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# The Relationship between Managers' Disclosure Tone and the Trading Volume of Investors

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**Abstract:** The present research investigates the relationship between managers' disclosure tone and the trading volume of small and large investors separately. The inconsistency of disclosure tone and abnormal trading volume generally indicates information asymmetry between managers and investors. However, by separating the abnormal trading volume of minor investors from major investors, this relationship shows the information asymmetry between minor and major investors. In this research, the disclosure tone of management discussion and analysis (MD&A) is measured using Loughran and McDonald's (L&M) finance-oriented dictionaries, and tone inconsistency is measured using a benchmark model. The data were collected from 143 companies listed on the Tehran Stock Exchange from 2011 to 2020, totalling 1380 annual reports. The results show that MD&A tone inconsistency positively correlates with abnormal trading volume for all investors. In addition, MD&A tone inconsistency has a different impact on the trading behaviour of small and large investors and misleads the former. The present research contributes to the literature by providing evidence of the relationship between MD&A tone inconsistency and abnormal trading volume of small and major investors. It also uses both common words and word combinations to measure tone.

**Keywords:** writing tone; tone inconsistency; trading volume; net purchase of shares; small investors



**Citation:** Pouryousof, Azam, Farzaneh Nassirzadeh, Reza Hesarzadeh, and Davood Askarany. 2022. The Relationship between Managers' Disclosure Tone and the Trading Volume of Investors. *Journal of Risk and Financial Management* 15: 618. <https://doi.org/10.3390/jrfm15120618>

Academic Editor: Thanasis Stengos

Received: 1 December 2022

Accepted: 15 December 2022

Published: 19 December 2022

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## 1. Introduction

The current development and increasing complexity of financial markets have increased accounting expectations, and users of information expect more accurate quantitative and qualitative information. Qualitative information is the information provided in financial statements. In contrast, qualitative information is the textual information provided to shareholders in notes, earnings announcements, press releases, conference calls, management discussion and analysis (MD&A), and letters to shareholders. In descriptive reports, managers have a say in how information is disclosed and even in the language and tone of the reports. This is important since the language and tone of managers in financial statements and annual general meetings affect how users perceive information. Disclosure tone is the degree of optimism or pessimism in the tone of managers' financial reports. It is measured by subtracting the number of negative words from the number of positive words. Huang et al. (2014) define tone as qualitative text in reports that are too optimistic or pessimistic relative to concurrent disclosures of quantitative performance.

Some studies have shown that quantitative information alone does not provide a complete picture of a company's performance (Huang et al. 2014; Davis et al. 2015; Arslan-Ayaydin et al. 2016; Luo and Zhou 2017; Kiattikulwattana 2019). Managers' disclosures in textual and qualitative reports, such as earnings press releases, conference calls, MD&A, and letters to investors, affect the processing of quantitative information by investors. There have been numerous studies on the readability, tone, and precision of financial reports in general and qualitative reports in particular and their impact on

investor decisions (Kiattikulwattana 2019). Although the results have been mixed, there is a general agreement that the content and form of accounting information can influence users' perceptions. According to Davis et al. (2008), recent accounting research has focused more on the impact of qualitative or non-numerical information on their users.

Research has documented the significant effect of managers' qualitative disclosures on users' perceptions and investment decisions. Several studies have focused on the qualitative information provided by companies, including news articles (Hales et al. 2011), MD&As (Engelberg 2008), letters to investors and conference calls (Feldman et al. 2008), and earnings press releases (Riley 2011). These studies first examine the effect of qualitative information on the judgement of investors and other users and then evaluate different aspects of disclosures, such as linguistic styles and approaches and how they convey information. This new body of accounting research views accounting as a language emphasising non-numerical and descriptive information.

Following Liu and Nguyen (2020), the present study measures managers' disclosure tone inconsistency using residual tone. Residual tone or "abnormal tone" is the positive language that the company's economic circumstances cannot justify. According to Law and Mills (2015), people tend to react more strongly to negative content. Therefore, managers may use an overly optimistic or pessimistic tone in MD&As that is inconsistent with the company's current performance and circumstances. Tone inconsistency negatively affects the capital market, such as information asymmetry between managers and investors or between small and large investors.

Investigating the reaction of small and large investors to the tone of corporate disclosures helps us understand the differences in the effect of disclosure tone on investors' trading behaviour and wealth. As noted by Mary (2017), the former chair of the US Securities and Exchange Commission (SEC), the SEC has a three-pronged mission: protecting investors; maintaining fair, orderly, and efficient markets; and facilitating capital formation. She also argues that the mission of the SEC hinges on the first prong—i.e., protecting the investors.

Given the importance of small investors in the performance of the capital market, the present research investigates to see if the differences in investors' understanding of disclosure tone can lead to different investment decisions. If the tone of the managers' disclosure is inconsistent with the company's performance and circumstance (i.e., overly optimistic tone), it may mislead small investors and lead to poor investment decisions. The results have important implications for managers, small investors, and regulators. An increase in net purchases increases stock prices, but small investors will suffer losses with subsequent price reductions and may leave the market.

The present research contributes to the literature in several ways. First, to our knowledge, this is the first study that investigates the effect of managers' disclosure tone inconsistency on abnormal trading volume of all investors (information asymmetry between managers and investors) and of small and large investors separately (information asymmetry between small and large investors) in Iran. Second, the present research analyses managers' tone inconsistency in two separate reports—annual reports to the general meeting of investors and conference calls—and provides compelling evidence of differences in the tone of these disclosures. Third, due to the limitation of existing word lists for tone measurement that often contains single words, the present research identifies a list of common word combinations used by managers and adds them to the word list by analysing the annual reports of a sample consisting of 50 firm-years. Finally, the findings contribute to the literature on the trading behaviour of small investors and provide evidence regarding the different effects of disclosure tone inconsistency on the perceptions and decisions of small investors in developing economies.

The remainder of this paper is organised as follows. Sections 2 and 3 present background and hypotheses development. Section 4 outlines the methodology and data collection and describes the sample and research variables. Section 5 presents the findings, and Section 6 provides the conclusions.

## 2. Theoretical Framework and Review of the Literature

Poor investment decisions by small investors are well documented in the literature (Battalio and Mendenhall 2005; Barber et al. 2009; Bhattacharya et al. 2007; Baginski et al. 2018). According to Barber et al. (2009), no disclosure or publication of events forms the basis for investors' transactions. Bhattacharya et al. (2007) show that more optimistic earnings forecasts influence the transactions of small investors. However, they do not examine the degree of over-optimism and its inconsistency with current performance. Battalio and Mendenhall (2005) show that small investors underestimate the implications of recent earnings innovations for future earnings levels. However, the present research considers MD&As or "soft" information instead of earnings press releases or "hard" information to examine how small investors react to a biased disclosure tone. This study extends the work done by Baginski et al. (2018) and provides evidence on how small investors react to and are often misled by the disclosure tone of managers in less developed economies.

### 2.1. Implications of Tone Inconsistency

Managers have significant leeway in preparing qualitative disclosures<sup>1</sup> as there are few regulations regarding the form or content of these reports. When reviewing a company's financial performance, new insights can be gained by reviewing managers' disclosures. Although a standard solution to reducing the information asymmetry between managers and investors is to disclose non-financial information in annual reports, research has shown that the tone in qualitative and non-financial reports tends to be biased (Huang et al. 2014; Wu et al. 2021). Agency theory suggests that managers are motivated to maximise their interests through financial reporting and, as a result, may mislead investors. Tetlock (2007) argues that the market reacts more strongly to bad news. Therefore, managers may use a biased tone to attract investors. Moreover, various studies have shown that managers often use a positive tone to mask bad news (Loughran and McDonald 2011; Davis et al. 2012; Huang et al. 2014). According to Huang et al. (2014), managers' disclosure tone is more positive before essential events, such as new equity issuance and mergers and acquisitions.

As mentioned earlier, disclosure tone is the degree of optimism or pessimism in the tone of managers' financial reports. Following Liu and Nguyen (2020), disclosure tone inconsistency is measured based on the residual tone in the present study. Residual tone or "abnormal tone" is the positive language that the company's economic circumstances cannot justify.

The implications of tone inconsistency, or tone management, have recently attracted increasing attention. Demers and Vegat (2010) showed that the positive tone of earnings announcements is associated with positive abnormal returns and post-announcement drift. Feldman et al. (2010) and Loughran and McDonald (2011) found that the market reacts more positively to a favourable disclosure tone. Doran et al. (2012) and Davis et al. (2012) reported a positive relationship between the tone of press releases and abnormal stock returns immediately after the quarterly earnings announcement. Similarly, Bowen et al. (2018) examined 17,000 private meeting summary reports between corporate insiders, analysts, and investors. They found that the tone of these reports is positively associated with stock market reactions. This increases the risk of litigation related to qualitative corporate disclosures. Rogers et al. (2011) found that companies with a more optimistic disclosure tone are more likely to be targeted by plaintiffs since investors can claim that their previous expectations about the company's value were too high and based on the company's overoptimistic disclosures.

Disclosure tone is also associated with audit risk assessment and audit fees. Using a sample of annual reports of Australian public companies, Bicudo de Castro et al. (2019) found that auditors consider the tone of annual reports when assessing risk, and evaluate a more positive tone as a better financial position and lower risk, thus charging lower fees. In general, the tone of other disclosures can indicate the company's performance and risk of financial distress, and therefore, it can influence investor decisions.

Jiang and Kim (2015) argue that it is easier and less risky for companies to mask their poor performance by embellishing non-financial information instead of manipulating financial information. Thus, managers may use an overly optimistic or pessimistic tone in MD&As that is inconsistent with the company's current performance and circumstances. This inconsistency can have detrimental consequences for the capital market, one of which is the information asymmetry between managers and investors and between small and large investors, which is the subject of the present research. That is because information asymmetry can lead to abnormal returns, price volatility, mispricing, reduced information content, lower stock market efficiency, and ultimately, investors' mistrust in the capital market. Therefore, the present research aims to investigate the effect of managers' disclosure tone inconsistency on the trading volume of all investors (information asymmetry between managers and investors) and of small and large investors (information asymmetry between small and large investors).

## 2.2. Disclosure Tone and Investors' Transactions

There is some empirical evidence that market participants react not only to the content but also to the written form and tone of disclosure in financial reports (Tetlock 2007; Henry 2008; Kothari et al. 2009; Loughran and McDonald 2011, 2014; Loughran et al. 2009; Costa et al. 2013; Jegadeesh and Wu 2013).

Loughran and McDonald (2014) showed that market participants react not only to the content but also to the form and tone of disclosures. Davis et al. (2015) argue that different disclosure states allow managers to develop a general disclosure strategy, and thereby increase the impact of their reports on readers. Various studies have also shown that a pessimistic (negative) tone has a more significant effect and causes investors to react negatively (Tetlock 2007; Feldman et al. 2010; Loughran and McDonald 2011; Iatridis 2016).

There are different theoretical and empirical views regarding the implications of managers' disclosure tone and their impacts on investor judgments and decisions. Some studies have reported a significant relationship between negative disclosure tone and investor decisions (Jegadeesh and Wu 2013; Tetlock 2007), while others have found no meaningful relationship between positive disclosure tone and investor decisions (Loughran and McDonald 2011).

Feldman et al. (2010) and Lee and Park (2019) argue that MD&As convey more information about the company's state as they complement the information provided in financial statements, help reduce information asymmetry between managers and investors, and improve the disclosure environment. However, managers' strategic use of disclosure tone may increase information asymmetry and mislead investors. As discussed above, it seems that managers often use a positive tone to appease investors and avoid or under-disclose bad news.

## 2.3. Disclosure Tone and Trading by Small and Large Investors

The literature suggests the complexity of the implications of managers' tone in qualitative reports for the company, managers, and small and large investors (Henry 2008; Hofstede 1972). Research shows that large (institutional) and small (individual) investors have distinct trading behaviours (Barberis et al. 1998; Battalio and Mendenhall 2005; Libby et al. 2002; Lee 1992). Large investors are more rational than small investors, and small investors are more likely to react to earnings surprises based on the seasonal random walk model. Bhattacharya et al. (2007) showed that small investors are more likely to trade based on earnings forecasts and other managerial disclosures. Similarly, Shanthikumar (2012) found that small investors react more strongly to a series of positive or negative surprises. Mikhail et al. (2007) and Blankespoor et al. (2019) also show that small investors are less interested in trading based on analysts' recommendations and forecasts and are more likely to include value-relevant disclosures in their trading decisions. Therefore, managers' disclosure tone is expected to affect small and large investors differently.

### 3. Hypotheses Development

Baginski et al. (2018) argue that it is difficult for the market to process the tone of managers' disclosures carefully. In the short term, market transactions may be based on the discriminatory language of these disclosures. For example, an overly optimistic disclosure tone inconsistent with the company's current performance may induce net buying by investors, resulting in overpriced shares in the short term and losses for investors in the long term. Therefore, disclosure tone inconsistency may cause the company's shares to be overpriced. Although prices will be adjusted with subsequent reports, the market could be misled in the short term. Therefore, it is important to investigate the implications of disclosure tone inconsistency for investor wealth. Various studies have shown that market transactions based on biased disclosures can lead to mispricing (Engelberg 2008; Huang et al. 2014; Baginski et al. 2018).

Although stock prices reflect the general reaction of the market to any disclosure, Cready and Hurtt (2002) argue that trading volume should be used to distinguish between the responses of small and large investors, since volume represents the behaviour or activity of different investors, while price represents the perceptions of all investors. According to Atiase and Bamber (1994), there is a positive relationship between the magnitude of volume and price reactions. However, Bamber (1987), Kim and Verrecchia (1991), and Bamber and Cheon (1995) showed that corporate disclosures might induce different volume and price reactions. Bamber and Cheon (1995) found that volume reactions to earnings announcements relative to price reactions indicate significant divergence among (small and large) investors. They argued that volume reactions indicate differences in the expectations and interpretations of investors, while price reactions reflect the sum of transactions of all investors. Therefore, the difference in trading volume relative to the absolute value of the price change (price change irrespective of trading volume) can reflect the divergence of beliefs between small and major investors. Bamber et al. (1997) use dispersion in analysts' forecasts to measure differences in the understanding, interpretation, and processing of information by small and large investors. However, most studies estimate this difference using abnormal trading volume (Garfinkel 2009; Cho and Kwon 2014; Baginski et al. 2018). Similarly, the present research uses abnormal trading volume to measure differences in investor expectations and investment decisions.

We expect disclosure tone inconsistency to be positively associated with information asymmetry between managers and investors and abnormal trading volume during a 3-day event window, which includes the day the report is published, the day before, and the day after (−1, 0, and 1). Given the above, we propose the following hypothesis:

**H1.** *A significant positive relationship exists between disclosure tone inconsistency and abnormal trading volume.*

Empirical evidence suggests that qualitative disclosures are more challenging to understand than financial statements, and investors' reliance on illustrative disclosures depends on their level of sophistication (how they access and process information). That is, less sophisticated or uninformed (small) investors tend to rely on heuristics, making them prone to the positive framing effects of tone. On the other hand, informed (large) investors tend to rely less on heuristics and are usually more sceptical of the positive tone of managers' disclosures. Therefore, we expect small investors to be less mindful of biased disclosure tone when making investment decisions and more likely to adjust their trading behaviour according to current financial reports and news. In contrast, large investors are expected to better understand managers' incentives in qualitative and quantitative reports due to their more sophisticated information processing and better access to information. Therefore, we expect managers' disclosure tone inconsistency to be positively associated with the abnormal trading volume of small investors but be negatively associated with or have no significant effect on the abnormal trading volume of large investors. Given the above, we propose the following hypothesis:



**H2.** *There is a significant positive relationship between disclosure tone inconsistency and abnormal trading volume of small investors.*

#### 4. Methodology

The present study employs a quantitative, ex post facto design. The population consists of all the companies listed on the Tehran Stock Exchange (TSE) from 2011 to 2020. Data are primarily based on the TSE's audited financial statements and board reports, a reliable source of information (Nassirzadeh et al. 2022; Shandiz et al. 2022; Daryaei et al. 2022; Namakavarani et al. 2021). The sample is selected using purposive sampling whereby companies that have been continuously active during the research period without a trading halt of more than six months are included in the sample, while investment firms, insurance companies, banks, credit institutions, and holding and leasing companies are excluded due to the unique nature of their activity. The sample includes one hundred and fifty-six companies (see Table 1).

**Table 1.** Screening procedure.

Description	N
Total number of active companies in 2020	599
Listed after 2008	−76
Trading halt of more than three months	−55
Changes in fiscal year	−12
Delisted	−38
Investment firms, insurance companies, banks, credit institutions, and holding/leasing companies	−161
Unrelated industries	−96
Inaccessible data	−5
Remaining companies	156

The present research measures managers' tone in MD&As. The data relating to managers' disclosure tone in MD&As are analysed using MAXQDA 11 (VERBI GmbH, Berlin, Germany). This software calculates the frequency and percentage of positive and negative words in texts in MS Word format. Other data are collected through document mining from the CODAL database<sup>2</sup> (financial information of TSE-listed companies). Multiple linear regression with year and industry fixed effects is used for data analysis.

##### 4.1. Model and Variables

Model (1) is used to test the first hypothesis regarding the relationship between managers' disclosure tone inconsistency and abnormal net purchase volume:

$$\begin{aligned}
 AVOL_{i,t+1} = & \beta_0 + \\
 & \beta_1 RSD\_Tone_{it} + \beta_2 N\_Tone_{it} + \beta_3 ABSCAR3_{i,t+1} + \beta_4 MCAP_{i,t+1} + \beta_5 LNPRC_{it} + \\
 & \beta_6 PRIORAFSD_{it} + \beta_7 MKTVOL_{i,t+1} + \beta_8 \sum macroeconomic_{i,t+1} + \sum \alpha_t year + \\
 & \sum \alpha_t ind + \varepsilon_{it}
 \end{aligned}
 \tag{Model 1}$$

where *AVOL* is abnormal net purchase volume; *RSD\_TONE* is tone inconsistency (residual tone); *N\_TONE* is normal tone; *ABSCAR3* is the absolute value of the return of the event window; *MCAP* is market capitalisation; *LNPRC* is the natural log of the stock price at the fiscal year-end; *PRIORAFSD* is the manager's forecast surprise risk; *MKTVOL* is the percentage of shares traded; and  $\sum macroeconomic$  denotes the macroeconomic variables.

The event window covers the day of publication of MD&As, the day before, and the day after (−1, 0, and +1). To calculate the abnormal net purchase volume, first, stock sales are subtracted from stock purchases to obtain net stock purchases for the 3-day event window. Then, the average net purchase in this window is calculated. Similarly, the average net purchase is calculated for the 30 trading days before the publication of MD&As (−2 to −31). Finally, the abnormal net purchase volume is calculated by subtracting the past 30 trading days' average net purchase of the 3-day event window. Table 2 (first panel) shows the measurement of other variables.

**Table 2.** Variables and measurements.

Panel a: Variables of Model 1			
	Variable	Index	Measurement
Dependent	Abnormal net purchase volume	AVOL	Mean daily trading volume during the event window (−1, 0, 1) minus the mean daily trading. Volume in the non-event window (−49, −2) scaled by the non-event window total volume of trades.
	Residual tone	RSD_TONE	Residual linguistic tone is estimated as the error value in Equation (2). (See Equations (1) and (2) in the measurement section of the tone inconsistency variable).
Firm-level controls	Normal tone	N_TONE	TONE(Equation (1))—RSD_TONE.
	The absolute value of the return of the event window	ABSCAR3	The absolute size and book-to-market adjusted 3-day event window buy-and-hold returns.
	Market capitalisation	MCAP	Log of the firm's market value at the beginning of the forecast period.
	Stock price	LNPRC	Natural log of the stock price at the fiscal year-end.
	Manager's forecast surprise risk	PRIORAFSD	The standard deviation of financial analyst forecasts before the management forecast release.
	Percentage of shares traded	MKTVOL	The sum of the percentage of shares traded in the 3-day event window. The rate of shares traded per day equals the total shares traded divided by the total number of shares outstanding.
Macroeconomic controls	Inflation rate	FR	Consumer price index
	Interest rate	IR	The interest rate set by the Central Bank.
	Dollar price	DR	The average dollar price announced by the Central Bank.
	Money supply	MS	The total amount of money and near money in circulation (announced by the Central Bank).
	Stock price volatility	SPF	The standard deviation of the stock price at the end of the year.

Table 2. Cont.

Panel b: Variables of Model 2			
	Variable	Index	Measurement
Dependent	Abnormal net purchase	NETBUY	Similar to the first model, separated from small and major shareholders.
Independent	Residual tone	RSD_TONE	Similar to the first model.
	Interactive effect of investor type and tone contrast	TYPE- INVESTOR * $RSD\_Tone_{it}$	Number one for small shareholders and zero for major shareholders multiplied by the residual tone.
	Normal tone	N_TONE	Similar to the first model.
Firm-level controls	Earnings surprise	ESURP	The difference between actual earnings per share minus mean analyst forecast per share.
	The absolute value of the return of the event window	ABSCAR3	Similar to the first model.
	Market value	MCAP	Log of the firm's market value at the beginning of the period.
Macroeconomic controls	Similar to the first model.		

Firm-level control variables are adopted from Baginski et al. (2018). \* Significant at the 90% level.

Model (2) is used to test the second hypothesis regarding the relationship between managers' disclosure tone inconsistency and abnormal net purchase volume of small and large investors:

$$NETBUY_{i,t+1} = \beta_0 + \beta_1 RSD\_Tone_{it} + \beta_2 TYPE-INVESTOR_{i,t+1} \times RSD\_Tone_{it} + \beta_3 N\_Tone_{it} + \beta_4 ESURP_{it} + \beta_5 MCAP_{i,t+1} + \beta_6 ABSCAR3_{i,t+1} + \beta_7 \sum macroeconomic_{it+1} + \sum \alpha_t year + \sum \alpha_t ind + \varepsilon_{it} \quad (\text{Model 2})$$

where *NETBUY* is the abnormal net purchase volume; *RSD\_TONE* is residual tone; *N\_TONE* is normal tone; *TYPE-INVESTOR* denotes the type of investor (small or large); *ESURP* is manager's forecast surprise risk; *MCAP* is market capitalisation; *ABSCAR3* is the absolute value of the return of the event window; and  $\sum macroeconomic$  denotes the macroeconomic variables. The abnormal net purchase volume is calculated separately for small and large investors, similar to Model (1). The variable definitions are presented in Table 2.

The measurement of the variables included in Models (1) and (2) is described in Panels A and B of Table 2, respectively. The measurement of tone inconsistency and investor type is described in more detail below.

#### 4.2. Measuring Tone Disclosure Inconsistency

Following Henry (2008) and Henry and Leone (2016), disclosure tone is measured as follows using a word list:

$$Tone = \frac{PW - NW}{PW + NW} \quad (1)$$

where *PW* is the number of positive words, and *NW* is the number of negative words. If the result is positive (negative), the disclosure tone is optimistic (pessimistic).

The present research uses Loughran and McDonald's (L&M) finance-oriented dictionaries (Loughran and McDonald 2011, 2014). As noted earlier, one of the contributions of the present research is that it uses word combinations along with common words. According to Luo and Zhou (2019), one of the limitations of disclosure tone measurement is that standard dictionaries do not contain word combinations, which can potentially lead to measurement errors. For example, "growth" is a positive word and "loss" is a negative



word. However, “growing damage” has a very negative tone. To address this limitation, a set of word combinations were identified based on an analysis of a sample of 50 annual reports of the manager to the general meeting of shareholders. Common combinations were identified and added to L&M dictionaries. More specifically, 57 word combinations were added to the list of negative words and 57 to the list of positive words.

Finally, tone inconsistency is measured as the absolute value of residual (abnormal) tone. Following Huang et al. (2014), we regress TONE on a set of variables that proxy for expected risk and return to identify residual tone. Our proxy for residual tone (RSD\_TONE) is thus the residual ( $\epsilon$ ) from the following Model:

$$Tone_{it} = \beta_0 + \beta_1 EARN_{it} + \beta_2 SIZE_{it} + \beta_3 BTM_{it} + \beta_4 RET_{it} + \beta_5 STD\_EARN_{it} + \beta_6 STD\_RET_{it} + \beta_7 LOSS_{it} + \beta_8 AGE_{it} + \beta_9 \Delta EARN_{it} + \epsilon_{it} \quad (2)$$

where *EARN* is the reported profit in the current period and is divided by the total assets for homogenisation; *SIZE* is the company's size, which is used from the natural logarithm of the market value of the total assets. *BTM* is measured by dividing the book value of equity by the market value of equity. *RET* is the annual stock return and is the average monthly return of the current period. *STD\_EARN* is the standard deviation of the profit of the current period compared to the previous period. *STD\_RET* is the standard deviation of the annual stock return of the current period compared to the previous period. *LOSS* is a dummy variable that if the company has a profit, it is assigned number one and otherwise is assigned number zero. *AGE* is the natural logarithm of the years of the company's life, and  $\Delta EARN$  is the change in the profit of the current period compared to the previous period.

#### 4.3. Identifying Small and Large Investors

There are various ways of distinguishing between small and large investors. Many studies assume that trades of USD 5000 or less are made by small investors and trades of USD 50,000 or more are made by large investors (Barclay and Warner 1993; Cornell and Sirri 1992; Bhattacharya et al. 2007; Baginski et al. 2018). This distinction is based on the assumption that large (sophisticated) investors are unlikely to engage in small trades. Following prior research, medium-sized trades (between USD 5000 and USD 50,000) are disregarded since it is unclear whether the investors behind these trades are sophisticated.

In other studies, the distinction is made based on the idea that professional investors (institutions) are wealthier, more sophisticated, and more likely to make larger trades. In contrast, individual investors who are less wealthy and less sophisticated are more likely to make smaller trades. Given the limited access to trade details in the Tehran Stock Exchange, individual investors are considered small and institutional investors as large in the present research.

## 5. Findings

### 5.1. Descriptive Statistics

The sample comprises 1551 company years for MD&A reports over the ten years between 2011 and 2020. Descriptive statistics of the variables are provided in Table 3.

The abnormal net purchase has the highest variation range and skewness among the variables in Models (1) and (2) (see Table 3). The descriptive statistics suggest that the data have a normal distribution.

**Table 3.** Descriptive statistics of the variables.

	Obs.	Mean	Median	Max.	Min.	SD	Skewness
AVOL	1411	0.2	−0.004	185.46	−81.98	5.74	22.54
RSD_TONE	1411	0.083	0.064	0.87	0.00	0.075	2.22
N_TONE	1411	0.57	0.58	0.92	0.082	0.16	−0.43
ABSCAR3	1411	0.046	0.022	2.17	0.00	0.12	11.74
MCAP	1411	14.64	14.3	22.59	10.49	1.84	0.84
LNPRC	1411	8.70	8.55	12.69	6.01	1.10	0.43
PRIORAFSD	1411	0.46	0.11	17.41	0.00	1.16	7.78
MKTVOL	1411	0.007	0.002	0.23	$4.07 \times 10^{-7}$	0.01	6.61
NETBUY	1411	2,187,748	0.00	1,760,000,000	−303,000,000	52,423,777	28.57
TYPE_INVESTOR	1411	0.64	1	1	0	0.47	−0.61
ESURP	1411	0.093	0.012	24.62	−23.57	1.75	−1.14
Inflation Rate	1411	24.15	30.5	41.2	9	11.91	−0.047
Interest Rate	1411	17.59	18	21.5	13	2.63	−0.40
Dollar Rate	1411	6964	3586	22977	1600	6148	1.60
Money Supply	1411	13,788,023	12,533,900	34,670,000	3,522,200	8,418,387	1.14
Stock Price Fluctuation	1411	5.19	5.12	9.82	0.00	1.52	−0.12

### 5.2. Hypotheses Testing

Table 4 provides the results of fitting Model (1) pertaining to the relationship between managers' disclosure tone inconsistency and abnormal trading volume. The first model results show that the fitted model is significant and has acceptable performance. The adjusted coefficient of determination indicates that 20.56% of abnormal trading volume is explained by changes in tone inconsistency and the control variables. The regression coefficient of tone is 0.88 (SE = 0.2;  $p$ -value = 0.0052). The first hypothesis is confirmed at the 95% confidence interval (CI) according to the regression coefficient and significance level. Only the event window positively affects abnormal trading volume among firm-level control variables (SE = 0.031;  $p$ -value = 0.19). Moreover, there is no significant relationship between macroeconomic control variables and abnormal trading volume (see Table 4).

Table 3 provides the results of fitting Model (2) for the second hypothesis. In this model, the investor type ( $TYPE\_INVESTOR_{it+1}$ ) is a dummy variable that takes the value of 1 for small investors and 0 for large investors.  $\beta_1 + \beta_2$  indicates the relationship between tone inconsistency and abnormal trading volume of small investors, and  $\beta_1$  indicates the relationship between tone inconsistency and abnormal trading volume of large investors.

Fisher's statistic and the significance level indicate that the fitted model is significant. The adjusted coefficient of determination shows that changes in the tone inconsistency variable and the control variables explain 25% of changes in abnormal trading volume. The coefficient of tone inconsistency ( $\beta_1$ ) is not significant. Therefore, there is no meaningful relationship between tone inconsistency and the abnormal trading volume of large investors. For the second hypothesis, the coefficient of interest is  $\beta_1 + \beta_2$ . Since  $\beta_1$  is not significant, it is set to zero.  $\beta_2$  (interaction) is 0.61 (SE = 0.1;  $p$ -value = 0.000). Therefore, there is a significant positive relationship between tone inconsistency and the abnormal trading volume of small investors, and the second hypothesis is confirmed at 95% CI. Among firm-level control variables, there is a significant negative relationship between normal tone and abnormal trading volume (SE = 0.15;  $p$ -value = 0.000), and a significant positive relationship between event window and abnormal trading volume (SE = 0.01;  $p$ -value = 0.000). Moreover, there is no significant relationship between any of the macroeconomic control variables and abnormal trading volume (see Table 4, Panel B).

**Table 4.** Results of fitting the models.

	MODEL 1		MODEL 2	
	Coefficients (Statistics)	VIF	Coefficients (Statistics)	VIF
RSD_TONE	0.88 ** (2.94)	1.85	0.08 (0.2)	1.77
TYPE-INVESTOR * <i>RSD_Tone<sub>it</sub></i>			0.91 *** (8.81)	1.9
N_TONE	−0.26 (−0.26)	2.03	−0.57 ** (8.71)	2/23
ESURP			−0.02 (−1.3)	1.86
ABSCAR3	0.074 ** (2.33)	3.15	0.008 (0.03)	1.69
MCAP	0.011 (0/1)	1.55	0.072 ** (3.71)	2.5
LNPRC	−0.11 (0.47)	1.39		
PRIORAFSD	−0.004 (−0/032)	1.8		
MKTVOL	−5.13 (−0.47)	1.94		
FR	−0.013 (−0.79)	2.12	0.001 (0.27)	1.8
IR	0.033 (0.37)	2.2	−0.005 (−0.37)	1.57
DR	0.0002 (1.19)	2.51	−2.49 (−0.84)	2.48
MS	−1.47 (−1.44)	1.66	3.14 (0.18)	2.12
SPF	0.04 (0.26)	1.23	−0.004 (−0.18)	1.73
Constant	1.65 (0.52)		−0.94 (−2.04)	
Year FE	Yes		Yes	
Firm FE	Yes		Yes	
Observations	1551		1551	
R <sup>2</sup>	20.56%		25.5%	
F-statistics	5.35		8.23	
Durbin-Watson stat	1.86		2.04	

\* Significant at the 90% level; \*\* significant at the 95% level; \*\*\* significant at the 99% level. The coefficient for each variable is reported, and *t*-test values appear in parentheses.

### 5.3. Robustness Tests

The following additional tests are performed to verify the robustness of the baseline results.

1. The independent variable, tone inconsistency, is divided into quartiles, and the models are estimated based on the first and fourth quartiles (Table 5, Panel A). In the first model, the coefficients of tone inconsistency are 0.65 for the first quartile and 0.92 for the fourth quartile, and both are statistically significant. In the second model, the coefficients of the interaction (*TYPE-INVESTOR* × *RSD\_Tone<sub>it</sub>*) are 0.73 for the first quartile and 1.08 for the fourth quartile, and both are statistically significant. This

- coefficient difference shows the effect of tone inconsistency on abnormal net purchase volume and confirms the first hypothesis.
- Research models are estimated for a subsample of the 1411 MD&As (Table 5, Panel B). A total of 20 percent of the sample (282 reports) are randomly selected and tested. The results show that the coefficient of tone inconsistency in the first model and the coefficient of the interaction  $TYPE-INVESTOR \times RSD\_Tone_{it}$  in the second model are significant and equal to 0.75 and 0.87, respectively. These coefficients are close to the baseline estimates.
  - The models are estimated using random instead of fixed effects (Table 5, Panel C). The estimation results are not significantly different from the baseline findings.

**Table 5.** Results of robustness tests.

Independent Variable	Panel A: Estimating the Models for the First and Fourth Quartiles				Panel B: Estimating the Models with a Randomly Selected Subsample		Panel C: Estimating the Models Using Random Effects	
	First Quartile	Fourth Quartile	First Quartile	Fourth Quartile				
	Model 1	Model 1	Model 2	Model 2	Model 1	Model 2	Model 1	Model 2
$RSD\_Tone_{it}$	0.65 ** (2.16)	0.92 ** (1.97)			0.75 ** (1.14)		0.94 * (1.14)	
$TYPE-INVESTOR * RSD\_Tone_{it}$			0.73 ** (1.76)	1.08 *** (3.09)		0.87 *** (2.7)		0.65 ** (1.8)

\* Significant at the 90% level; \*\* significant at the 95% level; \*\*\* significant at the 99% level. These results are only provided for the independent variables.

## 6. Discussion

The tone of managerial disclosures is inherently tricky to process, and this is likely to create disagreement among investors and has significant implications for stock prices (Engelberg 2008; Huang et al. 2014). Various studies (e.g., Bhattacharya et al. 2007; Shanthikumar 2012; Mikhail et al. 2007; Blankespoor et al. 2019) have shown that small (individual) investors are more prone to suboptimal trading and wealth loss due to their relative lack of expertise in information processing. However, except for Baginski et al. (2018), there has been no comprehensive study on the effect of managers' biased tone on the transactions of small and large investors. The present research study contributes to the theoretical and empirical literature.

In the present research, the part of tone related to economic news and fundamentals is separated from the section containing noise or bias using financial linguistics and archival data. The residual tone is investigated as a measure of managers' tone inconsistency and its relationship with investors' trading volume. Differences between small and large investors in information processing are measured using abnormal trading volume. We use a different approach to distinguish small and large investors compared to Baginski et al. (2018). Another contribution of this research is that it supplements a standard word list with 100 word combinations. Moreover, this research provides evidence of managers' abnormal disclosure tone effect on investors' transactions in developing economies.

Comparison of findings with previous research: Our results indicate a significant positive relationship between managers' tone inconsistency and the abnormal trading volume of all investors. This is consistent with the findings of Engelberg (2008); Huang et al. (2014); Baginski et al. (2018); and Loughran and McDonald (2011) who found that managers' positive tone has no significant effect on investors' transactions.

Furthermore, the findings show a positive and significant relationship between the tone inconsistency and the abnormal net purchase of small shareholders. However, there is a negative but non-significant correlation between the tone inconsistency and the anomalous net purchase of significant shareholders. These findings support the results of Hofstede (1972), Barberis et al. (1998), Lee (1992), Libby et al. (2002), Battalio and Mendenhall (2005), Bhattacharya et al. (2007), Mikhail et al. (2007), Henry (2008), Shanthikumar (2012), and

[Blankespoor et al. \(2019\)](#). However, [Feldman et al. \(2010\)](#) and [Lee and Park \(2019\)](#) show that MD&As convey more information about the company's position and help reduce the information asymmetry between management and shareholders, thus improving the disclosure environment.

## 7. Conclusions

The results also indicate a significant difference in small and large investors' ability to process the tone of overly optimistic disclosure. This is in line with the assumption that pessimistic language is inherently more credible and leads to a more homogeneous interpretation by investors. It can be concluded that small (individual) investors have less expertise and ability to process managers' disclosures and may misinterpret their biased or inconsistent tone. Therefore, managers' tone inconsistency can lead to the transfer of wealth from small (individual) investors to large (institutional) investors.

Based on the present findings and other theoretical and empirical evidence discussed in this article, we argue that it is easier and less risky for companies to mask their poor performance by embellishing non-financial information instead of manipulating financial information. Therefore, managers may use a biased tone in their qualitative reports that are inconsistent with the company's current performance and circumstances. This inconsistency can have detrimental consequences for the capital market. The present research results indicate that disclosure tone inconsistency creates information asymmetry between managers and investors and between small and large investors. Information asymmetry can lead to abnormal returns, price volatility, mispricing, reduced information content, lower stock market efficiency, and ultimately, investors' mistrust in the capital market.

**Implications and suggestions:** Given that the stock market may not take biased disclosure tone (whether intentional or unintentional) seriously due to the voluntary nature of these disclosures, reviewing and improving qualitative disclosure standards in financial reporting can contribute to the stability of stock markets, reduction of volatility, and lead to better investor protection. Future researchers can also target medium-sized firms to test the developed hypotheses in this study.

In addition, the inconsistency between the results of this research and some previous studies suggests that the source of managers' biased tone could be significant in investigating its impact on the capital market. We recommend that future researchers address this issue. Future researchers can also target medium-sized firms to test the developed hypotheses in this study.

**Limitations:** The present study is subject to some restrictions. Various methods and word lists have been used for measuring managers' disclosure tone and abnormal tone. Our choices may have affected the results and could potentially limit the generalisability of the findings. We used the L&M dictionary and word list for tone measurement and added 100 word combinations to address its limitations. We also used [Huang et al.'s \(2014\)](#) model to measure abnormal tone (tone inconsistency). The information used in this study is related to 143 companies listed on the Tehran Stock Exchange from 2011 to 2020. Given the specific characteristics of the environment and the market in which these firms operate, generalising the findings to other markets may not be very applicable. However, we believe this limitation had no significant impact on the validity and reliability of the models and the obtained results.

**Author Contributions:** Conceptualisation, methodology, software, validation, formal analysis, investigation, resources, data curation, and writing—original draft preparation: A.P., F.N. and R.H.; writing—review and editing and revision, and administration: D.A. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no funding.

**Data Availability Statement:** Tehran Stock Exchange ([seinitiative.org](http://seinitiative.org) accessed on 14 September 2018).

**Conflicts of Interest:** The authors declare no conflict of interest.



## Abbreviations

MD&A	Management discussion and analysis
L&M	Loughran and McDonald
SEC	Securities and Exchange Commission
RSD_TONE	Residual tone
CI	Confidence interval
VIF	Variance inflation factor

## Notes

- <sup>1</sup> Quantitative disclosure refers to financial statements and qualitative disclosure refers to other textual or narrative disclosures by managers. In this article, disclosure tone refers to the tone of qualitative disclosures or narrative and textual reports.
- <sup>2</sup> [www.codal.ir](http://www.codal.ir). (accessed on 18 September 2020).

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