THE EFFECT OF THE INVESTORS' SENTIMENT ON THE TRADE-OFF BETWEEN EARNINGS MANAGEMENT STRATEGIES: THE CASE OF TUNISIAN MARKET

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ABSTRACT

The aim of this study was to provide evidence to the benefit of an emerging market on whether and how the prevailing investors' sentiment influences the earnings management tactics i.e. accrual earnings management and real earnings management. used data related to Tunisian listed firms over the period 2009–2018. We measure the investors' sentiment index using Google search volume approach. We estimated a recursive equation system to investigate the effect of the investors' sentiment on the trade-off decision between accrual earnings management and real earnings management. First, in line with the catering theory we found that optimistic period is an opportune occasion that encourages Tunisian managers to upward their earnings whether by accrual earnings management or by real earnings management. Indeed, Tunisian managers are likely to rely on abnormal cashflows. Second, we found that the Tunisian managers, use both techniques as complementary rather than substitutes. However, during high sentiment period, this complementary relation decreases which may be explained by total cost of earnings management tools. Our results give the investors and the financial analysts, within emerging markets, important insights and requires them to adopt necessary adjustments to their expectations when evaluated from an optimistic market' perspective. During such periods, they should be more cautious to the possible distortions of reported earnings made by managers. Our research differs from previous studies dealing with the implication of behavioral biases

on accounting policies from two viewpoints. First, it advances knowledge to the benefit of emerging contexts, which is still embryonic. Such contexts have their uniqueness regarding the economic, social and political environment making evidence drawn from developed contexts questionable. Second, we address this query in a more comprehensive way. We were interested in examining the effect of the investors' sentiment on each of earnings management technique taken individually as well as on the possible trade-off between them.

INTRODUCTION

The determinants of earnings management have received a sizable attention in accounting literature. In the classical approach, most of these studies rely on the positive accounting theory (Watts & Zimmerman, 1986) to investigate the earnings management determinants and identify the several market, contractual, and remuneration incentives as well as the political visibility[1]. However, since the early 2000s the emergence of the behavioural finance approach has challenged the previous evidence since it reveals that the behavioural biases of market actors play a critical role in assessing the firm market value. Therefore, financial statements makers could take into account the behavioural metric when shaping their public financial communication. One of the most related theoretical developments is the catering theory initiated by Baker and Wurgler (2004). The main assumption of this theory is that managers are likely to be aware of the prevailing investors' sentiment and they consequently manipulate earnings numbers in such a way that helps them react strategically to their feelings.

Rajgopal et al. (2007), Ali and Gurun (2009), Simpson (2013), found a direct and positive relationship between the investors' sentiment and the earnings management. Beer et al. (2018) and Miranda et al. (2018) demonstrate that this relationship is likely to be moderated by the cultural and institutional factors as well as the participation of the market analysts. Despite the interesting contributions of these previous works, three main gaps remain unfilled. First, to the best of our knowledge except for the work of Miranda et al. (2018), the effect of the investors' sentiment on earnings management in emerging markets is still unexplored. In fact, emerging markets have a weak institutional setting, a massive intervention by the government, an ineffective companies' governance structure, and a low investor protection as compared to developed market (Faccio, 2006; Attia et al., 2016; Nagar & Sen, 2016; Maaloul et al., 2018).

Second, except for Park (2018), previous studies investigating the effect of the investors' sentiment on earnings management have focused only on Accrual Earnings Management component (AEM) and neglect the Real Earnings Management (REM). Ali and Kamardin (2018) have reviewed the recent studies of REM but they did not identify the investors' sentiment as a determinant of this practice. Third, the effect of the investors' sentiment on the trade-off between AEM and REM is a debatable issue. Indeed, in the presence of the two forms of earnings management, Cohen et al. (2008), Cohen and Zarowin (2010), Gunny (2010), Zang (2012), Chan et al. (2015) and Anagnostopoulou and Tsekrekos (2016), Ali and Kamardin (2018) argue that managers could use the two strategies as substitutes or jointly to meet their earnings targets. They claim that several factors are likely to affect this decision mainly the costliness of the two methods, the level of firm leverage, the adoption of compensation clawback provisions, the tightening accounting standards and the development of regulations like SOX Act.

Therefore, the aim of our research is to investigate the effect of the investors' sentiment on both earning management strategies (AEM and REM) and on the trade-off decision between AEM and REM.

Thus, in our study we rely on prior theoretical and empirical developments to presume that managers are aware of the prevailing investors' sentiment and accordingly are likely to choose the opportune moment in order to vary carefully their reporting strategies by manipulating reported earnings using either AEM or REM. In particular, we hypothesise that managers are more (less) likely to boost earnings through AEM and/or REM practice during periods of high (low) investors' sentiment. We also presume that if investors' sentiment affects each of the two kinds of earnings management policies (AEM and REM) it should consequently affect the trade-off decision.

In this paper, we use data related to 44 non-financial Tunisian firms listed in the Tunisian stock exchange over the period 2009–2018. First, we examine the effect of the investors' sentiment on AEM and then on REM by using linear regressions model. Second, we estimate a recursive equation system to investigate the effect of the investors' sentiment on the trade-off decision between accrual earnings management and real earnings management. We estimate abnormal accruals by using the modified Jones model. We follow Roychowdhury (2006) to calculate abnormal cash flow and abnormal production costs as proxies of REM. We operationalise Investor's sentiment measure by using the Google Search Volume Index (SVI) developed by Da et al. (2015).

Our contributions to the literature linking earnings management and investors' sentiment are threefold. First, we focus on Tunisian emerging market which is less explored. Second, we take into account the two forms of earnings management as well as the behaviour of manager with regard to the trade-off between them. Third, we rely on an innovative approach to measure the investors' sentiment, i.e. by Internet search behaviour. According to Da et al. (2015), Gao et al. (2016), this approach appears to be promising to generate data that are more flexible in terms of high frequency, high degree of detail and low cost rather than the traditional measures commonly used in the developed contexts like the Michigan index.

THEORETICAL AND EMPIRICAL BACKGROUND BEHIND RESEARCH HYPOTHESES

Investors' Sentiment and Earnings Management Strategies AEM/REM

There is widely held evidence that earnings management is an important accounting policy that managers use in order to influence the investors' reactions to the published financial information. Investigating the determinants of earnings management has been the subject of abundant literature worldwide. In the context of developed countries, Dechow et al. (2010) and Campa and Minano (2015) undertake a close literature review and classify these determinants into several types of incentives like market incentives, contractual incentives, remuneration incentives and political visibility. Elghuweel et al. (2017), Nagar and Sen (2016), Abdallah (2018), Saona and Muro (2017), Zehri and Shabou (2008), Riahi and Ben Arab (2011), Klai and Omri (2011), Hamza and Bannouri (2015), and Swai and Mbogela (2016), focus on the emerging context like Oman, India, Egypt, Latin American countries and East Africa.

For the Tunisian context, Zgarni et al. (2012) reported that the audit quality is effective in reducing the two forms of earnings management, real and accruals earnings management using a sample consisted of 29 companies listed on the Tunisian Stock exchange. The same sample was used in the Zgarni et al. (2016) study which focuses on the role of audit committee effectiveness and audit quality on reducing the accruals earnings management. They found that audit committee characteristics and audit quality are mechanisms which attenuate agency costs, regulate conflict of interest and mitigate the earnings management practice. Relying on signalling and agency theory, Riahi and Ben Arab (2011) investigated the effect of information disclosure (mandatory as well as voluntary, financial as well as non-financial information) on the level of

earnings management using a sample of 19 non-financial Tunisian firms. Their empirical study showed that earnings management is a decreasing function of the disclosure level. Attia et al. (2016) analysed the political costs effect on earnings management by comparing the political connected and non-connected firms. Using a sample of non-financial companies listed in the Tunisian stock exchange between 2007 and 2011, the authors reported that the politically connected firms have less incentive to engage in income-decreasing earnings management than political non-connected firms do. Charfeddine et al. (2013) conducted an empirical analysis by dividing factors that determine earnings management in Tunisia into two principal groups, incentive group and constraint group, during the period 2003–2009. They found that some control mechanisms such as the board size, the external audit quality and the ownership structure are inefficient in affecting the earnings management strategy.

All these studies provide evidence on the magnitude of the significance of several variables related either to firm characteristics drawn from the positive theory of accounting like ownership structure, size and audit quality, or to country characteristics like its legal environment, its culture and religion. Unfortunately, these previous investigations disregard the behavioural bias as another explanatory factor of earnings management, while the behavioural finance presume that the investors' belief is fast becoming a key factor that explains the huge divergence between the market's real value and its intrinsic value (Barberis et al., 1998; Shleifer, 2000; Shiller, 2003). More specifically, the catering theory presumes that the managers are likely to be aware of the investors' sentiment when they decide to manipulate reported earnings.

The catering theory is originally developed by Baker and Wurgler (2004) in order to explain the manager decision to distribute dividend or to change its amount. These authors consider that investor demand for dividend-paying stocks is time-varying. Indeed, managers cater to prevailing investors' demand by paying dividends when investors put higher prices on dividend-paying firms and by not paying dividends when investors choose non-dividend paying firms. These authors explain the propensity to paying dividend by dividend premium which is measured particularly by the difference between the average market-to-book ratio of dividend payers and non-payers. They found that in order to enhance the stock price, manager caters the time-varying investor demand. Since this study, catering theory has received great interest by researchers examining the influence of the catering incentives on the firm's decision to pay dividends in developed and emerging capital markets (Labhane, 2019). Rajgopal et al. (2007) considered this theory to explain earnings management by catering incentives. Indeed, the authors related accruals earnings management to the time

varying of investor demand for earnings surprises. They found that managers cater to investors' sentiment by managing accruals upwards (downwards) during high (low) investor sentiment periods. Their findings complement the prior studies that focused almost exclusively on firm-specific incentives for earnings management as they added an incentive for earnings management that derives from the aggregate-market level. Similarly, Ali and Gurun (2009) found that in high sentiment periods, the mispricing per unit of accruals for small firms is greater during high sentiment periods than during the low ones. Moreover, Simpson (2013) hypothesised and found that during the periods of high investors' sentiment, the manager inflates earnings to meet the investors' optimism expectations. However, in low sentiment periods, they report more conservatively. Unlike previous evidences, Park (2015) found that Korean listed firms are more likely to engage in upward earnings management to meet the analyst forecasts, to sustain recent performance or to report greater profits during pessimistic sentiment periods than during optimistic ones. Beer et al. (2018) provided an in-depth study of the relationship between the investors' sentiment and earnings management in the European context. First, they assumed that investors with optimistic views about stocks have the tendency to be excessively optimistic in high sentiment periods, leading to a larger overvaluation of accruals as compared with low sentiment periods. Second, they addressed the moderating effect of cultural and institutional factors as well as the degree of difficulty to value and arbitrage the firm on this relationship. Contrary to their expectations, Miranda et al. (2018) found a negative relationship between the investors' sentiment and the level of accruals. Using a sample of non-financial Brazilian firms, they explained this negative relationship by the participation of market analysts as protagonist agents in mediating the relation between earnings management and the investors' sentiment.

We mainly rely on previous works to evaluate the relationship between the investors' sentiment and the accrual earnings management. We conduct our study to the benefit of an emerging country which is Tunisia for at least two reasons. First, the validity of evidences confirmed on developed countries are obviously questionable in less developed countries' context. This is due to a big divergence between both settings if one compares the economic, institutional and political landscapes between them. Beer et al. (2018) findings further support this argument. Indeed, they interestingly addressed whether the level of development of countries' financial institutions and the level of sophistication of their equity market matter in the causal relationship between the investors' sentiment and accrual anomaly mispricing. They found that the investors' sentiment influences accruals anomaly in countries with weaker outside shareholder rights, lower legal enforcement, lower equity market than the developed countries. Second,

the relationship between investors' sentiment and earnings management in the Tunisia was ignored while the effect of behavioural biases on Tunisian financial market has been validated by previous research. Indeed, Chaffai and Medhioub (2014) investigated the effect of behavioural variables on the investment decisions and portfolio selection by Tunisian investors. Using a questionnaire collected from 193 Tunisian investors they found that loss aversion, representativeness, availability and anchoring are the most important behavioural biases that affect the Tunisian investors. Boubaker and Talbi (2014) used a sample of Tunisian listed firms over the period 2008 to 2012. They found a negative relationship between investor sentiment measured by a composite index and future returns. Bouteska and Regaieg (2020) investigated and validated the existence of anchoring and optimism among Tunisian financial analysts on the Tunisian stock market over the period 2010–2014. Furthermore, Bouteska (2020) provided evidence on the existence of herd behaviour during times of crisis, namely the Tunisian revolution using a sample of daily observations of closing prices of all common stocks listed on the Tunisia financial market during the period between 2007 and 2018. Therefore, we believe that the investigation of behavioural biases on Tunisian financial market still remains a contemporaneous question among Tunisian scholars.

Therefore, we develop the first hypothesis as follows:

H1: Tunisian managers' use of income-increasing abnormal accruals to boost earnings is positively associated with the level of the investors' sentiment.

Earnings management can occur using two different strategies i.e. accrual earnings management or real earnings management. The main difference between these two approaches is that AEM tends to misrepresent the underlying operations of the firm in the books. However, REM represents a deviation from the normal operational practices (Roychowdhury, 2006; Kothari et al., 2016). Real activities manipulation can take many forms, including abnormal cash-flows, overproduction and discretionary expenditures like investment in research and development. Relying on developed country, Park (2018) find no significant effect between REM and the investors' sentiment.

During optimistic period, characterised by favourable economic conditions, managers are encouraged to upward earnings by accelerating the sales through allowing increased price discounts or more lenient credit terms and/or by decreasing production cost per unit through overproduction, (Roychurdhury, 2006). Furthermore, Gunny (2010) suggests that managers use

REM during an optimistic period in an attempt to enhance the firm's credibility and reputation in a way to respond to the investors' optimism. Thus, we suggest that the relationship between the prevailing investors' sentiment and earnings management using abnormal cash-flows and overproduction manipulation, as techniques of REM, may be positive.

Our study adds to the prior literature in examining the catering theory assumption and tests whether managers' incentives to use REM are sensitive to the prevailing investors' sentiment. We thus state the second hypothesis as follows:

> H2: Tunisian managers' use of real-activities manipulations to boost earnings is positively associated with the level of the investors' sentiment.

Investors' Sentiment and the Trade-Off between AEM and REM

It is agreed in the previous literature on the joint examination of AEM and REM that managers use them as substitutes (Zang, 2012; Cohen & Zarowin, 2010; Campa & Minano, 2015) or complements (Chen et al., 2012; Anagnostopoulou & Tsekrekos, 2016).

Kothari et al. (2016) provide a validation on the substitution relationship between AEM and REM. They find that a high level of scrutiny compels managers to prefer REM rather than AEM because it escapes from the auditors' scrutiny. Aikaterini et al. (2016) find that after the adoption of IFRS in Greek, the firms managers tend to substitute the accrual earnings management by real earnings management. The main reason behind the substitution between AEM and REM is the relative costs of the two earnings management methods. Indeed, based on the relative costliness of earnings management strategies, Zang (2012) considers that both strategies are costly, leading managers to trade-off between them. In other words, in order to minimise the total cost of earnings management, managers balance the magnitudes of the two earnings management techniques. Thus, the higher (the lower) the level of the relative cost of one of the two strategies, the higher (the lower) the level of adopting the other strategy. Cohen and Zarowin (2010), Chan et al. (2015) provide a validation to this assumption in the context of increased AEM cost such as the Sarbanes-Oxley Act (SOX) adoption around seasoned equity offerings and the clawback adoption successively.

In contrast, other studies found a complementary relationship between the two earnings management practices. The major justification behind this

complementarity is the sequential nature of the REM and the AEM strategies highlighted by Zang (2012). This means that managers use the real activities manipulation during the fiscal year and then resort to AEM after the end of the fiscal year and before reporting the financial results in order to supplement REM in such a way to achieve the earning manipulation target. In this context, Anagnostopoulou and Tsekrekos (2016) find that in the presence of high levels of leverage, the substitution relation between REM and AEM is observed to turn into a complementarity effect. They explain their finding by a very high leverage level which results in an increased outsider monitoring that motives managers to combine both strategies to attain their targets. Li (2019) examines the impact of the equity compensation of chief executive officers (CEOs) on earnings management. He shows that equity compensation motivates CEOs to leverage both the accrual- and real-based earnings managements simultaneously.

As indicated above, the trade-off between accrual and real earnings management depends on many factors such as a high level of leverage and the IFRS adoption. To our knowledge, no study has examined the effect of the optimism and pessimism of investors on the trade-off between the AEM and REM. To fill up this gap, we explore the effect of the Tunisian investors' sentiment on the trade-off between REM and AEM and advance the following hypothesis:

> H3: Investors' sentiment affects the trade-off between REM and AEM by Tunisian managers.

DATA AND METHODOLOGICAL APPROACH

Data

We collected manually semi-annual accounting data from the interim reports as well as from the annual financial statements published by listed firms from the Tunisian Stock Exchange website (http://www.bvmt.com.tn) during the period from January 2009 to December 2018. We excluded firms with a specific nature of accounting methods and rules such as the financial sector and the public services sectors. For the same period, we collected the Search Volume Index (SVI) data to measure the investors' sentiment from Google Trends (https://www.google.com/trends/). Our final sample consists of 44 firms observed during 19 semesters for the period beginning from July 2009 and continuing until December 2018, resulting in 836 semester-firm observations. The first six month of 2009 were

excluded due to the use of lagged variables in the models, which results in an effective analysis from July 2009 to December 2018.

In the Tunisian market, listed companies are required by the Financial Market Commission (CMF) and the Tunis Securities Exchange Market (BVMT) to disclose semi-annual statements to the Financial authorities. Therefore, Tunisian managers of listed companies have two opportunities to interfere with accounting choices, not just one throughout the fiscal year, in order to react strategically to the prevailing investors' sentiment. In this context, Livnat and Santicchia (2006), Rodrigues et al. (2019) drew attention to the fact that it is still unclear whether the level of accruals in intermediary statements has the same pattern with annual accruals. Their affirmation relies on prior mixed evidence investigating the differentiation between managing annual earnings and managing interim earnings. Furthermore, investors' sentiment fluctuates and consequently exhibits a high frequency of varying throughout the fiscal year following observable and/or predicted events related to the political, economic, social or financial circumstances. Considering all these arguments, we used semester periods to, better, capture the effect of the time varying of investor sentiments on earnings management.

Our study period from 2009 to 2018 is considered as a suitable period since it involves turbulent and tranquil periods which respond to the objective of our paper examining the effect of the time varying scrutiny of investor during high and low investor sentiment on the firms earnings management decision. Indeed, the Jasmine revolution on 14 January 2011 and the multiple attacks in 2015–2016 created political and economic instability. These factors have perturbed all participants in the Tunisia stock exchange such as managers, investors, regulators and policy makers resulting in an increase of investor's scrutiny. In contrast, the legislative elections in 2014 had a favourable impact on market performance which decreases the attention of investor. The time varying of investor sentiment may reveal the manager incentives to report excessive earnings management or to be more conservative.

Variable Measurement

Abnormal accruals proxy

Since the apparition of the earnings management research, several models have been developed to estimate the discretionary component of accruals as a proxy of earnings management (Healy, 1985; DeAngelo, 1986; Jones, 1991; and the Modified Jones Model proposed by Dechow et al., 1995). However,

Debnath (2017) argued that the Modified Jones Model by Dechow et al. (1995) is extensively used by prior research as it provides more efficient estimation of earnings management. Moreover, according to Chatterjee and Rakshit (2020) from extant literature focusing in identifying the better model to estimate discretionary accruals, the Modified Jones Model was retained. Therefore, in our study we apply the modified Jones model to estimate the discretionary accruals.

In this study, we calculate abnormal accruals for firm i and semester t by the difference between normal accruals and total accruals. We measure total accruals TA_{it} by calculating the difference between income before extraordinary items and net cash flows from operating activities. We estimate, normal accruals using a Modified Jones Model as described by Dechow et al. (1995).

$$TA_{it} = \alpha_0 + \alpha_1 \Delta(REV_{it} - REC_{it}) + \alpha_2 PPE_{it} + \varepsilon_{it} \qquad (1)$$

where REV_{it} represents the revenues of firm i in semester t; REC_{it} is the trade receivables of firm i in semester t, PPE_{it} is the property, plant and equipment of firm i in semester t. All the variables and the intercepts are standardised by the firm's total assets for the previous semester.

Previous research interested in AEM used either signed or absolute value of discretionary accruals. However, in this paper we search to study the effect of the investors' sentiment on the upward/or downward earnings management. Thus, we use signed earnings management measures as a more appropriate approach for testing our directional hypotheses.

Real earnings management proxies

According to Graham et al. (2005), Roychowdhury (2006) and Kothari et al. (2016), managers can manipulate earnings through many decisions. They could allow excessive price discounts in order to, abnormally, increase sales. Alternatively, they could decide to produce more goods than necessary in an attempt to report a lower 'Cost of Goods Sold' (COGS) as fixed overhead costs are spread over a larger number of units. Eventually, they may prefer to reduce discretionary expenses like research and development, advertising and sales costs. However, in our study the major studied firms do not disclose information about the expenses of research and development. Thus, we measure REM only by abnormal cash-flows and abnormal production cost. In order to examine the entire effect of real earnings management, we use the aggregate REM proxy which combines these two measures.

Abnormal cash flows [*REM(AbCF)*] are measured by residuals derived from the model which estimates the level of normal cash-flows. This model is as follows:

$$CF_{it} = \alpha_0 + \alpha_1 Sales_{it} + \alpha_2 \Delta Sales_{it} + \varepsilon_{it} \tag{2}$$

where, CF_{it} is the cash-flows from operations of firm i in semester t, $Sales_{it}$ represents the sales of firm i in semester t, $\Delta Sales_{it}$ measures the difference between the sales of firm i in semester t and the sales of firm i in semester t–1 and ε_{it} is the residual term that captures the level of abnormal cash flows of firm i in semester t. All the variables and the intercepts are standardised by the firm's total assets of the previous semester.

Roychowdhury (2006) argues that companies with greater real transactions management are expected to have negative abnormal cash-flows from operations. Consequently, to ease the interpretation of our results we multiply abnormal cash-flows from operationsby minus one (–1). This allows to make the real earnings management measure in the way that, the higher the value of *REM(AbCF)* the proxy indicates, the more likely the firm would be engaged in real earnings management activities to upward the earnings.

Abnormal production cost [*REM(AbProd)*] is measured by residuals derived from the model which estimates the level of normal production. This model is as follows:

$$Prod_{it} = \alpha_0 + \alpha_1 Sales_{it} + \alpha_2 \Delta Sales_{it} + \alpha_3 \Delta Sales_{it-1} + \varepsilon_{it} \tag{3}$$

where $Prod_{it}$ is the sum of the cost of goods sold and the change in inventory of firm i in semester t, $Sales_{it}$ is the amount of sales of firm i in semester t. While $\Delta Sales_{it}$ is the sales of firm i in semester t minus the sales of firm i in semester t–1, $\Delta Sales_{it-1}$ is the sales of firm i in semester t–1 minus the sales of firm i in semester t–2 and ε_{it} is the residual term that captures the level of abnormal production costs *REM (Ab Prod)* of firm i in semester t. All the variables and the intercepts are standardised by the firm's total assets for the previous semester.

Total abnormal real earnings management [*REM(total)*]: In order to capture the entire effects of REM through abnormal cash-flows and abnormal production cost in a comprehensive measure, we follow Zang (2012) and Cohen and Zarowin (2010) by creating *REM(total)* as a single proxy. This proxy combines these two individual real activities manipulations, as it is the sum of the two standardised variables. As discussed above, to represent real transactions

management in a consistent way, we multiply the abnormal cash flows from operations by minus one (–1) following Zang (2012) and Cohen and Zarowin (2010). Therefore, the higher the value of *REM(total)* the proxy indicates, the more likely the firm would engage in real earnings management activities to upward the earnings.

Investors' sentiment measure

Traditionally, there are two main approaches used by previous literature to measure the investors' sentiment. The first one relies on the market-based measures (e.g., trading volume, initial public offering, first-day returns). The second consists in the survey-based index (e.g. the Michigan index). However, more recently Da et al. (2015) developed and validated a new approach to measure the investors' sentiment based on Internet search data. The main advantages for the use of search-based measures of investors' sentiment are firstly the availability at a high frequency and at the same time, it directly and objectively reflects the investors' attitudes toward stocks. Kim et al. (2019) provide empirical evidence in the Norwegian stock market that Google search is a good predictor of a trading volume and volatility indicating that the investors use information from Google along with other information channels in making investment decisions.

Thus, following Da et al. (2015), we rely on Google search to provide a measure of investors' sentiment labelled Googling Investors' sentiment. This measure is based on a Search Volume Index (SVI) of search items extracted from Google Trends. Appendix A describes the different steps developed by Gao et al. (2016) that we performed to calculate the investors' sentiment index labelled *Sent.*

Control variables

In line with previous literature investigating the determinants of the earnings management practices, we include a set of control variables that are associated with the level of earnings management. According to Anagnostopoulou and Tsekrekos (2016), Roychowdhury (2006), Zang (2012), Khanh and Thu (2019), Baker et al. (2019), a significant relationship between leverage and earnings management exists with different directions. Indeed, firms with higher level of leverage are subject to greater scrutiny of both creditors and investors, leading to a limitation of AEM. However, such increasing scrutiny may lead firms to turn to REM leading to a positive association between earnings management and leverage. Watts and Zimmermann (1986) also support this positive relationship

because when a firm is close to the brink of contractual clauses, managers have the incentive to select accounting procedures that increase earnings.

Furthermore, we include a size indicator because as provided by prior research larger firms tend to have lower abnormal accruals (Watts & Zimmermann,1986; Khanh & Thu, 2019; Baker et al., 2019; Rodrigues et al., 2019). The common argument behind this negative relationship between earnings management and firm size is that larger firms are under more scrutiny, therefore they are obliged to better monitor the use of earnings management in order to avoid potential law authorities' sanctions.

Moreover, in line with Simpson (2013) and Khanh and Thu (2019) we control for the effect of future improvements in a firm's operating performance on the level of current earnings management by including a measure of the change in one-period-ahead ROA. This allows mitigating the problem of omitted variables measuring future growth opportunities that may explain the willingness of managers to manage their current earnings.

Furthermore, we control for semester factor because when analysing the firm' earnings management strategy, managers may exhibit different tactics between the first and the second semester. This argument is in line with Simpson (2013) examining quarter data to investigate the relationship between AEM and investors' sentiment. She found that the level of abnormal accrual are more conservative at the end of the fiscal year because the financial statements are audited. However, Rodrigues et al. (2019) argued that due to capital market and debt contract incentives the probability of manipulating the information would be higher at the end of the fiscal year comparing to its level at the end of the first semester period.

Ultimately, following Simpson (2013) we include the lagged value of AEM to control for potential serial correlation in abnormal accruals.

We then considered in the regression models the following measures of the control variables discussed above in order to better isolate the effect of the investors' sentiment on earnings management:

- $Lev_{i,t}$: is the leverage ratio measured for each semester end by total debt to total assets.
- $Size_{i,t}$: we proxy firm size by the natural logarithm of total assets.
- $\Delta ROA_{i,t+1}$: measures the change in one-semester-ahead of return on assets ratio.

- *Semester$_t$* : is an indicator variable, which equals 0 for the first semester period and 1 for the second semester.
- *AEM$_{i,t-1}$* : represents the amount of AEM for the previous semester.

Estimated Models

The aim of this paper is to investigate the effect of the investors' sentiment on earnings management. We initiate our investigation by studying the relation between the investors' sentiment and discretionary accruals. Thus, we estimate a regression model in which the discretionary accruals are the dependent variable and the independent variable being investors' sentiment as well as a set of control variables considered as other determinants of earnings management in prior studies.

Thus, we firstly estimate the effect of the investors' sentiment on AEM (H1) by considering the following model:

$$AEM_{it} = \alpha_0 + \alpha_1 Sent_{t-1} + \alpha_2 Semester_t + \alpha_3 AEM_{i,t-1} + \alpha_4 Size_{i,t} + \alpha_5 Lev_{i,t} \alpha_6 \Delta ROA_{i,t+1} + \varepsilon_{i,t} \tag{4}$$

where $AEM_{i,t}$ is the amount of accrual earnings management estimated for the firm i at the end of the semester t, $Sent_{t-1}$ is the investors' sentiment index as of previous semester, $Semester_t$ is the semester variable indicator, $AEM_{i,t-1}$ is the lagged value of AEM. $Size_{i,t}$ is the firm size, $Lev_{i,t}$ is the leverage ratio and $\Delta ROA_{i,t+1}$ is the change in one-semester-ahead return on assets.

Then, we focus on the effect of the investor's sentiment on the second used practice to manage earning, real earning management. Thus, we estimate regression models in which the real earning management is the dependent variable and the independent variable being the investors' sentiment. In this context, we consider three measures of real earning management (abnormal cash flow, overproduction and aggregate real earning management). We add other factors as control variables.

We assess the effect of the investors' sentiment on real earnings management by estimating the following models related to each proxy of REM:

$$REM(total)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t} \tag{5}$$

$$REM(AbCF)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t} \tag{6}$$

$$REM(AbProd)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \tag{7}$$
$$\beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t}$$

where, $Sent_{t-1}$ is the investor's sentiment index for previous semester. The control variables are the following: $Size_{i,t}$ is the firm size, $Lev_{i,t}$ is the leverage ratio and $\Delta ROA_{i,t+1}$ is the change in one-semester-ahead return on assets ratio. The dependent variables, respectively for the three models (5), (6) and (7), are $REM(total)_{i,t}$ which is the total level of real activities manipulation during semester t, $REM(AbCF)_{i,t}$ which is the amount of REM through manipulating cash-flows and $REM(AbProd)_{i,t}$ which is the amount of REM through overproduction practice.

Studying separately each earning management strategy may give partial conclusions. Thus, to accomplish our investigation we analyse the effect of the investors' sentiment on the trade-off relation between the accruals and real earnings management practices. We follow Zang (2012) and Chan et al. (2015) and Anagnostopoulou and Tsekrekos (2016) by using a recursive equation system. Indeed, we use two equations' systems. The first one includes the total level of real earnings management as a dependent variable through which we extract the residual labelled as the *UnexplainedRM*. The second system with accrual-based earning management as a dependent variable, includes investors' sentiment, *UnexplainedRM* and the interactive term which was calculated as the multiplication of *UnexplainedRM* and lagged investors' sentiment. The main justification behind this modelling approach is the sequential nature of AEM and REM (Zang, 2012; Chan et al., 2015; Anagnostopoulou & Tsekrekos, 2016).

Therefore, we specify a recursive equation system as follows:

$$REM(total)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} +$$
$$\beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t}$$
$$AEM_{it} = \alpha_0 + \alpha_1 Sent_{t-1} + \alpha_2 Semester_t + \alpha_3 AEM_{i,t-1} +$$
$$\alpha_4 Size_{i,t} + \alpha_5 Lev_{i,t} + \alpha_6 \Delta ROA_{i,t+1} + \alpha_7 UnexplainedRM_{i,t} + \tag{8}$$
$$\alpha_8 (UnexplainedRM_{i,t} * Sent_{t-1}) + \varepsilon_{i,t}$$

where $REM(total)_{i,t}$ is the amount of REM during the semester t and $AEM_{i,t}$ is the amount of AEM estimated in the final semester t. $REM(total)_{i,t}$ is explained in the first equation of the system by our variable of interest which is $Sent_{t-1}$ and all control variables of Equation (5) while $AEM_{i,t}$ is explained by $Sent_{t-1}$ and all control variables of Equation (4). Moreover, in the second equation $UnexplainedRM_{i,t}$ is the estimated residual from the first system equation and

UnexplainedRM$_{i,t}$ * *Sent$_{t-1}$* represents the interaction term. The coefficient of this interaction term should be significant if investors' sentiment affects the relationship between AEM and REM even after controlling the individual effects of *UnexplainedRM$_{i,t}$* and *Sent$_{t-1}$*.

EMPIRICAL RESULTS

Descriptive Statistics

Table 1 reports descriptive statistics for our four dependent variables (*AEM, REM total, REMAbCF* and *REMAbProd*) and our independent variable *Sent*. Over the sampled period July 2009 to December 2018, Table 1 shows that discretionary accruals estimated using modified Jones' model range from –0.6131 to 0.5841 with mean (median) value of –0.0045 (–0.0043). Furthermore, Table 1 exhibits a negative value for the mean of AEM which is in accordance with previous research observing discretionary accruals values around zero (Haga et al., 2018). Moreover, the mean value of abnormal cash-flows (REM AbCF) is –0.0039 which is in accordance with Haga et al. (2018) and Alhadab and Nguyen (2018) who found respectively –0.0109 and –0.007. The positive average of the two other measures of real earnings management (*REM total* and *REM AbProb*) confirms the Anagnostopoulou and Tsekrekos (2016) finding.

Table 1
Descriptive statistics

	AEM	REM(AbProd)	REM(AbCF)	REM(total)	Sent
Mean	–0.0045	0.0092	–0.0039	0.0008	–0.0041
Median	–0.0043	0.0023	–0.0054	0.0022	–0.0049
Maximum	0.5841	0.4915	0.6495	0.6096	0.0112
Minimum	–0.6131	–0.8151	–0.7483	–0.9604	–0.0070
Standard deviation	0.1084	0.0996	0.1086	0.1719	0.0093
Q1	–0.0553	–0.0358	–0.0536	–0.0931	–0.0070
Q3	0.0529	0.0493	0.0487	0.0912	–0.0009

Notes: Table 1 reports summary statistics for our dependent variables measuring accrual-earnings management AEM, and the three proxies of real-earnings management namely abnormal production cost 'REM (AbProd)', abnormal cash-flows 'REM(AbCF)' and the total measure of real activities management 'REM(total). Furthermore, this table provides summary statistics for the main explanatory variable, which is investors' sentiment 'Sent'. Data related to these variables cover 19 semesters from December 2009 to December 2018. We begin from December 2009 since, during data collection period, historical data of the Tunindex market index, that we used to calculate lagged value of 'Sent' are available on the Tunisian financial market only from June 2009

Moreover, over the period from June 2009 to December 2018, Table 1 clearly shows that the mean and median values of the investors' sentiment variable are negative, indicating a general pessimistic feeling during the period of our study. This may be due to the fact that our sampled period includes the revolution period where Tunisia experienced terrible attacks and assassinations disturbing the market actors and the economic environment.

To give a more advanced analysis of the dynamic of the investors' sentiment during the sampled period, we present in Figure 1 the trend of investors' sentiment during the period that falls from June 2009 to December 2018.
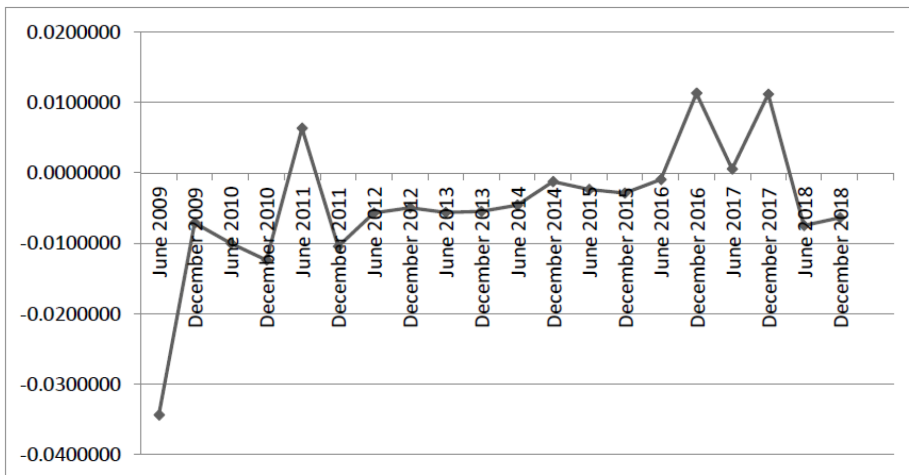

Figure 1. Googling the investors' sentiment in the Tunisian market

According to statistics reported by Table 1, Figure 1 reports that the values of the investors' sentiment measure in the Tunisian financial market are mostly negative, indicating that investors exhibited generally a pessimistic sentiment during the study period with some exceptions. Moreover, we find that the negative values present different magnitudes. What is interesting is that the Googling investors' sentiment reflects the major events that occurred in the financial market. Indeed, we clearly notice from Figure 1 a decreasing trend from June 2010 to December 2010. We may explain this decrease by the fear and panic around the Spring Revolution which started at the end of 2010. The continuous decline of the investors' sentiment from December 2012 to December 2013 can be explained by the occurrence of the political assassinations of Chokri Belaid on 6 February 2013 and Mohamed Brahmi on 25 July 2013. These

assassinations caused a political and an economic instability. An increasing trend of the investor's sentiment took place in 2014, which can be explained by some progress in the process toward a democratic transition. However, Tunisia went through difficult periods caused by the attacks of the Bardo Museum in March 2015 and the attacks of Sousse in the second half of 2015.

According to the annual rapport of the Tunisian Stock Exchange of 2016, the stock market 2016 year was characterised by many events. Particularly, the first two months were accompanied by heavy losses due to the fear of recession in the United States, the risk of failure in the oil sector, the decline of raw material prices and the devaluation of the Chinese Yuan. However, the relative control of the security risk has generated a slight revitalisation of the tourist flow and the promotion of a favourable investment climate ending the Tunisian stock market 2016 year on a positive note which generates optimism in the Tunisian financial market. All these events may explain the negative values of the investor's sentiment observed in the beginning of 2016 and positive values observed in the end of 2016. Eventually[2], the decrease in the middle of 2018 is may be due to the preoccupant depreciation of the Tunisian currency (loss of almost 60% of its value) making Tunisia even less competitive to draw foreign direct investments.

In sum, it seems that the shape of the investors' sentiment curve is coherent with the economic and political environment in Tunisia during the sampled period. We can consequently presume that consistent with Da et al. (2015), the Googling investors' sentiment is a good proxy of investors' sentiment since it reflects the major events affecting the Tunisian financial market.

Assessing the Impact of the Investors' Sentiment on AEM

Table 2 provides the regression results of the Equation (4) estimation, which models the effect of the investors' sentiment on accrual earnings management, taking into account the effect of a set of control variables drawn from prior literature as discussed in a previous section.

The coefficient of the Googling Tunisian investors' sentiment is significantly positive. This result firstly indicates that the investors' sentiment indeed matters for the Tunisian managers when they choose to manipulate earnings through discretionary accruals. More precisely, when keeping in mind the clear fluctuations exhibited by Figure 1, the positive sign implies that Tunisian managers tend to boost earnings through abnormal accruals when investors' sentiment increases while they tend to report more conservatively during low investors' sentiment periods. This result is consistent with Simpson's (2013)

study that finds a positive effect of the investors' sentiment on accrual earnings management using US firms' sample. Furthermore, our result corroborates Miranda et al. (2018) finding for Brazilian firms as an example of an emerging market when estimating the link between the investors' sentiment and accrual earnings management. Therefore, our finding tends to support the catering theory presumption, of Baker and Wurgler (2004), which specifies that managers are susceptible to the investors' sentiment and tend to react strategically their feeling.

Table 2

The effect of the investors' sentiment on accrual earnings management

Equation 4: $AEM_{i,t} = \alpha_0 + \alpha_1 Sent_{t-1} + \alpha_2 Semester_t + \alpha_3 AEM_{i,t-1} + \alpha_4 Size_{i,t} + \alpha_5 Lev_{i,t} + \alpha_6 \Delta ROA_{i,t+1} + \varepsilon_{i,t}$

Variables	Coefficients	t-statistics
$Sent_{t-1}$	0.4199*	(1.78)
$Semester_t$	0.0021	(0.52)
$AEM_{i,t-1}$	0.3697***	(9.85)
$Size_{i,t}$	0.0006	(0.25)
$Lev_{i,t}$	−0.0222	(−0.71)
$\Delta ROA_{i,t-1}$	0.1743**	(4.35)
Constant	−0.0143	(−0.32)
Wald chi^2	163.95	(0.000)

Notes: Table 2 reports panel estimation results of AEM regression (Equation 4) for the sample period through July 2009 to December 2018 that encompasses 19 semesters. $AEM_{i,t}$ is the amount of the discretionary accruals estimated in final semester t. $Sent_{t-1}$ is the investors' sentiment index as of previous semester measured using Googling search volume. Semester$t$ is a dichotomous variable that takes 1 for the second semester of the fiscal year and 0 for the first semester. $AEM_{i,t-1}$ is a one-year lagged variable of AEM, $Size_{i,t}$ is the firm size measured by the natural logarithm of total assets. $Lev_{i,t}$ is the leverage ratio of the total debt to total assets and $\Delta ROA_{i,t-1}$ is the change in one-semester-ahead of return on assets ratio that capture the future improvements in a firm's operating performance. The Wald chi^2 statistic is a Wald test where all coefficients in the regression model (except the constant) are all equal to zero (and its p-value is reported between square brackets). *, ** and *** report statistical significance respectively at the 10% level, 5% level and 1% level

After analysing the control variables coefficient, we find that lagged value of accrual earnings management $AEM_{i,t-1}$, and the improvement of future performance indicator $\Delta ROA_{i,t-1}$ have positive effect on AEM. The coefficient of lagged discretionary accruals is significantly positive. This result indicates that firms experiencing discretionary accruals manipulation in previous periods tend to preserve the same strategy of earnings management through accounting methods during a current period. Furthermore, firms that are likely to expect improvement in their future operating performance $\Delta ROA_{i,t-1}$, tend to resort to upward accrual manipulation in a current period. We could explain this positive relationship by

the fact that the expectation of a better future performance is likely to offset the reversal effect of current upward accrual manipulation during a future period. However, Table 2 exhibits insignificant effect of size and leverage variables. This result corroborates recent studies in emerging economies such as Swai and Mbogela (2016), Attia et al. (2016) and Elghuweel et al. (2017) respectively in East Africa, Tunisia and Oman. Still, contrary to Simpson (2013) and Kothari et al. (2016) we did not find a negative and significant effect of a semester indicator variable on AEM magnitude. It seems that the managers do not seek to avoid or limit accrual earnings management practices during the second six-month period to escape the legal audit.

Taken together, our findings confirm our first hypothesis (H1). These results indicate that managers are likely to take into account the investors' sentiment when they decide to use the accrual-earnings management technique after controlling the effect of several other firm characteristics revealed by prior literature. More precisely, managers tend to choose the opportune period according to the investors' feeling trend, in order to manipulate earning through discretionary accruals.

Assessing the Impact of the Investors' Sentiment on REM

The aim of our study is to provide a comprehensive investigation that explores the relationship between the earnings management policies and the Tunisian investors' sentiment. That is why we decide to go deeper by considering the second possible alternative of manipulating earnings which is real activities manipulation. As detailed above, to take up earnings management using real activities, we used three proxies. We first followed Roychowdhury (2006) and estimated abnormal cash-flows and abnormal production. Second, in line with Zang (2012), Cohen and Zarowin (2010), we combined these two measures into a comprehensive aggregate measure of real earnings management. Table 3 provides results of the three regressions estimation (Equations 5, 6 and 7) associated respectively to three proxies of REM.

Table 3

The effect of the investors' sentiment on real earnings management

Equation 5: $REM(total)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t}$

Equation 6: $REM(AbCF)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t}$

Equation 7: $REM(AbProd)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t}$

Variables	REM (total) Equation 5		REM(AbCF) Equation 6		REM (AbProd) Equation 7	
	Coefficients	t-statistics	Coefficients	t-statistics	Coefficients	t-statistics
$Sent_{t-1}$	0.8502*	(1.79)	0.4847*	(1.79)	–0.0169	(–0.07)
$Size_t$	–0.0053	(–1.05)	–0.0017	(–0.64)	–0.0009	(–0.42)
$Lev_{i,t}$	0.1780***	(3.20)	0.0831**	(2.74)	0.0388	(1.47)
$\Delta ROA_{i,t+1}$	–0.5338***	(–7.60)	–0.2266***	(–5.58)	–0.2559***	(–7.61)
Constant	0.0902	(1.01)	0.0270	(0.56)	0.0240	(0.62)
Firm and year fixed effects	Yes		Yes		Yes	
Wald chi^2	125.70 (0.000)		67.23 (0.000)		105.70 (0.000)	

Notes: Table 3 reports panel estimation results of the three regressions (Equations 5, 6 and 7) for the sample period through July 2009 to December 2018 that encompasses 19 semesters. We construct these regressions to explain the three proxies of real earnings management: the total measure of real activities management '*REM* (*total*)', abnormal cash-flows '*REM* (*AbCF*)' and the abnormal production cost '*REM* (*AbProd*)'. *Sent*$_{t-1}$ is the investors' sentiment index as of previous semester measured using Googling search volume. S*ize*$_{i,t}$ is the firm size measured by the natural logarithm of total assets. *Lev*$_{i,t}$ is the leverage ratio of the total debt to total assets and $\Delta ROA_{i,t+1}$ is the change in one semester-ahead of return on assets. The Wald chi^2 statistic is a Wald test that all coefficients in the regression model (except the constant) are all equal to zero (and its p-value is reported in square brackets).*, ** and *** report statistical significance respectively at the 10% level, 5% level and 1% level.

Table 3 interestingly shows a positive effect of the investors' sentiment on the aggregate measure of real earnings management. This result provides further evidence of the sensitivity of the Tunisian managers to the prevailing investors' sentiment when they decide to manipulate earnings through real activities. Therefore, the validation of the catering theory assumption was held regardless the earnings management strategy, AEM or REM.

Therefore, we find that the Tunisian managers react strategically during an optimistic period by boosting earnings relying on real activities manipulation. More specifically, they resort more to abnormal cash-flows through allowing lenient credits and excessive discount rates rather than to over production. Indeed, when splitting up aggregate REM measure into its two components, we found a significant effect of the investors' sentiment only on abnormal cash flows.

This conclusion is in line with Makhaiel's work (2019) which adopts interviews with company executives to investigate the influence of the Egyptian

context on the trade-off between earnings management tools. She found that Egyptian managers use extensively sale activities as an earnings management strategy. Still, overproduction is not a mechanism, on which they commonly rely for adjusting the profits figures because of the limitations of the Egyptian market. Consequently, unlike the developed countries' context, where overproduction is extensively used for boosting profits, it may not be a valid tool in the emerging contexts.

Regarding the control variables, the different REM proxies are negatively associated with the measure of the future improvement of operating performance. This result is in line with that presented by Gunny (2010) who provides evidence on the negative effect of real earnings management during current period on the future value of the firm. Moreover, the leverage coefficient is positive, which suggests that the more the leveraged firm, the less is the manipulation of real activities. These findings corroborate recent studies in emerging countries that investigate the determinants of REM, like Swai and Mbogela (2016) in East Africa, Razzaque et al. (2016) in Bangladesh and Tai (2017) in Taiwan. Size variable remains insignificant according to the REM equations estimation.

Thus, we can confirm that the investors' sentiment affects positively the managers' use of real manipulation through abnormal cash flows, which leads us to accept H2.

Assessing the Impact of the Investors' Sentiment on the Trade-Off between AEM and REM

Since the effect of the investors' sentiment on the trade-off between the two different practices is still unexplored, we aimed in this paper to fill this gap. Thus, firstly we examined the correlation between the earnings management proxies [$AEM_{i,t}$, $REM(total)_{i,t}$, $REM(AbCF)_{i,t}$ and $REM(AbProd)_{i,t}$]. Secondly, we examined the effect of the investors' sentiment measure on the trade-off between the earnings' management tactics by estimating system Equation (8).

Correlations between the earnings management practices

Table 4 presents the Pearson and Spearman correlations among earnings management variables: accrual earnings management, aggregate real-earnings management, abnormal production costs and abnormal cash-flows.

Table 4

Pearson correlation between alternative proxies of earnings management

	AEM	REM(total)	REM (AbCF)	REM(AbProd)
AEM	1.000			
REM (total)	0.4364***	1.000		
REM (AbCF)	0.6935***	0.8378***	1.000	
REM(AbProd)	−0.0486	0.7926***	0.3311 ***	1.000

Notes: Table 4 reports pair-wise correlation coefficients between the AEM measure and the REM proxies. *, ** and *** report statistical significance respectively at the 10% level, 5% level and 1% level

Table 4 exhibits a high level of correlations between both *REM(AbProd)* and *REM(total)* and between *REM(AbCF)* and *REM(total)*. This result is mechanical because *REM(total)* is the sum of *REM(total)* and *REM(AbCF)*. Moreover, the correlation between *AEM* and *REM(total)* is significant and positive (Pearson correlation of 0.4364). Thus, we can suggest that the magnitudes of these two techniques tend to vary in the same sense. This result rather gives preliminary support to the previous findings of Anagnostopoulou and Tsekrekos (2016) that firms use complementarily accrual-based earnings management and real-activities manipulation to manage earnings.

More specifically, the correlation between discretionary accruals and abnormal cash-flows from operations is significantly positive while that with abnormal production costs insignificant. Thus, we can suggest that the significant correlation between AEM and REM is likely to be due to abnormal cash-flows from operations. Otherwise, when managers want to upward their earnings for a specific purpose, they potentially use the manipulation by accruals and by cash-flows.

The effect of the investors' sentiment on the trade-off between earnings management practices

Table 5 presents the effect of the investors' sentiment on the trade-off between real-earnings management and accrual earnings' management practices. It shows that the relationship between *UnexplainedRM$_{i,t}$* [3] and the accruals is significantly positive ($\alpha_7 = 0.3618$). This positive sign indicates that the increase of *UnexplainedRM$_{i,t}$* is associated with an increase in accruals. This means that after using real activities manipulation during the fiscal year, managers tend to manipulate earnings with accruals after the fiscal year's end and before reporting the financial results in order to achieve an earning manipulation target. Therefore, managers of the sampled firms tend to manipulate earnings using the AEM and

REM complementarity and do not handle them as substitutes. The complementary relationship between AEM and REM is in line with Anagnostopoulou and Tsekrekos (2016) and challenges the evidence of Cohen and Zarowin (2010) as well as that of Zang (2012) regarding the substitutive relationship.

Table 5

The effect of the investors' sentiment on the trade-off between REM and AEM

Recursive Equation 8

$REM(total)_{i,t} = \beta_0 + \beta_1 Sent_{t-1} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 \Delta ROA_{i,t+1} + \varepsilon_{i,t}$

$AEM_{it} = \alpha_0 + \alpha_1 Sent_{t-1} + \alpha_2 Semester_t + \alpha_3 AEM_{i,t-1} + \alpha_4 Size_{i,t} + \alpha_5 Lev_{i,t} +$

$\qquad \alpha_6 \Delta ROA_{i,t+1} + \alpha_7 UnexplainedRM_{i,t} + \alpha_8 \left(UnexplainedRM_{i,t} * Sent_{t-1} \right) + \varepsilon_{i,t}$

Variables	Coefficients	t-statistics
$Sent_{t-1}$	0.6920*	(1.72)
$Semester_t$	0.0124*	(1.77)
$AEM_{i,t-1}$	0.1720***	(4.94)
$Size_{i,t}$	–0.0009	(–0.23)
$Lev_{i,t}$	0.0817**	(2.05)
$\Delta ROA_{i,t+1}$	0.3358 ***	(6.85)
$UnexplainedRM_{i,t}$	0.3618***	(14.13)
$UnexplainedRM_{i,t}*Sent_{t-1}$	–6.8116 **	(–2.92)
constant	–0.0092	(–0.13)
Wald chi^2	483.90	
Prob > chi^2	(0.000)	

Notes: Table 5 reports results estimation of the recursive equation system (Equation 8) that examines the effect of investors' sentiment on the trade-off decision between AEM and REM. $REM(total)_{i,t}$ is the amount of earnings management through real activities manipulation during the semester t and $AEM_{i,t-1}$, is the amount of earnings management through accruals manipulation after the end of semester t. $REM(total)_{i,t}$ is explained in the first equation of the system by our variable of interest which is $Sent_{t-1}$ and all the control variables of Equation (5) while $AEM_{i,t-1}$, is explained by $Sent_{t-1}$ and all the control variables of Equation (4). Moreover, in the second equation, $UnexplainedRM_{i,t}$ is the estimated residual from the first system equation and $UnexplainedRM_{i,t} * Sent_{t-1}$ represents the interaction term. This table provides OLS estimation for the recursive Equation (8) for the sample period 2009 to 2018 using panel data. The Wald chi^2 statistic is a Wald test showing that all coefficients in the regression model (except the constant) are all equal to zero (and its *p*-value is reported in square brackets). *, ** and *** report statistical significance respectively at the 10% level, 5% level and 1% level

To check the effect of the investors' sentiment on the complementary relationship between AEM and REM, we then examined the coefficient α_8 of the interaction term *UnexplainedRM$_{i,t}$*Sent$_{t-1}$*. We found that this coefficient is significant and negative. Thus, we can confirm firstly that, the investors' sentiment matters for the trade-off decision between AEM and REM. Secondly,

the negative sign indicates that the higher the investors' sentiment, the weaker the complementarity between REM and AEM. The decrease in the complementarity level between REM and AEM can be explained by the fact that during the period that shows improvement in the investors' sentiment which is associated with a decrease in outside parties' scrutiny, managers may rely more on AEM rather than REM since real-activities management is expected to be costlier for the firm. This result tends to be consistent with Kothari et al. (2016) presuming that in high sentiment periods, managers naturally decide to accomplish earnings management via accruals rather than engaging in real activities.

Therefore, we confirm our third hypothesis H3 that the investors' sentiment has a significant effect on the trade-off decision between the two strategies (AEM/REM). Furthermore, it contributes to shed light on the behaviour of the Tunisian managers regarding the choice between them. Indeed, they tend to use the two tools of earnings manipulation as complementary rather than substitutive. However, the prevailing investors' sentiment affects negatively this complementarity.

IMPLICATIONS AND DISCUSSION

We find a positive relationship between the investors' sentiment and earnings management. This positive association is robust to the alternative proxies of earnings management specifically AEM and REM as shown by Tables 2 and 3. Therefore, we provide further evidence to the assumption, which states that managers resort to earnings management practices in optimistic periods. The choice of the adequate period to resort to earnings manipulation confirms the opportunistic behaviour of the managers in order to mislead investors. Indeed, because the sentiment is related to the human aspect and is consequently unintentional and not self-controlling, opportunistic managers will quickly seize this opportunity whether by REM if the opportunistic period occurs during the fiscal year or by AEM if it falls after the year ends. Doing so, managers tend to exploit the inability of the investors to detect possible distortions of reported earnings and its components like Cash-flows, during optimistic periods, to achieve desirable earnings levels. Miranda et al. (2018) confirm this statement. They argue that the optimism in the capital market engenders excessive increase of stock prices. Accordingly, the managers are likely to benefit from this situation, to attain favourable results through making opportunistic accounting choices.

We decided to conduct our study in a context of an emerging market because previous literature demonstrated that evidence on the relationship

between the investors' sentiment and earnings management in such contexts are still incipient and still deserve attention. We expected that emerging markets have their uniqueness and therefore the evidences drawn from developed markets (Simpson, 2013; Ali & Gurun, 2009) are not appropriate to such contexts. Interestingly, we provided further support to the role of the behavioural biases on financial reporting quality, which is usually addressed in developed contexts. Our explanation for this result is that the investors' sentiment is, basically, connected to a natural and human feeling and consequently its role does not depend on the context. A general feeling of optimism encourages opportunistic managers to cater to the investors' appetite, as presumed by the catering theory, because they are aware that on the one hand, investors are less vigilant to detect their opportunism, and on the other hand external scrutiny is reduced.

Our results from Table 3 show that managers react positively to the investors' sentiment by real activities manipulation. More specifically, in contrast to previous evidence in developed countries, Tunisian managers are likely to rely only on abnormal cash-flows. Two possible arguments can explain this result. First, this finding corroborates Makhaiel (2019) conclusion drawn from Egyptian context. Therefore, it seems that the economic specificities of the developing context characterised by the dominance of the small and middle size enterprises constraint the use of an overproduction strategy because it is more costly and likely to be riskier than the sales manipulating strategy. Indeed, the cost of storage could weigh a lot on the company and offset the possible gain that the company can make in terms of unit cost of production as a result of the overproduction. Second, the 2011 revolution affected severely the Tunisian trade, both national and international, making the production strategy no longer appropriate. Indeed, Tunisian trade exchanges with the neighbouring' countries, especially Libyan market, have been deeply constraint by the Libyan revolution which limits Tunisian exportations toward this country. Furthermore, foreign customers of totally exporting business have no longer confidence in the credibility of the Tunisian companies, in relation to the respect of delivery times, because of the political problems and repetitive strikes. With regard to the national market, after the flight of Ben Ali there was a release of the parallel import networks that previously worked under the auspices of the ruling family members through corruption practices and political pressure (Attia et al., 2016).

This has engendered a climate of unfair competition that hinders companies to sell their production in the national market. For the same discussed arguments, it becomes easier for the Tunisian firms to act on their real activities through offering lenient credits or excessive discount to accelerate sales and attain earnings objectives rather than engage in excessive production.

Results from Table 5 reveal how the Tunisian managers use the two techniques to react to the prevailing investors' sentiment. We focus on the coefficient α_7 related to the part of discretionary REM that is labelled *UnexplainedRM$_{i,t}$*. The positive sign indicates a complementary relationship rather than a substitute use between AEM and REM. The opportunistic managers tend to avoid the risk of using a single earnings management technique. As supported by Cohen and Zarowin (2010) if the managers decide to rely only on AEM, that becomes possible only after the end of the fiscal reported period, they may support a considerable shortfall. This is because the gap between unmanaged earnings and the desired threshold could exceed the amount by which it is possible to manipulate accruals after the end of the fiscal period. Indeed, after the end of the fiscal year, if all accrual-based strategies are used, managers are left with no option to manipulate earnings through real activities.

Eventually, we found that the sign of the coefficient of *UnexplainedRM$_{i,t}$* becomes negative when it is multiplied by *Sent$_{i,t-1}$*. The negative sign of α_8 associated to this interaction means that in a high sentiment period, the complementary relation between REM and AEM decreases. This result indicates that taking into account the increase of the investors' sentiment, manager tend to prefer one practice more than the other. Under the weakness capitals-market scrutiny, that characterises investors' optimism, managers are more likely to engage in AEM than REM. The lower level of scrutiny induces a lower cost of accrual earnings management which promotes its use by managers. This is in line with the suggestion reported by Zang (2012) that when one earnings management method is relatively more costly, the managers engage more in the other. Thus, we suggest that Tunisian managers seek to benefit from optimistic investors and at the same time try to minimise the total cost of earnings management tools by engaging in AEM more than REM.

To summarise and in line with the catering theory we gave affirmative answer to the question addressed in the hypothesis development section that is whether the investors' sentiment does indeed matter for Tunisian manager decision in prioritising one earnings management technique rather than the other during optimistic periods. More specifically, we concluded that the Tunisian manager uses both techniques as complementary rather than as substitutes in order to achieve earnings objective. However, we suggest that the managers may exploit optimistic periods in order to minimise the total cost of earnings management practices by a little shift toward AEM rather than REM.

CONCLUSION

Three conclusions can be drawn from this study. First, our results show that the coefficient of the investors' sentiment is significantly positive in the AEM regression model, indicating that Tunisian managers tend to boost earnings through abnormal accruals when investors' sentiment increases. However, during low sentiment periods, which are characterised by a high level of scrutiny from investors as well as regulators and policy makers, managers' report more conservatively. Second, we also validate a positive effect of the investors' sentiment on aggregate real earnings management that stems from the positive effect on abnormal cash flows. This result is likely to be explained by the contextual setting of the Tunisian market which is characterised by a harmful economic and political environment that constricts earnings management through an overproduction strategy.

Taken together, these two results confirm the catering theory' assumption which suggests that managers tend to produce a suitable picture of firms through earnings management policies, when the investor is optimist.

Third, we found a positive association between the residual of real earnings management equation, *UnexplainedRM*, and the abnormal accruals confirming the complementary relationship between AEM and REM in the Tunisian financial market. Our findings do not confirm the substitution relationship between AEM and REM found by Cohen and Zarowin (2010), Zang (2012), but corroborate the results of Anagnostopoulou and Tsekrekos (2016), Li (2019) with regard to the complementary relationship between the two policies. Thus, the opportunistic managers tend to avoid the risk of using a single earnings management practice to achieve a desired level of earnings management and they tend to use both tools of earnings manipulation conjointly. Finally, we found that the higher the investors' sentiment is, the weaker the complementary relationship between REM and AEM will be. Therefore, taking into account improved investors' sentiment, managers may prefer one practice more than the other. We could explain this result by a shift to the accrual earnings management compared to the REM due to the weaker of the scrutiny cost during investors' sentiment optimism period.

Evidence provided by this study about the association between earnings management policies and the investors' sentiment has interesting practical implications to financial statement users, especially investors and financial analysts. Indeed, it gives them important insights and requires them to adopt necessary adjustments to their expectations when evaluated from an optimistic

market' perspective. Our findings confirm the positive effect of the investors' sentiment on Tunisian earnings management practices. Nevertheless, many emerging questions are left unanswered. Understanding the reason underlying the managers strategic reaction to the investors' sentiment is still a major challenge for scholars in the context of developing economies. Furthermore, analysing how the Tunisian context specificities affect the behaviour of the investors as well as the managers choices regarding the appropriate tools to manipulate earnings is an important area that requires further research. That is why adopting alternative methods like interviews might be appropriate and could therefore supplement our results suggesting new insights about the effect of behavioural biases on accounting policies within developing markets.

NOTES

1. Campa and Minano (2015) provide a detailed review of studies investigating internal and external factors to earnings management relying on positive theory.
2. http://kapitalis.com/tunisie/2018/04/28/depreciation-du-dinar-tunisien-et-inflation-un-vrai-casse-tete-chinois/ (Accessed 5 August 2019).
3. As explained in methodology section, *UnexplainedRM$_{i,t}$* is the estimated residual from the first system equation. It represents a proxy of the discretionary amount of real earnings management undertaken during the fiscal year.

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APPENDIX A

In order to measure the investors' sentiment index we performed the following steps, as described by Gao et al (2016):

- We used positive and negative items that can measure the investors' sentiment based on terms related to economics collected from the Harvard IV-4 Dictionary. These words are classified as "Econ@" or "ECON".
- We downloaded the weekly SVI of search terms (covering the search volume from Sunday to Saturday) from January 2009 to December 2018. Since Tunisian people use the Arabic and French languages in their Internet searches, we downloaded the SVI of search terms in both languages. Moreover, we kept only the search terms that have at least 100 weekly SVI observations. Following this criterion, we initially retained 77 words.
- We calculated the weekly change in SVI (ΔSVI) for each search term and standardised the time series to make them comparable by using their standard deviations. Thus, we obtained the adjusted weekly change in search volume (ΔASVI).
- We ran the expanding backward rolling regressions of ΔASVI on the contemporaneous market returns of the Tunindex market index and we selected only terms that are significant (*t*-statistics). During data collection period, the historical data of the Tunindex market index are available in the Tunisian financial market only from July 2008. Thus, we estimated the regression from July 2009 to December 2018 since we used the first six-month period from January 2009 to June 2009 as the initial rolling regression window. This procedure generated a dynamic final list of 29 search terms.
- We classified the significant terms into positive and negative ones through the sign of term's *t*-statistics to construct our sentiment index. Thus, we measured this index by calculating the difference between the average of ΔASVI of the significant positive terms and the average of ΔASVI of the negative search terms for every week as follows:

$$Sent_t = \text{WAP–WAN}$$

where $Sent_t$ is the investors' sentiment index for window t, WAP is the *t*-statistic-weighted average of the positive searched items and WAN is the *t*-statistic-weighted average of the negative searched ones.