

Income smoothing and the market value of companies during the COVID-19 pandemic

Luciana de Sousa Santos

<https://orcid.org/0009-0001-2048-0000>

Carlos Henrique Silva do Carmo

<https://orcid.org/0000-0002-9397-8678>

Ilirio José Rech

<https://orcid.org/0000-0001-7027-737X>

Abstract

Objective: To investigate the effect of the COVID-19 pandemic on the market value (MV) of companies listed on [B]3 in intentional income smoothing.

Method: The study sample comprised data from non-financial companies included in the Novo Mercado from 2017 to 2021. The models proposed by Lang et al. (2012) were adopted to calculate the intentional income smoothing variables. The estimations were performed using a dynamic panel with the Generalized Method of Moments Estimation.

Results: The COVID-19 pandemic negatively affected the companies' MV. The negative impact of general intentional smoothing was reduced during the pandemic though, while the negative effect of intentional smoothing using accruals was intensified. The results suggest that the companies' reduced level of operations during the pandemic more intensively influenced the effect of general smoothing and less intensively influenced intentional smoothing on the companies' value.

Contributions: The results of this study contribute to the literature on income smoothing in emerging countries during periods of uncertainty and alert to the effects of such practices on asset prices on the Brazilian stock exchange.

Keywords: Income Smoothing; COVID-19; Market Value; Intentional smoothing.

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1. Introduction

At the beginning of 2020, the World Health Organization (WHO, 2020a) received the information of several cases of pneumonia in Wuhan, China. Shortly afterwards, the global situation worsened as a new type of coronavirus was identified (Wu *et al.*, 2020), leading the WHO to declare a state of Public Health Emergency of International Concern. The COVID-19 pandemic was an extraordinary event of public health risk for other states, due to its spread worldwide, which would potentially require a coordinated international response (Brazil, 2020; Wu *et al.*, 2020).

In Brazil, the first case was identified at the end of February, and the first death occurred in March 2020 when community transmission was verified. Hence, countries had to adopt measures, including the shutdown of commercial establishments— the so-called lockdown— to contain the spread of the new coronavirus. According to Gomes *et al.* (2021), lockdowns have severe economic, financial, and social impacts. Hence, managers from the most diverse organizations implemented different strategies to mitigate such impacts and maintain their companies' good performance.

From an economic point of view, one of the first effects that may result from a pandemic is a decline in economic activity due to lockdowns imposed by health authorities. A potential consequence of reduced commercial activities is a decrease in the companies' market value. A publicly traded company's market value (MV) depends on many factors, including how accounting information is presented. In this sense, the users of accounting information rely on the results managers disclose through financial statements, in particular profits, to assess the effects of a crisis on an organization's activities and performance to make assertive investment decisions (Nicoleta-Cornelia *et al.*, 2012).

In turn, managers, aware of the relevance of the information provided in financial statements, use their discretionary power and subjectivity in which accounting standards may be applied to earnings management, showing a manipulated result, even if it does not reflect the organization's actual situation to gain benefits (Healy & Wahlen, 1999). This practice may be associated with the opportunistic perspective of manipulating accounting information, which results from managers taking actions to maximize their companies' MV to meet their interests to the detriment of the investors' interest (Beneish, 1997; Subramanyam, 1996; Watts & Zimmerman, 1986).

According to Paulo and Mota (2019), managers use their discretionary power to manage their companies' earnings during a crisis. They present evidence that managers tend to increase accrual levels when the economy slows down, whereas, in the recovery phase, they tend to reduce accrual levels. Other times, managers use operational activities to reduce management, aiming to smooth income for investors' analyses.

Such actions are possibly explained by the notion that managers are constantly adapting to the restrictions imposed by the business environment (Chandler Jr., 1962; Galbraith, 1973), such as the unpredictability of the actions of customers, suppliers, competitors, and regulators (Govindarajan, 1984). According to Ghosh and Olsen (2008), managers resort to flexibility and use their judgment to deal with uncertainties arising in the organizational environment, adopting different strategies. Uncertainty increases the risk associated with assessing future earnings, giving managers an incentive to use discretion to improve future reports' predictability and provide a more predictable stream of earnings (Ghosh & Olsen, 2008).

Avelar *et al.* (2021) note that during the pandemic, the managers attempted to influence the risk perspective of interested parties to avoid a significant drop in their organizations' MV. Thus, managers can use their decision-making power to decrease additional uncertainty by adopting income-smoothing practices.

The literature provides some definitions for income smoothing and its purposes. Gordon (1964) states that managers smooth their companies' accounting results because investors feel more comfortable investing in more stable companies. Copeland (1968) argues that income smoothing is related to managers' accounting choices intended to modify profit variation, making them more stable over time. Baioco *et al.* (2013) consider that the purpose of income smoothing is to reduce profit variability disclosed to the market and reflect more consistent results by intentionally smoothing them (Meli, 2015). In this sense, income smoothing allows managers to reduce the variability of profits over time, seeking a balance between very high and very low profits and showing the market a stable situation, therefore signaling low risk to shareholders.

In this context, this study aims to answer the following question: **What was the effect of the COVID-19 pandemic on the MV of [B]³ companies in the practice of intentional income smoothing?** Therefore, the objective is to investigate the effect of the COVID-19 pandemic on the practice of intentional smoothing on the MV of companies listed on [B]³ to verify the effect of intentional smoothing during times when businesses face uncertainty on the market value of these companies.

Economic instability is assumed to affect the organizations' MV, and intentional income smoothing is supposed to mitigate such an effect. Therefore, this study is based on the hypothesis that Brazilian non-financial companies changed their practices regarding income smoothing during the COVID-19 pandemic. Such uncertain context during the pandemic is assumed to have led managers to take actions to maintain their assets' market value by resorting to the management instruments available, including income smoothing.

Silva *et al.* (2014), Agrawal & Chatterjee (2015), and Fiehn & Struck (2011) investigated the effects of economic-financial instability on earnings management, and Shen *et al.* (2020) analyzed the impact of COVID-19 on the organizations' performance. This study contributes to the literature by addressing income smoothing in times of uncertainty, associating it to the market value of companies during the COVID-19 pandemic in an emerging country; Brazil is among the markets most strongly affected by the crisis caused by the coronavirus (Fernandes, 2020).

Considering the relevance of the companies' MV, this study's relevance lies in the social and economic-financial impact caused by the COVID-19 pandemic. Extreme events can potentially disclose behaviors that would go unnoticed in typical situations. In this sense, this study reveals to investors and market analysts the behavior of managers and the effects of the pandemic on the companies' MV and intentional smoothing. For society, this study's importance concerns the fact that the MV of organizations impacts the price and availability of goods and services.

A literature review is presented, including the studies with the most relevant discussions on the subject.

2. Literature Review

2.1 Impact caused by the COVID-19 pandemic

Since December 2019, with the new coronavirus outbreak in China, which caused a global state of emergency, several studies have addressed the COVID-19 pandemic and its social, economic, and financial impacts. WHO declared the pandemic on March 11, significantly aggravating the risk and uncertainty inherent to the global capital markets (Zhang *et al.*, 2020). Brazil was among the 25 countries most severely affected by the virus (Phan & Narayan, 2020), ranking among the ten stock markets with the worst performance, showing a drop of 48% (Fernandes, 2020).

Coelho and Rodrigues (2021) investigated the value relevance of accounting information during the coronavirus crisis. They used the adapted OJ model, associating net equity and net profit with the companies' market value. One of their findings showed that net equity supported decisions that negatively affected the companies' market value during the crisis (Coelho & Rodrigues, 2021), though the quality of information disclosed through accounting statements improved.

The results found by Shen *et al.* (2020) show that the pandemic had a significant negative impact on the performance of Chinese organizations, reducing investments and affecting revenue.

Ramelli and Wagner (2020) analyzed how economic agents, in particular investors, assessed the risks and consequences caused by the virus, indicating that the market reacted to the progression and consequences of the pandemic. Their findings showed that corporate value was affected depending on each country's situation. As countries managed to contain the virus spreading, the markets started correcting themselves. However, investors remained concerned about issues regarding high debt and the importance of the companies' financial position, which stood out due to the available resources that supported the companies' value.

Avelar *et al.* (2021) showed that the pandemic affected the organizations' economic-financial sustainability, as measures were taken to contain the spread of the virus, mainly social isolation, which caused significant losses in the value of the capital market, a systematic drop across the most varied economic-financial indicators, and a considerable increase in third-party fundraising during the period.

Still, according to the study above, managers tend to present opportunistic behavior to avoid disclosing losses, considering that the market responds quickly to the disclosure of adverse results, causing share prices to drop and, consequently, the company's MV (Walker, 2013). The results reported by Silva *et al.* (2014) show that managers change their behavior during economic instability, adopting or intensifying earnings management.

2.2 Relationship between income smoothing and the companies' market value

The concept of earnings management is broad and controversial. Some authors, like Healy and Wahlen (1999) and according to Schipper (1989), argue that this practice is used to manipulate accounting information in order to “deceive” external users. On the other hand, Dechow and Skinner (2000) understand that accounting choices are linked to the specificities of each type of business, which gives managers different motivations and not necessarily the intention to deceive interested parties. Among the earnings management practices in the literature, income smoothing is the most frequently used (Lopo Martinez, 2013). Studies addressing earnings management practices generally associate the opportunistic behavior of managers with another aspect of organizations to measure its impact, the most commonly adopted being income smoothing.

Ronen and Yaari (2008) show that earnings management through income smoothing is related to the fact that external users, such as investors, are averse to business risks. In this sense, as this practice is intended to reduce profit variation over time, avoiding highlighting extreme discrepancies in the behavior of results (Lopo Martinez, 2001; Ronen & Yaari, 2008), managers likely adopt this strategy to make investors feel more secure about investing in an organization, as such a practice shows more consistent results (Meli, 2015).

Eckel (1981) observes that income smoothing may be divided into two types: natural and intentional smoothing. Lopo Martinez (2001, 2006) notes that intentional smoothing may be further subdivided into actual and artificial. A point highlighted in the literature is that some smoothing occurs naturally, considering that organizations use the accrual basis. The problem is when managers use their discretionary power to manipulate results though, aiming to avoid revealing their companies' actual results, which is a harmful practice (Eckel, 1981).

According to Almeida *et al.* (2011), by considering incentives such as reporting profits close to analysts' forecasts on earnings per share, sustaining recent performance or income smoothing, or publishing positive earnings, companies seek to have their MV above the book value, to create expectations on its shareholders and stakeholders toward future cash flows. The findings of the previous study suggest that companies with a market-to-book ratio above 1 (one) have incentives to manage results and maintain their MV.

Avelar *et al.* (2021) consider that managers tended to influence the risk perspective of investors and analysts to avoid a more significant drop in the organizations' MV during the pandemic. Studies indicate that managers often exhibit opportunistic behavior to prevent disclosing losses, given a perception that the market responds quickly to the disclosure of adverse results, causing share prices to drop (Paulo & Mota, 2019; Walker, 2013). From this perspective, Silva *et al.* (2014) found that Brazilian companies listed on the stock exchange tended to adopt earnings management practices during economic crises, with managers changing their behavior.

The study by Avelar *et al.* (2021) showed that the COVID-19 pandemic affected the economic-financial sustainability of organizations. The authors found that the measures to contain the spread of the virus, mainly social isolation, and changes in consumption habits, caused significant losses in the capital market value and a systematic drop in economic-financial indicators, in addition to an increase in raising third-party resources during the period. The pandemic generated uncertainties that directly impacted companies' earnings, increasing risks and making investors more cautious, especially the most conservative and risk-averse.

Michelson *et al.* (1995) showed that smoothing organizations present a significantly lower average return and a higher MV than non-smoothing organizations. Another piece of evidence is that the level of smoothing is more noticeable in larger companies, which present lower returns and lower risks, indicating that its practice reduces asset risk and improves investors' perception.

As for emerging countries, Agrawal and Chatterjee (2015) addressed Indian companies and found that incentives to manage earnings are linked to an organization's level of financial difficulty. Investors and creditors must be more cautious when evaluating companies during an economic recession because managers are predisposed not to disclose their organizations' actual financial situation, impacting the reliability of accounting information.

Silva *et al.* (2014) studied the effect of global crises, such as the bursting of the American real estate bubble, and found that managers change their behavior during economic crises. Based on B³ companies, the study above identified a significant relationship between economic crises and earnings management among the Brazilian companies in their sample.

Abogun *et al.* (2021) addressed Nigerian companies and found that most were smoothing companies, a practice that significantly reduced their MV. They also found evidence that market risk affects the companies' MV. When the market is regulated, as is the case in Nigeria, the value of companies is negatively affected by income smoothing. In this case, the above authors highlight that smoothing is perceived as an attempt to mislead investors when assessing the value of companies.

The literature presents different results depending on the type of crises faced. Another factor influencing the studies' results is the degree of market regulation and the level of investor confidence in each context. This study assumes that the COVID-19 pandemic unusually affected the companies' MV though, considering that it is deemed the most significant health, social, and economic crisis in history, as its impact was intensified by the characteristics of the contemporary world, with the globalization of social interactions, communication, and market integration (Souto & Silva, 2021).

3. Method

3.1 Study Design

This study population comprised 414 companies listed on B³. Its scope is restricted to companies in the *Novo Mercado*, as the main characteristics of this segment include greater transparency in the disclosure of financial information and lower volatility in share prices compared to other organizations listed on the Brazilian stock exchange (Carvalho *et al.*, 2017); desirable aspects to meet this study's objective. Note that, according to B³, the creation of particular segments, *Novo Mercado* being one of them, was intended to promote the growth of the Brazilian capital market, encourage a trading environment conducive to the interests of investors, and the appreciation of organizations, improving their valuation. Hence, these companies show highly differentiated corporate governance standards, expressing the transparency investors expect (B3, 2018).

According to Srour (2005), in periods of crisis, the companies listed in this differentiated governance segment present higher returns and higher profits distributed as dividends. Additionally, *Novo Mercado* is a listing segment intended for trading shares issued by companies that voluntarily commit to advanced corporate governance practices and disclose information beyond what is required by legislation (Arruda et al., 2008; Fonseca et al., 2016). Such an aspect aims to encourage performance and the creation of value (Pace et al., 2003), influenced by the security and quality of the information that companies present, to offer more reliable and transparent information disclosure (Dalmácio et al., 2013).

Furthermore, financial institutions were not included in the sample, given the particularity of this sector, with rules regulated by the Central Bank, which restricts the manipulation of accounting reports and income smoothing. Furthermore, the companies missing data concerning the study variables in any period were excluded to ensure data consistency. Hence, 99 companies were included in the final sample and analysis.

Data were collected from the financial statements of companies listed on B3 from 2017 to 2021, available in the Economática® database. Note that a long period is needed to measure intentional smoothing (Sousa et al., 2020), 11 quarters prior to the period for which the measure is calculated.

This study had to adjust the period due to the COVID-19 pandemic though, an interactive variable between income smoothing and the companies' MV; hence, only six quarters could be analyzed while the pandemic was in effect. Hence, data concerning the third quarter of 2021 and the five previous quarters were used, comprising data from the second quarter of 2018 to the third quarter of 2021. As a result, data were obtained for 14 quarters, seven of which included the COVID-19 pandemic and seven before the pandemic (WHO/WHO, 2020b). It is worth noting that the last semester was not included due to the intention of measuring income smoothing in equal periods; hence, seven periods were analyzed within and seven before the pandemic. Ramelli and Wagner (2020) assert that, as of January 20, 2020, managers and analysts were already concerned about the potential impacts the disease outbreak would cause. The model by Lang et al. (2012), based on the metrics proposed by Leuz et al. (2003), was adopted to meet this study's objective of verifying intentional income smoothing. These measures allow adjusting volatility arising from decision-making through operations.

According to Lang et al. (2012), these metrics allow measuring income smoothing. Smoothing 1 (*SMTH1*) enables capturing the general income smoothing while Smoothing 2 (*SMTH2*) measures income smoothing only by *accruals*. *SMTH1* is defined by the ratio between the standard deviation of net profit divided by the standard deviation of operating cash flow (Sousa et al., 2020), both scaled by average total assets (Lang et al., 2012). The logic explained by Leuz et al. (2003) is that this measure allows for controlling performance volatility. Based on these studies, we have Equation 1:

$$SMTH1 = \frac{\sigma(LL/TA_{average})}{\sigma(OCF/TA_{average})} \quad (1)$$

Where:

SMTH1 = general income smoothing;

$\sigma(LL/TA_{average})$ = standard deviation of net profit divided by average total assets;

$\sigma(OCF/TA_{average})$ = standard deviation of operating cash flow divided by average total assets.

Six quarters for each period were considered to calculate standard deviations.

Likewise, SMTH2 was calculated to verify income smoothing through accruals using Equation 2:

$$SMTH2 = \rho[(OCF/TA; Accruals/TA)] \cdot -1 \quad (2)$$

Where:

SMTH2 = income smoothing through accruals;

OCF = operating cash flow;

TA = total assets;

Accruals = total accruals.

Six quarters for each period were considered to calculate the correlations.

SMTH2 results from the correlation between operating cash flow and total accruals, scaled by total assets. Six quarters were considered for the calculation of correlations. As Lang et al. (2012) and Leuz et al. (2003) present a negative coefficient of this measure, it is an indication that the company has its results more frequently smoothed by accruals, as the metrics indicate that due to their discretionary power, managers intensify the use of accruals, and manage earnings when profits decrease. Therefore, this measurement must be multiplied by minus one so that its analysis becomes more intuitive, indicating that the higher its value, the more frequent the adoption of smoothing.

The econometric model proposed by Lang et al. (2012) was adopted to obtain intentional smoothing. Submitting SMTH1 to a regression allows identifying general intentional income smoothing, while submitting SMTH2 to the same regression equation shows intentional smoothing by accruals. Therefore, Equation 3 was adopted:

$$SMTH_{it} = \alpha_{it} + \beta_1 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 MTB_{it} + \beta_4 SDREVENUE_{it} + \beta_5 PERC_PREJ_{it} + \beta_6 CYCLE_{it} + \beta_7 CRESCREC_{it} + \beta_8 IMOB_{it} + \beta_9 FLOW_{it} + \beta_{10} TEMP_{it} + \beta_{11} SECTOR_{it} + \varepsilon_{it} \quad (3)$$

Where:

SIZE_{it} = logarithm of total assets at the end of the year of company *i* in period *t*;

DEBT_{it} = total debt (loans and short- and long-term financing) at the end of the year divided by total assets at the end of the year of company *i* in period *t*;

MTB_{it} = market-to-book at the end of the year of company *i* in period *t*;

SDREVENUE_{it} = standard deviation of the year's net revenue, considering the current quarter and the five previous quarters of company *i* in period *t*;

PERC_PREJ_{it} = proportion of the analysis periods in which there is a negative net result for company *i* in period *t*;

CYCLE_{it} = logarithm of the operational cycle at the end of the year of company *i* in period *t*;

CRESCREC_{it} = growth in revenue for the year of company *i* in period *t*;

IMOB_{it} = fixed assets at the end of the year divided by the total assets at the end of the year of company *i* in period *t*;

FLOW_{it} = average operating cash flow divided by total assets at the end of the year of company *i* in period *t*;

TEMP_{it} = quarterly periods, from June 2018 to September 2021;

SECTOR_{it} = represents the Bovespa economic sector of company *i* in period *t*.

Finally, the residuals from estimating SMTH1 and SMTH2 models based on Equation 3 consisted of the values of the variables of intentional earnings smoothing (SMTH1) and intentional smoothing by accruals (SMTH2), used in the final econometric model.

Following the empirical model adopted by Abogun et al. (2021), the functional adapted version of the econometric model is specified as shown in Equation 4:

$$MV_{it} = \beta_0 + \beta_1 MV_{it-2} + \beta_2 SMTH_{it} + \beta_3 COVID_{it} + \beta_4 SMTH \cdot COVID_{it} + \beta_5 ROA_{it} + \beta_6 SIZE_{it} + \beta_7 ALAVEF_{it} + \beta_8 INC_SMOOTH + \varepsilon_{it} \quad (4)$$

The measurement of the variables used in the empirical model was performed using the panel data method, with the dynamic model using the Generalized Method of Moments (GMM) by Blundell and Bond (1998). In order to obtain consistent and unbiased estimators in a dynamic model, regressors are differenced and used as instruments in a GMM estimation approach. Such an estimation approach is valid only when variables are strictly exogenous though, and thus, idiosyncratic errors are not autocorrelated and uncorrelated with the lagged dependent variable. Otherwise, the estimation should not be carried out using the Blundell and Bond (1988) approach.

Blundell and Bond's (1988) approach obtains efficient estimators of the parameters by imposing additional moment conditions, which can be tested and permit joint estimation of the equations in levels using lag-differenced variables as instruments. This estimation approach is commonly called system GMM. These additional moment conditions were tested using the Sargan Test, which has the null hypothesis that moment conditions are valid. Further, following the literature (Blundell & Bond, 1998; Lucinda & Meyer, 2013), testing for second-order serial correlation AR(2) of the model error is necessary. The null hypothesis of no serial correlation AR(2) aligns with the maintained assumptions validating the use of lagged variables as instruments. If the null hypothesis is rejected, additional lags of the dependent variable need to be included.

MV was based on the price of shares on B3. Chen et al. (2017) and Yu et al. (2018) note that a company's share price directly consists of its MV. Hence, it was multiplied by the number of shares available on Economática on the last day of the month at the end of each quarter. Note that some financial statements may not yet be available when we consider the end date of each quarter as the last day of the month of the quarter.

Intentional income smoothing (*SMTH1*) and intentional income smoothing by accruals (*SMTH2*) were based on the metrics of Leuz et al. (2003), according to the model adopted by Lang et al. (2012).

COVID-19 is a dummy variable, where 1 (one) indicates the presence of the pandemic and 0 (zero) otherwise. As suggested by Baron and Kenny (1986), the interaction between intentional income smoothing and COVID-19 (*SMTH1*COVID*) and intentional smoothing by accruals and COVID-19 (*SMTH2*COVID*) were included in the model to moderate inconsistency between variables. Additionally, the *INC_SMOOTH* variable, obtained by the coefficient of variation proposed by Eckel (1981) and subsequently adapted by Bao and Bao (2004), was also included in the model. It takes on 1 (one) when the company is considered to have adopted smoothing strategies and 0 (zero) otherwise in each period analyzed.

Eckel (1981) considers that the coefficient is based on the principle that if any variation in profits is greater than the variation in revenue, the company does not adopt smoothing strategies, while the opposite characterizes smoothing companies. The coefficient was adapted by Bao and Bao (2004), who defined the interval to classify companies into smoothing and non-smoothing; smoothing companies are classified with a Smoothing Index (SI) below 0.9, while an index above 1.1 concerns non-smoothing firms. Those that fell within the “gray area” range were excluded from the sample.

Thus, we have Equation 5:

$$SI = (\text{smoothing}) \ 0.9 < \left| \frac{CV \Delta\% \text{ Profits}}{CV \Delta\% \text{ Sales}} \right| < 1.1 \ (\text{non-smoothing}) \quad (5)$$

Where:

SI = Smoothing Index;

CV $\Delta\%$ Profits = coefficient of variation of profit variations obtained by the standard deviation of profit variation divided by the average profit variation;

CV $\Delta\%$ Sales = coefficient of variation of sales variation obtained by the standard deviation divided by the sales variation's average.

The modeling adopted by Abogun *et al.* (2021) considers the lagged dependent variable (VMit-1) as one of the explanatory variables. The existence of this lagged dependent variable, $\gamma_{(t-1)}$, becomes a valid instrument to control the effects corresponding to previous periods. According to Gujarati and Porter (2011), if the model considers the inclusion of past values of the dependent variable among its explanatory variables, it is classified as an autoregressive model, i.e., a dynamic model that describes how the dependent variable changes over time, based on its previous values. The instruments' validity and consistency were tested in addition to second-order autocorrelation. In cases where the null hypothesis was rejected, another lag was added to the dependent variable. Therefore, a panel data model requires two global variables (Wooldridge, 2016): a variable that identifies each company in the sample (id Space) and a variable that indicates the time (id Time), covering the temporal space. Furthermore, Gujarati and Porter (2011) believe that the impact of the independent variables (X) on the dependent variable (Y) does not always occur immediately since the response of Y at time “t” is not solely influenced by what occurred in X at time “t-0”, but also by past observations of X, such as “t-1”, “t-2” and so on, which leads to an understanding that there is a relationship considering the lagged periods.

In addition to the variables of interest presented earlier, the following control variables were included: Return on Assets (ROA), Asset Size (SIZE) obtained through the natural logarithm of total assets, and Leverage (ALAVEF). The definition of the Return on Total Assets (ROA) was included in the model because it considers that there is a positive relationship between a company's market value and its profitability. Therefore, ROA was obtained by dividing net profit by total assets, as Fiehn and Struck (2011) and Huang (2011) did.

Although there is no consensus in the literature on the relationship between the quality of accounting information and an organization's size (Cvetanovska & Kerekes, 2015; Fiehn & Struck, 2011; Rountree *et al.*, 2008), Andrade *et al.* (2009) argue that larger and consolidated companies have more significant potential for appreciation in the stock market. Therefore, the size of companies, measured by the logarithm of total assets, was inserted into the model.

Finally, another control variable (Leverage [ALAVEF]) was included based on studies reporting a relationship between a company's value and leverage (Aggarwal & Zhao, 2007; Bao & Bao, 2004; Fiehn & Struck, 2011). It was developed using the ratio between long-term loans and financing, and total assets.

As a result, a positive and significant relationship is expected between ROA, SIZE, and MV (Andrade et al., 2009). A negative relationship is expected between ALAVEF and MV during the COVID-19 pandemic though (Fiehn & Struck, 2011), and as for income smoothing, a negative relationship is expected when it is intentional (Huang et al., 2009).

All the variables are presented in Table 1, as follow:

Table 1

Description of variables

Variable	Description	Operationalization	References
Dependent Variable			
MV	MV is based on the share price on B3	Share price multiplied by the number of shares, both available on the Economatica database on the last day of the final month of each quarter.	Abogun et al. (2021), Chen et al. (2017) e Yu et al. (2018)
Independent variables of interest			
SMTH1	General intentional smoothing	Residual from the following regression: $SMTH1_{it} = \alpha_{it} + \beta_1 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 MTB_{it} + \beta_4 SDREVENUE_{it} + \beta_5 PERC_PREJ_{it} + \beta_6 CYCLE_{it} + \beta_7 CRESCREC_{it} + \beta_8 IMOB_{it} + \beta_9 FLOW_{it} + \beta_{10} TEMP_{it} + \beta_{11} SECTOR_{it} + \epsilon_{it}$	Lang et al. (2012)
SMTH2	Intentional smoothing by accruals	Residual from the following regression: $SMTH2_{it} = \alpha_{it} + \beta_1 SIZE_{it} + \beta_2 DEBT_{it} + \beta_3 MTB_{it} + \beta_4 SDREVENUE_{it} + \beta_5 PERC_PREJ_{it} + \beta_6 CYCLE_{it} + \beta_7 CRESCREC_{it} + \beta_8 IMOB_{it} + \beta_9 FLOW_{it} + \beta_{10} TEMP_{it} + \beta_{11} SECTOR_{it} + \epsilon_{it}$	Lang et al. (2012)
Interactive Variables			
SMTH1-COVID	Obtained by the interaction between SMTH1 and COVID-19	SMTH1-COVID19	Developed by the authors
SMTH2-COVID	Obtained by the interaction between SMTH2 and COVID-19	SMTH2-COVID19	Developed by the authors
Control Variables			
Return on assets (ROA)	Obtained by the ratio between the company's net profit and its total assets	ROA = LL/TA	Fiehn and Struck (2011), Cvetanovska and Kerekes (2015)
Size (SIZE)	The company's total assets transformed into its logarithmic base	Natural logarithm of Total Assets	Moses (1987)
Leverage (ALAVEF)	Obtained by the ratio between the company's long-term loans and financing by Total Assets	ALAVEF = LT Loans + financing / Total Assets	Aggarwal and Zhao (2007), Bao and Bao (2004), and Fiehn and Struck (2011)
COVID	COVID-19	Dummy takes 1 when the period was during the COVID-19 pandemic and 0 otherwise.	Developed by the authors
INC_SMOOTH	Obtained by the coefficient of variation proposed by Eckel (1981)	Dummy takes 1 when the company is classified as smoothing and 0 otherwise.	Bao and Bao (2004) and Eckel (1981)

Source: Study data.

The models were estimated using a dynamic panel with the System GMM estimator, which considers asymptotic variance and autocorrelated errors, which makes it more effective and enables a more assertive investigation of variations that may not be found in a cross-sectional or longitudinal section. Hence, it contributes to mitigating bias and having more degrees of freedom, controlling for unobserved heterogeneity, endogeneity, omitted variable bias, and heteroscedasticity (Wooldridge, 2016).

4. Results

4.1 Descriptive Statistics

Descriptive statistics are presented to characterize data (Table 2). Because MV, the dependent variable, is represented in monetary units, it presents high asymmetry and kurtosis, which requires logarithmic transformation (Andrade et al., 2009) to stabilize data variance and resemble a normal distribution with constant mean and variance (Wooldridge, 2016).

Table 2

Descriptive Statistics*

Var./Est.	Mín.	1° Quartil	Mediana	Média	3° Quartil	Máx.	DP	Assimetria	Curtose
MV	4002.1	1117080.8	4121847.3	14535951.4	14593555.9	570520998.6	38079304.3	8.0	83.4
NL_MV	8.3	13.9	15.2	15.1	16.5	20.2	1.9	-0.4	0.2
INC_SMTH	0	0	0	0.35	1	1	0.5	0.6	-1.6
SIZE	10.4	14.5	15.4	15.6	16.7	20.0	1.5	-0.1	0.5
ROA	-0.9	-0.004	0.01	0.01	0.04	0.4	0.1	-3.9	41.1
ALAVEF	0.01	0.2	0.4	0.4	0.5	2.3	0.2	1.0	7.5
COVID	0	0	0.5	0.5	1	1	0.5	0	-2.0
SMTH1	-4.6	-0.2	0	0.00	0.1	9.5	0.8	3.1	33.5
SMTH2	-1.7	-0.04	0.0	0.00	0.1	0.8	0.3	-1.7	7.7
SMTH1_COVID	-4.6	0	0	0.00	0	9.5	0.7	3.5	48.2

Note. *Number of observations 1,386.

Source: study data.

Table 2 shows that the variables MV, ROA, ALAVEF, SMTH1, SMTH2, SMTH1*COVID, and SMTH2*COVID presented asymmetry differences from zero and kurtosis below or above three (Morettin & Bussab, 2017), indicating strong volatility, which may harm the model's consistency. A potential explanation for this significant volatility is associated with the size of the companies in the sample, which presented a minimum of 10.4 and a maximum of 20.

As regression analysis is sensitive to the presence of extreme values (Hair Jr. et al., 2009), tests were performed to detect outliers for the regression analysis using quartiles, maximum values, minimum values, box-plot graphs, and histograms, techniques based on exploratory data analysis (Wooldridge, 2016). Problems with dispersion, asymmetry, and kurtosis in the data can generate high variability in the model, which is undesirable. Hence, data were "winsorized" based on 1% of the centiles of the variables with corrected extreme values to avoid such problems (Hastings Jr., 1947).

4.2 Analysis of the regression models and discussion of results

Table 3 presents the results estimated by the System GMM method. Two lags were performed in the dependent variable to correct the second-order autocorrelation problem, which was detected through the Blundell-Bond test. Initially, SMTH1 and SMTH1*COVID were analyzed, in addition to their relationship with the dependent variable (MV). Next, the model was applied using SMTH2 and SMTH2*COVID to verify its relationship with the dependent variable. Although they are complementary, SMTH1 and SMTH2 behave differently within the same time frame. Zang (2012) explains that this occurs because, in a given period, income smoothing may be the manager's accounting choice, while in another period, the decision may be to smooth income through accruals; hence, the choice depends on the year's results. For this reason, these variables were analyzed separately (Sousa et al., 2020). See Table 3.

Table 3

Analysis of the models' coefficients using general intentional smoothing (SMTH1) and intentional smoothing by accruals (SMTH2) on Market Value (MV)

Estimate Coefficient	SMTH1	SMTH2
VM _{t-1}	0.555*** (-40.3)	0.566*** (-67.45)
VM _{t-2}	0.304*** (-50.24)	0.301*** (-48.55)
INC_SMOOTH	-0.050*** (-7.26)	-0.060*** (-5.41)
COVID	-0.130*** (-44.63)	-0.128*** (-30.71)
SMTH	-0.091*** (-6.53)	0.171*** (-3.45)
SMTH*COVID	0.067*** (-5.01)	-0.254*** (-4.01)
SIZE	0.185*** (-12.84)	0.177*** (-11.55)
ROA	1.703*** (-13.01)	1.721*** (-19.67)
ALAVEF	0.045*** (-6.08)	0.315*** (-5.24)
Constant	-0.719*** (-3.71)	-0.713*** (-4.00)
Observations	1,188	1,188
Number of groups	99	99
Number of Instruments	562	562
Wald- χ^2	24,972.63	42,868.39
Sargan test	95.96	96.47
Order 1 Endogeneity Test	-6.81***	-6.89***
Order 2 Endogeneity Test	-0.19	-0.19

Note. The results between parentheses refer to "z" statistics. The significance of the variables' coefficients is represented by asterisks, as follows: *Significance at 10%, ** Significance at 5%, *** Significance at 1%.

Source: Study data.

The analysis of the model's global statistics shows that the Wald- χ^2 statistics was statistically significant at 1%, indicating that all GMM models were globally significant, i.e., at least one of the instrumented coefficients was different from zero. There were 99 groups of companies and 1,188 observations in all the models.

The values of the dependent variable lagged in two periods were positively significant for the current market value in the models with SMTH1 and SMTH2. This result indicates that previous market values are positively and significantly associated with the MV values of the companies in the sample.

The results of the GMM showed that general intentional smoothing (SMTH1) was negatively associated with the companies' market value, with a coefficient of -0.091. A similar result was found for the COVID dummy variable, with a coefficient of -0.130. The result concerning the interaction of the general intentional smoothing variable with the variable representing the pandemic (SMTH1*COVID), however, was a coefficient of 0.067 concerning the companies' market value. Therefore, the effect of general intentional smoothing during the COVID-19 pandemic on market value has the opposite effect of the period before the pandemic (-0.091). This result shows that the negative effect of general intentional smoothing on market value was reduced during the pandemic. Thus, SMTH1 negatively impacted the companies' market value during and before the pandemic.

General intentional income smoothing (SMTH1) was negatively associated with the companies' value in the period before the COVID-19 pandemic. A potential explanation for this result is that income smoothing, in general, is perceived as harmful to the entities' performance, as it comprises smoothing through accruals and smoothing through actual operations. Consequently, the companies' market value is negatively affected by this discretionary behavior of managers, as it may increase the risks for investors (Susanto & Pradipta, 2019; Yu *et al.*, 2018). Even though the negative effect of general smoothing remained during the pandemic, it was lower than in the previous period. The level of income smoothing through actual activities possibly fell due to the companies' less intense level of operations caused by the pandemic restrictions. Nonetheless, such a result must be interpreted cautiously, considering it relates to extraordinary events in the period addressed here. This finding is similar to that of Fiehn and Struck (2011), who closely examined results during financial crises and observed that the volatility coefficients of cash flow and profits showed an interesting behavior. While the cash flow volatility coefficient shows a significant negative association (-0.0371), indicating an inverse relationship between this indicator's volatility and financial performance, the previously negative earnings volatility coefficient currently reveals a positive association (0.0391). The authors above recognize that these coefficient changes may be motivated by exceptional circumstances that occurred during economic instability.

A coefficient positively associated with the companies' value (0.171) was found before the pandemic for intentional smoothing by accruals (SMTH2). In contrast, a negative coefficient (-0.0128) was found for the variable representing the pandemic (COVID). However, the result concerning the interaction between the intentional smoothing variable by accruals with the variable representing the pandemic (SMTH2*COVID) showed a negative coefficient (-0.254). A coefficient of -0.083 was obtained by adding the coefficients of the SMTH2 variable (0.171) with the coefficient of the interactive variable (-0.254), indicating that the effect of intentional smoothing by accruals during the pandemic reduced the market value and surpassed the positive influence that accruals smoothing produced in the period before the pandemic.

Therefore, intentional smoothing by accruals (SMTH2) showed a positive relationship with companies' value in the non-pandemic period, suggesting that a higher level of income smoothing by accruals is not perceived as harmful by investors, producing a positive effect on the companies' market value, similar to that obtained by Fiehn and Struck (2011). Nonetheless, considering the companies' decreased operations during the pandemic, the adoption of income smoothing by accruals seems to assume greater prominence among smoothing practices, drawing the attention of investors and producing a negative effect on the companies' market value. This finding is consistent with the results presented by Rountree et al. (2008), who, despite not finding a relationship between income smoothing and managers' competence, show that part of the market acknowledged the importance of consistent and predictable cash flows. This finding suggests that investors value stable cash flows, contributing to a company's value.

As for the effect of the dummy variable INC_SMOOTH, which shows whether a company adopted smoothing practices within each period, both models showed a negative effect on the market value. This result confirms the relevance of the classification proposed by Bao and Bao (2004) and Eckel (1981) for the market value of Brazilian companies.

The COVID-19 (COVID) variable negatively affected the companies' value in both models (SMTH1 and SMTH2). These results are consistent with those reported by Shen *et al.* (2020), in which COVID-19 negatively impacted company performance, i.e., a time of economic uncertainty imposing high risks, showing how MV is affected by income smoothing (Yang & Zhu, 2014).

The control variables, SIZE, ROA, and ALAVEF, positively affected the companies' value in both models. This study's results concerning leverage (ALAVEF) are contrary to previous studies (Bao & Bao, 2004; Fiehn & Struck, 2011; Sousa et al., 2020) showing a significant negative relationship with MV. In this study, the ALAVEF variable presented positive coefficients, indicating that the greater the leverage, the greater the company's MV. This finding corroborates the results by Stulz (1990), who reported a positive relationship between debt and company valuation.

5. Final Considerations

This study aimed to investigate the effect of the COVID-19 pandemic on the MV of companies listed on [B]³ in the adoption of intentional income smoothing. The results showed the effect of intentional smoothing in times of uncertainty in the business context of Brazilian companies. The models proposed by Lang et al. (2012) were used to estimate intentional income smoothing and the companies' market value based on data collected from the Economatica database.

Considering the estimates based on a dynamic panel, intentional income smoothing was found to have a moderating effect between the companies' market value and the pandemic.

The results of this study reveal that the negative impact of general intentional income smoothing on market value was reduced during the pandemic. On the other hand, intentional smoothing through accruals, which in the period before the pandemic positively affected the companies' value, had a negative and greater effect on market value during the pandemic than smoothing in general.

Additionally, the results show that the negative effect of intentional income smoothing in general (including the transactions based on adjustments by the accrual accounting system (accruals) and those resulting from actual operations, which affect the companies' cash flows) on market value was reduced during the pandemic. On the other hand, intentional smoothing through accruals, which in the period before the pandemic was positively associated with the companies' value, presented a more intense and negative effect on market value during the pandemic than smoothing in general.

These results align with those of Ghosh and Olsen (2008), in which managers exercise their decision-making power to reduce uncertainty arising from turbulent periods. Hence, managers more frequently adopt smoothing practices through accruals to prevent disclosing information that shows uncertainty when facing evident risk. Paulo and Mota (2019) corroborate this study's results, as they consider that managers use their discretionary power to manage their companies' results in times of crisis, making adjustments through accruals, while management in recovery is intended to reduce such adjustments.

Overall, these results show that the General Intentional Smoothing in (the effects of actual transactions in companies whose level of operations was significantly reduced during the pandemic) also led to equally reduced opportunities to carry out these transactions aiming for income smoothing. On the other hand, in order to compensate for the opportunities for decreased actual transactions due to the companies' lower operational levels during the pandemic, managers may have increased the practice of smoothing through the more intense use of accruals, which did not directly affect cash flows, and depend less on organizations' level of operations. Hence, smoothing practices did not affect the companies' market value because investors did not identify effects on cash flows.

Furthermore, the results show that income smoothing is a practice that may elicit investor distrust. Given the market efficiency hypothesis, investors identified the risk of managers attempting to provide misleading information and disregarded some information for self-protection. Therefore, investors prefer non-smoothing organizations, information that is in line with Fiehn and Struck (2011), whose results do not indicate that investors value earnings smoothing, as opposed to the results found by Rountree et al. (2008).

Because the results originated from aggregated data and the companies express characteristics that are inherent to the sectors to which they belong, future studies are suggested to disaggregate the companies, considering the particularities of each sector, involving other segments, considering that the health crisis affected all sectors, even if differently. One of this study's limitations is that only the companies in the *Novo Mercado* segment were included in the sample.

Another limitation is that we could not address the entire period of the COVID-19 pandemic because the WHO did not disclose an official declaration of the end of the pandemic before this study's conclusion. Thus, given that investors' perspectives change according to extraordinary economic events, future studies might cover the period before the pandemic, during the pandemic, and even post-pandemic to assess its impact over time between income smoothing and market value. Future studies can obtain the market variable (MV) calculation considering the base date of data collection as the date on which the financial statements were released.

Another point that deserves to be highlighted is that this study was based on the capital market in Brazil, which is an emerging country. Considering the global reach of COVID-19 spreading, new studies might investigate the impact of the pandemic on the market value and income smoothing of capital markets in countries similar to Brazil and make comparisons.

The results of this study contribute to the literature by associating the business environment of an emerging country with the most significant current sanitary and economic crisis. By presenting results showing that intentional income smoothing often negatively affects companies' market value, this study might serve as a warning to managers. The results show that income smoothing behaves differently depending on economic turbulence, and investors may be suspicious of such a practice. An alternative for managers to create value is to be cautious when adopting income smoothing using practices that alter cash flow. Such a practice does not always improve a company's value, and using cash flow is seen as a risk management strategy.

Agrawal and Chatterjee (2015) report a similar understanding that the market perceives earnings management during a crisis to be opportunistic and does not value it. Hence, this study draws investors' attention, suggesting they perform more accurate analyses to identify the companies presenting reliable accounting reports, with or without income smoothing, protecting themselves, and investing in companies considered safe.

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