

The Impact of Earnings Management on Liquidity: Case of the Tunisian Stock Market

Youssef Riahi^{1*}, Imen Lamiri², and Mounira Ben Arab³

¹Institute of higher Management of Tunis, university of Tunis

² Institute of higher Management of Tunis, university of Tunis

³ Institute of higher Management of Tunis, university of Tunis

*Correspondence: Youssef Riahi, Assistant at Institute of higher Management of Tunis, university of Tunis, Tunis. E-mail: youssef.riahi@gmail.com

Abstract: The aim of this paper is to study the relationship between earnings management and the liquidity of the Tunisian market. Our study was conducted on a sample of 19 companies listed on the Tunis Stock Exchange over the 1999 - 2011 periods.

Our results corroborate the existence of a positive and significant relationship between the earnings' management achieved by the Tunisian companies and the market liquidity.

Our study shows that the practice of earnings' management makes the market more liquid. This result can be accounted for by the lack of awareness among the liquidity- providers of this practice, especially as the level of earnings' management and the level of disclosure carried out the by companies that constitute our sample are not very high. Besides, this result confirms the theory stating that the investors buy the earnings.

JEL Classifications: G10, M41

Keywords: Earnings' management, information asymmetry, disclosure information, market liquidity.

1. Introduction

It is taken for granted that information is the cornerstone that determines the effective operation of any financial market. In this respect, Levitt (2000) suggests in a somewhat metaphorical rhetoric that *«the quality of information is the vital blood of a powerful and efficient market. Without it liquidity is crippled and the market efficiency fades out¹»*. This quotation can only confirm the fundamental role that can be played by disclosure information in the capital market.

The quality of financial information is a controversial issue that has been widely discussed in the accounting and financial literature. In terms of methodology, it turns out that the variable quality of financial information can be measured either by the level of disclosure (Botoson, 1997) or by the level of earnings' management (Zhou, 2007; Bhattacharya, Desai, & Venkataraman, 2008). The communication decisions aim at influencing investors' expectations, improving the relationships with the capital providers or upgrading the conditions of access to the financial market. As liquidity

¹ Quality information is the lifeblood of strong, vibrant markets. Without it, liquidity dries up. Fair and efficient markets cease to exist.

is a key concept for operating in the financial markets around the world, it stands for a fundamental quality sought by any investor for the selection and management of his portfolio. Therefore, it represents the ultimate intervention criterion in the markets.

The existence of an information asymmetry between the business organization and the investors urges the market makers to widen the spread of this company to hedge themselves against losses when they undertake any transaction. By enhancing the quantity and quality of the information they disseminate, firms can reduce the expectations' heterogeneity of external investors. Transparent information minimizes the risk of adverse selection perceived by the trader and upgrades the liquidity of the issuer on the market.

The efficient functioning of the capital market depends on the quality, accuracy and transparency of financial information. Heflin, Shaw, and Wild (2001) state that high-quality disclosure fosters the market liquidity by reducing information asymmetry. Information issues prevent the optimal and efficient resource allocation in a capital -market economy. The disclosure of credible information plays an important role in mitigating these problems.

Henceforth, given the importance of the role played by the disclosure of information, and mainly its credibility, it is worth examining this mechanism among the listed Tunisian companies. In fact, Tunisia has adopted a proactive policy of economic liberalization urged by the market economy mechanisms (the signing of the General Agreement on Tariffs and Trade, the accession to the World Trade Organization, the establishment of a free trade zone with the European Union², implementing schemes for boosting the financial market, the liberalization of foreign trade, as well as the restructuring of the banking sector, etc ...). This new orientation is accompanied by economic, legal and cultural reforms aimed at promoting domestic and foreign private investment along with partnerships set up in an environment of transparency and security.

Law No. 94-117 of 14-11-1994 governing the reorganization of the financial market regulated the information disclosure undertaken by the listed companies. In addition, since 1995, Tunisia has set a reform of the accounting system in force by cancelling the French- inspired accounting principles and aligning with the international accounting standards. Thus, in compliance with these shifts, the regulatory agencies require more reliable and swift information. The revised accounting- system set in a new conceptual framework shows that the financial statements stand for communication mechanisms whose regular publication allows the users to assess, compare and forecast the company's profitability, solvency and liquidity.

The reform of the accounting standards are thereby justified to meet the ever-increasing needs of financial information useful for the decision- making in terms of investment and loan-making. The New Corporate Accounting System set in 1996 (96 SCE) aims, in particular at achieving the following goals:

Meet the needs of the different users by fostering the production and publication of accurate and comprehensive financial data that should be relevant to the adequate economic decision-making mainly for investment and credit.

The publication and disclosure of standardized financial statements allow for comparative studies over time and space and help determine the macroeconomic aggregates.

In our study, we shall try to analyse, first, how investors interpret the phenomenon of earnings' management carried out by the Tunisian firms and, secondly, find out the impact of earnings management on the market liquidity.

² The agreement was signed 17 July 1995. It provides the full opening of the country to European products.

The remainder of our research paper shall be structured as follows. Section 2 presents a review of the literature on disclosure information, earnings management, and the market liquidity by focusing on the various explanations offered. In section 3 in a first step, we shall describe the sample and the data used in the empirical study. Then, in a second step we shall display the results findings. Eventually, section 4 provides a summary of the results.

2. Disclosure Information, Earnings Management and Market Liquidity: Review of the Literature

The issue whether the poor quality of accounting results is costly for businesses, has received a tremendous interest not only from theorists but also from practitioners and regulators. Likewise, Arthur Levitt (1997), former chairman of the Securities and Exchange Commission (SEC) pointed out in a statement, «*a paramount benefit of high- quality accounting standards is to improve liquidity and lower capital cost*», Heflin *et al.* (2001) indicate that high- quality disclosure enhances the market liquidity by reduces information asymmetry. As a matter of fact, one of the fundamental objectives of the of high-quality information disclosure useful for making appropriate decisions in the right time is reducing information asymmetry between the misinformed investors and the well-informed ones. Through this objective of minimizing information asymmetry, the managers of the listed companies on the stock market seek by adopting an open- communication policy that reduces transaction costs related to the acquisition of private information, to ensure an appropriate risk - sharing between investors and ensure a consistent anticipation for these investors, in order to improve the liquidity of securities and the financial markets. In this regard, several research studies (Leuz & Verrecchia, 2000; Bloomfield & Wilks, 2000; Heflin *et al.*, 2001; Zhou, 2007; Wasan & Boone, 2010) tested the hypothesis on the existence of a positive relationship between the quality of corporate financial and accounting communication and the liquidity of their securities.

Cox (2006) points that the high-quality of accounting standards improves the liquidity of the market and it is beneficial for investors as it enhances the comparability of financial information in terms of investment strategies.

On a sample of 3912 observations (firm, year) over an eight-year period (1995-2002), Wasan and Boone (2010) found that the adverse selection (spread-component) rises with the level of abnormal accruals.

Chung, Sheu, and Wang (2009) show that when the level of information asymmetry is high and the shareholders do not have sufficient resources to monitor the managers, they are more likely to manage the results. By studying the relationship between earnings management and the liquidity of the securities, they found that the firms that process their performance through earnings management report the highest costs of adverse selection. Owing to these costs, the liquidity providers expand their bid ask spread and therefore the liquidity decreases.

Bhattacharya, Ecker, Olsson, and Schipper (2007) reported that among the outcome of poor accounting results is the surge in information asymmetry, i.e. greater adverse selection (which is a component of the bid ask spread), and thus there are more high liquidity costs. The intuition behind the poor-quality results that lead to information-asymmetry is extended to the very nature of accruals.

The accruals allow the forecast of future cash flows. So the quality of the results may affect the uncertainty of future cash flows and therefore it may induce information asymmetry between the informed investors and the uninformed ones.

In some cases earnings management can be beneficial and can enhance the quality of financial information disclosed by the company. For instance, in a context of asymmetric information, where

managers have the privileged information on the future of their business, must provide this information to investors to enable them to properly assess the shares that are proposed to them. It seems that such a handling could be beneficial. According to Chung, Ho, and Kim (2004) it seems that foreign investors prefer to invest in Japanese companies that are characterized by a high quality of disclosure and an insignificant informational asymmetry.

Similarly, vein, Aharony, Lee and Wong (2000) reported that the Chinese companies do not have the same motivation in earnings management as the U.S. companies. Indeed, for the Chinese companies the manager is not a shareholder, he has no benefit in manage earnings. In this case, it is the state that urges the companies to handle the earnings in order to increase the hard-currency yields achieved from the share-trading with foreign investors. Habib, Hossain, and Jiang (2011) also indicated that the investors are more confident towards the companies that generate steady earnings.

Easton, Harris, and Ohlson (1992) and Habib *et al.* (2011) argue that investors « buy the earnings ». Indeed the institutional investors avoid the companies that have high fluctuating results and perceived as risky. Hence, the institutional investors would rather invest in companies with steady earnings.

While several previous studies have examined the relationship between earnings' management and the disclosure of information (Yu, 2008; Allayannis & Simko, 2009; Iatridis & Kadorinis, 2009; Riahi & Ben Arab, 2011), other research have investigated the relationship between disclosure information and the liquidity of securities (Matoussi, Karaa, & Maghraoui, 2004; Gana & Chemli, 2008; Haddad, AlShattarat, & Nobanee, 2009); however, studies on the relationship between earnings' management and liquidity remain relatively scarce, especially in emerging markets.

Our paper aims to enrich the debate on this issue by examining the impact of earnings management on the market liquidity in the Tunisian context.

3. Methodology

The quality of information, such as accounting information provided to the public, is very paramount for the market liquidity. The disclosure reduces information asymmetry through the securities' trading, which increases the liquidity of securities and also cuts the cost of the business capital (Amihud & Mendelsohn, 1980).

Some authors emphasized that the quality of public information, such as the accounting records, influence the liquidity of a company's securities, for instance Heflin, Shaw, and Wild (2005); Espinosa Blasco, Tapia, and Trombetta (2008); and Chan, Dimmock, and Lakonishok (2009) point out that there is a relationship between the information quality and the liquidity of the market.

In this paper, we intend is to provide evidence on the relationship between earnings' management and the market liquidity. We shall start by developing the hypotheses. Based on these assumptions, we shall present the model to be tested and measure the used variables. Then, we set the estimation method and the descriptive statistics. Eventually, we shall display and interpret the results.

3.1 Hypotheses' Formulation

Chung *et al.* (2009) studied the influence of earnings' management on the liquidity of the securities of a company; they found that the organizations that manage the earnings suffer higher liquidity costs. They also found that aggressive earnings' management reports higher agency costs and asymmetric information. As a result, liquidity providers incur higher costs and therefore it increases the value of the bid ask spread and reduces the liquidity supply.

Kim, Jain, and Rezaee (2006) showed how the Sarbanes-Oxley³ Law has affected the market liquidity. They also ascertained that the improvement of the market liquidity is related to the enhancement of the quality of the recorded results. Thus, our first hypothesis is put forward as follows:

H1: There is a negative relationship between earnings management and the market liquidity.

DeFond & Jiambalvo (1994) reported that the firms which violated covenants' restrictive clauses have positive discretionary accruals suggesting that the leaders of such firms manage their earnings according to a rising trend.

Dumontier and Elleuch (2002) pointed out in their study conducted on the French market that the investors were aware of the manipulations when they had the means to detect them. However, the investors do not alter the assessment of the company when they notice that the results are handled according to a rising trend. Nevertheless, they revise their evaluation with a downward trend when the results are reported to be down. In other words, a low-trend earnings handling leads to the share price movements, whereas the increase has no significant effect on prices. Investors believe that a downward-trend earnings management reveals that the leaders hold pessimistic expectations about the future of their business.

Balsam, Bartov, and Marquardt (2002) focused on how investors react when the detailed financial statements are published. They found that the upward-trend earnings manipulation was consistently associated with negative price reactions, while the manipulation of earnings on the fall is associated with positive price reactions. They concluded that the investors recognize the manipulations when they have the data enabling their detection. As for the second hypothesis, it checks the trend of the earnings management performed by the companies. We presume that the investors react according to the earnings management trend. Hence, our second hypothesis is as follows:

H2: Investors react according to the earnings management trend (upward or downward).

3.2 Data Sources and Sample

The study deals with a sample of 19 non-financial companies quoted on the Tunis Stock Exchange (TSE) over a 13 year- period (1999-2011). The selection of our sample was made on the basis of two criteria:

1. Eliminating the financial companies like (banks, financial services, leasing companies, insurance brokers, and real estate firms), as their accounting documents comply with specific accounting standards that are different from the ones applied to the activity sectors and which record specific accruals.
2. A set of available financial information such as the income statements and balance sheets of these companies.

The data were compiled from the TSE and the Financial Market Council.

3.3 Model Specification

In order to test the hypothesis on the relationship between earnings management and the market liquidity, we opt for a technical econometric estimation on panel data. Bearing in mind that our goal

³ In the U.S., the 2002 Law on accounting reform of listed companies and investor protection is a federal law imposing new rules on accounting and financial transparency.

is to find out the impact of earnings management on the market liquidity, and then discover if the investors are aware of the phenomenon of earnings management.

To meet our goal and test the hypothesis, we use the Chung *et al.* (2009) model:

$$LIQ_{j,t} = \beta_0 + \beta_1 AD_{j,t} + \beta_2 SIZE_{j,t} + \beta_3 TVOL_{j,t} + \beta_4 PRICE_{j,t} + \beta_5 RETURN_{j,t} + \beta_6 VOLRETURN_{j,t} + \varepsilon_{j,t} \quad (1)$$

With:

$LIQ_{j,t}$: is the liquidity of the stocks of the firm j in year t ;

$AD_{j,t}$: is the discretionary accruals of firm j in year t ;

$SIZE_{j,t}$: is the size of firm j in year t ;

$TVOL_{j,t}$: is the mean daily dinar trading volume of stock j in year t ;

$PRICE_{j,t}$: is the mean price of stock j in year t ;

$RETURN_{j,t}$: is the mean daily returns of stock j in year t ;

$VOLRETURN_{j,t}$: is the standard deviation of daily returns of stock j in year t ;

3. 4 Variables' Measurement

The theory provides various measurements for the market liquidity (relative spread, practiced spread, depth ...). In our study, we measure this variable with the relative spread (Heflin *et al.*, 2001; Matoussi *et al.*, 2004; Kim *et al.*, 2006; Hakim, Triki, & Omri, 2008; and Almutairi, Dunn, & Skantz, 2009), and depth (Heflin *et al.*, 2001; Matoussi *et al.*, 2004; and Kim *et al.*, 2006) since these measures to be adopted in the Tunisian context and are the most crucial liquidity on the Tunis Stock Exchange (Table 1).

The Relative Spread: for each value of the sample and for each day, we calculate the spread, as the difference between the best purchase price and the best sale price divided by the average of the two prices. Indeed, it is calculated over a year. And it is equal to the average of the spread computed for this period. This variable was measured in the same way by Sarin, Shastri, and Shastri (2000); Heflin and Shaw (2000); and Attig, Fong, Gadhoun, and Lang (2006).

$$SPRD_{j,t} = (\text{price ASK}_{j,t} - \text{price BID}_{j,t}) / Mt \quad (2)$$

With:

price ASK j, t : is the price ask of stock j on day t ;

price BID j, t : is the price bid of stock j on day t ;

Mt : $(\text{price ASK}_{j,t} + \text{price BID}_{j,t}) / 2$

Depth: Similar to the relative spread, the daily depth is calculated as the sum of the available amounts on the best displayed limits (the best bid and ask price) which are halved. Then the depth is defined by the logarithm of the annual average. The greater this measurement, the greater the liquidity.

$$\text{Depth}_{j,t} = (Q_{\text{ask } j,t} + Q_{\text{bid } j,t}) / 2 \quad (3)$$

With:

Qask j, t : the amount available on the ask price for firm j on day t ;

Qbid j, t : the amount available on the bid price of firm j on day t ;

Discretionary Accruals:

We adopt the definition of discretionary accruals of Kothari, Leone, and Wasley (2005) to measure earnings management. So Kothari *et al.* (2005) add the variable ROA to Jones (1991) model. We used this model, because it showed its robustness to detect earnings management, especially in performance firms and we found that on average the Tunisian firms are successful. However, this model proved to be more adaptable to the Tunisian context:

$$(Tacc_{j,t} / AT_{j,t-1}) = w0 + w1 (1 / AT_{j,t-1}) + w2 (\Delta REV_{j,t} / AT_{j,t-1}) + w3 (PPE_{j,t} / AT_{j,t-1}) + w4 ROA_{j,t-1} + \varepsilon_{j,t} \quad (4)$$

Where:

TAcc $_{j,t}$: Total accruals⁴ for firm j in year t ;

AT $_{j,t-1}$: Total assets for firm j in year $t-1$;

$\Delta REV_{j,t}$: Revenues for firm j in year t with less revenues for year $t-1$;

PPE $_{j,t}$: Net property, plant and equipment for firm j in year t ;

ROA $_{j,t}$: Return on assets for firm j in year t ;

$\varepsilon_{j,t}$: A residual term that captures discretionary accruals.

Thus, the parameters obtained for the estimation of regression (4) are used in determination of non discretionary accruals (AND) scaled by lagged total asset:

$$AND_{j,t} = \hat{w} 0 + \hat{w} 1 (1 / AT_{j,t-1}) + \hat{w} 2 (\Delta REV_{j,t} / AT_{j,t-1}) + \hat{w} 3 (PPE_{j,t} / AT_{j,t-1}) + \hat{w} 4 ROA_{j,t-1} \quad (5)$$

Therefore, discretionary accruals (AD $_{j,t}$) are determined by the difference between TAcc $_{j,t} / AT_{j,t-1}$ and AND $_{j,t}$.

Size: the size of the firm may have an effect on the liquidity of its shares. Indeed, on the one hand, a large firm is followed by analysts and attracts investors. On the other hand, its size allows it to disclose a lot of information thereby reducing information asymmetry and improving liquidity.

The size of the business company is measured by the logarithm of its market value at the end of December of each year. This measurement was also used by Naes (2004); Comerton-Forde and Rydger (2006); Kim *et al.* (2006) and Chung *et al.* (2009). The use of the logarithm has the advantage of circumventing the scale problem resulting from the smallness of the measures of the other model variables. Chae (2005) argues that the small –size enterprises have a greater

⁴ Estimation of total accruals:

$$TAcc_{j,t} = \Delta CA_{j,t} - \Delta cash_{j,t} - \Delta CL_{j,t} - \Delta DEPN_{j,t}$$

where:

$\Delta CA_{j,t}$: firm j 's change in current assets;

$\Delta cash_{j,t}$: firm j 's change in cash;

$\Delta CL_{j,t}$: firm j 's change in current liabilities;

$\Delta DEPN_{j,t}$: firm j 's depreciation and amortization expense;

information asymmetry than the large enterprises. According to Stoll (2000), the securities of small capitalization companies are less liquid than the securities of large capitalization companies.

So, we expect a negative (positive) relationship between the firm's size and the spread (depth).

The Trading Volume: The impact of the trading volume on liquidity seems to be ambiguous. Indeed, Hasbrouck (1991); Lin, Sanger, and Booth (1995) argue that the volume of transaction implies an adverse-selection issue because the informed investors prefer to trade large volumes so as to take advantage of the information they hold. So, the soaring trading volume causes a significant imbalance in the stock market and generates additional costs that must be offset by the expansion of the spread.

Anderson and Fraser (2000) argue that the share-exchange frequency is a proxy for the speed with which new information is acquired in terms of share price. In addition, Chordia, Subrahmanyam, and Anshuman (2001) found a strong correlation between the trading volume, the bid ask spread and depth. Admati and Pfleiderer (1988), Handa and Linn (1993) have revealed the existence of a positive correlation between the liquidity of small-size firms and the transaction volume. This is accounted for by the fact that all the investors are more liable to concentrate their transactions at the same time to benefit from improved liquidity. Likewise, Welker (1995); Gregoriou, Ioannidis, and Skerratt (2005); Chung, Chou, and Wang (2006) predict that the trading volume is positively related to liquidity.

The trading volume is measured by the logarithm of the average daily trading volume. This measurement was also used by Rubin (2007) and Chung *et al.* (2009). No forecast is made between the relative spread (depth) and the trading volume.

Price: The empirical literature states that the price spread of a security is closely linked to the level of its trend. Indeed, the empirical studies conducted by Lamoureux and Sanger (1989) on the NASDAQ and Hamon and Jacquillat (1992) on the French market, show that there is a negative relationship between the spread and the stock price. Stoll (1978) shows that the trading volume and the risk affect the cost of shareholding. He also stresses that the share price is a proxy for the unobservable minimum cost. His theoretical and empirical survey highlights that the spreads are negatively related to the trading volume while the share price is positively related to the variability returns'.

The share price is measured by the average daily closing price over the whole trading year. This measurement was applied by Dennis and Weston (2001); Heflin *et al.* (2001) and Kim *et al.* (2006). Henceforth, we can anticipate that liquidity is an increasing function of the price. Thus, the higher the price, the more liquid is the market.

The Stock's Return: The effect of the stock return on liquidity remains fuzzy. In fact, several authors have developed theoretical models that examine the relationship between returns and liquidity. For example, Constantinides (1986) and Vayanos (1998) show that the expected returns are negatively correlated with liquidity. This negative relationship is due to the fact that investors require a liquidity premium in order to offset the high transaction costs. This idea is corroborated in a recent model established by Easley and O'hara (2004), which show that in equilibrium, uninformed investors demand compensation for the risk of holding stocks with high private information. In other words, the more risky a stock is, the greater the required returns will be. However, Brennan, Chordia, and Subrahmanyam (1998); Datar, Y. Naik, and Radcliffe (1998) show that the most liquid stocks have higher returns. Similarly Cao, Simin, and Wang (2013) found a positive relationship between the market return and liquidity.

The share return is measured by the logarithm of the stock price on a daily basis divided by the price of day $t-1$, which is calculated on a daily basis and then averaged over one year.

No evidence is forecast between the return of the securities and the market liquidity.

Volatility Return: Stoll (1978); Kothare and Laux (1995); Battalio, Jennings, and Selway (2001) found a positive relationship between volatility and the spread. In fact, the more risky is the share, the more costly is its holding which increases the bid ask spread. Similarly, Chan *et al.* (2009); Chae (2005); Almutairi *et al.* (2009); and Cao *et al.* (2013) predict that the return volatility is negatively related to the liquidity. Empirical studies such as those conducted by Stoll (1978) on the NASDAQ; Hamon and Jacquillat (1992) on the Paris Stock Exchange, Chung *et al.* (2006) on the NASDAQ and the NYSE and LaFond, Lang, and Skaife (2007) in an international context, argue that there is a positive relationship between the spread and the return volatility of the security.

The volatility return is measured by the standard deviation of the daily returns, calculated on a daily basis and then averaged over one year (Heflin & Shaw, 2000; Almutairi *et al.*, 2009). The variance of returns (or volatility) measures the risk of an unfavorable change in the price for an investor.

So, a positive (negative) and significant relationship is expected between the volatility return and the price spread (depth).

Table 1. Definition and measurement of variables

Variable	Abbreviation	Measurement
Dependent variables		
Depth	DEP	The sum of the available amounts on the best displayed limits (the best bid and ask price) which are halved.
Relative spread	SPRD	The difference between ask and bid prices divided by the mean of the two prices.
Independent variables		
Discretionary accruals	AD	Discretionary accruals calculated from the model of Kothari and al. (2005).
Control variables		
Size	SIZE	log (market value).
Trading volume	TVOL	log (the annual mean of daily dinar trading volume).
Price	PRICE	the mean daily closing price for the year.
Return	RETURN	log (pt/pt-1).
Volatility return	VOLRETURN	σ (RETURN).

3.5 Descriptive Statistics

The following chart provides the descriptive statistics (mean, standard deviation, minimum and maximum) of each variable used in our analysis.

According to the table 2, the analysis of the spread in the Tunisian market shows that it varies between .0014337 and .2938837 with an average of .0904293. It is less than the one observed in other markets, 0.32 in the study of Zhou (2007) on the Chinese market.

The sample represents a relatively deep market, with an average of 2.314, with a minimum depth of 1.04 and maximum of 3.56.

The average level of earnings' management over the 13 years does not seem high (mean value equal to .083812), otherwise, the managers of these companies show a low-intensity earnings'

management. This value is close to the one found by Jian *et al.* (2008) on a sample of American companies .054. Then, the following positive sign indicates that on average the firms in the sample have upward- trend earnings management attempt.

Table 2. Descriptive statistics

Variable	Mean	Std dev	Min	Max
SPRD	.0904293	.0691953	.0014337	.2938837
AD	.083812	.4636569	-.7901545	2.14307
SIZE	7.599551	.4822267	6.274472	8.919036
TVOL	4.400346	.7200577	2.166498	6.610082
PRICE	31.9697	43.25546	1.735321	206.7267
RETURN	.074079	.7210513	-1.73024	1.951017
VOLRETURN	.003236	.0093359	.0000722	.0661564
DEP	2.314604	.411453	1.043061	3.564423

This table presents descriptive statistics of variable studied (dependent, independent and control). The sample covers 19 Tunisians firms during the period of 1999 to 2011.

SPRD = (ask – bid)/Mt, DEP = (Qask + Q bid) / 2, AD : Discretionary accruals calculated from the model of Kothari and al. (2005), SIZE = log (market value), TVOL = log (the annual mean of daily dinar trading volume), PRICE : the mean daily closing price for the year, RETURN = log (pt/pt-1), VOLRETURN = σ (RETURN).

The average size of the companies encompassing the study sample is 7.599551; it varies between 6.274472 and 8.919036. This allows us to conclude that the average Tunisian firms are medium-sized. This value is close to that found by Sami and Zhou (2008) on the Chinese market (6.791), but it is lower than the one found by Kanagaretnama, Lobob, and Whalenc (2007) on a sample of American companies (8.20). However, we note that the volatility of this indicator is not very high (.4822267). Indeed, it is lower than the one found by Sami and Zhou (0.768). This value implies that the volatility of the company size measured by the logarithm of the market value of the latter does not vary significantly within the sample.

Over the whole period, the trading volume ranges from a minimum of 2.166498 to a maximum of 6.610082. The average being of 4.400346 for the whole sample with a standard deviation of .7200577; this value is close to the one found by Zhou and Sami (2008) who reported a trading volume of 4.58 for the case of China. Given these statistics, we can notice that the transaction volume is low compared to the U.S. companies (13.08 in the study of Kanagaretnama *et al.* (2007)).

Based on the value of the price- standard deviation of (43.25546), we can state that the price varies substantially between the different companies in our sample. This value is almost as twice as the one found by Kanagaretnama *et al.* (2007) on a corporate American sample (23.44).

The securities' return of all the firms in the sample is set between a negative performance of - 1.73024 and a positive extreme value of 1.951017, with an average of 0.079. Since the standard deviation of .7210513 enables us to note that this indicator varies substantially between the different companies which make up our sample.

We can deduce that the securities' volatility of the Tunisian firms is not characterized by a very wide disparity because of the small difference between its maximum level (.0661564) and its minimum level (.0000722) and the low-variability level (.0093359), this value being lower than that found by Kanagaretnama *et al.* (2007) in their research conducted on the U.S. market (0.044).

3.6 Tests on Panel Data

It is necessary however, to note that the estimations of our model are made on panel data since the regressions are about two dimensions: one temporal and the other individual, which enables to check some tests. These tests are essentially Pearson test and VIFs of independent variables, to detect the multicollinearity between these variables, test of the presence of individual effect, Hausman test and heteroscedasticity test.

3.6.1 Test of the Presence of the Individual Effect

Since our data are penalized, it is worth identifying the effect associated to every individual, otherwise it would be an effect that doesn't vary in time, but that varies an individual to the other. This effect can be within or random effect. The test of existence of the individual effect rejects the hypothesis of the individual⁵ effects absence. We are going to test hypothesis H0 therefore against the hypothesis H1.

H0: absence of individual effect

H1: there is individual effect

Table 3. Result of test presence individual effect

	36.27
Chi test (2)	(0.0023)

Results of test individual effect presence indicated in the table 3 show that the individual effects exist.

3.6.2 Hausman Test

Since our model is of the effect, it is necessary to choose what modeling is the best suitable to our data: within or random modeling of these effects, i.e. these effects can be either within, or random. It is for it us resort to Hausman test.

Table 4. Result of Hausman test

	7.67
Chi test (2)	(0.6610)

The results of Hausman test in the table 4 indicate that we must turn towards a random modeling of effects, in other words the consideration of individual specificity of firms otherwise under the shape of an uncertain effect which provides significant statistically better results in comparison to a model that is within individual effect.

3.6.3 Pearson Correlation Matrix and VIF

Before moving to the regression, it is essential to establish the correlation matrix between the variables in order to test the possible relationship between the independent variables and to avoid the problems of multicollinearity.

⁵ These individual effects can be represented by an intercepts to every individual, u_i . One tries therefore to test the hypothesis H0: $u_i = 0$ in the regression $Y_{it} = Y + X_{it} + u_{it} + \epsilon_{it}$.

Table 5. Pearson correlation matrix and VIFs

With:

SPRD = (ask – bid)/Mt, DEP = (Qask + Q bid) / 2, AD: Discretionary accruals calculated from the model of Kothari and al. (2005), SIZE = log (market value), TVOL = log (the annual mean of daily dinar trading volume), PRICE: the mean daily closing price for the year, RETURN = log (pt/pt-1), VOLRETURN = σ (RETURN).

	SPRD	DEP	AD	SIZE	TVOL	PRICE	RETURN	VOLRET	VIF
SPRD	1.000								
DEP	0.4632	1.000							1.04
AD	-0.208	0.0126	1.000						1.04
SIZE	0.101	0.0757	0.025	1.000					1.78
TVOL	0.277	0.4303	-0.013	0.577	1.000				1.59
PRICE	-0.202	-0.4627	0.097	0.407	0.190	1.000			1.22
RETURN	-0.046	0.1019	0.105	0.107	0.014	-0.012	1.000		1.03
VOLRET	0.0269	-0.06	0.109	-0.214	-0.300	-0.040	-0.048	1.000	1.12

The multivariate analysis helps to carry out the simultaneous treatment of a set of variables. In our survey, the linear regression requires the absence of multicollinearity problem between the independent variables introduced in the same model. We verify this condition while resorting to Pearson correlation matrix and VIFs.

Table 5 shows the results yielded by this test. The positive coefficients (negative) indicate positive relationships (negative) between the explanatory variables. According to these results, although Pearson's correlation coefficients are not raised⁶, we can put forward that a certain interdependence exists between the different independent variables kept in our survey. Consequently, the absence of autocorrelation between the explanatory variables is shown. The absence of the multicollinearity problem between the variables is also justified by Vifs test in which all the variables have a value lower than 3 with a global mean equal to 1.17.

3.6.4 Heteroscedasticity Test

Besides, we took care to verify the hypotheses of homoscedasticity⁷ while using Breush-Pagan test (Table 6). The rationale behind these tests is to verify if the square of the residues can be explained by explanatory variables of the model. In other words, the variance of the residual term is bound then to the values of the explanatory variable, if it is the case when we have a problem of heteroscedasticity.

H0: Homoscedasticity.

⁶ Kervin (1992) foresees an $r = 0.7$ to be pronounced on a problem serious of colinearity between two independent variables included in a model of regression.

⁷ The homoscedasticity qualifies a constant variance of the residues of data composing the sample. To the inverse, one says that there is homoscedasticity when the variance of the residues of the model is not constant, that is to say that the value predicted by the estimator doesn't converge toward the value in the population.

H1: Heteroscedasticity.

Table 6. Result of Breush-Pagan test

	80.96
Chi test (2)	(0.0012)

The results of Breush-Pagan test verify the absence of heteroscedasticity problem.

4. Results' Regression and Interpretations

After the implementation of the econometric tests: the Pearson's correlation matrix and the VIF test, the test for the presence of individual effects, the Hausman test and the heteroscedasticity test, it would be relevant to present the findings of our model.

The following table 7 shows the results of the equation estimation which tests the relationship between earnings' management and the market liquidity: the variables' coefficients, and the expected signs as well as the probabilities associated.

Table 7. Results of regression

Variables	Expe sign	SPRD		Expe sign	DEP	
		Coefficient	Probability		Coefficient	Probability
AD	+	-.026*	0.001	-	1.431**	0.016
SIZE	-	.001	0.911	+	-.0601	0.375
TVOL	?	.041*	0.001	?	.288*	0.002
PRICE	-	-.0002	0.089***	+	-.0046*	0.003
RETURN	?	-3.14354**	0.050	?	12.621***	0.059
VOLRETU	+	.994***	0.060	-	2.631	0.307
R ²		0.1712		0.8637		
Wald chi (2)		36.27		119.58		

$LIQ_{j,t} = \beta_0 + \beta_1 AD_{j,t} + \beta_2 SIZE_{j,t} + \beta_3 TVOL_{j,t} + \beta_4 PRICE_{j,t} + \beta_5 RETURN_{j,t} + \beta_6 VOLRETURN_{j,t} + \epsilon_{j,t}$

With:

$SPRD = (ask - bid)/Mt$, $DEP = (Qask + Qbid) / 2$, AD : Discretionary accruals calculated from the model of Kothari and al. (2005), SIZE = log (market value), TVOL = log (the annual mean of daily dinar trading volume), PRICE : the mean daily closing price for the year, RETURN = log (pt/pt-1), VOLRETURN = σ (RETURN).

*, **, *** Significant at 1, 5 and 10% level, respectively.

The table above shows the results of multiple regression in which we seek to determine the impact of earnings management on the market liquidity.

According to table 7, we note that the yielded results confirm the existence of a significant negative relationship between the discretionary accruals and the spread on the one hand, and a positive and significant relationship between the discretionary accruals and the depth on the other. This disproves our hypothesis that market liquidity is a decreasing function of the level of earnings'

management. Similarly, Aharony, Lee, and Wong (2000) reported that the Chinese companies do not have the same motivation in earnings management as the U.S companies. Indeed, as far as the Chinese companies are concerned, the manager is not a shareholder; he has no interest in managing the earnings. In this case, the state encourages the companies to manipulate the earnings in order to increase foreign exchange equities from the sale of shares to foreign investors. Habib *et al.* (2011) also indicated that investors are more confident about the companies that earn stable earnings.

Easton *et al.* (1992) and Habib *et al.* (2011) argue that the investors "buy the earnings." Indeed the institutional investors avoid the companies that record boom and bust results which are perceived as risky. In other words, the institutional investors tend to prefer companies with steady earnings.

Unlike the results of Chung *et al.* (2009), who found that aggressive earnings' management increases the information asymmetry and reduces liquidity, our results show that earnings' management reduces agency costs and information asymmetry. Therefore, the liquidity providers incur lower costs and the spread will be smaller and the market more liquid. The obtained findings enable us to speculate that the liquidity providers are not aware of the process of earnings management especially when its level in the companies that constitute our sample is not very high. On the other hand, this result corroborates the theory which states that investors buy the profit.

Given the impact of the trading volume on the bid ask spread, a significant and positive relationship is detected. The coefficient related to the volume of trade is positive and significant at the 1% level for the price spread. This result can be interpreted as follows: the rise in the trading volume is due firsthand to the growing spread because of the greater likelihood of intervention undertaken by the informed traders. Very quickly, the progress of this condition tends to reduce information asymmetry in the market because of the rational expectations of the contents of the markets and thus reduce the price spread. This finding can also be accounted for by the fact that the information asymmetry approach assumes that the transaction volume heralds news not yet known by the investors, in which case, they will expand the bid ask spread to hedge themselves against the losses caused by the exchange with informed investors. This result coincides with the results of Hasbrouck (1991) and Lin *et al.* (1995) who emphasized that the transactions' volume involves a problem of adverse selection because the informed investors prefer to trade large volumes to take advantage of the information they hold. So the rise in the trading volume causes a significant imbalance in the stock market and generates additional costs that must be offset by the expansion of the spread. But the relationship between the trading volume and the depth is positive and significant at 1%. This result confirms that of Matoussi *et al.* (2004). Thus, these authors showed that the more active the title is, the more reduced are the problems of information asymmetry and the lower is the risk of holding a suboptimal portfolio. The authors also argue that when the security is active, the order-giver does not incur the risk of non-execution of his order.

The price variable has a negative and a significant sign on the threshold of 10% for the bid ask spread as well as for the depth. Therefore the price spread is a negative price function. In other words, the higher the price of a security, the narrower the relative spread. Likewise, Lamoureux and Sanger (1989) in their study of the NASDAQ, Hamon and Jacquillat (1992) carried out on the French market, have shown that there is a negative relationship between the spread and the stock price. This result confirms the one obtained by Sarin *et al.* (2000), Attig, Gadhoun, and Lang (2002) and Rubin (2007), yet, it contradicts the result of Comerton-Forde and Rydge (2006).

Regarding the variable related to the return of the share, we found a significant negative relationship at the threshold of 5% with the relative spread. This result corroborates that of Matoussi *et al.* (2004). In fact, according to Easley and O'hara (2004) to strike a balance, the uninformed investors demand compensation on the risk of holding highly- private information securities. In other words, the more risky a stock is, the greater the required returns will be.

As for the size of the company and the volatility of returns, they have no effect on the price spread and the depth, since the relationships were not significant.

To know if the liquidity providers react in the direction of earnings' management, we introduce a dichotomy variable indicating the earnings management on the rise. The introduction of a dichotomous variable enables to assess how investors interpret earnings' management on the rise and how they interpret the downward –trend- earnings management.

DEM: a dichotomous variable = 1 if the firm manages to boost its earnings and 0 if not.

Table 8. Frequency of binary variables

Variable		frequency	Frequency %
DEM	0	123	49.79%
	1	124	50.21%

DEM : a dichotomous variable = 1 if the firm manages to boost its earnings and 0 if not

Table 8 displays the frequency of the direction of the earnings management. This table shows that there is 'is almost an equality between the proportion of the upward-trend earnings' management and the proportion of earnings' management on the fall (since there almost the same frequency percentage).

The regression results are displayed in the following table 9:

Table 9. Results of regression

Variables	Expe sign	SPRD		Expe sign	DEP	
		Coefficient	Probability		Coefficient	Probability
AD	+	-.0266*	0.010	-	1.352**	0.037
DEM	?	.0075	0.427	?	-.0537	0.623
SIZE	-	.0007	0.964	+	-.0820	0.220
TVOL	?	.0404*	0.003	?	.2989*	0.004
PRICE	-	-.00021***	0.079	+	-.0044*	0.003
RETURN	?	.0074	0.242	?	-.0399***	0.091
VOLRETU	+	1.014***	0.056	-	3.001	0.234
R ²		0.1683			0.8839	
Wald chi (2)		36.85			133.97	

$LIQ_{j,t} = \beta_0 + \beta_1 AD_{j,t} + \beta_2 DEM_{j,t} + \beta_3 SIZE_{j,t} + \beta_4 TVOL_{j,t} + \beta_5 PRICE_{j,t} + \beta_6 RETURN_{j,t} + \beta_7 VOLRETURN_{j,t} + \epsilon_{j,t}$

With:

SPRD = (ask – bid)/Mt, DEP = (Qask + Q bid) / 2, AD : Discretionary accruals calculated from the model of Kothari and al. (2005), DEM: a dichotomous variable = 1 if the firm manages to boost its earnings and 0 if not, SIZE = log (market value), TVOL = log (the annual mean of daily dinar trading volume), PRICE : the mean daily closing price for the year, RETURN = log (pt/pt-1), VOLRETURN = σ (RETURN).

*, **, *** Significant at 1, 5 and 10% level, respectively.

The results presented in the table above reveal that there is a non-significant relationship between the direction of the earnings management and the market-liquidity proxy-variables, i.e., investors do not react in the direction of the earnings management. This outcome can be interpreted as follows: investors are simple short-term speculators who seek swift profit and do not care about the results inversion'. Also, it can be corroborated by the new measures provided for by the 2011 Finance Act, aiming to streamline the exemption of capital gains derived from the sale of the stock market listed shares in order to foster the role of the financial market in mobilizing long-term financial resources as an incentive to promote long-term investment and to deter and limit speculation, which simultaneously have a negative impact on the market equilibrium.

5. Conclusion

The literature dealing with the relationship between earnings' management and the liquidity of the market is not very large and is not unanimous. The results of our study show that the market liquidity is an increasing function of the level of earnings' management, i.e. if the level of earnings management increases, the market liquidity also increases. As far as we are concerned, the results allowed us to conclude that the majority of liquidity providers on the Tunis Stock Exchange purchase the earnings. Also one can conclude that these investors are mere short-term speculators seeking quick and easy profit and do not care about the results' inversion.

Based on the results provided in this study, some solutions can be put forward to upgrade the liquidity of the TSE. On the one hand, the Tunisian regulators should encourage the quoted companies to step up their voluntary disclosures. In addition, the Financial Market Council ought to implement a tighter monitoring over the disseminated information and set penalties for the non-disclosure of the compulsory information. On the other hand, curbing speculation and promoting long-term investment to provide the Tunisian companies seeking finance through the stock market, with a solid base of shareholders and investors.

Like any research, our work has some limitations. First, the size of the sample examined is reduced to nineteen companies. This could be accounted for by the number of the non-financial companies listed on the stock exchange. Second, other liquidity measures can be used.

This piece of research could lead to several developments. A possible extension would be taking into account the common or systematic factors that would affect the liquidity of the market as a whole, that is to say, events, phenomena or variables varying the liquidity of individual securities simultaneously. It is finally worth finding out whether the Tunisian investor is paid for the liquidity risk he incurs. It would also be relevant to take the path of behavioral finance to better grasp the liquidity of the shares in the Tunis Stock Exchange.

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