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Managing through a pandemic: ex-ante earnings uncertainty and income-decreasing earnings manipulation in 2020

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The rarest commodity in the stock market (...)

(...) is certainty, and it doesn't come cheap.

(Wall Street Journal [1997, pp. Cl, C2])

Abstract (English)

The realization that economic conditions can affect the value-relevance of reported earnings has motivated a series of contextual studies in the field of earnings management. Less than one year after the first reported case of COVID-19 in the U.S., this thesis investigates how and why the magnitude and direction of income manipulation by North American firms changed in 2020. This study is split into a univariate analysis and a regression analysis part. In the former I run expectation models for normal accruals within each industry-quarter and proxy for accruals management through the regression residuals. The significance of the difference in the magnitude of abnormal / discretionary accruals between the comparison period (2018-2019) and the crisis period (2020) is estimated through a bootstrap procedure. In the latter I regress discretionary accruals against a proxy for high-order uncertainty (dispersion in analyst forecasts) in both the comparison period and the crisis period. First, I find that 2020 brought about a significant increase in the magnitude of income-decreasing manipulation (relative to the comparison period, firms underreported earnings by a greater percentage of assets in 2020). Second, I find that in 2020 higher ex-ante earnings uncertainty levels are correlated with higher absolute negative discretionary accruals (associated to income-decreasing manipulation). Third, I conclude that the underreporting trend in 2020 is at least partially explained by earnings shifting incentives since the effect of positive surprises on announcement returns is significantly mitigated by ex-ante earnings uncertainty.

Keywords: earnings management, accruals management, ex-ante earnings uncertainty, earnings response coefficients, earnings surprise

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Resumo (Português)

O entendimento de que as condições económicas têm o potencial de afetar o valor da informação contida nos relatórios financeiros fomentou o desenvolvimento de estudos contextuais na área de manipulação de resultados. Menos de um ano após o registo do primeiro caso de COVID-19 nos U.S., esta tese investiga de que forma a magnitude e sentido da tendência de manipulação de resultados por empresas Norte Americanas sofreu alterações em 2020. Este estudo inclui uma análise univariada e uma análise de regressão. A primeira consiste em calcular acréscimos discricionários através dos resíduos resultantes da estimativa de um modelo de acréscimos e diferimentos transversalmente. A significância da diferença na magnitude dos acréscimos discricionários entre o período referência (2018-2019) e o período crise (2020) é estimada através de um procedimento de bootstrap. A segunda análise procura estabelecer uma relação entre acréscimos discricionários e o nível de incerteza económica (aproximado pelo desvio padrão das previsões dos analistas) nos períodos de referência e crise. Primeiro, os resultados sugerem um aumento na magnitude da atividade manipulativa que procura minimizar/depreciar ganhos nos primeiros dois trimestres de 2020 (relativamente aos homólogos do período referência). Segundo, os resultados sugerem que em 2020 níveis elevados de incerteza ex-ante dos ganhos estão positivamente correlacionados com níveis elevados de acréscimos discricionários negativos (valor absoluto). Terceiro, concluo que a tendência de minimização de resultados em 2020 é parcialmente explicada por incentivos de *shifting* de ganhos motivados pelo papel mitigador da incerteza no efeito de surpresas positivas nos coeficientes de resposta de ganhos (ERCs).

Palavras-chave: manipulação de resultados, acréscimos, incerteza económica, coeficientes de resposta de ganhos, surpresas positivas

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List of abbreviations

EQ	Earnings Quality
EM	Earnings Management
AM	Accruals Management
RAM	Real Activities Management
TA	Total Accruals
NDA	Nondiscretionary Accruals (normal)
DA	Discretionary Accruals (abnormal)
ERC	Earnings Response Coefficient
WC	Working Capital
CF	Cash Flow
PP&E	Property, Plant & Equipment
SP	Share Price

1.Introduction

Managers face the challenge of disclosing a single earnings number whilst balancing multiple reporting objectives. In that respect, it is not uncommon for managers to make use of accounting discretion to manipulate the bottom line value. A vast strand of literature concentrates on earnings management surrounding firm-specific events (such as capital issuance), or in the presence of firm-specific attributes (such as earnings-based compensation schemes or debt contracts with strict covenants). A far less explored strand of literature acknowledges that there are also contextual incentives behind earnings management which are likely to influence various firms' managers at a given point in time. For instance, overstating earnings is believed to be more common during economic expansions because the market penalty to negative surprises is by far greater in booms (Cohen & Zarowin, 2007; Strobl, 2013). By contrast, understating earnings might be particularly attractive amidst high-uncertainty periods as this strategy allows managers to effectively shift earnings to periods of lower uncertainty during which good results will be more impactful on share price (Stein & Wang, 2016).

The realization that macroeconomic conditions can indeed affect the value-relevance of reported earnings has motivated a couple of recent contextual studies in the field of earnings management. Particularly, research has been conducted on the prevalence of income manipulation during the 1997-98 Asian crisis and the 2008-09 European financial crisis (Ahmad-Zaluki et al., 2011; Filip & Raffournier, 2014). The fact that income manipulation appeared to rise during the Asian crisis but subside during the European financial crisis is evidence that no contextual earnings management study is generalizable. Further, it has become clear that the current COVID-19 crisis is not fully comparable to a traditional slump arising from the boom-bust cycle and therefore historical precedent is frankly lacking. For that reason, an empirical investigation of the prevalence and magnitude of earnings management during the 2020 crisis represents "terra incognita" in literature. To the extent of my knowledge this is the first research work that identifies preliminary evidence of a change in the magnitude of accruals management in North America as a result of the early 2020 uncertainty shock.

The COVID-19 pandemic triggered both a public health emergency and a grim economic crisis in North America. U.S GDP fell by an annualized rate of 5% (U.S. BEA, 2020) and 32.9% (U.S. BEA, 2020) in the first and second quarters of 2020, respectively. The

scenario was similar in Canada, where the economy contracted at an annualized rate of 8.2% (Statistics Canada, 2020) and 38.7% (Statistics Canada, 2020) in the first and second quarters of the year. Although the third quarter brought about record GDP growth rates, the damage to business sentiment in North America had been done. Unsurprisingly, the CBOE's VIX – the "fear index" – spiked in March 2020 to its highest value on record and has been trading at relatively high levels throughout the rest of the year. Considering the adverse effect of uncertainty on investment and hiring it becomes evident that restoring investor confidence must be a priority in the wake of the current crisis. To that end, investors must be made aware of the value-relevance of earnings in 2020. To what degree are reported earnings reflecting opportunistic accounting choices rather than unmanaged earnings? For that reason, not only is this analysis novel, but it is also highly relevant.

This research project aims to clarify whether earnings management practices significantly changed in 2020 in comparison to a reference period. First, I determine whether accruals management as proxied through the magnitude of abnormal accruals is significantly different in the period of interest in relation to the comparison period. In this respect, it is worth clarifying that higher absolute abnormal accruals are associated to a lower quality of reported earnings as deviations from accrual models reflect income manipulation (Rajgopal & Venkatachalam, 2011). Second, I attempt to explain this hypothesized difference by examining ex-ante earnings uncertainty levels as proxied by the dispersion in analyst EPS forecasts across both periods. This analysis is relevant to the extent that high earnings uncertainty levels have been shown to motivate managers to underreport in the current period with the purpose of shifting earnings to periods of greater certainty (Stein & Wang, 2016). Third, I seek to determine whether the hypothesized effect of ex-ante earnings uncertainty on managers' incentives to underreport in 2020 is driven by a market mechanism (ERC effect) through which market participants' acknowledgement of incentives to underreport reinforces such incentives.

I consider the entire COMPUSTAT North America database as my sample (firms with necessary data available) and complement the analysis with analyst forecast data from I/B/E/S and daily share price data from Thomson Reuters' Datastream. I find that 2020 brought about a significant increase in the magnitude of income-decreasing manipulation. In other words, relative to the comparison period, firms underreported earnings by a greater percentage of assets in 2020. I further conclude that in 2020 higher ex-ante

earnings uncertainty levels are correlated with higher absolute negative discretionary accruals (associated to income-decreasing manipulation). Finally, my findings suggest that underreporting in 2020 is at least partially explained by earnings shifting incentives since the effect of positive surprises on announcement returns is significantly mitigated by high-order uncertainty (or forecast disagreement).

The rest of the dissertation is organized as follows: section 2 provides a review of relevant literature; section 3 presents data and methodology in detail; section 4 discusses the results of the analysis and evaluates them in light of the hypotheses; and sections 5 and 6 contain conclusions and limitations, respectively.

2.Literature review

2.1.Earnings Quality

2.1.1.Earnings Management

Earnings quality is often defined as the degree to which reported earnings faithfully represent the firm's fundamental earnings process (Dechow et al., 2010).

Earnings management comprises a broad spectrum of methods through which managers make use of their discretion to bias earnings with the purpose of influencing investors or contractual outcomes (Leuz et al., 2003). When used to signal accurate private information regarding future CF, discretion can enhance transparency (Sankar & Subramanyam, 2001). When used to misrepresent information with the purpose of maximizing utility for management or other contracting parties, discretion threatens transparency by introducing distortions in reported earnings (Palepu & Healy, 1993). In the latter case, EM compromises EQ.

Incentives for EM can be split into the categories of equity market and non-equity market. The former arise from contemporaneous positive equity market returns associated to meeting or slightly beating forecasts or earnings goals. The latter are tied to the firm's need to meet contractual obligations such as "litigation, debt contracting, proprietary costs, compensation, and internal information needs" (Dechow et al., 2010).

There are two channels through which EM may occur, Real Activities Management (RAM) and Accruals Management (AM). RAM concerns manipulation of investment or operating activities and includes tactics such as under-investment, aggressive discounting, and overproduction. AM concerns the exercise of managerial discretion regarding accounting and reporting choices but does not entail the modification of operations (Kothari et al., 2015). Since the focus of this study is on accruals management, the next section provides an overview of common models for identification of AM.

2.1.2.Accruals models

The goal of modelling "normal" levels of accruals is to proxy for "abnormal" levels through residuals. Models differ in respect to which categories of accruals they consider (WC, long-term operating, and financial), and their identification approach (balance-sheet, CF, or both) (Larson et al., 2018). All accrual models are subject to three potential problems: loss of power due to DA that are removed from the DA proxy; loss of specification due to correlated NDA that are left in the DA proxy; and inefficiency due to uncorrelated NDA that are left in the DA proxy (Dechow et al., 2012).

The first function of accruals is to capture investments related to growth in scale. Scholars have modelled this function through growth in employees (Allen et al., 2013) or sales (Jones, 1991). Jones models TA as a function of revenue growth and PP&E to control for changes in economic activity and the depreciation charge, respectively. Dechow et al. (1995) modify the Jones model by relaxing the assumption that revenues are nondiscretionary and Kothari et al. (2005) control for performance to mitigate specification issues arising from the correlation of DA with earnings. The second function of accruals is to capture conservatism which under U.S. GAAP is reflected onto the obligation to recognize losses as soon as they are probable whilst recognizing gains only when realized (Larson et al., 2018). In that respect, models often adjust for asymmetric timely recognition (whilst simultaneously controlling for operating performance) by incorporating a contemporaneous CF regressor into the Jones model (Larcker & Richardson, 2004; Ball & Shivakumar, 2006). The third function of accruals is to alleviate timing differences between CF and underlying transactions (Larson et al., 2018). This role is often modeled by incorporating leading and lagging CF regressors in addition to the contemporaneous CF (Dechow & Dichev, 2002).

There is a vast branch of literature which discusses the power and specification of the multiple existing models, without consensus. The Jones and modified Jones models are often criticized for having relatively little explanatory power (Dechow et al., 2010) and for misclassifying accruals that anticipate WC fluctuations as discretionary (Allen et al., 2013). Despite its indisputable limitations, the Jones and Modified Jones remain the most widely used models across a variety of studies within the topic of EM. For robustness, this study considers two expectation models for total accruals: the modified Jones Model augmented for ROA (Kothari et al., 2005) and the Larcker & Richardson model as modified by Cimini (2014).

2.2.EM & downturns

2.2.1.EM & investors in downturns

Reaction to surprises in downturns

To begin with, one can argue that North American economies entered a contraction stage in 2020. For that reason, literature which relates EM to the economic cycle becomes relevant. I hereby review the strand of literature that analyses the behavior of investors, outsiders, and insiders throughout the business cycle.

I start by exploring the impact of the fluctuation of investor confidence throughout the business cycle on incentives for EM. Confidence can be framed as a strong belief in positive future economic developments, and it erodes in downturns (Nowzohour & Stracca, 2017).

Literature suggests that reaction to earnings disappointments is more adverse in good times than in bad times (David 1997), and that reaction to disappointments in good times is stronger than reaction to positive surprises in bad times (Veronesi, 1999). The first proposition is justified by the fact that information that confirms beliefs has little impact but information that contradicts such beliefs shakes confidence. The second proposition is explained by the dual effect of information that contradicts beliefs: the uncertainty effect prompts risk-averse investors into requiring higher returns to hold stocks while the information effect forces investors to readjust the perceived probability that the market is in a good state (Conrad et al., 2002). Thus, for disappointments in booms both effects on SP are negative but for positive surprises in busts the two effects on SP are opposing.

Consistently, authors have shown that income-increasing EM is indeed more pervasive in good times (Cohen & Zarowin, 2007; Povel et al., 2007; Strobl, 2013). Although Povel et al. (2007) focus on fraud and Strobl (2013) considers all forms of EM conclusions are alike: the incentive for income-increasing EM is "inversely related to the correlation between the firm's earnings and the market" (Strobl, 2013). When the firm's earnings are uncorrelated with the market, investors monitor disclosures to attempt to understand the departure from their expectations. Thus, any information disclosed by the firm becomes highly impactful on SP making it worthwhile to incur the costs of EM. Finally, because it is more common to have deviators when the market goes up and the effect of surprises is stronger in booms, income-increasing EM becomes more widespread in expansions.

Pricing of equity & debt in downturns

The previous section discusses one of the mechanisms through which equity markets enforce greater reporting conservatism during downturns (the weaker reaction to surprises due to the overall deterioration in business confidence). It is also worth mentioning another channel stemming from the pricing of equity. Because equity markets are subject to a degree of sentiment-driven pricing, issuing equity in periods of high optimism is often preferred by firms (Baker & Wurgler, 2006) in order to minimize adverse selection costs. For that reason, IPO & SEO activity tends to decline in economic downturns. Consequently, income-increasing EM incentives associated to IPOs (Teoh et al., 1998) and SEOs (Cohen & Zarowin, 2010) are likely also less prevalent in downturns.

It is also worth discussing the pricing of debt when the market goes down, since evidence suggests that managers have strong incentives for income-increasing EM to enhance borrowing capacity (Mafrolla & D'Amico, 2017) in the private debt market. Garleanu & Pedersen (2007) suggest that volatility in downturns leads to a reduction in institutions' risk-bearing capacity. The consequent higher cost of debt is therefore consistent with the countercyclicality of leverage ratios (Halling et al., 2016). On the one hand, the aggravation of lenders' diligence associated to a decline in investment opportunities during downturns may ease income-increasing EM incentives associated to signaling. However, the effect of pre-existing debt on incentives for EM during downturns is unclear. Consistent with the debt covenant hypothesis (Dichev & Skinner, 2002) it is possible that the deterioration of financial results during downturns forces managers to overreport results in order to avoid covenant violations. Conversely, it is also true that multiple firms attempt to restructure debt during economic slumps by seeking interest payment deferrals and covenant waivers (Asquith et al., 1994). In that case, underreporting might be useful in obtaining concessions from lenders.

2.2.2.EM & outsiders in downturns

Regulators & auditors in downturns

U.S. financial regulation has been historically pro-cyclical, with regulators relaxing supervision during booms and tightening oversight in downturns. Further, evidence suggests that the U.S. entered a de-regulatory stage during the Trump Administration (Dagher, 2018) which is expected to reverse in the wake of the current downturn. Thus, managers might be obliged to report more conservatively in 2020 since increased monitoring from outsiders is associated to lower managerial discretion. There is mixed evidence in respect to how economic conditions influence audit quality. On the one hand, lack of independence became obvious during the last crisis (Sikka, 2009). On the other hand, there are reasons to believe that auditing standards are more conservative during downturns as auditors are skeptical in periods of uncertainty (He et al., 2018). Audit quality often represents greater guarantee of the quality of reported earnings (Defond & Zang, 2014) as it is in the auditors' best interest to report high DA levels in client firms (Heninger, 2001). In that sense, it is believed that auditing conservatism increases during downturns and therefore the freedom for intentional estimation errors subsides in busts.

The government in downturns

Firms often take advantage of periods of severe underperformance to lobby against certain laws (DeAngelo et al., 1994) or obtain governmental aid in the form of public funds or regulatory reliefs (Navissi, 1999). Further, the government is more likely to provide support to firms that are financially distressed in order to prevent insolvency. In that sense, income-increasing EM is not attractive when managers strive to secure publicly-funded aid, as they wish to portray the firm's poor financial situation (indeed, income-decreasing EM has been shown to be helpful under such circumstances).

Trading counterparties in downturns

When trading counterparties face liquidity constraints they may need to collect on unresolved accounts. For that reason, downturns boost demand for litigation services in the realm of commercial law. Further, litigation risk induces accounting conservatism (Huijgen & Lubberink, 2005) as firms attempt to minimize litigation costs by recognizing bad news early. Early recognition may lower the probability that class action lawsuits are certified and shorten the length of the class period (Qiang, 2007). Therefore, higher litigation risk during downturns is also believed to enhance reporting conservatism.

2.2.3.EM & insiders in downturns

Managerial compensation in downturns

The prevalence of managerial incentive / bonus pay is expected to decline in downturns due to the challenge of identifying realistic goals, managers' unwillingness to accept loss targets, and the need to promote company unity (Becker et. al, 2016). Whenever managers make use of accounting discretion to maximize their own wealth, EM is opportunistic. In that respect, the effect of bonus variables on accounting choice tends to be significant across studies (Healy, 1985; Watts & Zimmerman, 1990) and associated to higher levels of positive DA (Bergstresser & Philippon, 2006). For that reason, opportunistic income-increasing EM behavior tends to subside in economic downturns.

Employee appeasement in downturns

Finally, agency relations are difficult to manage during crises. It is important that employees get an understanding that the firm is going through troubled times. Indeed, reporting losses has been shown to facilitate the negotiation of concessions with unions (DeAngelo et al., 1994). For that reason, income-increasing EM is not particularly attractive under such circumstances (and income-decreasing strategies may actually be helpful in appeasing distraught employees).

2.3.EM & earnings shocks

2.3.1.Income smoothing

One can also argue that for many North American firms the spread of COVID-19 brought about significant shocks to earnings. For that reason, literature which relates EM to earnings shocks is also relevant in predicting the magnitude and direction of EM in 2020.

The first strategy that firms can pursue in the context of an earnings shock is smoothing as defined by Fudenberg & Tirole (1995) as the manipulation of the time profile of earnings to reduce volatility in reported income. In practice, smoothing is reflected onto a reporting bias which is in the opposite direction of the shock to earnings such that managers overreport amidst negative shocks and underreport amidst positive shocks.

On the one hand, smoothing is appealing because firms with lower earnings variability are perceived as being less risky (Erickson et al., 2016). Consistently, this approach has

been shown to lower investors' perceived probability of bankruptcy (Trueman & Titman, 1988) and increase the manager's likelihood of keeping his position (Fudenberg & Tirole, 1995) and avoiding external interference (Leuz et al., 2003). On the other hand, smoothing is also an insurance mechanism: if managers underreport through positive earnings shocks they can later rely on this buffer to overreport through negative shocks (Gerakos & Kovrijnykh, 2013). However, it is worth noticing that managers' incentives for EM depend not only on the firm's current performance but also on its future relative performance (Fudenberg & Tirole 1995; DeFond & Park 1997). Thus, even if the firm is currently facing a negative performance shock managers may be unwilling to "borrow" from the future if expected future earnings are also poor.

2.3.2. Taking a "big bath"

There appears to be an exception to income smoothing during bad times. Thus, the second strategy which managers can adopt in the wake of a negative shock to earnings is to take a "big bath". Evidence suggests that when results are "sufficiently bad" (Kirschenheiter & Melumad, 2002) such that no accounting procedure would help the firm meet targets (Healy, 1985) managers might opt for underreporting current earnings to the maximum by deferring revenues and accelerating costs and non-recurring expenses.

Doing so can be advantageous for two reasons. On the one hand, it might prompt estimators into lowering the following period's forecast therefore boosting the firm's odds of meeting the target. On the other hand, managing current period earnings down preserves greater income-increasing capacity for the future. Indeed, in light of the balance sheet constraint to EM, the ability to manage current period's earnings up (down) depends on the magnitude of past income-increasing (decreasing) manipulation (Baber et al., 2011). However, managers must be prudent in selecting the most favorable moments to underreport. Evidence suggests that the optimal moment to take a "big bath" is when earnings are already depressed, and uncertainty is high. The former condition ensures that the punishment for underreporting is minimized since the market appears to punish firms similarly whether they miss forecasts by a little or a lot (Skinner & Sloan, 2002). The latter condition allows the firm to shift earnings to a period of lower uncertainty during which the market response to higher earnings is stronger (Stein & Wang, 2016).

2.4.EM & uncertainty

2.4.1.Uncertainty shocks

Finally, 2020 represented a generalized uncertainty shock. For that reason, I hereby review the strand of literature which relates earnings management to uncertainty.

Uncertainty is defined as either a large range of potential economic outcomes (type I) or the lack of knowledge of the probability distribution of potential economic outcomes (type II) (Nowzohour & Stracca, 2017). Uncertainty has been shown to be strongly countercyclical (Baker & Bloom, 2013) and to rise across multiple proxies (macro uncertainty, micro uncertainty, high-order uncertainty / belief heterogeneity) in the aftermath of uncertainty shocks (Kozeniauskas et al., 2018). Indeed, Bloom's (2009) work on macro uncertainty shocks such as the Cuban Missile crisis, the oil-price shocks, JFK's assassination, and 9/11 established that implied volatility on average doubles in the aftermath of such events. In accordance, the CBOE's VIX – which gauges the stock market's expectation of volatility – reached an historical peak in 2020.

2.4.2.Earnings shifting

High-order uncertainty – which can be proxied by forecast disagreement (Kozeniauskas et al., 2018, Barron & Stuerke, 1998) – has been shown to be negatively correlated to the level of DA (Stein & Wang, 2016) because the less informative nature of earnings, and hence weaker ERCs, in times of uncertainty motivates managers to take less positive / more negative DA.

Because uncertainty delays investment decisions (see for instance Grenadier & Malenko, 2010) and accruals can be framed as a component of investment (Fairfield et al., 2003) uncertainty has been shown to be negatively correlated to the level of WC accruals through a real-options approach (Arif et al., 2016). However, Stein & Wang (2016) find that the negative effect of uncertainty on the level DA is about seven times as large as its effect on WC accruals, suggesting that the negative uncertainty-DA relation is not driven by an "investment under uncertainty" effect. Instead, it appears to be driven by an incentive to shift earnings to more certain times (in the future) which drives a subset of firms into reporting more negative DA during periods of high forecast disagreement.

The negative correlation between ex-ante earnings uncertainty levels and ERCs (due to noise in the earnings signal) has been robustly established in literature (Imhoff & Lobo, 1992) and therefore whenever firm-specific forecast disagreement is high managers face incentives to manage earnings down (to shift results to a future in which good news will be more impactful on SP). However, the negative uncertainty-DA relation is only significant at overall high levels of uncertainty (Stein & Wang, 2016), suggesting the existence of an underlying reinforcement mechanism. In short, when ex-ante earnings uncertainty levels are high enough (generally in periods of overall high uncertainty) market participants become aware of managers' incentives to underreport thereby further lowering ERCs which in turn reinforces managers' first-order incentives to underreport.

Therefore, not only reporting incentives affect ERCs (Fischer & Verrecchia, 2000), but ex-ante knowledge about variation in ERCs can also affect reporting incentives. This conclusion is similar to that of Fang et al. (2017), who find that managers' ex-ante knowledge about the value-relevance of their earnings can affect reporting incentives.

2.5.Hypothesis development

Predicting the magnitude and direction of income manipulation in the wake of the COVID-19 uncertainty shock is no easy task since literature relating EM incentives to economic conditions can be complex to interpret. Further, previous contextual EM studies are not particularly useful since conclusions are not generalizable. For instance, Filip & Raffournier (2014) find that the magnitude of both income-increasing and income-decreasing EM subsided in Europe during the financial crisis, whilst Ahmad-Zaluki et al. (2011) find evidence of stronger income-increasing EM during the 1997-98 Asian crisis.

With respect to income-decreasing manipulation, there appears to be converge amongst the three branches of literature reviewed above: First, literature on EM & downturns suggests that income-decreasing manipulation is particularly useful in busts for (1) obtaining concessions from lenders, (2) securing governmental aid, (3) lowering the probability and length of lawsuits through early recognition, and (4) facilitating union negotiations; Second, literature on EM & earnings shocks suggests that in the wake of an earnings shock which affected most North American firms some managers are bound to opt for "big bath" accounting tactics and underreport earnings by a greater percentage of assets; Third, literature on EM & uncertainty suggests that the 2020 uncertainty shock is

an optimal moment to underreport and thereby shift earnings to the future. Therefore, my first hypothesis is the following:

H1: The magnitude of income-decreasing accruals management is greater in the crisis period than in the comparison period.

With respect to income-increasing manipulation, there is no convergence amongst the branches of literature reviewed above. On the one hand, literature on EM & downturns suggests that income-increasing manipulation is particularly unattractive in busts since (1) market reactions to disappointments are milder, (2) the sentiment-driven pricing of equity & debt make capital issuance less attractive, (3) the pervasiveness of managerial incentive pay declines, and (4) regulators and auditors are more conservative thereby constraining the ability for EM overall; On the other hand, literature on EM & earnings shocks suggests that some managers are bound to opt for smoothing tactics and thus overreport earnings by a greater percentage of assets in 2020. Asserting whether reporting behavior will be aligned with the expected conduct in a shock or in a downturn is complex, and for that reason there are two equally probable hypotheses at this stage:

H2.a: The magnitude of income-increasing accruals management is lower in the crisis period than in the comparison period.

H2.b: The magnitude of income-increasing accruals management is greater in the crisis period than in the comparison period.

In this study I focus on firm-specific ex-ante economic uncertainty as a determinant of the magnitude and direction of EM. The potential effect of managers' prior knowledge of high market uncertainty on EM behavior has been greatly overlooked in literature and the current pandemic presents the ideal scenario to further explore it. Consistently, based on the findings of Stein & Wang (2016) I further predict that:

H3: The DA-uncertainty relation is significantly negative in the crisis period

H4: The negative DA-uncertainty relation in the crisis period is driven by a market mechanism which reinforces managerial incentives to underreport

3.Methodology

3.1.Data

3.1.1.Univariate analysis

This study is split into a univariate analysis and a regression analysis. In the former I compute and compare the magnitude of positive and negative absolute DA in the crisis period vis-à-vis the comparison period. The comparison period encompasses 2018 (Q1-Q3) and 2019 (Q1-Q3), whilst the crisis period consists of 2020 (Q1-Q3).

Due to the high sensitivity of accrual estimation models (and the need for at least 20 observations per industry-quarter for cross-sectional estimation) it was paramount to preserve a large sample size for the univariate analysis. For that reason, the sample used for the univariate analysis is significantly larger than the one used for the regression analysis (which requires more data fields, as well as consolidation of multiple platforms). The sample construction process is detailed in table 1 and descriptive statistics can be found in annex 2. The final sample consists of 1,226 firms for a total of 7356 and 3678 firm-quarters in the comparison and the crisis period, respectively.

TABLE 1 – UNIVARIATE ANALYSIS SAMPLE CONSTRUCTION

COMPUSTAT North America Fundamentals Quarterly	13,208
Excl. financial services firms (SIC 6000-6999)	7,404
Excl. firms missing a necessary reporting date	2,124
Excl. firms missing a variable in any quarter (annex 1 list A)	1,557
Excl. firms whose assets < $1M in any quarter	1,523
Excl. firms belonging to major groups with less than 20 companies (2-digit SIC industries)	1,236
Excl. firms with DA > 100% in any quarter (DA exceeding total assets)	**1,226**

The geographical focus on North America was compulsory in order to perform this analysis before year-end, since public American and Canadian companies are required to file quarterly reports thereby increasing the size of the pool of observations available. The exclusion of the financial industry (SIC 6000-6999) as well as firms which fail to meet size thresholds is standard practice in the context of EM studies (see for instance Collins et al., 2016). The specification of a minimum of 20 observations per industry-quarter for cross-sectional estimation of accrual models is also common (see for instance Filip & Raffournier, 2014). Finally, firms for which models yield DA measures above 1 in any

quarter (discretionary accruals exceeding total assets) are removed from the sample as they are likely to be the result of errors in the underlying accounting data.

3.1.2.Regression analysis

On the one hand, the DA measures computed in the univariate analysis then serve as a dependent variable for the regression analysis, which is why the final sample in table 1 is the starting point for the construction of the second sample. On the other hand, the regression analysis also required further accounting data from COMPUSTAT as well as analyst forecast data from I/B/E/S and daily share price data from Thomson Reuter's Datastream. The COMPUSTAT-I/B/E/S link was established through Wharton's linking suite and the link to Thomson Reuters was established manually through the transformation of CUSIP9 codes into DS local codes. As a result of the linking process I derive a consolidated cross-sectional time-series panel in which each firm-quarter is attributed (in addition to its respective accounting data fields), a consensus forecast (median forecast), an economic uncertainty measure (dispersion in forecasts), and share prices on relevant dates in relation to the quarterly earnings announcement (specifically 20 days before, 3 days before, and 1 day after).

The sample construction process is detailed in table 2 and descriptive statistics can be found in annex 3. The final sample consists of 513 firms for a total of 3078 and 1539 firm-quarters in the comparison and the crisis period, respectively.

TABLE 2 - REGRESSION ANALYSIS SAMPLE CONSTRUCTION

Univariate analysis sample	1,226
Excl. firms missing a variable in any quarter (annex 1 list B)	845
Excl. firms without and I/B/E/S match	762
Excl. firms without at least 2 I/B/E/S estimators per firm-quarter	**513**

The sample compositions for both samples (in terms of industry representation at the 2-digit SIC code level) can be found in annex 4.

3.2.Empirical strategy

3.2.1.Univariate analysis

The construction process for all explanatory, control, and outcome variables mentioned is described in detail in annex 8. To begin with, following Hribar & Collins (2002) total accruals for each firm-quarter are computed directly from the CF statement as the difference between net income and cash flow from operations, such that:

$$\mathrm{TA}_{i,t} = \frac{\mathrm{NI}_{i,t} - \mathrm{OANCF}_{i,t}}{\mathrm{AT}_{i,t-1}}$$

As mentioned in section 2, Total accruals have a nondiscretionary (normal) component and a discretionary (abnormal) component. Because accrual estimation models are highly sensitive, particularly for samples with extreme performance, I rely on two different models for robustness. The first follows the Jones model (1991) as modified by Dechow et. al (1995) and extended with a current ROA regressor to control for performance as in Kothari et. al (2015). The second follows the Larcker & Richardson model (2003) as modified by Cimini (2015), which controls for performance with a current operating cash flow regressor. The inclusion of a constant in either model may help mitigate heteroskedasticity in residuals as well as problems arising from an omitted size variable (Kothari et al., 2005). The first and second models (hereafter MOD-JONES + ROA and MOD-LARCKER) are presented below.

$$\frac{\mathrm{TA}_{i,t}}{\mathrm{AT}_{i,t-1}} = \beta_0 + \beta_1\left(\frac{1}{\mathrm{AT}_{i,t-1}}\right) + \beta_2\left(\frac{\Delta\mathrm{REVT}_{i,t}-\Delta\mathrm{RECT}_{i,t}}{\mathrm{AT}_{i,t-1}}\right) + \beta_3\left(\frac{\mathrm{PPENT}_{i,t}}{\mathrm{AT}_{i,t-1}}\right) + \beta_4\left(\frac{\mathrm{NI}_{i,t}}{\mathrm{AT}_{i,t-1}}\right) + \mathrm{e}_{i,t} \quad (1)$$

$$\frac{\mathrm{TA}_{i,t}}{\mathrm{AT}_{i,t-1}} = \alpha_0 + \alpha_1\left(\frac{1}{\mathrm{AT}_{i,t-1}}\right) + \alpha_2\left(\frac{\Delta\mathrm{REVT}_{i,t}-\Delta\mathrm{RECT}_{i,t}}{\mathrm{AT}_{i,t-1}}\right) + \alpha_3\left(\frac{\mathrm{PPENT}_{i,t}}{\mathrm{AT}_{i,t-1}}\right) + \alpha_4\left(\frac{\mathrm{MC}_{i,t}}{\mathrm{AT}_{i,t-1}}\right) + \alpha_5\left(\frac{\mathrm{CFO}_{i,t}}{\mathrm{AT}_{i,t-1}}\right) + \mathrm{e}_{i,t} \quad (2)$$

The expectation models for accruals model total accruals (TA) as a function of the change in sales net of the change in receivables ($\Delta\mathrm{REVT} - \Delta\mathrm{RECT}$), Property, Plant & Equipment (PPENT), and a control for performance – net income (NI) or CF from operations (CFO). The MOD-LARCKER model further controls for market capitalization (MC).

To prevent extreme values from warping model results – which is crucial in the crisis period – 98% winsorization is performed on all regressors. Winsorization is standard

practice in studies of AM as extreme data points may yield faulty model coefficients for industry-quarters with fewer observations (see for instance Collins et al., 2016). Thereafter the regression coefficients are estimated cross-sectionally for each industry-quarter with at least 20 observations, with industries defined at the 2-digit SIC code level (Filip & Raffournier, 2014).[1] Finally, for each firm-quarter observation, discretionary accruals (DA) are computed as the difference between actual and estimated TA thus corresponding to the regression residuals.

Subsequently, for the univariate analysis, I consider the mean absolute value of positive and negative discretionary accruals as measure of accrual quality (Rajgopal & Venkatachalam, 2011; Cimini, 2015). Thus, variables of interest are (DA^+) and (DA^-) which are respectively the equal-weighted average of absolute positive and negative DA measured every quarter (Rajgopal & Venkatachalam, 2011). Notice that positive DA are associated to overreporting / overstatement of earnings (or income-increasing EM) whilst negative DA are associated to underreporting / understatement of earnings (or income-decreasing EM). (DA^+) and (DA^-) are computed in the comparison and crisis periods and the statistical significance of the difference is estimated through a bootstrap procedure.

3.2.2.Regression analysis

3.2.2.1.Uncertainty-DA relation

At this point it is worth recalling the negative relation between firm-specific economic uncertainty and total DA, which appears to be driven by high-vol periods during which firms manifest more negative DA. It is therefore vital to analyze the strength of this relation in the crisis period in relation to the comparison period.

To do so I regress total DA against a measure of firm-specific economic uncertainty: ex-ante earnings uncertainty (hereby DISP) which I compute as the intra firm-quarter standard deviation of all current period EPS forecasts issued until the day immediately prior to the earnings announcement for every firm-quarter with at least 2 different estimators. Following Stein & Wang (2016) I further control for market capitalization (log), book-to-market (log), debt-to-asset ratio, inverse interest coverage, and the number

[1] For a discussion on the benefits of cross-sectional estimation of accrual models over time-series estimation see for instance Bartov et al. (2000)

of analysts covering the firm in each quarter. These variables may directly induce EM or mediate the effect of uncertainty on EM. Finally, I include industry dummies at the two-digit SIC code level. The model is presented below.

$$DA_{i,t} = \alpha_1 + \alpha_2 DISP_{i,t} + \alpha_3 MC_{i,t} + \alpha_4 BM_{i,t} + \alpha_5 DAT_{i,t} + \alpha_6 IIC_{i,t} + \alpha_7 NUMEST_{i,t} + f + e_{i,t} \quad (3)$$

MC is market capitalization (log), BM is the book-to-market ratio (log), DAT is the debt-to-asset ratio, IIC is inverse interest coverage and NUMEST is the number of estimators covering the firm in any given quarter. The regression is run independently for both the comparison and the crisis period. Thereafter I perform a significance test on the difference of α_2 between both periods.

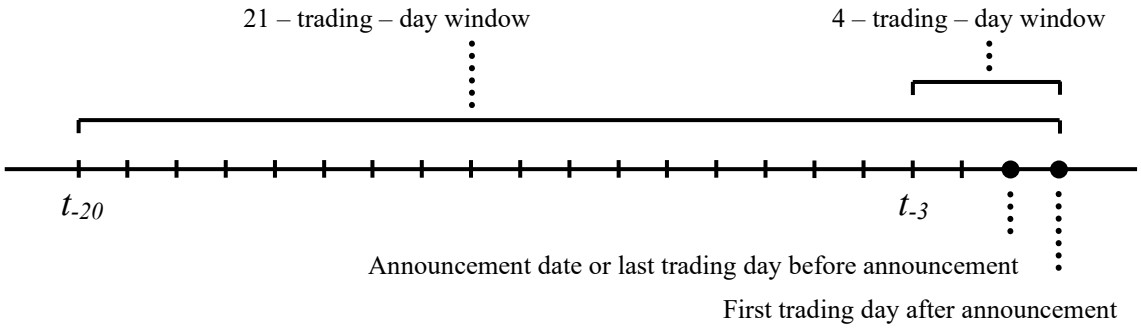
3.2.2.2.ERC mechanism

Albeit theoretically the incentives to underreport may always be present when firm-specific ex-ante earnings uncertainty is high, the negative DA-uncertainty relation should only be significant in periods of relatively high uncertainty during which a market-driven reinforcement mechanism arises: when uncertainty levels substantially rise market participants become aware of managers' incentives to underreport which results onto even lower ERCs. This in turn further reinforces managers' incentives to underreport since managers know that poor results will be attributed to circumstances rather than fundamentals anyways. For that reason, determining whether the higher magnitude of negative DA in the crisis period is indeed a result of earnings shifting behavior requires analyzing the strength of the above-mentioned reinforcement mechanism (hereby ERC mechanism) in the comparison and crisis periods alike. To do so, I regress earnings announcement returns against the interaction between ex-ante earnings uncertainty (DISP) and earnings surprise (SURP). The remaining control variables are as in the previous regression and the model is presented below.

$$RET_{i,t} = \beta_1 + \beta_2 DISP_{i,t} + \beta_3 SURP_{i,t} + \beta_4 DISP_{i,t} * SURP_{i,t} + \beta_5 MCAP_{i,t} + \beta_6 BTM_{i,t} + \beta_7 DAT_{i,t} + \beta_8 IIC_{i,t} + \beta_9 NUMEST_{i,t} + f + e_{i,t} \quad (4)$$

Earnings surprise is computed for every firm-quarter as announced EPS minus consensus forecast normalized by assets per share. Announcement returns are computed for every firm-quarter over the 4- and 21-trading-day windows ending the first trading day after announcement date (as reported by COMPUSTAT). Once again, the construction process for all variables can be found in annex 8.

FIGURE 1 – ANNOUNCEMENT RETURN CALCULATION WINDOWS



4.Results & discussion

4.1.Univariate analysis

4.1.1.Pooled analysis

Table 3 presents the results of the pooled analysis in which the comparison period comprises all firm-quarter observations respective to 2018 and 2019 (Q1-Q3) whilst the crisis period contains all firm-quarter observations respective to 2020 (Q1-Q3). The larger sample of 1226 firms (sample 1) is used for the univariate analysis presented in table 3. For robustness, the same analysis is run for the smaller sample (S2) and results can be found in annex 5. Following Filip & Raffournier (2014) the statistical significance of the difference between both periods' mean DA is tested through a bootstrap procedure. The procedure consists of drawing 1,000 random samples of 100 firm-quarter observations from each period and computing the relevant EM measures (DA^+ and DA^-). An independent-samples t-test follows. For the purpose of visualization the measures of interest (DA^+ and DA^-) are multiplied by 100.

TABLE 3 - POOLED ANALYSIS ABSOLUTE DA

	comparison	crisis	difference
MOD-JONES + ROA			
$(DA^-)*100$	3.05	3.51	**+0.46*** (13.9)**
$(DA^+)*100$	3.57	3.63	**+0.06 (1.64)**
MOD-LARCKER			
$(DA^-)*100$	2.61	3.14	**+0.53*** (19.1)**
$(DA^+)*100$	2.24	2.34	**+0.1*** (3.76)**
OBS			
N (DA^-)	3873	1898	
N (DA^+)	3483	1780	
N (T)	7356 (1226*6)	3678 (1226*3)	

The entire sample of 1226 firms (sample 1) is used. (DA^+) and (DA^-) are respectively the equal-weighted average of absolute positive and negative DA which correspond to the residuals which result from running the MOD-JONES + ROA and MOD-LARCKER models cross-sectionally for each 2-digit SIC industry-quarter. The average values reported on the table are computed through a bootstrap procedure consisting of pulling 1000 samples of 100 firm-quarter DA observations from the comparison period (2018 Q1-Q3 & 2019 Q1-Q3) and 1000 samples of 100 firm-quarter observations from the crisis period (2020 Q1-Q3). An independent-samples t-test follows to compute the significance of the difference between both periods' average values.
***, **, * indicate statistical significance at the 0.01, 0.05, and 0.1 levels.

To begin with, notice that mean values of absolute quarterly DA (multiplied by 100) vary between 2.2% and 3.6% of total lagged assets. Rajgopal & Venkatachalam (2011) report values of absolute DA (x100) between 4 and 7% of total assets in the period ranging from 1962-2002 with an increasing trend in the same period. Although results are not directly comparable to the extent that the authors consider annual DA whilst I analyze quarterly DA, the values reported appear to be generally consistent with previous findings on the magnitude of absolute DA. Further notice that the magnitude of absolute DA estimated with the MOD-JONES + ROA model is on average higher than the magnitude of those estimated with the MOD-LARCKER model. This is consistent with recent arguments which suggest that accrual models without cash flow terms incorrectly classify accruals related to natural fluctuations in working capital needs as discretionary (Allen et. al, 2013). Nonetheless, the models are consistent at least in the direction of change which they suggest and therefore it is clear that the incorporation of both models provides robustness to the analysis.

To begin with, I am cautious about drawing conclusions relative to a potential change in the magnitude of positive DA. Although both models suggest an increase in the magnitude of (DA^{+}) in the crisis period, the difference is insignificant in the case of the MOD-JONES + ROA model and significant but negligible in the case of the MOD-LARCKER model which yields a mere 0.001 increase in positive absolute DA over assets. For that reason, I believe that the data does not provide robust statistical evidence of a significant change in the magnitude of positive DA in 2020 vis-à-vis the comparison period.

Contrarily, both models generate significantly higher (DA^{-}) in the crisis period suggesting that absolute negative DA are indeed higher in the crisis period. The results are significant at the 1% level across both models, with the MOD-JONES + ROA and the MOD-LARCKER yielding an increase of 0.0046 and 0.0053 in negative absolute DA over assets, respectively. The results imply that on average firms have understated earnings by a greater percentage of assets in 2020 vis-à-vis the comparison period.

For robustness, in annex 6 the same analysis is run for each year separately (2018 Q1-Q3, 2019 Q1-Q3, and 2020 Q1-Q3). One can observe that (for both models) negative DA in 2020 are indeed significantly higher than (DA-) in 2019 and significantly higher than (DA-) in 2018.

4.1.2.Quarter-by-quarter analysis

Because an increase in the magnitude of DA appears to contradict the idea that economic downturns encourage reporting conservatism, it makes sense to analyze the quarter-by-quarter difference in the magnitude of discretionary accruals between the crisis and the comparison period. In that respect, table 4 below compares mean absolute positive and negative DA across the first three quarters of the comparison period (2018-2019) and the crisis period (2020).

TABLE 4 – QUARTER-BY-QUARTER ANALYSIS ABOSLUTE DA

	Q1			Q2			Q3		
	comp.	crisis	diff	comp.	crisis	diff	comp.	crisis	diff
MOD-JONES									
(DA-)*100	4.06	4.79	**+0.73*** (18)**	2.55	3.19	**+0.64*** (22.7)**	2.7	2.83	**+0.13*** (4.7)**
(DA+)*100	3.19	3.49	**+0.3*** (8.9)**	3.12	3.4	**+0.3*** (12.7)**	4.5	4.03	**-0.47*** (-11.2)**
MOD-LARCKER									
(DA-)*100	2.64	3.42	**+0.78*** (28.2)**	2.17	2.57	**+0.4*** (15.8)**	1.98	2.03	**+0.05** (2.14)**
(DA+)*100	2.4	2.8	**+0.4*** (13.8)**	2.4	2.6	**+0.2*** (8.6)**	2.86	2.83	**-0.03 (-1.1)**
OBS									
N (DA^-)	1138	551		1333	635		1402	712	
N (DA^+)	1314	675		1119	591		1050	514	
N (T)	2452	1226		2452	1226		2452	1226	

The entire sample of 1226 firms (sample 1) is used. (DA^+) and (DA^-) are respectively the equal-weighted average of absolute positive and negative DA which correspond to the residuals which result from running the MOD-JONES + ROA and MOD-LARCKER models cross-sectionally for each 2-digit SIC industry-quarter. The average values reported on the table are computed through a bootstrap procedure consisting of pulling 1000 samples of 100 firm-quarter DA observations from each period. For instance, Q1 comparison reported values are estimated by pulling 1000 samples of 100 observations from 2018Q1 and 2019Q2, whilst Q1 crisis values are estimated by pulling 1000 samples of 100 observations from 2020Q1. An independent-samples t-test follows to compute the significance of the difference between both periods' average values.
***, **, * indicate statistical significance at the 0.01, 0.05, and 0.1 levels.

A quarter-by-quarter analysis allows for the conclusion that indeed during the first two quarters of the year the magnitude of positive DA is higher in the crisis period than in the comparison period. Albeit this difference is about ½ smaller than the effect found for negative DA, it is still significant. Notice nonetheless that the effect appears to reverse entirely in the third quarter, in which positive DA in the crisis period are actually lower than the ones measured in the comparison period's third quarter.

With respect to (DA^-), the difference in negative DA between both periods is also almost entirely driven by the first and second quarters of the analysis periods. Indeed, when analyzing third quarter data, the magnitude of negative DA in only slightly higher in 2020. The results are depicted graphically in figures 1 and 2 below.

FIGURE 2 – ABSOLUTE NEGATIVE DA BY QUARTER

MOD-JONES + ROA residuals (top) & MOD-LARCKER residuals (bottom)

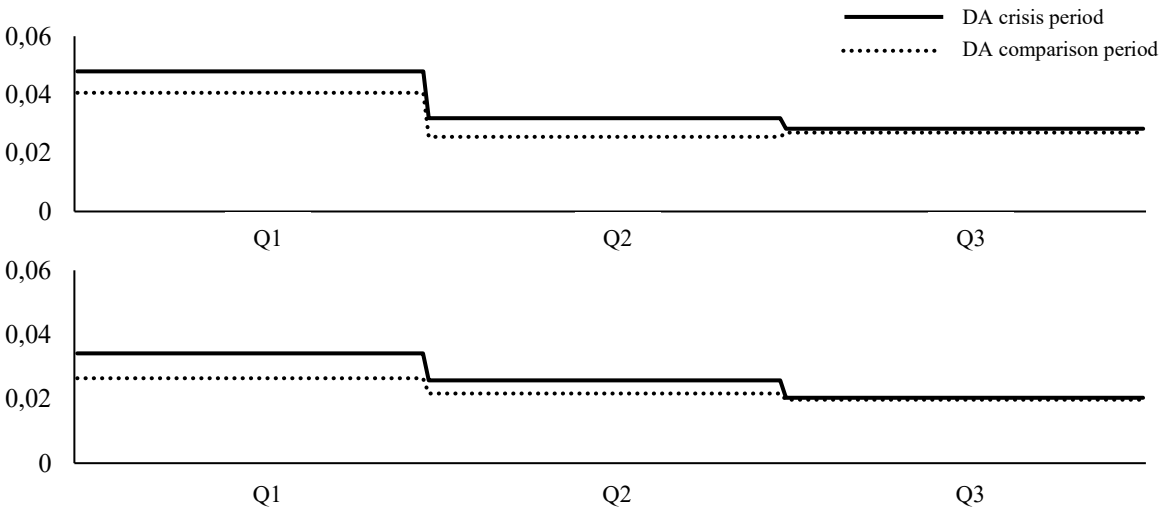
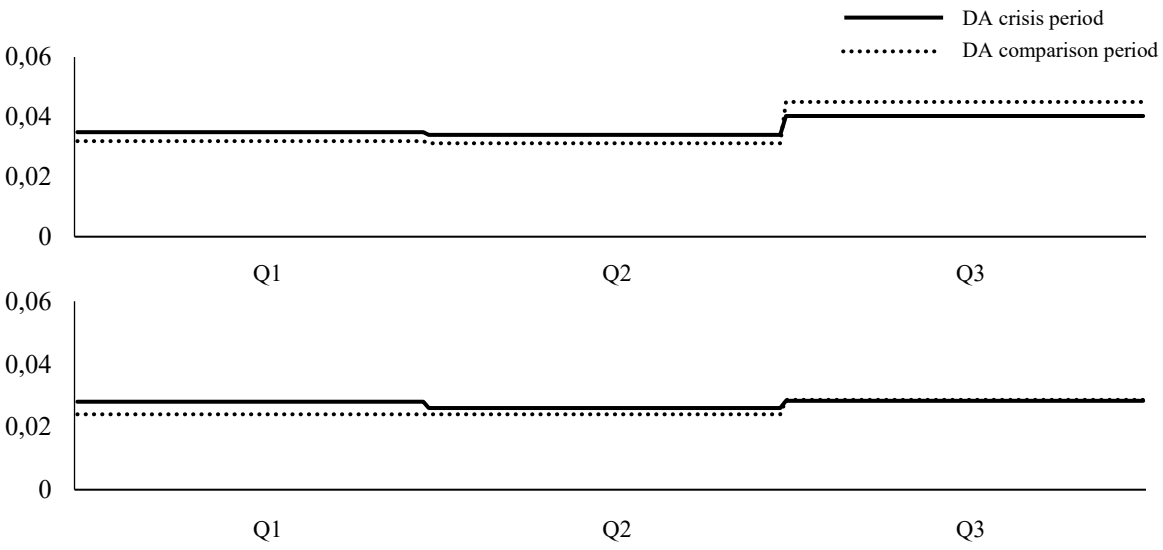


FIGURE 3 – ABSOLUTE POSITIVE DA BY QUARTER

MOD-JONES + ROA residuals (top) & MOD-LARCKER residuals (bottom)



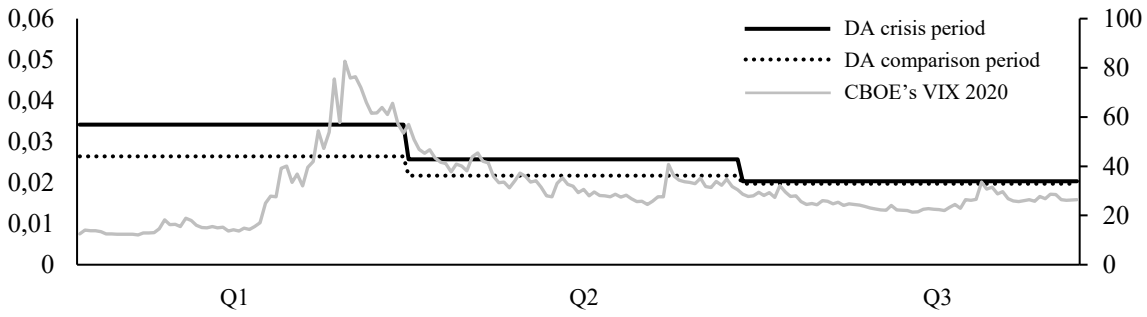
Taken together these results suggest multiple ideas. First, the first two quarters of the year were met with a decline in earnings quality as proxied by accruals quality (recall that our poxy for accruals quality is the magnitude of absolute DA). Second, two different sets of strategies contributed to the decline in earnings quality in the first two quarters of the year: one set of firms adopted smoothing strategies therefore reflecting a reporting bias in the opposite direction of the earnings shock (and thus manifesting higher positive DA); the second set of firms adopted strategies consistent with "big-bath-accounting" and further understated earnings (thus manifesting higher negative DA). Third, by the third quarter of 2020 there is already evidence of an overall increase in reporting conservatism and consequential improvement in earnings quality. Indeed, in 2020Q3 the magnitude of income-increasing AM is lower than in the comparison period (which is expected during downturns) and the magnitude of income-decreasing AM is only slightly higher than in the comparison period. All in all, based on the sample considered, North American firms' reporting choices in 2020 Q1-Q2 are consistent with a tactic response to a shock whist reporting choices in 2020Q3 are already consistent with a tactic response to a downturn.

The potential overstatement of earnings in early 2020 was a recurrent concern amongst auditors, regulators, and market participants. However, only rarely was the possibility of intentional understatement mentioned. Considering that the effect found for the increase in (DA^-) is about 4x larger than the one found for the increase in (DA^+) in the pooled analysis (and about 2x larger in the quarter-by-quarter analysis), it is worth further exploring the motive behind underreporting in the first two quarters of the year. As discussed in section 2 (literature review) there may be several motives behind the underreporting trend in early 2020, such as employee appeasement during collective dismissals, efforts to secure governmental aid or concessions from lenders, or earnings shifting due to heightened uncertainty. Empirically testing each of these individual hypotheses is outside the scope of this study. I hereby focus on the latter explanation to an increase in negative DA in early 2020: uncertainty-driven earnings shifting.

For that reason, the CBOE's VIX 2020 is plotted in figure 4 alongside the previously computed measures of accrual quality. Even though the VIX is based on the S&P500 only, it still provides a comprehensive measure of market participants' expectation of volatility in North America throughout 2020. The VIX's highest peak on record was reached on the 16th of March and the index has since gradually subsided to less extreme values, albeit still superior to those found in the comparison period. Curiously enough,

the difference in negative DA between the comparison and the crisis period is maximized in the first quarter (when the VIX is at its peak). In the second quarter, negative DA are still considerably larger in the crisis period than in the comparison period (and the VIX is still trading well-above its long-run average). By the third quarter of the year (when the VIX is approaching pre-March levels) the difference in the magnitude of negative DA between the comparison and the crisis period is virtually null. This suggests that uncertainty-driven earnings shifting is indeed a compelling hypothesis to the significant increase in negative DA in the first two quarters of the year. While at this point it serves merely as anecdotal evidence, in the next section I formally test the hypothesis that ex-ante earnings uncertainty motivated underreporting in early 2020.

FIGURE 4 – NEGATIVE DA - CBOE's VIX (MOD-LARCKER MODEL)



4.2.Regression analysis

4.2.1.Uncertainty-DA analysis

Because it was shown in the previous section (univariate analysis) that the difference in the magnitude of DA in 2020 is almost entirely driven by the first two quarters of the year, this section will focus solely on this period. Therefore, the crisis period becomes 2020 (Q1-Q2) and the comparison period comprises the first two quarters of 2018 and 2019. At this point I begin empirically testing the hypothesis that underreporting in 2020 was driven by earnings shifting due to market participants' uncertainty. The first step consists of determining whether there is a significantly negative relationship between firm-specific economic uncertainty (DISP) and the level of DA in the crisis period. The coefficients which result from running equation (3) using the residuals from the MOD-JONES + ROA model are not significant. Therefore, table 5 shows the results from running equation (3) whilst using the residuals from the MOD-LARCKER model as

dependent variable. The coefficient of interest is the one associated to DISP (our measure of firm-specific economic uncertainty).

TABLE 5 – UNCERTAINTY-DA RELATION

	(1) MOD-LARCKER DA		
	comparison	crisis	difference
DISP	**+0.016**	**-0.09***	**-0.106****
	(0.7)	**(-1.89)**	**(-2.0)**
MC	0.0008	0.003***	
	(1.53)	(3.63)	
BTM	-0.006***	0.008***	
	(-4.7)	(3.55)	
DAT	0.0006	0.004	
	(0.19)	(0.65)	
IIC	-0.02***	-0.02***	
	(-18)	(-13.9)	
NUMEST	-0.00**	-0.00**	
	(-2.15)	(-2.5)	
Ind. effects	YES	YES	
Adj. R^2	0.17	0.23	
OBS	2052	1026	
	(513*4)	(513*2)	

The entire sample of 513 firms (sample 2) is used. OLS regression with the inclusion of constant term. The dependent variable are the **signed** residuals which result from running the MOD-LARCKER model cross-sectionally for each 2-digit SIC industry-quarter. DISP is the standard deviation in intra firm-quarter analyst forecasts; MC is the logarithm of market capitalization (quarterly); BTM is the logarithm of the book-to-market ratio (quarterly); DAT is the debt to asset ratio (quarterly); IIC is interest expense over operating income before depreciation; NUMEST is the number of different estimators covering the firm in each quarter; fixed effects include industry dummies at the 2-digit SIC level.
***, **, * indicate statistical significance at the 0.01, 0.05, and 0.1 level

To begin with, notice that the coefficient associated to inverse interest coverage is significantly negative, suggesting that for this sample firms with higher interest expense to operating income take more negative / less positive DA. Although inconsistent with the debt covenant hypothesis, there are at least two explanations for this relation: First, the negative coefficient can be interpreted in light of the corporate governance role of lenders since the added layer of external surveillance potentially lowers managers' ability for opportunistic income-increasing AM – which would be reflected onto a lower magnitude of positive DA; Second, for highly indebted firms seeking concessions from lenders underreporting has been shown to be useful – which would be reflected onto a higher magnitude of negative DA. Although statistically significant, the coefficients associated to the remaining control variables are not economically significant.

As expected, the coefficient of interest (DISP) is only significantly negative in the crisis period. These results are consistent with Stein & Wang's (2016) finding that the negative uncertainty-DA relation is driven by periods of overall high uncertainty. On average in the crisis period, higher firm-specific ex-ante earnings uncertainty is associated to lower DA. In the crisis period, one standard deviation increase in the uncertainty distribution (0.019, computed as the standard deviation of DISP which is respectively the standard deviation of intra firm-quarter analyst forecasts divided by assets per share) would yield an average decline of 0.0017 in DA/AT (-0.09*0.019). For reference, median operating ROA in the crisis period is approximately 0.022 (2.2%), which means that the above-mentioned effect would translate into an 8% proportional decline in reported operating earnings (0.0017 / 0.022), which is economically significant. Notice for reference that Dichev et. al (2013) find that approximately 10% of reported earnings are managed.

However, this effect does not suggest a higher quality of earnings in the crisis period because the dependent variable (DA) corresponds directly to the signed residuals obtained from running the MOD-LARCKER model and therefore takes both positive and negative values. For that reason, the above-discussed decline can either be driven by a negative effect of DISP on positive DA, similar to the one documented by Payne & Robb (2000) and which on its own would entail an increase in EQ in the crisis period; or by a positive effect of DISP on negative DA, similar to the one documented by Stein & Wang (2016) and which on its own would entail a decline in EQ in the crisis period. Since it was established in section 4.1 (univariate analysis) that both positive and negative DA increased in the crisis period (at least in the first two quarters of the year), the more likely explanation to the above-documented relation is indeed a positive effect of DISP on the magnitude of negative DA in the crisis period, which is tested in section 4.2.2.

The positive association between DISP and DA in the comparison period (although not predicted by literature) is neither statistically nor economically significant.

4.2.2. Uncertainty-(DA$^-$) analysis

As mentioned in the previous section, the most likely explanation for the negative uncertainty-DA relation in the crisis period is a positive uncertainty-(DA$^-$) relation in the same period. To conclude that the effect reported in section 4.2.1. is mostly driven by firms taking more negative DA (rather than less positive DA) with increasing levels of ex-ante earnings uncertainty I run regression (3) using absolute negative DA (DA-) rather than DA as dependent variable. Therefore, sample size is narrowed to firms who report negative DA in either period. Once more, the crisis period is 2020 (Q1-Q2) and the comparison period comprises the first two quarters of 2018 and 2019. At this stage I expect a positive coefficient associated to DISP which should be stronger in the crisis period.

TABLE 6 – UNCERTAINTY-(DA$^-$) RELATION

	(1) MOD-JONES + ROA			(2) MOD-LARCKER		
	comparison	crisis	diff	comparison	crisis	diff
DISP	**+0.07***	**+0.19**	**+0.12**	**+0.03**	**+0.15**	**+0.12**
	(1.69)	**(1.33)**	**(0.78)**	**(0.7)**	**(1.31)**	**(1.1)**
MC	-0.002***	0.00		-0.0013**	-0.0045***	
	(-2.93)	(0.09)		(-2.49)	(-4.11)	
BTM	-0.009***	-0.006*		-0.007***	-0.0088***	
	(-6.17)	(-1.77)		(-5.7)	(-3.1)	
DAT	-0.008*	-0.015*		-0.007**	-0.0042	
	(-1.96)	(-1.75)		(-2)	(-0.6)	
IIC	-0.004**	-0.00		0.014***	0.0096***	
	(-2.24)	(-0.14)		(9.8)	(4.4)	
NUMEST	0.00	-0.00		0.0002**	0.0005***	
	(1)	(-1.43)		(2.5)	(4.3)	
Ind. Effects	YES	YES		YES	YES	
Adj. R^2	0.11	0.11		0.19	0.22	
OBS	1038	500		1038	500	

For this analysis S2 (513 firms) is narrowed to firms which report negative discretionary accruals. OLS regression with the inclusion of constant term. The dependent variable are the **absolute negative** residuals which result from running the MOD-LARCKER model cross-sectionally for each 2-digit SIC industry-quarter. DISP is the standard deviation in intra firm-quarter analyst forecasts; MC is the logarithm of market capitalization (quarterly); BTM is the logarithm of the book-to-market ratio (quarterly); DAT is the debt to assets ratio (quarterly); IIC is interest expense over operating income before depreciation; NUMEST is the number of different estimators covering the firm in each quarter; fixed effects include industry dummies at the 2-digit SIC level.
*, **, *** indicate statistical significance at the 0.01, 0.05, and 0.1 level

Both models perform consistently at this stage of the analysis and the resulting coefficients of interest (DISP) are highlighted in table 6. As hypothesized, the magnitude of the coefficient associated to DISP is significantly higher in the crisis period than in the comparison period which supports the idea that the effect of ex-ante earnings uncertainty on negative DA is mostly driven by periods of high uncertainty. Although the coefficients of interest are marginally insignificant (p-values of 0.18 and 0.19 for the regressions run in the crisis period using absolute negative residuals from the MOD-JONES and MOD-LARCKER models respectively), they are certainly economically significant in the crisis period which is not necessarily true for the comparison period. On a more detailed level, the reported coefficient of +0.15 in the crisis period can be interpreted as follows: a firm experiencing a 1 standard deviation increase in the uncertainty distribution (0.012, computed as the standard deviation of DISP which is respectively the stdev of intra-firm-quarter analyst forecasts divided by assets per share) would increase negative DA over assets by an amount equal to 0.0018 (0.012*0.15). For further clarification notice that median ROA for firms reporting negative DA in the crisis period is approximately 0.026 which means that a 0.0018 increase in (DA^-) would correspond to proportional decrease of 7% (0.0018 / 0.026) in reported operating income. For reference, a coefficient of +0.03 in the comparison period is interpreted as follows: a firm experiencing a 1 standard deviation increase in the uncertainty distribution (0.017) would increase negative DA/TA by 0.0005 (0.03*0.017). Considering that the median operating ROA for firms reporting negative DA in the comparison period is approximately 0.03, the effect would correspond to a proportional decrease of 1.7% (0.0005 / 0.03) in reported operating earnings.

In this section it is established that the negative uncertainty-DA relation in the crisis period is driven by the fact that the positive relation between ex-ante earnings uncertainty and negative DA is much stronger in the crisis period. The last stage of the analysis (section 4.2.3) consists of determining whether the uncertainty-(DA^-) relation is stronger in the crisis period due to the hypothesized market reinforcement mechanism which arises only when uncertainty exceeds expected values (or during high-vol periods).

4.2.3.ERC mechanism analysis

For that purpose, table 7 below shows the results of regressing 4-trading-day and 21-trading-day window announcement returns against ex-ante earnings uncertainty (DISP), earnings surprise (SURP) and the interaction between both variables (SURP X DISP). Surprise is computed as announced EPS minus median forecast considering all estimates recorded until the day immediately prior to the announcement. Under annex 7 the same analysis is replicated by computing surprise using the earliest consensus forecast on I/B/E/S for each firm quarter.

TABLE 7 – ANNOUNCEMENT RETURN-SURPRISE X DISPERSION RELATION

	4-DAY-WINDOW			21-DAY-WINDOW		
	comparison	crisis	diff	comparison	crisis	diff
SURP	0.5***	0.49***	-0.01	0.61***	0.95***	+0.34
	(4.46)	(3.31)	(-0.048)	(4.16)	(2.94)	(0.96)
SURP X DISP	**-0.041**	**-0.28***	**(-0.24)**	**-0.05**	**-0.49**	**-0.44**
	(-0.65)	**(-1.61)**	**(-1.3)**	**(-0.61)**	**(-1.31)**	**(-1.14)**
DISP	0.03	-0.21		-0.11	0.27	
	(0.31)	(-1.09)		(-0.9)	(0.64)	
MC	-0.0027	-0.014***		0.00	-0.05***	
	(-1.53)	(-4.6)		(0.12)	(-7.95)	
BTM	-0.003	-0.006		-0.008	0.0016	
	(-0.69)	(-0.8)		(-1.48)	(0.1)	
DAT	0.012	0.024		0.014	0.096**	
	(1.14)	(1.25)		(0.96)	(2.3)	
IIC	-0.011***	-0.013**		-0.02***	-0.022*	
	(-2.7)	(-2.3)		(-4)	(-1.88)	
NUMEST	-0.00	0.00*		-0.00*	0.00***	
	(-0.56)	(1.74)		(-1.76)	(4.6)	
Ind. effects	YES	YES		YES	YES	
Adj. R^2	0.02	0.05		0.02	0.13	
OBS	2052	1026		2052	1026	
	(513*4)	(513*2)		(513*4)	(513*2)	

The entire sample of 513 firms (S2) is used. OLS regression with the inclusion of constant term. The dependent variables are earnings announcement returns over 4-trading-day and 21-trading-day windows ending the first trading day after announcement. SURP is earnings surprise (announced EPS – consensus); DISP is the standard deviation in intra firm-quarter analyst forecasts; MC is the logarithm of market capitalization (quarterly); BTM is the logarithm of the book-to-market ratio (quarterly); DAT is the debt to asset ratio (quarterly); IIC is interest expense over operating income before depreciation; NUMEST is the number of different estimators covering the firm in each quarter; fixed effects include industry dummies at the 2-digit SIC level.
*, **, *** indicate statistical significance at the 0.01, 0.05, and 0.1 level

To begin with, the coefficient associated to inverse interest coverage is significant and negatively associated to announcement returns across specifications (in both the comparison and crisis periods). This result is in line with Dhaliwal & Reynolds' (1994) finding that ERCs are negatively correlated to the default risk of debt (although the

authors proxy default risk through covenants). That is because default risk of debt is another way of capturing the discount rate (beta) associated to the firm's earnings, which is negatively correlated to ERCs. Further, market capitalization is negatively correlated to announcement returns. This relation is in line with literature which theorizes that the market reaction to the announcement is less pronounced for large firms because more information is available throughout the year for these companies (Collins et al., 1987). The coefficients associated to the remaining control variables are not significant.

As expected, the coefficient associated to SURP is positive and significant across both periods. This is consistent with the well-documented relationship between earnings surprises and announcement returns: higher positive surprises yield higher stock returns. In the crisis period, if DISP was approximately 0 (indicating negligible standard deviation in intra-firm-quarter analyst forecasts), a one standard deviation increase in the surprise distribution (0.027 in the crisis period, computed as the standard deviation of SURP which is respectively earnings surprise divided by assets per share and winsorized at the 98% level) would yield a 0.013 (1.3%) increase in announcement return (0.027*0.49). For reference, the average firm's announcement return in the crisis period is approximately 2.6% (4-trading-day announcement window) which is in line with the average ERC of 4.6% reported by Imhoff & Lobo (1992).

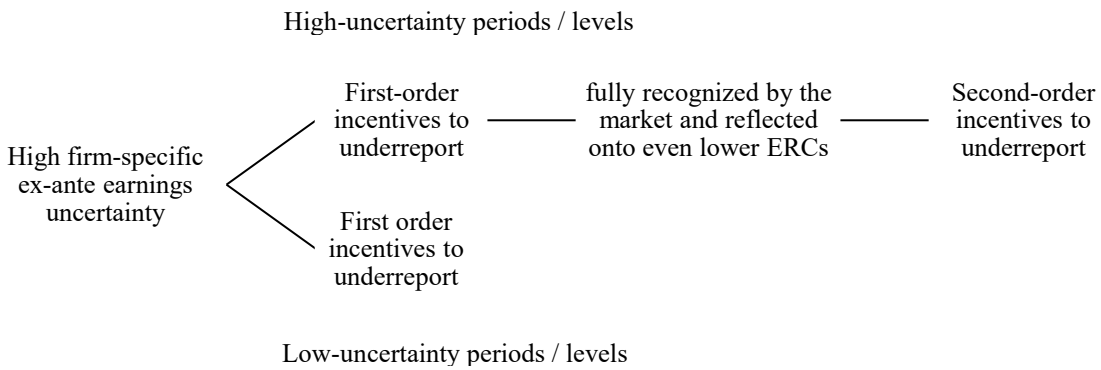
At this point the coefficient of interest is the one associated to the interaction term (SURP X DISP). The interaction coefficient for the regressions run in the crisis period is statistically significant (10% level) when using a 4-day return window and marginally insignificant (p-value of 0.19) when using a 21-day return window. The results suggest that in early 2020 the relationship between earnings surprise and announcement returns significantly depended on the level of ex-ante earnings uncertainty. More specifically, the negative coefficient associated to SURP X DISP allows for the interpretation that for every value of DISP greater than 0, the effect of surprise on earnings response will always be mitigated by market participants' ex-ante uncertainty (ERCs are higher when firm-specific ex-ante earnings uncertainty is lower).

The fact that the interaction coefficient is insignificant in the comparison period is in line with the theory that uncertainty-driven variation in ERCs should only reinforce EM incentives related to the market's information environment when uncertainty levels are overall high (Stein & Wang, 2016). In the comparison period, high firm-specific forecast disagreement generates first-order incentives to underreport as managers are aware of

lower ERCs associated to noise in the earnings signal (for that reason, there is already a mild positive correlation between DISP and (DA-) in the comparison period, as shown in table 6). However, it is highly unlikely that in the comparison period market participants are aware of the existence of incentives to underreport when firm-specific forecast disagreement is high, and therefore no reinforcement mechanism is in place (table 7). However, in early 2020 (a period of overall high uncertainty) it is highly likely that market participants became aware of the existence of uncertainty-driven incentives to underreport. This perception was reflected onto even lower ERCs for firms facing high disagreement (table 7) which in turn generated second-order incentives to underreport (as managers became aware of how little value-relevance the market would grant their disclosed earnings). Thus, the correlation between DISP and (DA-) is much stronger in 2020 (table 6).

In short, in the comparison period (at low uncertainty levels) the positive uncertainty-(DA^-) relation is flatter (table 6 columns 1 & 4) as it stems only from first-order incentives to underreport. For that reason, it does not translate into a significantly negative uncertainty-DA association (table 5 column 1). In the crisis period (at high uncertainty levels) the positive uncertainty-(DA^-) relation is steeper (table 6 columns 2 & 5) as it stems from both first-order incentives and second order incentives to underreport when reinforced by the market (ERC) mechanism. For that reason, it translates into a significantly negative uncertainty-DA association (table 5 column 2). In sum, managers' pre-existing incentives to underreport become much stronger when market participants realize that the former exist (as in early 2020) because the value-relevance of reported earnings is even lower and thus shifting earnings to a period of more certainty is even more opportune.

FIGURE 5 – INCENTIVES FOR INCOME-DECREASING EM



5.Conclusions

2020 was an atypical year in which most firms' unmanaged earnings were severely impacted by the spread of the COVID-19 pandemic and subsequent lockdown measures. Concerns over the value-relevance of reported earnings naturally arose and the SEC and ESMA promptly disclosed guidelines with the purpose of encouraging reporting practices that ensure a fair review of the position of issuing firms amidst the pandemic. Even so, it was still anticipated that EM practices would change in early 2020 and I hereby provide empirical evidence of such a shift.

One of the most remarkable conclusions is that managers' reporting choices throughout the year clearly reflect the evolution of the context from an uncertainty shock (first and second quarters) to an economic downturn (third quarter). As a result, earnings quality as proxied by the magnitude of discretionary accruals also varies throughout the year. In the first two quarters of 2020 there was a decline in EQ as suggested by the increase in both positive and negative DA (in relation to the comparison period). These results also suggest that reporting strategies wavered between smoothing and big-bath approaches, which are two well-documented tactic responses to earnings shocks. Contrarily, third quarter data shows an increase in EQ as suggested by the decline in positive DA (in relation to the comparison period) and relative decline in negative DA (in relation to the previous two quarters). This result is in line with the idea that reporting conservatism in general increases during economic downturns.

A surge in income-increasing EM was generally expected by policymakers and regulators. It is however unclear whether were there was awareness around the strong incentive to underreport in 2020 and thus the even greater increase in the magnitude of income-decreasing EM might come as a surprise to some. Indeed, the increase found for negative discretionary accruals in 2020 is about 4x larger than the increase found for positive discretionary accruals. Consistently, I further conclude that one explanation for the increase in the magnitude of underreporting in the first semester of the year is the positive relation between ex-ante earnings uncertainty and absolute negative DA in the same period. Although marginally statistically insignificant, this relation is economically significant in the crisis period: indeed, amongst firms which underreport in the first semester of 2020 one standard deviation increase in the ex-ante earnings uncertainty distribution yields an increase of 0.0018 in the magnitude of negative DA/TA which

roughly translates into a managed decline of 7% in operating income. On average, firms whose earnings estimators were most uncertain about underreported earnings by a greater percentage of assets in 2020.

Lastly, I conclude that the atypically large magnitude of income-decreasing manipulation in the first semester of 2020 is explained by a market-driven mechanism which reinforced managers' pre-existing incentives to underreport (which theoretically also exist in the comparison period for firms facing high forecast disagreement). Indeed, ex-ante earnings uncertainty levels in 2020 were so high that market participants became aware of managers' incentives to underreport when faced with high forecast disagreement. As a result, the effect of earnings surprises on announcement returns in the first semester of 2020 is significantly moderated by high-order uncertainty levels – which is evidence that the market was aware that the value-relevance of earnings for firms facing high forecast disagreement should be lower. Then, managers' awareness of the poor value-relevance of their reported earnings prompted them into further underreporting (since ERCs would be low anyways).

To my knowledge, this is the first contextual study in the field of earnings management which identifies preliminary evidence of an increase in the magnitude of accruals manipulation in North America amidst the 2020 uncertainty shock. I further believe it is the first study on EM which provides evidence of widespread earnings shifting in response to the hit of a macro uncertainty shock. On the one hand, one could argue that the preliminary evidence which is put forward in this study is concerning to the extent that it suggests a severe deterioration of accruals quality in 2020. On the other hand, it appears that managers' reporting panic was short-lived. By the third quarter of the year there is already evidence of an increase in accounting conservatism which is to be expected during downturns. Subsequent research should include the "after-crisis" period (2020Q3 onwards) to validate the theory of an increase in earnings quality going forward.

6.Limitations

The first limitation of this research project is tied to data availability. Due to the exceptional impact of the COVID-19 pandemic on firms' operations the SEC granted a 45-day extension for the disclosure of mandatory quarterly earnings statements. Consequently, at the time of data collection, multiple North American firms had failed to release third quarter data. For that reason, sample was restricted to firms who reported timely which in itself can introduce a bias in the sample (timeliness). This is one point of improvement for future contextual studies of EM during the COVID-19 pandemic.

The second limitation of this research project is tied to the methodology behind the estimation of DA. Although literature on the topic of accruals management is vast, there is yet no consensus with respect to the suitability of competing accrual estimation models. Despite being widely used, both the original and modified Jones models have relatively low explanatory power of around 10-12% of variation in accruals (Dechow et al., 2010) and may incorrectly classify accruals related to fluctuations in WC needs as discretionary (Allen et al., 2013). Further, it is worth mentioning that accrual estimation models generally perform worse in samples with extreme financial performance.

Another methodological constraint is the consideration of a single channel for earnings management (accruals management). Recent studies highlight the importance of considering real activities management as a source of EM, as this form of income manipulation is easier to camouflage and costlier in the long-run (Cohen & Zarowin, 2010). Nonetheless, it would be nearly impossible to demonstrate that R&D shrinking or underproduction in 2020 was driven by incentives to manage earnings, since these are also optimal investment responses during periods of high demand uncertainty.

The fourth limitation of this study arises from the focus on a single determinant of managers' incentives for income manipulation – market participants' ex-ante earnings uncertainty. In reality multiple determinants of EM are likely to have changed in early 2020, such as firm indebtedness, managerial compensation schemes, and regulator and auditor conservatism. Although I control for some of these factors, others are far too complex to quantify and doing so would require data that is not yet available. In the future, this contextual study can be enhanced by incorporating controls for the ability to manage earnings and the presence of opportunistic incentives to do so (such as equity-based compensation and the degree of external pressure).

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Annex 1. Required COMPUSTAT variables for univariate and multivariate analysis

List A

ATQ (assets – total); NIQ (net income); OANCFY (operating activities – net cash flow); REVTQ (revenue – total); RECTQ (receivables – total); PPENTQ (plant, property & equipment – total net); CSHOQ (common shares outstanding); PRCCQ (price close quarter)

List B

CEQQ (common ordinary equity – total); DLTTQ (long-term debt – total); XINTQ (interest and related expense – total); OIBDPQ (operating income before depreciation – quarterly); TXDBQ (deferred taxes – balance sheet)

Annex 2. Descriptive Statistics univariate analysis sample (S1)

full	mean	stdev	p25	p50	p75	skew
DA JONES	0.00	0.06	-0.02	-0.00	0.02	0.23
DA LARCK.	-0.00	0.05	-0.01	0.00	0.01	-0.07
ATQ ($M)	14212.6	42532.5	541.5	2275.3	8693.5	6.5
REVTQ ($M)	2077.3	6782.9	94.8	377.9	1300.8	7.3
RECTQ ($M)	1327.9	4832.9	49.7	226.4	787.1	9.8
PPENTQ ($M)	4947.4	17387.9	66.7	378.7	2203.1	7.6
NI	147.2	874.1	-2.6	13.3	89.9	3.4
N	11034 (1226*9)					
Comparison	mean	stdev	p25	p50	p75	skew
DA JONES	0.00	0.06	-0.02	-0.00	0.01	0.31
DA LARCK.	-0.00	0.05	-0.01	0.00	0.01	-0.9
AT ($M)	13877.2	41873.5	506.2	2149.6	8495.9	6.6
REVT ($M)	2133.9	6995.6	94.6	381.5	1306.9	7.2
RECT ($M)	1349.6	4922.5	49.2	231.3	798.1	9.7
PPENT ($M)	4852.3	17365.7	59.1	351.9	2092.1	7.9
NI ($M)	182.5	809.5	-1.00	16.21	99.0	7.3
N	7356 (1226*6)					
crisis	mean	stdev	P25	P50	P75	skew
DA JONES	-0.00	0.07	-0.02	-0.00	0.02	0.11
DA LARCK.	-0.00	0.05	-0.01	0.00	0.02	1.2
AT ($M)	14888.4	43818.6	611.5	2427.7	9113.2	6.3
REVTQ ($M)	1964.2	6335.6	94.9	370	1269.6	7.4
RECTQ ($M)	1284.5	4649.1	51.3	220.8	736.9	9.9
PPENTQ ($M)	5137.5	17432.9	86.4	433.7	2388.2	7.1
NI ($M)	76.9	987.6	-7.6	7.1	73.0	-0.77
N	3678 (1226*3)					

Annex 3. Descriptive Statistics multivariate analysis sample (S2)

full	mean	stdev	p25	p50	p75	skew
DA JONES	0.000	0.036	-0.015	0.000	0.014	0.285
DA LARCK.	0.000	0.031	-0.008	0.002	0.013	-0.502
DISP	0.004	0.024	0.001	0.001	0.003	21.04
MC	8.401	1.677	7.234	8.293	9.566	0.176
DAT	0.313	0.201	0.178	0.300	0.419	0.839
IIC	0.398	0.622	0.071	0.149	0.292	2.023
RET-4	0.009	0.097	-0.037	0.005	0.051	1.424
RET-21	0.051	0.183	-0.038	0.031	0.109	4.641
N	3078 (513*6)					
comparison	mean	stdev	p25	p50	p75	skew
DA JONES	0.000	0.035	-0.015	-0.000	0.014	0.663
DA LARCK.	0.000	0.029	-0.009	0.002	0.012	-0.036
DISP	0.004	0.026	0.001	0.001	0.002	21.08
MC	8.501	1.597	7.365	8.367	9.589	0.299
DAT	0.303	0.202	0.168	0.288	0.402	0.892
IIC	0.341	0.562	0.066	0.139	0.257	2.409
RET-4	0.001	0.088	-0.043	0.002	0.047	-0.275
RET-21	0.006	0.117	-0.054	0.007	0.067	-0.138
N	2052 (513*4)					
crisis	mean	stdev	P25	P50	P75	skew
DA JONES	-0.000	0.037	-0.014	0.000	0.015	-0.385
DA LARCK.	0.000	0.035	-0.007	0.005	0.016	-1.011
DISP	0.005	0.019	0.001	0.002	0.004	17.53
MC	8.200	1.810	6.959	8.147	9.491	0.084
DAT	0.334	0.199	0.204	0.321	0.439	0.760
IIC	0.511	0.715	0.085	0.175	0.414	1.481
RET-4	0.026	0.110	-0.027	0.013	0.062	3.055
RET-21	0.140	0.247	0.016	0.098	0.198	4.796
N	1026 (513*2)					

Annex 4. Samples composition

2-digit SIC	Industry	S1(#)	S1(%)	S2(#)	S2(%)
10	Metal mining	60	4.9	17	3.31
13	Oil & gas extraction	66	5.4	35	6.82
20	Food & kindred products	40	3.3	13	2.53
28	Chemicals & allied products	169	13.8	75	14.62
29	Petroleum refining & related inds.	22	1.8	13	2.53
33	Primary metal industries	22	1.8	6	1.17
34	Fabricated metal products	28	2.3	13	2.53
35	Industrial & commercial machinery	90	7.3	33	6.43
36	Electronic & other electrical equipment	109	8.9	35	6.82
37	Transportation equipment	50	4.2	21	4.09
38	Measuring & analyzing instruments	88	7.2	36	7.02
48	Communications	37	3.0	18	3.51
49	Electric gas & sanitary services	89	7.3	53	10.33
50	Wholesale trade-durable goods	39	3.2	13	2.53
51	Wholesale trade-nondurable goods	27	2.2	12	2.34
58	Eating & drinking places	26	2.1	15	2.92
59	Miscellaneous retail	20	1.6	5	0.97
73	Business services	192	15.6	70	13.65
80	Health services	28	2.3	19	3.70
87	Engineering & accounting & management	25	2.0	11	2.14
		1226		513	

Annex 5. Pooled analysis absolute DA (S2)

	comparison	crisis	difference
MOD-JONES + ROA			
(DA-)*100	2.33	2.63	**+0.3*** (10.33)**
(DA+)*100	2.62	2.59	**-0.03 (-1.3)**
MOD-LARCKER			
(DA-)*100	1.97	2.67	**+0.7*** (31.5)**
(DA+)*100	1.78	1.83	**+0.05** (2.3)**
OBS			
N (DA-)	1662	805	
N (DA+)	1416	734	
N(T)	3078 (513*6)	1539 (513*3)	

The entire sample of 513 firms (sample 2) is used. (DA^+) and (DA^-) are respectively the equal-weighted average of absolute positive and negative DA which correspond to the residuals which result from running the MOD-JONES + ROA and MOD-LARCKER models cross-sectionally for each 2-digit SIC industry-quarter. The average values reported on the table are computed through a bootstrap procedure consisting of pulling 1000 samples of 100 firm-quarter DA observations from the comparison period (2018 Q1-Q3 & 2019 Q1-Q3) and 1000 samples of 100 firm-quarter observations from the crisis period (2020 Q1-Q3). An independent-samples t-test follows to compute the significance of the difference between both periods' average values.
***, **, * indicate statistical significance at the 0.01, 0.05, and 0.1 levels.

Annex 6. Pooled analysis - yearly (S1)

	2018 (Q1-Q3)	2019 (Q1-Q3)	2020 (Q1-Q3)
MOD-JONES + ROA			
(DA-)*100	3.18	2.93	3.50
(DA+)*100	3.72	3.35	3.65
MOD-LARCKER			
(DA-)*100	2.56	2.57	3.11
(DA+)*100	2.24	2.23	2.36
OBS			
N (DA-)	1924	1949	1898
N (DA+)	1754	1729	1780
N (T)	3678 (1226*3)	3678 (1226*3)	3678 (1226*3)

The entire sample of 1226 is used. (DA^+) and (DA^-) are respectively the equal-weighted average of absolute positive and negative DA which correspond to the residuals which result from running the MOD-JONES + ROA and MOD-LARCKER models cross-sectionally for each 2-digit SIC industry-quarter. The average values reported on the table are computed through a bootstrap procedure consisting of pulling 1000 samples of 100 firm-quarter DA observations from each year;

Annex 7. ERC mechanism with earliest consensus forecast on I/B/E/S

	4-day-window		21-day-window	
	comparison	crisis	comparison	crisis
SURP	0.47***	0.45***	0.59***	0.89***
	(4.3)	(3.23)	(4.23)	(2.97)
SURP X DISP	**-0.04**	**-0.28**	**-0.06**	**-0.49**
	(-0.7)	**(-1.6)**	**(-0.7)**	**(-1.3)**
DISP	0.02	-0.21	-0.12	0.28
	(0.26)	(-1.1)	(-0.99)	(0.66)
MC	-0.003	-0.014***	0.00	-0.05***
	(-1.6)	(-4.65)	(0.09)	(-7.9)
BTM	-0.003	-0.005	-0.00	0.00
	(-0.65)	(-0.7)	(-1.4)	(0.11)
DAT	0.012	0.02	0.01	0.09***
	(1.1)	(1.2)	(0.9)	(2.72)
IIC	-0.01***	-0.01***	-0.02***	-0.02*
	(-2.73)	(-2.35)	(-4)	(-1.9)
NUMEST	-0.00	0.00*	-0.00*	0.003***
	(-0.5)	(1.73)	(-1.7)	(4.6)
Ind. effects	YES	YES	YES	YES
Adj. R^2	0.02	0.05	0.02	0.13
OBS	2052	1026	2052	1026

The entire sample of 513 firms (S2) is used. OLS regression with the inclusion of constant term. The dependent variable are earnings announcement returns over 4-trading-day and 21-trading-day windows ending the first trading day after announcement. SURP is earnings surprise (announced EPS – consensus); DISP is the standard deviation in intra firm-quarter analyst forecasts; MC is the logarithm of market capitalization (quarterly); BTM is the logarithm of the book-to-market ratio (quarterly); DAT is the debt to assets ratio (quarterly); IIC is interest expense over operating income before depreciation; NUMEST is the number of different estimators covering the firm in each quarter; fixed effects include industry dummies at the 2-digit SIC level.
*, **, *** indicate statistical significance at the 0.01, 0.05, and 0.1 level

Annex 8. Variable descriptions

Variable	Description	Calculation
TA	Total accruals	([ni]−[oancf]) / [at $_{t-1}$] [ni] = net income (loss) [oancf] = net cash flow from operations Q1: oancfq $_t$ = oancfy $_t$ Q2-Q3: oancfq $_t$ = oancfy $_t$ – oancfy $_{t-1}$
DA	Discretionary accruals	Residuals resulting from estimating the modified Jones model augmented with ROA cross-sectionally for each two-digit SIC code-based industry quarter. Linear regressions of TA on $1/[at]_{t-1}$, $(\Delta[revt]-\Delta[rect])/[at]_{t-1}$, $[ppent]/[at]_{t-1}$, and $[ni]_{t-1}/[at]_{t-1}$. All regressors are winsorized at the 1 and 99 percentiles. [revt] = total revenue [rect] = total receivables [ppent] = property, plant and equipment (net) [ni] = net income (loss)
DISP	Dispersion in forecasts normalized by assets per share	Standard deviation of all analyst forecasts on I/B/E/S on the date prior to the announcement date (reported by COMPUSTAT) divided by total assets per share
SURP	Earnings surprise normalized by total assets per share	Announced EPS minus median analyst forecast divided by total assets per share winsorized at 98% level
RET	Announcement return	$(P_{t+1} - P_{t-3}) / P_{t-3}$ or $(P_{t+1} - P_{t-20}) / P_{t-20}$ Calculated in the window beginning 3 days or 20 days before the announcement
MC	Market cap (log)	Log([csho]x[prcc]) [csho] = common shares outstanding [prcc] = close price (quarter)
BTM	Book-to-market (log)	Log([at] / ([at]−ceq+[csho]×[prcc]−[txdb])) [ceq] = common/ordinary equity [txdb] = deferred taxes (balance sheet)
DAT	Debt-to-assets	[dltt] / [at] capped at 1 [dltt] = total long-term debt
IIC	Inverse interest coverage	[xint] / [oibdp] capped at 2 or set to 2 for oibdp < 0 [xint] = interest and related expense [oibdp] = operating income before depreciation
NUMEST	Number of analysts covering firm	Number of distinct estimators on I/B/E/S on the date immediately before the announcement.