses of accounting and have basic information around the financial statements and the disclosure of companies. In addition, because this paper focuses on the impact of linguistic characteristics, students in the English section were chosen to participate in the experiment. Finally, due to the difficulty of having real investors participating in the study, those students act as proxy or surrogates to real investors [16].

Design and manipulation

Participants are told to assume themselves as naïve investors of Cooper Soda Co., a hypothetical company that develops, produces and distributes high quality beverages. To test the first research hypotheses regarding readability effect, a between subjects experiment design was used. The experiment is considered to be suitable because it allows to identify the impact of readability as financial disclosures follow the same readability level; either more readable or less readable. However, to test the impact of complexity levels, a within subject experimental design was used. This experimental design is considered appropriate, as investors presented with financial disclosures can read less complex and more complex information in the same report or disclosures. These two variables are confounded with other variables that make it difficult to identify their impact in real practice. The level of readability has been manipulated, where linguistic and formatting differences appear between the two cases (less readable Vs. more readable). The SEC plain English Handbook issued in 1998 as a guide for reporting was used as the main source for doing this manipulation [1].

The less readable report includes long sentences, passive voice, weak verbs and complex and superfluous words. In addition, it was center justified and written using Franklin Gothic font, which is considered to be less readable one [1].

On the contrary, the more readable report includes short sentences, active voice, simple words and strong verbs. As for the formatting design, it was left justified and written using Times New Roman font which is considered to be more readable. In addition bullets were being used to make the text clearer, more readable and organized [1].

The level of task complexity has been manipulated, where students were presented with two additional paragraphs. The first additional paragraph is focusing on options, which is considered to be more complex, as students in the second year don't have any background regarding options and derivatives (according to the subjective definition and complexity [2]). The second paragraph is focusing on convertible bonds, where students have basic background on this issue (simple task).

Finally, to avoid the impact of good news Vs. bad news on investors' decisions and judgements, this paper chose only negative information to concentrate on the impact of readability and complexity on investors' willingness to invest and stock valuation.

Task and Procedure

Participants were presented with brief information around Cooper Soda Co. with basic financial information for the years 2014 and 2015. This financial information includes the total assets, liabilities, equity, revenues and net income and the number of outstanding shares. Because participants have no other information to evaluate the stocks of the company, they were asked to assume that such a company is to be valued initially as an average one (at \$50 on a scale ranging from low (\$0) to high (\$100) (Appendix A). The brief description and the basic financial information of the two years were exactly the same for the sample of the less readable and the more readable reports.

After evaluating the stocks of the company as an average, participants were presented with two additional information paragraphs regarding two subsequent events. The first one was showing that the company is issuing options of 2 million shares to its top executives to be exercised on a specific date using a specific price. However, because the market price on the exercise date was higher

(\$45) than the exercise price (\$35), the company is suffering from losses. These losses will have an inverse effect on the company's investors. As for the second additional information paragraph, it showed that the company has issued convertible bonds to one of its creditors, however, when the creditor asked to convert the bonds into shares (convert \$100 million bonds for 4 million shares), the market price (\$45) was higher causing the company to suffer from losses, which will affect the company's current stockholders negatively. After reading each additional information paragraph regarding the subsequent events, students were asked a manipulation check question regarding the change in the number of shares outstanding after that piece of information (Appendix A).

To test the investor's understandability, students were asked directly whether they agree with the statement "I felt like I understood the information in the additional disclosure", (using a 5 point Likert scale ranging from 1=strongly disagree to 5=strongly agree). To test the impact of readability on investor's comfort and their willingness to invest, students were asked whether the information presented to them will encourage them to invest in this company and this can be determined obviously in their degree of agreement to the statement "the additional disclosure increases my willingness to invest in Cooper

Soda" (using a 5 point Likert scale ranging from 1=strongly disagree to 5=strongly agree). In addition, and to test the impact of the level of readability on the investor's valuation of stocks, students were asked to evaluate the stocks of Cooper Soda Co. after reading each additional information paragraph on a scale ranging from low (\$0) to high (\$100). To test the impact of complexity on investors' comfort, willingness to invest and valuation of stocks, students were presented with two additional paragraphs of different levels of complexity; the first additional paragraph is on options (more complex case) and the second one is on convertible bonds (less complex case)

Sample description

Copies of the less readable and more readable reports were distributed randomly on these students. Out of the 310 students, 149 students were presented with a less readable report and 161 students received the more readable reports. However, after excluding observations that have missing values, those realizing neither losses, those realizing the loss from bonds conversion but not options exercised, and those realizing the loss from options exercised but not bonds conversion, the remaining usable observations were 51 more readable and 31 less readable reports (Table 1).

| | More Readable | Less readable |
|---------------------------------------------------------------------------------|---------------|---------------|
| Total number of observations | 161 | 149 |
| Observations that have missing values | 12 | 12 |
| Observations realizing neither losses | 36 | 32 |
| Observations realizing the loss from bonds conversion but not options exercised | 29 | 38 |
| Observations realizing the loss from options exercised but not bonds conversion | 33 | 36 |
| Remaining usable observations | 51 | 31 |

Table 1: Sample description.

Results

Descriptive statistics

Table 2 presents the descriptive statistics for the first sample (the sample presented with less readable reports) and the second sample

(sample presented with more readable reports) respectively. The data presented showed the mean, median, standards deviation, minimum and maximum values and the appropriate percentiles for each of the four questions after the additional paragraph of options (questions 1 to 4) and that of the four questions after the additional paragraph concerning the convertible bonds (questions 5 to 8).

| Panel A: Less Readable sample (N=31) | | | | | | | | |
|--------------------------------------|-------------------------------|-------|-------|-------|-----------------------------------------|-------|-------|--------|
| | Responses to the options case | | | | Responses to the convertible bonds case | | | |
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Mean | 0.39 | 3.84 | 2.65 | 32.9 | -0.32 | 4.23 | 1.48 | 12.9 |
| Median | 0 | 4 | 2 | 30 | 0 | 5 | 1 | 10 |
| St. Dev. | 1.308 | 0.779 | 1.142 | 6.925 | 2.482 | 1.117 | 0.811 | 12.164 |
| Min | -2 | 2 | 1 | 10 | -4 | 2 | 1 | 0 |
| Max | 2 | 5 | 5 | 40 | 4 | 5 | 5 | 30 |
| 25th perc. | 0 | 3 | 2 | 30 | -2 | 4 | 1 | 0 |

| | | | | | | | | |
|---------------------------------------------|--------------------------------------|-------|-------|-------|------------------------------------------------|-------|-------|-------|
| 75th perc. | 2 | 4 | 4 | 40 | 2 | 5 | 2 | 20 |
| Panel B: More readable sample (N=51) | | | | | | | | |
| | Responses to the options case | | | | Responses to the convertible bonds case | | | |
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Mean | 1.31 | 3.9 | 2 | 39.41 | 3.06 | 4.08 | 1.67 | 27.84 |
| Median | 2 | 4 | 2 | 40 | 4 | 4 | 2 | 30 |
| St. Dev. | 0.99 | 0.755 | 0.775 | 3.106 | 1.618 | 0.997 | 0.841 | 6.104 |
| Min | -1 | 2 | 1 | 20 | -4 | 2 | 1 | 0 |
| Max | 2 | 5 | 5 | 40 | 4 | 5 | 5 | 30 |
| 25th perc. | 0 | 4 | 2 | 40 | 2 | 4 | 1 | 30 |
| 75th perc. | 2 | 4 | 2 | 40 | 4 | 5 | 2 | 30 |

Table 2: Descriptive statistics of the less readable sample Vs. the more readable sample.

Manipulation check questions

Regarding the change in the number of shares after presenting the options case, Statistical results showed that 12.9% (2%) of the less (more) readable observations found that the number of shares have decreased, 54.8% (31.4%) of the less (more) readable observations found that there is no change in the number of shares, however, 32.3% (66.7%) of the less (more) readable ones saw that there is an increase with 2 million shares. Accordingly, it is clear that the responses of the two groups are quite different and the percentage of the accurate responses (increase with 2 million shares) of the more readable cases is higher than that of the less readable ones.

Concerning the second manipulation check question, which is the change in the number of shares after exercising the convertible bonds by the creditor, results showed that 29% (2%) of the less readable observations found that there is a decline in the number of shares while 45.2% (7.8%) saw there is no change in the number of shares, 16.1% (23.5%) found an increase in the number of shares by 2 million shares, and 9.7% (66.7%) found an increase by 4 million shares. It is clear that percentage of accurate responses (increase by 4 million shares) of the more readable cases was quite higher than that of the less readable ones.

Investors' understandability

To identify the impact of readability level (less readable Vs. more readable) on the investor's understandability level, the nonparametric Mann Whitney test was used to determine whether there are significant differences between the less readable and the more readable conditions for the first additional information paragraph (options). It was expected that the students presented with the less readable reports will not understand the additional information in the same level of the students presented with more readable reports. However, the results of Mann Whitney test in Table 3 showed no significant difference between the two groups ($z=-0.740$, Asymp Sig=0.459) with regard to its impact on their understandability level. The same result appears with respect to the impact of the readability level on their understandability level for the second additional information paragraph (convertible bonds). Again, the results of Mann Whitney test didn't reveal

significant differences between the two groups ($z=-1.170$, Asymp Sig=0.242). Accordingly, it is clear that different readability levels have no significant impact on investors' understandability of the options case and the convertible bonds case.

| | Understandability of the options case | Understandability of the convertible bonds case |
|----------------------|----------------------------------------------|--------------------------------------------------------|
| Mann-Whitney U | 724 | 677.5 |
| Wilcoxon W | 1220 | 2003.5 |
| Z | -0.74 | -1.17 |
| Asymp Sig (2-tailed) | 0.459 | 0.242 |

Table 3: Results of Mann Whitney test of the impact of readability level on investor's under standability.

| | More Readable Vs Less Readable |
|--------------------|---------------------------------------|
| Understandability | Mann-Whitney U=724.000 |
| | Wilcoxon W= 1220.000 |
| | Z=-0.740 |
| | Asymp.Sig (2-tailed)=0.459 |
| Investors' comfort | Mann-Whitney U=553.000 |
| | Wilcoxon W= 1879.000 |
| | Z=-2.874 |
| | Asymp.Sig (2-tailed)=0.004 |
| Valuation of stock | Mann-Whitney U=334.000 |
| | Wilcoxon W= 840.000 |
| | Z=-5.617; Asymp.Sig (2-tailed)=0.000 |

Table 4: Options case.

Regarding the impact of complexity on investors' understandability, Wilcoxon Signed Ranks test was conducted to identify whether there are significant differences between investors' level of understanding to the additional paragraphs of options and convertible bonds for both the less readable and the more readable groups (Table 4). It was expected that investors' understandability for the more complex case (options) will be lower than that for the more complex case (convertible bonds) for the two readable groups. However, statistical

results presented in Tables 4 and 5 revealed no significant differences between the understandability levels in both the less readable group ($Z=-1.758$, Asymp. Sig. (2-tailed)=0.079) and the more readable group ($Z=-1.082$, Asymp Sig (2-tailed)=0.279) between the options case and the convertible bonds case. This result indicates that complexity has no significant effect on investors' understandability whether such complex information is presented in a more readable or a less readable form.

| | More readable Vs Less readable |
|--------------------|--------------------------------|
| Understandability | Mann-Whitney U=677.500 |
| | Wilcoxon W= 2003.500 |
| | Z=-1.170 |
| | Asymp.Sig (2-tailed)=0.242 |
| Investors' comfort | Mann-Whitney U=664.500 |
| | Wilcoxon W= 1160.500 |
| | Z=-1.370 |
| | Asymp.Sig (2-tailed)=0.171 |
| Valuation of stock | Mann-Whitney U=254.000 |
| | Wilcoxon W= 750.000 |
| | Z=-5.914 |
| | Asymp.Sig (2-tailed)=0.000 |

Table 5: Convertible bonds case.

Testing research hypotheses

To test the research hypotheses, nonparametric tests were used because the variables to be tested such as investors' understandability and willingness to invest are ordinal ones. In addition, the responses were tested for normality using Kolomogrov-Smirnov and the results indicated that the null hypothesis which assumes that the data is drawn from a normally distributed population (Sig=0.000, which is less than 5%) can't be accepted. Accordingly, parametric tests were not suitable to test the data related to the experiment and nonparametric tests were used to test the research hypotheses. Mann Whitney test was used to test whether there are significant differences between the 2 independent samples (less readable and the more readable groups) and Wilcoxon Signed Ranks test was used to test whether there are significant differences between the two dependent samples (less complex and more complex cases of the same group). The statistical package SPSS 20 was used to test the research hypotheses.

Impact of readability on investors' comfort and willingness to invest:

The first research hypothesis (H1) is formulated to identify whether investors' comfort willingness to invest will be more unfavorable when presented with less readable negative disclosures in comparison with more readable negative disclosures. To test this research hypothesis H1, Mann Whitney test was used. It was expected that investors will not be willing to invest-or their willingness to invest will decrease-after presenting them with the additional information showing that the company was suffering losses after exercising the options. However, this expectation will hold assuming that investors are able to read and understand the information presented. It was expected that investors' comfort and willingness to invest will be lower when presented with less readable negative disclosures in comparison with more readable negative disclosures.

| | Less complex (convertible bonds) Vs More complex (options) |
|--------------------|------------------------------------------------------------|
| Understandability | Z=-1.758 Asymp. Sig. (2-tailed)=0.079 |
| Investors' comfort | Z=-3.593 Asymp. Sig. (2-tailed)=0.000 |
| Valuation of stock | Z=-4.935 |

| | |
|--|------------------------------|
| | Asymp. Sig. (2-tailed)=0.000 |
|--|------------------------------|

Table 6: Less readable case.

Results of Mann Whitney test in Table 6 showed significant differences between the less readable and the more readable conditions with regard to the first additional information paragraph (options case) (complex case) ($z=-2.874$, Asymp Sig=0.004 which is less than 5%). Results showed that the willingness to invest of the investors presented with more readable information on options (mean rank=36.84) was lower than that of the less readable reports (mean rank=49.16). This result is consistent with that of Elliott et al. which revealed the positive impact of concrete language on investors' willingness to invest in contrast with abstract language [12]. However, this was not the result in the second additional information paragraph (convertible bonds), the results of Mann Whitney test indicated no significant differences between the two samples ($z=-1.370$, Asymp Sig=0.171, which is greater than 5%) (Table 5). Accordingly, the first hypothesis H1 is accepted partially.

Impact of readability level on investors' valuation of stock: The second research hypothesis (H2), is formulated to test the impact of the readability levels (less readable Vs. more readable) on the investor's valuation of stocks, and whether investors' stock valuation will be more unfavorable in case they are presented with less readable negative disclosures in comparison with more readable negative disclosures. To test this research hypothesis, Mann Whitney test was used again to reveal whether there are significant differences between the two samples. It was expected that investors' valuation of stocks will decrease after presenting them with the options information (showing losses of 1 million dollars) and that investors' presented with less readable disclosures will show more unfavorable valuation in comparison with those presented with more readable disclosure. Results of Mann Whitney test shown in Table 5 confirmed this expectation and showed significant differences in investors' valuation after presenting information about options ($z=-5.617$, Asymp Sig=0.000, which is less than 2.5%) between the less readable group and the more readable one (Table 5). Results showed that investors' valuation of stocks was lower for the less readable sample (mean ranks=27.10) than that for the more readable sample (mean ranks=50.25) after reading the additional paragraph about the options.

Same results are applicable for the convertible bonds case. Table 5 showing Mann Whitney test results indicated that there are significant differences between the less readable and the more readable groups with regard to their valuation of stocks after reading the additional paragraph of convertible bonds ($z=-5.914$, Asymp Sig=0.000, which is less than 2.5%). Results indicated that the investors' valuation of stocks had decreased after reading the additional paragraph of convertible bonds, however the impact was greater on the less readable group (mean ranks=24.19) in comparison with the more readable group (mean ranks=52.02). This result is consistent with that of Asay et al. that found that investors' valuation of stocks will be undermined in

case of reading less readable disclosures [23]. Accordingly, the second hypothesis H2 is accepted.

Impact of complexity on investors' comfort and willingness to invest: The third hypothesis (H3) predicts that investors' comfort and willingness to invest will be more unfavorable when presented with more complex negative disclosures than less complex negative disclosure. To test this hypothesis, Wilcoxon Signed Ranks test was used. The results presented in Table 6 showed significant differences between the two cases (options and convertible bonds) with regard to their impact on the investors' willingness to invest.

Concerning the less readable condition, results of Wilcoxon Signed Ranks test presented in Table 6 indicated that there are significant differences between the investors' willingness to invest after presenting the two additional information paragraphs. The null hypothesis which says that the median of differences between the willingness to invest after the options case and that of the convertible bonds case equals zero has been rejected ($z=-3.593$, Asymp Sig=0.000, which is less than 2.5%). Investors showed further reduction in their willingness to invest after they read the additional information regarding the convertible bonds. The same result was clear with regard to the more readable information about the convertible bonds case in comparison with that of the options case ($z=-3.157$, Asymp. Sig=0.002, which is less than 5%). Accordingly, the third hypothesis H3 is being rejected.

Impact of complexity on investors' valuation of stocks: The fourth hypothesis (H4) predicts that investors presented with more complex negative disclosures will provide more unfavorable stock valuation than in the case they are presented with less complex negative disclosures. The results of Wilcoxon Signed Ranks test showed significant differences between the two cases (options and convertible bonds) with regard to their impact on the investors' valuation of stocks. Accordingly, the null hypothesis saying that the median of differences between the 2 dependent samples (investors' valuation of stocks after the options case and their valuation of stocks after the convertible bonds case) equal zero has been rejected.

Concerning the less readable condition, results of Wilcoxon Signed Ranks test presented in table (6) indicated that there are significant differences between the investors' valuation of stocks after presenting the two additional information paragraphs ($z=-4.935$, Asymp Sig=0.000, which is less than 2.5%). Investors showed further reduction in their valuation of stocks after they read the additional information regarding the convertible bonds. The same result was clear with regard to the more readable information about the convertible bonds case in comparison with that of the options case ($z=-6.808$, Asymp Sig=0.000, which is less than 2.5%) (Table 7). Accordingly, the fourth hypothesis H4 is rejected.

| | |
|-------------------|------------------------------------------------------------|
| | Less complex (convertible bonds) Vs More complex (options) |
| Understandability | Z = -1.082 Asymp. Sig. (2-tailed) = 0.279 |

| | |
|--------------------|----------------------------------------------|
| Investors' comfort | Z = -3.157 Asymp. Sig. (2-tailed) = 0.002 |
| Valuation of stock | Z = -6.808 Asymp. Sig. (2-tailed) = 0.000 |

Table 7: More readable case.

It is clear from the results that different complexity levels (fewer complexes Vs. more complexes) didn't have significant effect on investors' willingness to invest and stock valuation. This might be due to the order of presenting the information, the more complex first then the less complex information. Students might be affected by the more complex information on options and this affected their valuation and decisions regarding the less complex information on convertible bonds.

Conclusion

Financial disclosures are very important for various users, particularly investors who depend heavily on such disclosures in making their investment decisions. Due to the increasing demand for such disclosures, significant amount of accounting academic research is concerned about studying various effective methods in communicating financial information to all stakeholders in the simplest and sufficient way possible in order to convey a complete picture of the financial situation of the firm. Prior literature over the last couple of decades has been intensively examining the influence of the ease of readability of such disclosures on investors' judgements and decisions. This study contributes to this line of research by introducing the first trial to distinguish between the effects of the ease of readability of the disclosures versus the effect of the task on hand complexity. This study independently examines the effect of each of these two elements on investors' willingness to invest and their stock valuation judgements. The results indicate that although readability level made a significant difference on investors' investments judgements in case of complex tasks, more complex decision setting did not seem to have the expected effect on investors' decisions.

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