

**FEDERAL UNIVERSITY OF ESPÍRITO SANTO
CENTER OF LEGAL AND ECONOMIC SCIENCES
POST-GRADUATE PROGRAM IN ACCOUNTING**

LUIZA DAZZI BRAGA

**REAL EARNINGS MANAGEMENT, BUSINESS STRATEGY AND PRODUCT
MARKET COMPETITION**

VITÓRIA

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Master's thesis project presented to the Post-Graduate Program in Accounting at the Center for Legal and Economic Sciences of the Federal University of Espírito Santo, as part of the requirements for obtaining a master's degree in Accounting.

Advisor: Prof. Dr. Luiz Cláudio Louzada

Co-advisor: Prof. Dr. Carolina Magda
Roma

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**“REAL EARNINGS MANAGEMENT, BUSINESS STRATEGY AND PRODUCT MARKET
COMPETITION”**

Dissertação apresentada ao Programa de Pós-graduação em Ciências Contábeis da Universidade Federal do Espírito Santo como requisito para a obtenção do título de Mestre em Ciências Contábeis.

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COMISSÃO EXAMINADORA

Prof. Dr. Luiz Cláudio Louzada
Universidade Federal do Espírito Santo

Prof^ª. Dr^ª. Carolina Magda da Silva Roma
Universidade Federal do Rio Grande

Prof. Dr. Vagner Antônio Marques
Universidade Federal do Espírito Santo

Prof^ª. Dr^ª. Flávia Zóbolli Dalmácio
Universidade de São Paulo



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REAL EARNINGS MANAGEMENT, BUSINESS STRATEGY AND PRODUCT MARKET COMPETITION

Abstract

Purpose – This research aims to investigate the relationships among firm-level business strategy (BS), industry-level market competition (MC), and real earnings management (REM), focusing on how BS and MC firsts jointly affect firms' engagement in the management of real activities.

Design/methodology/approach – Archival data from U.S. nonfinancial public firms in the period 2000-2019 were analyzed. The measurement of real earnings management was based on models that capture the abnormal level of activities related to REM practices. Business strategy was calculated using a composite score built on Miles and Snow's (1978; 2003) framework, while market competition is measured at industry level through multiple measures. The hypotheses were tested using OLS regressions controlled for year and industry fixed effects.

Findings – The empirical results suggest that firms following an innovative-oriented prospector strategy are associated with lower levels of engagement in real earnings management, while firms following an efficiency-oriented defender strategy are associated with higher levels of REM. Also, firms in less competitive industries are less associated with REM practices compared to those in more competitive environments. However, the combined effect of business strategy and market competition reveals that prospectors in less competitive markets engage more in real earnings management than defenders in similar environment.

Originality/Value – This research contributes to earnings management literature by documenting how a firm's business strategy and the level of industry competition are related with the level of firms' engagement on real earnings management. Thus, this study joins to the scarce literature that documents the singular and the combined effects of both business strategy and market competition on real earnings management, showing that this practice can be affected not only by exogenous determinants of competition within an industry, but also by the internal choices of allocating resources accordingly with a business strategy.

Keywords: Real earnings management; business strategy; market competition.

1. Introduction

This study investigates the effects of firm-level business strategy (BS) and industry-level competition (MC) on real activities-based earnings management (REM). The opportunistic practice of earnings management refers to managerial judgment in financial reporting and in structuring transactions with the purpose of adjusting reports to reach some specific financial result (Healy and Wahlen, 1999). Managers can engage in earnings management through accounting discretionary choices based on the accounting measurement system, or accruals. Another possibility is through managing real activities during the fiscal-year period, which is harder to be detected, however it is costly as decreases firm value in a long-term (Roychowdhury, 2006). Prior literature points out several drivers for the engagement in earnings management, including to reduce (rise) regulatory costs (benefits), to avoid debt

covenants restrictions, to raise external financing, and to increase job security and corporate managers' compensation (Dechow *et al.*, 1996; Healy and Wahlen, 1999). In sum, both external and internal firms' determinants can be incentives for this practice.

Business strategy can influence firms' budget allocations (Porter, 1996), manager compensation systems (Balsam *et al.*, 2011), other managerial discretionary decisions and the overall disclosure of information (Bentley-Goode *et al.*, 2017). Thus, BS is a relevant construct regarding real earnings management. Consistent with prior research (e.g. Bentley-Goode *et al.*, 2017; Habib & Hasan, 2017, 2018), this study relies on Miles and Snow (1978, 2003) business strategy typology: innovation-oriented prospectors and efficiency-oriented defenders. These strategies are the two ends of a business strategy continuum, while the middle is constituted by analyzers – firms pursuing attributes from both prospectors and defenders. On one side, prospectors tend to change rapidly and continuously their product market mix, and to invest heavily in innovation through research and development (R&D) and in brand-building marketing strategies. On the other side, defenders rarely adjust their product and market portfolios, focusing on production efficiency in a stable product mix. Both prospectors and defenders have incentives to disclose proper information. However, firms following any business strategy must deal with the cost of disclosing certain key information (Verrecchia, 1983), thus information can be withheld to protect a firm advantage in its chosen strategy (Bentley-Goode *et al.*, 2017). Thus, it is expected that prospectors to be more selective when disclosing information about investments in R&D activities, and defenders to be more selective in disclosing information over investments in technologies that are strategic to operational efficiency.

Competitive pressures also affect managerial decision-making, influencing internal procedures and operational decision, which includes the management of earnings (Datta *et al.*, 2013). Even though this subject is more explored by prior literature, there is no consensus about the role of market competition on earnings management practices. On one hand, high competition is found to be a driver for efficient markets, reducing the likeliness of firms to engage in earnings management practices as more information are presented in these environments (El Diri *et al.*, 2020; Laksmana and Yang, 2014). On the other hand, competitive environments are also understood as drivers for earnings management, as it exerts additional pressures on managers to achieve target results (Karuna *et al.*, 2012; Markarian and Santaló, 2014).

Few studies investigated the association between earnings management, firms' business strategy, and environmental characteristics together. For instance, Houque et al. (2013) examined whether business strategy is associated with conservatism and accrual earnings management, and how these relationships are affected by wider macro-economic environments. Using a sample of U.S. listed firms and relying on Miles and Snow (1978; 2003) strategy typology, they found that defenders are associated with higher levels of accrual earnings management, however in high-growth periods defender firms exhibit lesser accrual earnings management. Moreover, considering specifically the relationships among REM, BS and market competition, the study of Wu et al. (2015) explored the relationship among real earnings management, business strategy based on Porter's (1980) typology, and market competition in a Chinese context. Their findings indicate that cost-leaders (differentiators) are positively (negatively) associated with REM. Further, the moderator effect of market competition was found insignificant for firms following an innovative and marketing-oriented strategy, while for firms following cost leadership strategy and operating in highly competitive markets the engagement in REM is increased. More recently, Widuri and Sutanto (2018) examined the relationships between REM, differentiation strategy, and market competition in Indonesia. Their results confirmed the hypotheses that differentiators engage less in REM, while the interaction between differentiation strategy and market competition shows that in more competitive environments differentiators engage more in REM.

Thus, as important elements of firms' financial performance and its environment, both business strategy and industry aspects have been previously associated with earnings management. However, research regarding these concepts is still incipient. So, this study aims to explore the single and combined effect of both BS and MC on REM by applying different measures than prior literature and in a different country context. Therefore, it is proposed the following research question: how does business strategy and market competition affect the level of firm's real earnings management activities?

To answer it, a sample of U.S. nonfinancial listed firms for the period of 2000 to 2019 was examined. Following previous studies (Gunny, 2010; Roychowdhury, 2006; Shi *et al.*, 2018), engagement in REM activities was captured by deriving abnormal values from production costs, operational cash flows, and discretionary expenditures. Business strategy was calculated using a composite discrete measure based on Miles and Snow's (1978; 2003) framework (Bentley *et al.*, 2013; Habib and Hasan, 2017, 2018), while market competition was measured at industry-level using three measures, namely Herfindahl–Hirschman Index (HHI),

Concentration ratio (CR4) and Hall Tideman Index (HTI) (Datta *et al.*, 2013; El Diri *et al.*, 2020; Hall and Tideman, 1967). Also, additional measures were used to test the robustness of the results.

The empirical results suggest that firms following prospector strategy engage less in the practice of real earnings management than firms following defender strategy, which is in line with prior studies as Wu *et al.* (2015) and Widuri and Sutanto (2018). Also, firms in less competitive industries engage less in this practice, while firms in more competitive environments engage more in REM, consistently with prior research (e.g. Datta *et al.*, 2013; Karuna *et al.*, 2012; Markarian & Santaló, 2014) this indicates that competitive pressures increase the manipulation of real activities. However, the combined effect of market competition and business strategy reveals that prospectors in less competitive markets engage in higher values of real earnings management than defenders in similar environments. This results are partially corroborated by previous research, as Wu *et al.* (2015) found similar outcomes for efficiency-oriented firms in more competitive markets; however, they did not found a significant effect of MC on the relationship between REM and innovative-based strategy, while Widuri and Sutanto (2018) found that higher market competition generates higher level of real earnings management. The difference of results might be explicated by the context disparity, as the mentioned prior research analyzed Asian countries, and US has a strong legal system, investor rights, and market monitoring (Chen *et al.*, 2020).

This research contributes to the growing literature on earnings management, business strategy, and market competition in some important ways. First, by providing evidence that business strategy is a determinant of real earnings management engagement, and that different business strategies lead to different levels of REM. Also, by evidencing that competitive pressure increases the level of real earnings management, which supports the idea that high competition creates a hostile environment where firms are stimulated to misrepresent the financial information of firms. Besides, the moderator effect of market competition on the relationship between BS and REM is confirmed, and MC is found to change the direction of this relationship for both business strategies. This is a novel result that brings insights about the joint role of BS and MC on the unethical behavior of earnings manipulation. Second, compared to prior research, this study uses more robust measures to capture business strategy and market competition. The composite score of business strategy based on Miles and Snow (1978; 2003) and developed by Bentley *et al.* (2013) is composed by several indicators of a firm business strategy, while for competition at industry level three different proxies are

employed. Finally, different from previous literature regarding the studied concepts, this research unit of analysis is the U.S. listed firms, and, thus, brings evidence from a traditional market that has its own characteristics as high levels of market development and monitoring, and strong legal protection of investors.

The contributions of this research also can be of value for practitioners. For instance, external stakeholders as government, investors, and forecast analysts can better understand the risks and benefits of both prospectors and defenders, as well as the role of market competition, regarding the engagement in the unethical practice of real earnings management. Thus, by understanding the association between a firm's business strategy, the level of competition within its industry, and the degree of real earnings management, decision makers can be more accurate in their choices involving these matters.

The remainder of this paper is organized as follows. Section 2 outlines the theoretical framework and research hypothesis. Section 3 addresses the research design aspects. Section 4 refers to the main results and discussion, in sequence section 5 presents additional analyzes. Finally, section 7 brings the conclusions, by considering the implications, recognizing research limitations, and providing avenues for future research.

2. Hypothesis development

2.1. Business strategy and real earnings management

Business strategy is an important component of organizational structure and processes (Miles and Snow, 1978, 2003), influencing operational decisions and internal governance mechanisms, such as executive compensation systems (Balsam *et al.*, 2011), and affecting the overall disclosure of information environment (Bentley-Goode *et al.*, 2017). Verrecchia (1983) argue that disclosure-related cost, or proprietary cost, is associated with the cost of releasing information that can put the firm in an unfavorable situation. Hence, information can be withheld because it represents 'bad news', reflecting, for example, in contracts of external financing and in market expectations; or it can be 'good news', but not worth enough to warrant incurring the proprietary cost of releasing information that competitors, shareholders, or employees might use in a harmful way for the firm.

Agency theory postulates a conflict between principals and agents due to informational asymmetry and contract failure. Thus, managers who have privilege internal information can opportunistically manipulate certain operational and financial information, for example, to

smooth results or to raise earnings to meet market and investors' expectations (Jensen and Meckling, 1976). In this sense, earnings management is a practice regarding to the opportunistic use of discretionary judgment in financial reporting and in structuring transactions (Healy and Wahlen, 1999).

The practice of earnings management can occur by using accruals or by manipulating real activities. The first is based on accounting choices that does not affect cash flow directly. The second is based on altering real operations with potential to affect both cash flows and accruals, and to compromise results in the long-term (Jeong and Choi, 2019; Roychowdhury, 2006). Cohen and Zarowin (2010) pointed out two reasons for managers to choose real activities rather than accruals management. First, real activities manipulation is less likely to get auditor's attention or regulatory scrutiny. Second, engaging in real manipulation gives more options to managers to adjust results as desired. However, the manipulation of real activities requires influencing on critical strategic operational choices, as R&D and selling, general and administrative (SG&A) expenses, price discounts, and overproduction of inventory items (Gunny, 2010; Wu *et al.*, 2015). Hence, the management of earnings via real activities might compromise not only future performance, but also the achievement of a successful business strategy.

Several typologies of business strategy exist in management literature describing how companies compete in their respective market environments (Campbell-hunt, 2000). Two consolidated typologies applied by prior research are prospectors and defenders of Miles and Snow (1978; 2003) and Porter's (1980) differentiators and cost leaders strategic positioning. Both are compatible with each other, and describe business strategies in terms of innovative and marketing-oriented strategy (prospectors and differentiators) and efficiency-oriented strategy (defenders and cost leaders) (Bentley *et al.*, 2013; Kim *et al.*, 2004; Langfield-smith, 1997). Following prior literature, the focus of this study is on prospectors and defenders' strategies, which are considered both ends of a strategy continuum. Firms operating under a mixed strategy exhibit characteristics of companies at both ends of the continuum (Bentley-Goode *et al.*, 2017; Bentley *et al.*, 2013; Hambrick, 1983).

Miles and Snow (1978; 2003) argue that prospectors change their product and market mix to be innovative, with budgets oriented toward R&D and marketing. Whereas defenders rely on price, service, or quality to sustain a stable product portfolio, and focus on production and distribution of goods and services efficiently. Bentley *et al.* (2013) explain that prospectors

might make greater efforts to “protect” the marketing and research and development functions, while defenders “protect” the finance and production functions. Given the different complexity associated with each business strategy, it is reasonable to argue that strategy-level complexity may influence in the engagement in real earnings management.

Known motivations for managers to manipulate firm’s performance through earnings management are to obtain external financing and to avoid debt covenant restrictions (Dechow *et al.*, 1996). Wu *et al.* (2015) argue that firms following cost leadership strategy tend to strongly need outside resources for two reasons: to achieve scale and operational excellence; and due to cost leaders lower profit margins, which may difficult internal financing. On the other side, prospectors might demand external funds as the resources for innovative products require huge investments and often risk sacrifices short-run profitability (Bentley-Goode *et al.*, 2017; Bentley *et al.*, 2013). However, others researchers (e.g. Banker *et al.*, 2014; Grant, 1991) defend that it is expected firms with advantage based on marketing and innovation to be less dependent on external investments, as it is more difficult to imitate their products or services. Moreover, performance over time is more sustainable due to the nature of these investments, which leads prospectors to high margin profits and less need to rely on external investments.

However, firms following an innovative and brand based strategy are well rooted as risky and uncertain due to the nature of its investments on intangible assets research and development (R&D) (Banker *et al.*, 2014; Bentley-Goode *et al.*, 2017; Habib and Hasan, 2018), which leads them to deal with undesirable financial results and also with a high level of discretion. Habib & Hasan (2018) found out that firms with prospector-type business strategies produce less readable narratives, while those with defender-type business strategies produce more readable narratives (Habib and Hasan, 2018). Also, Habib and Hasan (2017) examined the effect of firm-level business strategies on future stock price crash risk, and the role of equity overvaluation on this relation. Their results suggest that prospectors are more prone to equity overvaluation and future crash risk than defenders, which leads them to be more exposed to misreporting.

Nevertheless, the competitive advantage acquired through strategic positioning might influence managers on the choice of manipulate earnings. Banker *et al.* (2014) investigated the relationship between firms’ strategic positioning and the sustainability of firm performance and found that cost leaders have less persistent superior performance than differentiators. They argue that the processes and resources needed to implement an operational efficiency are more

easily imitable or are more exposed to obsolescence, while the benefits of the process and resources used by differentiators are harder to be imitated. Further, high profit margins are expected to support firms' survival in uncertain environments and to reach specific financial goals (Widuri and Sutanto, 2018), lessening the need to engage in earnings management (Wu *et al.*, 2015).

Finally, the occurrence of opportunistic managerial behavior through earnings manipulation is also found to be caused by executive incentive-based compensation (Almadi and Ladic, 2016). Dechow and Sloan (1991) explain that when managers focus is greater on short-term performance, in detriment of long-term value creation, there is a horizon problem. It is commonly accepted that managerial compensation systems of operational efficiency-oriented firms are more focus on short-term financial metrics, whereas innovative-oriented firms focus on non-financial measures to evaluate performance (Balsam *et al.*, 2011; Govindarajan and Gupta, 1985; Singh and Agarwal, 2002; Wu *et al.*, 2015). For instance, Balsam *et al.* (2011) identified that business strategy is associated with metrics that influence the perception of short and long-term profitability, and found that cost leaders have higher expectations for an increase in sales results, while differentiators place significantly lower weight on accounting measures. Thus, it is reasonable to assume that defenders are more encouraged to misrepresent financial results in order to meet shorter-term accounting performance than prospectors.

Even though both business strategies might have incentives and opportunities to engage in the practice of real earnings management, the first hypothesis relies on Wu *et al.* (2015) and Widuri and Sutanto (2018) studies that found differentiators to be less associated with earnings' manipulation through real activities than cost leaders (Wu *et al.*, 2015). Thus, it is proposed that firms pursuing an innovative-oriented strategy are more concern with long-term performance and do not compromise future results to achieve immediate outcomes through the manipulation of real activities. By the other hand, firms following an efficiency-oriented strategy are focus on the short-term and to do not lose its source of competitive advantage they might misrepresent important operational information. Thus, it is reasonable to suppose that:

H1. Firms following prospector business strategy are negatively associated with the practice of real earnings management, whereas firms following defender business strategy are positively associated with this practice.

2.2. Market competition and real earnings management

To better understand the practice of real earnings management, prior literature indicates that market competition is a key determinant. While some studies found that high product market competition intensify agency problems and opportunistic behavior (e.g. Datta et al., 2013; Markarian & Santaló, 2014; Shi et al., 2018; Widuri & Sutanto, 2018; Wu et al., 2015; Zahra, 1993), others suggest that such competition is a disciplinary mechanism which forces managers to act efficiently and to improve earnings quality (e.g. Balakrishnan & Cohen, 2013; Cheng, Man, & Yi, 2011; Dechow, 1994; Laksmana & Yang, 2014; Marciukaityte & Park, 2009). Thus, it is recognized two possible sides of the effects of competition in a market.

For instance, the research of Laksmana and Yang (2014) found evidence indicating a negative association between product market competition and earnings management, in both accrual and real activities forms. These practices appeared to be more prevalent among firms in low competitive environments than those in high competition. Moreover, El Deri et al. (2020) examined the difference between high and low concentrated markets in using accrual and real earnings management. Their results show that in more concentrated markets the intensity of both types are higher, which the authors attribute to the high information asymmetry, stronger bargaining power of firms and the lack of disciplinary effect of competition in these markets.

In contrast, studies such as Markarian e Santaló (2014) found that manipulating earnings, by both accrual and real activities, is mostly rewarding in highly competitive industries, since that great results are required to increase firm's market value. Thereby, their results show that in more competitive environments firms go beyond the influence of financial reporting by taking discretionary accruals, achieving desired performance levels by means of real activities manipulation.

El Dirir et al. (2020) gather the arguments of both frameworks and placed it into three channels in which market competition motivates managers to engage in earnings management activities: (i) market pricing power, (ii) information disclosure, and (iii) disciplinary effect. The first channel predicts that firms with superior product pricing power engage less in earnings management due to their ability to pass on costs to costumers (Datta et al. 2013). Thus, firms in less competitive environment tend to have less difficult in protecting its competitive advantage, consequently, they are less motivated to manipulate earnings. The contrary is also applied and in more competitive industries it is harder to keep a sustainable competitive

advantage. The second channel has been found to cause different effects on earnings management. On one hand, the more companies are competing in a sector, the more information will be available in the market, and the more information will be required to reduce capital costs. On the other hand, the more competitive the industry is, the less companies are willing to disclose information, as competitors and new entrants are strong threats against their competitive advantage. The disciplinary channel of market competition also produces different effects on earnings management. As more information circulate in the market, more comparability among firms' performance is possible. However, this dynamic diminishes the odds of firm to survive in this competitive environment, and managers are more exposed to punishment. Thus, to avoid threats that came with high competition, managers feel tempter to engage in earnings management.

Based on the arguments discussed above, it is proposed the following hypotheses:

H2. Firms in more competitive markets are positively associated with the practice of real earnings management, while firms in less competitive markets are negatively associated with this practice.

2.3. Business strategy, market competition, and real earnings management

Research investigating the effect of the interaction between firms' business strategy and the level of market competition on real earnings management are incipient. First, Wu et al. (2015) investigated the impact of the interaction between Porter's (1980) business strategies and market competition on earnings management, in a Chinese context. Their results shown that the level of opportunistic manipulation by cost leaders is increased in high competition. But for differentiators the level of earnings management did not change due to differences in market competition. Another exception is the work of Widuri and Sutanto (2018), that explored the effects of the interaction between differentiation strategy and market competition on REM in Indonesia. They found a significant negative effect of market competition, that is, differentiators in more competitive markets are more associated with the engagement on real earnings management than differentiators in less competitive markets.

In this sense, it is expected a joint effect of market competition and business strategy on real earnings management, as proposed in the research hypothesis three:

H3. The combined effect of business strategy and market competition influence on real earnings management.

3. Methodology

3.1. Data and sample

The data used in this research was collected from Thomson Reuters DataStream database of listed firms in U.S. stock markets for the 20 year-period (e.g. Datta et al., 2013; Habib & Hasan, 2018) of 2000-2019. Initially, all industries identified by North American Industry Classification System (NAICS) subsectors code (2 digits) were selected. Following previous studies (e.g. El Diri et al., 2020; Habib & Hasan, 2017, 2018), firm year-observations from the regulated (NAICS code 22) and financial institutions industries (NAICS code 52-53) were not included in the final sample due to their unique accounting and financial practices, which are conditioned to specific regulation that causes idiosyncratic effect on accounting. Also, observations with missing 2-digit NAICS codes were eliminate. In line with Datta et al. (2013), firms with both total assets and net sales less than US\$1 million were removed from the database to avoid the effect of small firms. Finally, the continuous variables (REM and control) were winsorized at 1% and 99% levels to reduce the influence of outliers.

Table 1
Sample selection

Panel A: Sample selection procedure			
Description		Observations	
Total number of firm-year observations from 2000 to 2019		146,560	
Less: regulated industries (22 code) and financial industries (52-53 code).		(8,100)	
Less: Missing 2-digit NAICS Codes		(240)	
Less: Observations without at least \$1 million in net sales and total assets		(17,607)	
Less: Observations with missing values for dependent and independent variables, including observations lost for estimating lagged variables.		(108,320)	
Final sample		12,293	
Panel B: Industry distribution			
Code	Industry	Observations	% Observations
72	Accommodation and Food Services	186	1.51%
56	Administrative and Support and Waste Management and Remediation Services	295	2.16%
11	Agriculture, Forestry, Fishing and Hunting	17	0.14%
71	Arts, Entertainment, and Recreation	102	0.83%
23	Construction	248	2.02%
61	Educational Services	43	0.35%
62	Health Care and Social Assistance	346	2.81%
51	Information	1,272	10.35%
31-33	Manufacturing	6,031	49.06%
21	Mining, Quarrying, and Oil and Gas Extraction	618	5.03%

81	Other Services (except Public Administration)	39	0.32%
54	Professional, Scientific, and Technical Services	1,778	14.46%
44-45	Retail Trade	541	4.40%
48-49	Transportation and Warehousing	396	3.22%
42	Wholesale Trade	411	3.34%
TOTAL		12,293	100%

Table 1 presents the sample procedures in Panel A and the industry distribution in Panel B. Initially, the sample has 146,560 firm-year observations. Then, after excluding firm-year observations for regulated, financial, and missing 2-digit NAICS codes industries, small companies, and missing values of required variables to create dependent and independent proxies, the final sample was constrained to 12,293 firm-year observations and 1,544 unique companies. Due to the estimation of lagged variables for the business strategy proxy, the final sample period was constrained to 2005 to 2019. A wide variety of industries composes the final sample, whereas the higher proportion of firm-year observations are formed by the manufacturing sector (NAICS codes 31–33), representing 49.06% of the final sample.

3.2. Variable measurement

3.2.1. Real earnings management

In this study, earnings manipulation through real activities were measured based on prior models (Gunny, 2010; Roychowdhury, 2006; Shi *et al.*, 2018), which rely on the estimation of the “normal” level of operational activities related to REM practice. This estimation reveals the “abnormal level” from regression residuals, as the difference between the true observed value and the estimation obtained by applying the models is the abnormal component of real activities (Gunny, 2010; Roychowdhury, 2006). In this sense, these models aim to capture three types of real earnings manipulation: sales manipulation; decrease in discretionary expenditures; and overproduction.

It is expected that managers try to unsustainably increase sales during the current year as an effort to increase reported earnings for a period. Then, generating additional unsustainable sales by increasing price discounts or giving more lenient credit terms can be interpreted as REM practices. In these cases, the boost on sales volume is only temporal and it is not sustained when the old price is reestablished. Thus, current period earnings are improved by additional sales, considering that margins are positive, but future profits will incur in losses. Besides, the discount on price leads to lower margins as the production costs relative to sales tend to be

abnormally high. Also, abnormal lower current-period cash flow from operations (CFO) are expected as incomes are proportionally low to outcomes (Roychowdhury, 2006).

Moreover, reduction on reported discretionary expenditures to meet earnings target is another way to manipulate activities. This sort of expenditure normally is accounted for in the same period that it incurs, which leads to an increase in current period earnings and an unusually low discretionary expense. Also, this reduction can cause a positive effect on abnormal CFO in current period, as decreases in these expenditures diminish cash outflows. To measure it, SG&A expenses are used as it includes certain discretionary expenses such as employee training, maintenance, travel, etc.

Finally, manipulation through the production of more goods than is necessary to meet expected demand is also a way used by managers to increase earnings, as it lowers reported cost of goods (GOGS). An overproduction of goods can spread fixed costs over a larger number of units, lowering total costs per unit. Thus, reported COGS are lower, leading to a better reported operating margin. As one result of this manipulation, abnormally high production costs relative to sales tend to emerge because of the incremental marginal costs incurred to produce the additional inventory. Also, CFO tends to be lower than normal given sales levels.

To capture the deviation of normal levels of these activities, it was first estimated the normal levels of production cost (PROD), discretionary expenditure (DISX) and cash flows from operations (CFO) by running cross-sectional regressions for each industry-year. Following previous research, it was required a minimum of 10 observations to each industry-year grouping (Cupertino *et al.*, 2015). Equations (1)-(3) present the estimated coefficients that calculate the normal levels of PROD, CFO and DISX, respectively.

$$\frac{PROD_{it}}{A_{it-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \frac{S_{it}}{A_{it-1}} + \alpha_3 \frac{\Delta S_{it}}{A_{it-1}} + \alpha_4 \frac{\Delta S_{it-1}}{A_{it-1}} + \varepsilon_{it} \quad (1)$$

$$\frac{CFO_{it}}{A_{it-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \frac{S_{it}}{A_{it-1}} + \alpha_3 \frac{\Delta S_{it}}{A_{it-1}} + \varepsilon_{it} \quad (2)$$

$$\frac{DISX_{it}}{A_{it-1}} = \alpha_0 + \alpha_1 \frac{1}{A_{it-1}} + \alpha_2 \frac{S_{it-1}}{A_{it-1}} + \varepsilon_{it} \quad (3)$$

Where:

A_{it-1} = total assets at the end of year t-1;

S_{it} = net sales in year t;

S_{it-1} = net sales at the end of year t-1;

ΔS_{it} = the change in net sales from year t-1 to t;

ΔS_{it-1} = the change in net sales from year t-2 to t-1;

$PROD_{it}$ = sum of the cost of goods sold and change in inventory in year t;

CFO_{it} = cash flow from operations in year t;

$DISX_{it}$ = discretionary expenditures is the sum of SG&A expenses in year t.

Second, the abnormal PROD (APROD) is estimated by subtracting the estimated normal level from its actual PROD (equation 4). The same procedure is conducted to obtain abnormal CFO (ACFO) (equation 5) and abnormal DISX (ADISX) (equation 6).

$$APROD_t = \frac{PROD_t}{A_{t-1}} - \left[\hat{\alpha}_0 + \hat{\alpha}_1 \frac{1}{A_{t-1}} + \hat{\alpha}_2 \frac{S_t}{A_{t-1}} + \hat{\alpha}_3 \frac{\Delta S_t}{A_{t-1}} + \hat{\alpha}_4 \frac{\Delta S_{t-1}}{A_{t-1}} \right] \quad (4)$$

$$ACFO_t = \frac{CFO_t}{A_{t-1}} - \left[\hat{\alpha}_0 + \hat{\alpha}_1 \frac{1}{A_{t-1}} + \hat{\alpha}_2 \frac{S_t}{A_{t-1}} + \hat{\alpha}_3 \frac{\Delta S_t}{A_{t-1}} \right] \quad (5)$$

$$ADISX_t = \frac{DISX_t}{A_{t-1}} - \left[\hat{\alpha}_0 + \hat{\alpha}_1 \frac{1}{A_{t-1}} + \hat{\alpha}_2 \frac{S_{t-1}}{A_{t-1}} \right] \quad (6)$$

Where:

$APROD_t$ = the abnormal level of production cost in year t;

$ACFO_t$ = the abnormal level of cash flow from operation in year t;

$ADISX_t$ = the abnormal level of discretionary expenditure in year t.

As discussed above, firms that manipulate its earnings through real activities can present one, or a combination, of the following effects: positive levels of APROD, and low values of ADISX and ACFO (Cohen *et al.*, 2008; Roychowdhury, 2006; Zang, 2012). The proxy of real earnings management (REM) is formed by the difference between those three measures, as shown in equation (7).

$$REM_{it} = APROD_{it} - ACFO_{it} - ADISX_{it} \quad (7)$$

Given that APROD, ACFO, and ADISX are standardized by total assets of the past financial period, they all can be combined, and the result can be compared among firms with different sizes. Thus, REM proxy captures the total impact of manipulation through real activities for each firm-year. High values indicate intense utilization of real activities to manipulate the results of current financial period.

3.2.2. Business strategy composite measure

By using archival audited data, this study measures realized firm's strategy rather than intended one (David *et al.*, 2002; Mintzberg, 1987). The intended strategy is the conception of strategy based on a statement of intent, whilst realized strategy is related to a pattern of actions in a stream of decisions which is found by objective indicators such as archival data (Snow and Hambrick, 1980). Thus, following Bentley *et al.* (2013), a discrete strategy composite score was applied to measure firms' business strategy. Originally adapted from Ittner *et al.* (1997),

this strategy composite score is based on the Miles and Snow (1978; 2003) framework, and it has been consistently employed by prior researchers ((Bentley-Goode *et al.*, 2017; Chen *et al.*, 2017; Habib and Hasan, 2017, 2018).

Table 2
Business strategy composite measure

Variable	Description	Variable measurement
(1) Ratio of research and development to sales (RDS5)	Company's propensity to seek for new products.	Average of research and development expenditures to net sales from t-1 to t-5.
(2) Ratio of employees to sales (EMPS5)	Company's ability to produce and distribute products and services efficiently	Average of the number of employees to net sales from t-1 to t-5.
(3) Employee fluctuations (δ (EMP5))	Company's organizational stability.	Standard deviation of the total number of employees [EMP] from t-1 to t-5.
(4) Change in total revenue (REV5)	Company's historical growth or investment opportunities.	Average of one-year percentage change in net sales from t-1 to t-5.
(5) Marketing to sales (SGA5)	Company's focus on marketing investments.	Average of selling, general and administrative expenses to net sales from t-1 to t-5.
(6) Capital intensity (CAP5)	Company's commitment to technological efficiency and production.	Average of net plant and equipment scaled by total assets from t-1 to t-5.

Table 2 presents each of the six variables used to calculate the strategy composite measure. All variables were computed in a rolling average over the prior 5 years. Each of the six individual variables was ranked by forming quintiles within each two-digit NAICS industry-year. The observations with variables in the highest quintile received a score of 5, while the ones in the second highest quintile received a score of 4 and so on, until the observations with variables in the lowest quintile which were given a score of 1. The only exception was capital intensity, which was scored in reverse; therefore, observations in the lowest (highest) quintile were given a score of 5 (1). Then for each firm-year, the scores across the six variables were summed, in a way that a maximum score of 30 (prospector-type) and a minimum score of 6 (defender-type) could be given to a firm (Bentley *et al.*, 2013).

3.2.3. Market competition

Herfindahl–Hirschman Index (HHI) – Frequently used in prior literature (Datta *et al.*, 2013; Marciukaityte and Park, 2009; Markarian and Santaló, 2014; Shi *et al.*, 2018; Wu *et al.*, 2015), the Herfindahl–Hirschman Index (HHI) is an consolidated indicator of product market competition. HHI reflects the degree of concentration in an industry based on firms' market share, and was calculated as expressed in equation (8):

$$HHI = \sum_{i=1}^N \left(\frac{Total\ Sales_i}{Total\ Sales_{industry\ sector}} \right)^2 \quad (8)$$

Where:

Total Sales_i = total net sales of firm i;

Total Sales_{industry sector} = total net sales of all firms in a particular industry;

N = number of firms per year-industry.'

Low values of HHI indicate less concentrated markets that are assumed to be more competitive, while high values indicate more concentrated market that are expected to be less competitive

Concentration ratio (CR4) – Concentration ratio is the second measure for market competition used in this research, as expressed in equation 9. CR4 also captures the level of concentration in an industry sector, however it reflects high competition even in concentrated markets (El Diriri et al., 2020).

$$CR4 = \sum_{i=1}^{N=4} \left(\frac{Total\ Sales_i}{Total\ Sales_{industry\ sector}} \right)^2 \quad (9)$$

Where:

Total Sales_i = total net sales of firm i;

Total Sales_{industry sector} = total net sales of all firms in a particular industry;

N = number of firms per year-industry.

CR4 considers only the four firms with the largest market share in each industry. Nevertheless, the interpretation is the same as for HHI, and lower values mean highly competitive markets.

Hall Tideman index (HTI) – HTI measures the variation of product substitutability, considering the absolute number of firms and its relative sizes/thus, reflecting the entry barriers of an industry (El Diriri et al., 2020; Hall & Tideman, 1967).

$$HTI = 1/(2 \sum_{i=1}^N \left(k * \frac{Total\ Sales_i}{Total\ Sales_{industry\ sector}} \right) - 1) \quad (10)$$

Where:

k = firm rank according to market share.

Total Sales_{*i*} = total net sales of firm *i*;

Total Sales_{industry sector} = total net sales of all firms in a particular industry;

N = number of firms per year-industry.

Equation 10 presents HTI formulation, which considers the ranks of all firms in a particular industry based on their market share. As the other two proxies, as high the value of HTI as less competitive is the industry sector.

3.2.4. Control variables

ROA is the return of assets, and it is calculated through the net income before extraordinary items to total assets. Firms with lower profitability are expected to present higher levels of earnings management than the ones more profitable, as the engagement in earnings manipulation can occur because of the need to report high performance to stakeholders (Chen & Lee, 2015; Cupertino et al. 2015). A firm's LEVERAGE, or its amount of debt, was calculated by dividing total liabilities to total assets for each firm-year. Prior research points out a significative relationship between leverage and earnings management, as it can affects managers actions in order to deal with firms debt sources (Datta *et al.*, 2013; Wu *et al.*, 2015). Firm SIZE was determined as the natural log of firm's total assets. Although managers in large firms can have more opportunities to manipulate earnings as a huge number of transactions and complex operations are undertaken by them; big firms can be more diversified and predictable, and thus present high earnings quality and better communication with stakeholders. Also, more inside control as internal and external audition are expected (Dechow and Dichev, 2002). Finally, GROWTH was measured by dividing the difference between net sales of period *t* and net sales of *t-1* by the net sales of *t-1*. Following the idea that firm size affects earnings management, its growth also influences managers behavior regarding the manipulation of earnings. The increase of market share, political risks and investments in discretionary expenses that follows this growth are expected to pressure managers (El Diri *et al.*, 2020).

3.3. Empirical Models

The empirical models estimated to investigate the research questions are expressed in equations 9, 10, and 11. Ordinary least squares (OLS) regression models were performed to test all the empirical models, including industry fixed effects to control for industry-wide common factors, and year fixed effects to control for cross-sectional effects. Finally, standard errors adjusted for heteroscedasticity and within-firm clustering were estimated for all models

(Habib and Hasan, 2018; Petersen, 2009). The variables definitions are summarized in Appendix I.

$$\text{REM} = \beta_0 + \beta_1 \text{STRATEGY} + \beta_2 \text{ROA} + \beta_3 \text{LEV} + \beta_4 \text{SIZE} + \beta_5 \text{GROWTH} + \text{IndustryDummy} + \text{YearDummy} + \varepsilon \quad (9)$$

The model that tests the first hypothesis is expressed in equation 9, which explores the relationship between real earnings management and business strategy. This model also includes the control variables and the dummies for industry and year, as all the other models.

$$\text{REM} = \beta_0 + \beta_1 \text{STRATEGY} + \beta_2 \text{Market competition} + \beta_3 \text{ROA} + \beta_4 \text{LEV} + \beta_5 \text{SIZE} + \beta_6 \text{GROWTH} + \text{IndustryDummy} + \text{YearDummy} + \varepsilon \quad (10)$$

Next, equation 10 exhibits the model designed to test the second hypothesis, which regards to the relationship between real earnings management and market competition proxies. Strategy proxy was included to control for its effect. This model is tested using three different variables that represent market competition –HHI, CR4 and HTI–, in a way that three different regression models are performed to each proxy.

$$\text{REM} = \beta_0 + \beta_1 \text{STRATEGY} + \beta_2 \text{Market competition} + \beta_3 \text{STRATEGY} * \text{Market competition} + \beta_4 \text{ROA} + \beta_5 \text{LEV} + \beta_6 \text{SIZE} + \beta_6 \text{GROWTH} + \text{IndustryDummy} + \text{YearDummy} + \varepsilon \quad (11)$$

Finally, the combined effect of firm's business strategy and market competition on real earnings management is tested through the model exhibited in equation 11. As for the previous models, three different regression models are tested with each market competition proxy interacting with STRATEGY score.

4. Results and discussion

4.1. Summary statistics

Descriptive statistics of the variables used in the primary analysis are reported on Table 3. The dependent variable REM presented mean and median values of -0.069 and -0.005, respectively, which is close to prior literature (e.g. Shi et al., 2018). These values indicate that, in average, the sample firms engage in low values of real earnings management. The mean value of STRATEGY score is 17.83, which is in consonance with Habib and Hasan (2017;

2018). Market competition variables assume low values, that is comparable with Cheng et al. (2011) and Markarian and Santaló (2014). The mean values of HHI (0.068), CR4 (0.059), and HTI (0.033) indicate that market competition in the industry sectors analyzed is, in general, high, as low values of these variables indicate high values of competition within an industry.

Table 3
Descriptive statistics

Variables	Full sample (n = 12,293)					Prospectors (STRATEGY range of 24-30) (n = 1,095)		Defenders (STRATEGY range of 6-12) (n = 1,225)	
	Mean	Median	1st Quartile	3rd Quartile	Std. Dev.	Mean	Median	Mean	Median
REM	-0.069	-0.005	-0.323	0.247	0.540	-0.333	-0.273	0.246	0.247
STRATEGY	17.828	18.000	15.000	21.000	4.060	25.090	25.000	10.820	11.000
HHI	0.068	0.043	0.013	0.089	0.080	0.055	0.014	0.071	0.044
CR4	0.059	0.032	0.005	0.078	0.080	0.047	0.007	0.062	0.033
HTI	0.033	0.021	0.007	0.045	0.038	0.025	0.007	0.036	0.021
ROA	-0.026	0.042	-0.039	0.087	0.248	-0.203	-0.092	0.025	0.039
LEV	0.501	0.467	0.282	0.642	0.326	0.504	0.433	0.537	0.530
SIZE	13.204	13.266	11.544	14.853	2.346	12.470	12.500	13.592	13.483
GROWTH	0.091	0.062	-0.036	0.169	0.290	0.281	0.184	0.032	0.027

Note. The continuous variables REM, ROA, LEV, SIZE and GROWTH were winsorised at 1% and 99% levels to reduce the influence of outliers.

In addition, firms were classified accordingly with its STRATEGY score. Thus, a sample with prospectors was formed by firms with scores ranging from 24 to 30 (the maximum), whereas for defenders there is a sample of firms with scores ranging from 6 (minimum) to 12 (Bentley *et al.*, 2013; Habib and Hasan, 2018). Prospectors represent 8.91% of the full sample, and defenders represent 9.97% of it. STRATEGY has a mean of 25.09 for the prospector group, while for the defender group the mean is 10.82, which is similar to Bentley-Goode *et al.* (2017) and Bentley *et al.* (2013). Moreover, for prospectors the mean value of REM is -0.332, while for defenders it is 0.245, which indicate that prospectors manage their earnings less than defenders. Also, the control variables ROA and GROWTH showed different average values between the groups. The mean value of ROA for prospectors was -0.203, whereas for defenders it was 0.025, meaning that the first group has a highly negative return of its assets and the second has better returns. For GROWTH, the mean values are greater for prospectors.

Table 4
Correlation analysis

	1	2	3	4	5	6	7	8	9
1 REM	1.00								
2 STRATEGY	-0.34	1.00							
3 HHI	0.06	-0.04	1.00						
4 CR4	0.06	-0.04	1.00	1.00					
5 HTI	0.07	-0.06	0.85	0.84	1.00				
6 ROA	-0.08	-0.25	0.03	0.03	0.04	1.00			
7 LEV	0.05	-0.05	0.09	0.09	0.07	-0.28	1.00		
8 SIZE	0.04	-0.12	0.01	0.01	0.02	0.40	0.12	1.00	
9 GROWTH	-0.11	0.22	-0.04	-0.04	-0.03	0.10	-0.04	0.02	1.00

Note. The continuous variables REM, ROA, LEV, SIZE and GROWTH were winsorised at 1% and 99% levels to reduce the influence of outliers. Bold and italics variables are significant at $p < 0.001$, bold only variables are significant at $p < 0.01$, and italics for variables significant at $p < 0.05$.

Table 4 exhibits the Pearson correlation of the variables used in the final analyses. The correlation analysis indicates that REM is negative and significant correlated with STRATEGY, given an initial picture that firms pursuing prospector strategy engage less in REM than firms following defender strategy. In contrast, the correlation between REM and HHI, CR4, and HTI is positive and significant, which might be an indicative that as more concentrated is the industry as more the firms within this industry engage in REM. Also, the control variables LEV and SIZE present a positive relationship with REM, while ROA and GROWTH are negatively correlated with REM.

4.2. Main results

Table 5 presents the regression results for the first two hypothesis. Model 1 exhibits the findings related to the association between real earnings management and business strategy. The results show that the coefficient of STRATEGY is negative and significant (coefficient of -0.051, significant at $p < 0.01$). High scores of STRATEGY represent firms pursuing prospector strategy, while low scores indicate defender strategy. In this sense, this result supports the research hypothesis H1, as it indicates that firms following an innovative-oriented strategy are associated with low values of engagement on real earnings management, whereas firms following an efficiency-oriented strategy are associated with high values of this practice.

Table 5
Business strategy and market competition models results

	Dependent variable: Real Earnings Management			
	(Model 1)	(Model 2)	(Model 3)	(Model 4)
STRATEGY	-0.051*** (0.003)	-0.051*** (0.003)	-0.051*** (0.003)	-0.051*** (0.003)
HHI		-0.874*** (0.324)		
CR4			-0.827*** (0.311)	
HTI				-3.327*** (0.898)
SIZE	0.024*** (0.006)	0.024*** (0.006)	0.024*** (0.006)	0.024*** (0.006)
LEV	-0.082* (0.043)	0.004 (0.044)	0.004 (0.044)	0.004 (0.044)
ROA	-0.514*** (0.053)	-0.243*** (0.051)	-0.243*** (0.051)	-0.244*** (0.051)
GROWTH	-0.017 (0.026)	-0.205*** (0.026)	-0.205*** (0.026)	-0.205*** (0.026)
Constant	0.756*** (0.099)	-0.050 (0.110)	-0.068 (0.108)	0.156 (0.131)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	12,293	12,293	12,293	12,293
Adjusted R2	0.184	0.055	0.055	0.056
F Statistic (df = 33; 12259)	83.836*** (df = 33; 12259)	22.707*** (df = 33; 12259)	22.697*** (df = 33; 12259)	23.076*** (df = 33; 12259)

Note. All variables are described in Appendix I. All VIFs were checked for multicollinearity and presented values fewer than 10. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Models 2 to 4 (Table 5) show the results of the regression models that tested the relationship between REM and the market competition variables. The coefficients of all HHI (coefficient of -0.874, significant at $p < 0.01$), CR4 (coefficient of -0.827, significant at $p < 0.01$), and HTI (coefficient of -3.327, significant at $p < 0.01$) are negative and significant, confirming that firms within industries classified as less competitive are negatively associated with REM, while firms in more competitive industry sectors are positively associated with REM.

Table 6
Interaction models results

	Dependent variable: Real Earnings Management		
	(Model 5)	(Model 6)	(Model 7)
STRATEGY	-0.228*** (0.013)	-0.225*** (0.012)	-0.231*** (0.013)
HHI	-0.848*** (0.326)		
CR4		-0.827*** (0.313)	
HTI			-3.327*** (0.893)
STRATEGY*HHI	0.291*** (0.104)		
STRATEGY *CR4		0.283*** (0.103)	
STRATEGY*HTI			0.691*** (0.196)
SIZE	0.025*** (0.006)	0.025*** (0.006)	0.025*** (0.006)
LEV	-0.084** (0.042)	-0.084** (0.042)	-0.083* (0.042)
ROA	-0.521*** (0.053)	-0.521*** (0.053)	-0.523*** (0.053)
GROWTH	-0.015 (0.026)	-0.015 (0.026)	-0.014 (0.026)
Constant	-0.079 (0.095)	-0.095 (0.093)	0.111 (0.114)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	12,293	12,293	12,293
Adjusted R2	0.184	0.184	0.186
F Statistic (df = 35; 12257)	80.343*** (df = 35; 12257)	80.291*** (df = 35; 12257)	81.016*** (df = 35; 12257)

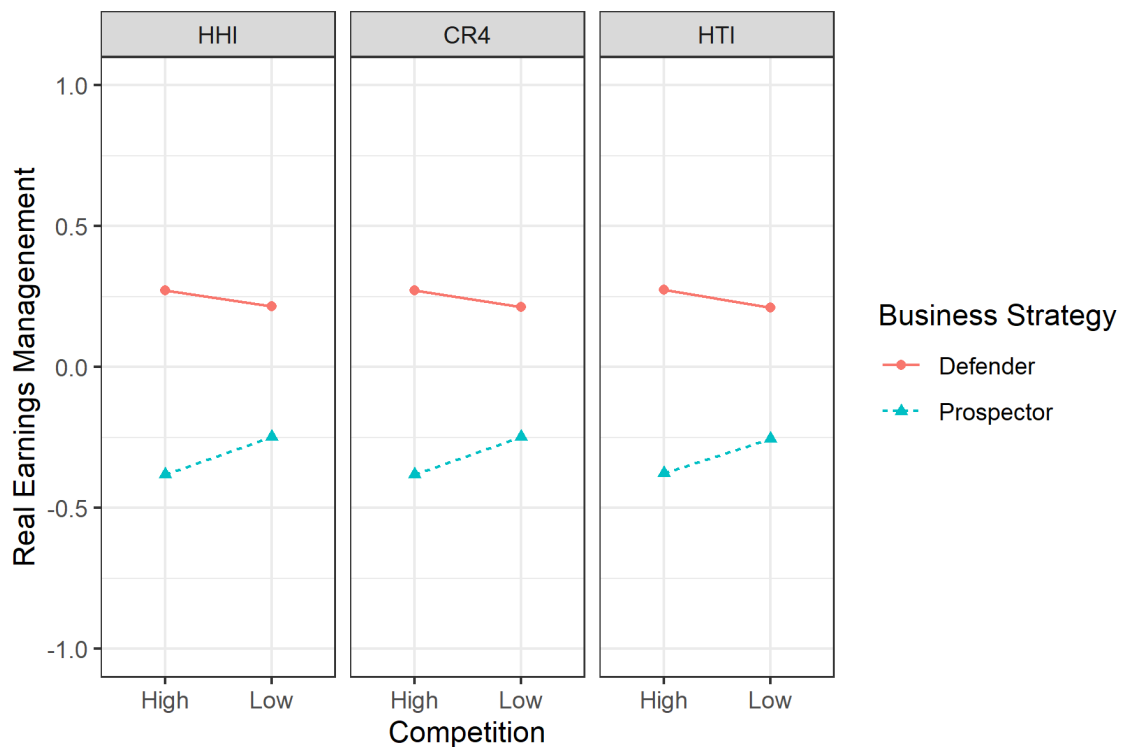
Note. To control for multicollinearity, STRATEGY was centered in the mean, and all VIF were checked and presented values fewer than 10. The variables are described in Appendix I. *p<0.1; **p<0.05; ***p<0.01

The outputs of all three models presented at Table 6 show that the coefficient of the interaction between STRATEGY and market competition – proxied by HHI (coefficient of 0.291, significant at $p < 0.01$), CR4 (coefficient of 0.283, significant at $p < 0.01$), and HTI (coefficient of 0.691, significant at $p < 0.01$) – are positive and significant. Supporting H3, these results confirm the statistical significance of a moderated effect of market concentration on the relationship between business strategy and real earnings management. Specifically, it can be inferred that firms pursuing prospector strategy operating in market with low

competition engage more in REM. In contrast, firms pursuing defender strategy and operating in markets also with low competition engage less in REM. Thus, it is notable that market competition changes the signal of the relationship between prospectors and real earnings management.

Figure 2 exhibits the plots of the interaction between each market competition variable and each group of business strategy. Thus, firms were trimmed into two groups: prospectors (STRATEGY score ≥ 24) and defenders (STRATEGY score ≤ 12). Figure 2 gives a picture of how defenders presented higher values of REM than prospectors. Moreover, considering the level of industry competition, defenders in low competition markets showed slightly lower REM values than in high competition markets. On the other hand, prospectors in markets with high competition presented lower REM values than in market less competitive. In sum, these results imply that the level of competition has different effects regarding each business strategy, which means that prospectors and defenders in the same environment act differently in terms of management of earnings through real activities. Figure 2 also shows that the results are remarkably similar regarding the different measures of market competition.

Figure 1
Interaction plot



In summary, the results evidence that, when considering only firms business strategy, prospectors are less associated with the engagement in real earnings management practice,

whilst defenders are more associated with REM. Also, prior research has found innovative-oriented strategy firms to be associated with low values of REM (Widuri and Sutanto, 2018; Wu *et al.*, 2015), whereas cost efficient-oriented strategy firms were found associated with greater values of REM (Wu *et al.*, 2015). These results are in line with the idea that efficiency-oriented firms have greater incentives to incur in earnings management, while prospectors have less motivation to engage in the management of real activities. As defenders tend to focus more on short-term and to rely more on external financing, they are more tempted to manipulate earnings to meet investors' expectations and to cover debt covenants. Also, the processes and resources needed to implement their operational efficiency are more easily imitable and exposed to obsolescence, thus, to protect their competitive advantage defenders might engage in real earnings management.

Now, when considering the degree of competition in the market, the results show that firms in less competitive environments engage less in real earnings management, while firms in more competitive markets engage more in this practice. In face of this result, this study joins to the literature which confirms that high levels of market competition can stimulate the engagement in real earnings management (Datta *et al.*, 2013; Karuna *et al.*, 2012; Markarian and Santaló, 2014).

However, when considering the combined effect of business strategy and market competition, it is noticed that prospectors in less competitive environments are positively associated with REM, indicating that low competition attenuates the negative effect over REM for prospectors. Moreover, defenders in markets less competitive are negative associated with REM, suggesting that in low competitive environments defenders are less incentive to engage in REM practices. On the other hand, when the competition within an industry is higher firms following a prospector strategy are less associated with REM, while defenders are more associated with it. These results are partially in line with prior research findings, as Wu *et al.* (2015) also found a negative relationship between efficiency-oriented cost leaders and real earnings management in more competitive markets. However, Wu *et al.* (2015) found an insignificant effect of market competition on the relationship between innovative-oriented firms and real earnings management, whereas Widuri and Sutanto (2018) found that differentiators in highly competitive markets have higher levels of REM. The discrepancy of this results might be due to the different country contexts, as these research analyzed firms operating in Asian while this study explored firms in U.S., which has a combination of strong

legal system, developed investor rights, and high levels of market monitoring (Chen et al., 2020).

4.3. Additional analysis

4.3.1. Alternative measure of business strategy

For additional analyses, an alternative measure of business strategy was used to test H1 and H3. From the composite measure of business strategy, two indicator variables for PROSPECTORS (strategy score ≥ 24) and DEFENDERS (strategy score ≤ 12) were created, whereas analyzers were used as the benchmark in the analysis (Bentley *et al.*, 2013; Habib and Hasan, 2018). The findings (Table 7) show that the coefficients of PROSPECTORS (DEFENDERS) are negatively (positively) associated with REM (Model 8), supporting the results of the main analysis.

Table 7

Alternative measure of business strategy

	Dependent variable: Real Earnings Management			
	(8)	(9)	(10)	(11)
PROSPECTORS	-0.265*** (0.031)	-0.264*** (0.040)	-0.263*** (0.038)	-0.276*** (0.040)
DEFENDERS	0.331*** (0.028)	0.398*** (0.037)	0.389*** (0.036)	0.389*** (0.036)
HHI		-0.813** (0.344)		
CR4			-0.770** (0.330)	
HTI				-3.466*** (0.929)
SIZE	0.023*** (0.006)	0.024*** (0.006)	0.024*** (0.006)	0.024*** (0.006)
LEV	-0.031 (0.043)	-0.031 (0.042)	-0.031 (0.042)	-0.030 (0.043)
ROA	-0.361*** (0.052)	-0.363*** (0.051)	-0.363*** (0.051)	-0.364*** (0.052)
GROWTH	-0.115*** (0.027)	-0.115*** (0.027)	-0.115*** (0.027)	-0.115*** (0.026)
PROSPECTORS*HHI		0.024 (0.371)		
DEFENDERS*HHI		-0.969*** (0.277)		
PROSPECTORS*CR4			0.004 (0.367)	
DEFENDERS*CR4			-0.957***	

			(0.273)	
PROSPECTORS*HTI				0.500 (0.842)
DEFENDERS+HTI				-1.671*** (0.475)
Constant	-0.148 (0.100)	-0.072 (0.104)	-0.087 (0.103)	0.136 (0.125)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	12,293	12,293	12,293	12,293
Adjusted R2	0.108	0.110	0.110	0.111
F Statistic	44.735*** (df = 34; 12258)	42.239*** (df = 37; 12255)	42.221*** (df = 37; 12255)	42.536*** (df = 37; 12255)

Note. *p<0.1; **p<0.05; ***p<0.01

The interaction analysis (Model 9 to 11) of the alternative measure of business strategy and each competition measure indicate a negative and significant coefficient for DEFENDERS and market competition for all three models, indicating that defenders in more competitive markets engage in REM more than defenders in less competitive markets. On the other hand, the interaction term for PROSPECTORS is insignificant, suggesting that market competition does not affect the relationship between prospectors and real earning management. These results are aligned with the main analysis and confirm partially the research hypothesis H3.

4.3.2. Alternative measure for earnings management

As firms can engage in both real earnings and accrual earnings management (AEM), to test the robustness of the model, total accruals were tested as dependent variable for all the three models described at section 3.3. Following Kothari et al. (2005), the modified version of Jones' model (Dechow *et al.*, 1995; Jones, 1991) was used to capture discretionary accruals. Table 8 shows the results of this analysis. Model 12 tested whether business strategy influence accruals. The results were opposite of REM, as prospector engage more in accruals then defenders. Nonetheless, business strategy is still a determinant of earnings management.

Table 7
Alternative measure of earnings management

	Dependent variable: Accrual earnings management						
	(Model 12)	(Model 13)	(Model 14)	(Model 15)	(Model 16)	(Model 17)	(Model 18)
STRATEGY	0.003*** (0.002)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.017*** (0.003)	0.017*** (0.002)	0.016*** (0.003)
HHI		0.019 (0.060)			0.012 (0.060)		
CR4			-0.013 (0.058)			0.006 (0.058)	
HTI				0.219 (0.006)			0.228 (0.152)
STRATEGY*HHI					-0.058** (0.020)		
STRATEGY*CR4						-0.053*** (0.020)	
STRATEGY*HTI							-0.112*** (0.038)
SIZE	-0.010*** (0.001)	-0.010*** (0.001)	-0.010*** (0.001)	-0.010*** (0.001)	-0.010*** (0.001)	-0.010*** (0.001)	0.010*** (0.001)
LEV	0.041***	0.040***	0.040***	0.040***	0.041***	0.041***	0.041***
	Dependent variable: Accrual earnings management						
	(Model 16)	(Model 17)	(Model 18)	(Model 19)	(Model 20)	(Model 21)	(Model 22)
ROA	(0.009) -0.101*** (0.016)	(0.009) -0.101*** (0.016)	(0.009) -0.101*** (0.016)	(0.009) -0.101*** (0.016)	(0.009) -0.099*** (0.016)	(0.009) -0.099*** (0.016)	(0.009) -0.098*** (0.016)
GROWTH	0.043*** (0.008)	0.043*** (0.008)	0.043*** (0.008)	0.043*** (0.008)	0.042*** (0.008)	0.042*** (0.008)	0.042*** (0.008)
Constant	0.102*** (0.013)	0.100*** (0.014)	0.101*** (0.013)	0.084*** (0.016)	0.162*** (0.014)	0.163*** (0.014)	0.144*** (0.017)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,327	10,327	10,327	10,327	10,327	10,327	10,327
Adjusted R2	0.174	0.174	0.174	0.174	0.175	0.175	0.175
F Statistic	68.931*** (df = 32; 10294)	66.839*** (df = 33; 10293)	66.837*** (df = 33; 10293)	66.900*** (df = 33; 10293)	65.439*** (df = 34; 10292)	65.428*** (df = 34; 10292)	65.539*** (df = 34; 10292)

Note. *p<0.1; **p<0.05; ***p<0.01

Models 13-15 tested the market competition effect on AEM, its results show a not significant effect of market competition on accrual earnings management. Finally, models 16-18 tested the combined effect of BS and MC on AEM and it also confirms H3 as a significant effect of MC on the relationship between BS and AEM was found. However, different from the main analysis, this effect is negative, which indicates that MC exercises the opposite effect

on the relationship between BS and AEM when comparing with BS and REM tested in the main analysis.

5. Conclusions

This study examines the relationship between firms' business strategy, market competition at industry-level, and the engagement in real earnings management practices. Little attention has been given on the relationship between these subject in all accounting and finance, strategic, and economic fields. However, firms' internal characteristics and environmental aspects are known as drivers for the unwilling practice of earnings management. Thus, this research hypothesis that the management of real activities is affected by both the business strategy that a firm follows, and the level of competition of its industry.

Relying on Miles and Snow (1978, 2003) strategy typology, and on a sample of 12,293 U.S. non-financial firm-years observations for the period 2000-2019, the first hypothesis tested was whether business strategy influences on the practice of real earnings management. The findings confirm the first hypothesis as the coefficients of this relationship are significant and suggests that firms following innovator business strategy are less associated with REM than firms pursuing efficiency business strategy. The second hypothesis tested concern about the effect of market competition on the level of firms' engagement in the management of real activities. The results suggest that firms in less competitive markets are less associated with the engagement in this practice than firms in more competitive environments. Finally, the third hypothesis explores the conjoint effect of business strategy and market competition on real earnings management practices. The findings confirm that market competition significantly affect the relationship between business strategy and real earnings management. Specifically, the results shown that prospectors in less competitive environments are more associated with the engage on real earnings management than in more competitive market. While for defenders in less competitive markets the engagement in real earnings management is greater than in more competitive markets.

The empirical results of this study are expected to contribute for a better understanding about the factors that influence the unwanted management practice of earnings management, bringing elucidation for both academicians and practical. Specially, the findings of this research confirm that the business strategy followed by a firm is a significant aspect to the degree of firms' engagement in real earnings management. Also, the significance of the isolated effect of market competition at industry-level on this practice is confirmed. Moreover, the combined effect of business strategy and market competition on real earnings management is

document as significant. Thus, the search for firm-level and industry-level factors related to the management of earnings through real activities, and how their interaction influence on REM occurrence, bring advances for all accounting, strategy, and economics fields. The distortion and noise in financial reporting through managers' real activities is an important aspect to be studied on the afore mentioned science areas, as this practice is prejudicial for decision-makers that need good quality financial information to make the economic environment more efficient as well as for the best business practices, in which it is expected that managers act for improve firms' operations in long-term perspective.

Hence, several stakeholders may be benefited from the findings of this research. Investors and analysts in the development of risk analyses and in choosing its allocation of resources can do it with more accuracy whereas better understandings of internal and external characteristics of firms in U.S. market are revealed. Also, auditors can be more aware about the differences between firms when considering its business strategy and level competition on influencing in the practice of earnings management, as accordingly to these characteristics they have indication about how firms are more, or less, associated with this practice. Managers can be more aware about how its own, and its peers, acts and choices affect its firms internally and are affected by external conditions. Finally, government can be more precise in the regulation as more knowledge of how firms combine tactics of earnings management, business strategies and the environment settings are explored.

This research is not without its limitations. First, this study relied on Miles and Snow (1973; 2003) business strategy typology and on the metrics developed by Bentley et al (2003), that are consolidated in the literature. However, hybrid strategies, as well as additional measures of business strategy can be aggregate to confirm the findings of this research. Moreover, this study measures the firm's realized strategy. Studying business strategy, market competition, and REM through the point of view of the manager, can bring different insights to this discussion. Future research should consider other environment characteristic beyond market competition, such as legal system and investor protection mechanisms, complexity munificence, and dynamism. Also, a comparison between these relationship in different countries (e.g. emergent and developed markets) and in different firms' contexts (e.g. each firm life cycle) might bring interesting insights about the concepts studied in this research.

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APPENDIX I

Dimension	Variable	Definition/Explanation
Dependent variable	Real earnings management	The value of real earnings management is the difference of $APROD - ACFO - ADISX$: where ACFO is the level of abnormal cash flows from operations, APROD is the level of abnormal production costs, and ADISX is the level of abnormal discretionary expenses.
Independent variables	STRATEGY	Each variable presented at Table 2 is measured per firm-year based on the rolling prior five-year average. In sequence, each of these average variables is ranked into quintiles per industry (two-digit NAICS code) and year. The observations in the highest quintiles are given a score of 5, while the ones in the lowest quintiles are given a score of 1 (except capital intensity which is reversed-scored, meaning that observations in the lowest (highest) quintile are given a score of 5 (1)). Within each firm-year, the scores are summed over the six measures, such that the maximum score that a firm could receive is 30 (prospector-type) and a minimum score of 6 (defender-type). Therefore, the discrete STRATEGY score ranges along a continuum in value from 6 to 30 with defender- and prospector-type companies closer to the endpoints
	HHIdummy	Market concentration measured as a dummy that takes a value of 1 if the Herfindahl-Hirschman Index (HHI) score is above the median value and zero otherwise. The HHI is calculated as $HHI = \sum_{i=1}^N \left(\frac{Sales_i}{Sales_{sector}} \right)^2$, where N is the number of i firms per year-industry.
	CR4dummy	The concentration ratio (CR4) score is the first alternative measure of market competition that considers only the largest four firms in the industry. The concentration ratio is calculated as $CR4 = \sum_{i=1}^4 \left(\frac{Sales_i}{Sales_{sector}} \right)^2$. CR4 is also turn into a dummy that takes a value of 1 if is above the median value and zero otherwise.
	HTIdummy	Hall Tideman index (HTI) score is the second alternative measure of market competition. And it is calculated as $HTI = 1 / (2 \sum_{i=1}^N \left(k * \frac{Sales_i}{Sales_{sector}} \right) - 1)$, where k represents firm rank according to market share. HTI assumes a dummy value of 1 if the industry score is above the median value and zero otherwise.
Control variables	ROA	The return on assets is calculate through the ratio of net income before extraordinary items to total assets.
	LEV	Leverage is calculated through the ratio of total liabilities to total assets.
	SIZE	Firm size is calculated by the natural logarithm of total assets.
	GROWTH	Growth is calculated by dividing the difference between net sales of period t and net sales of t-1 by the net sales of t-1.