International Journal of Business Management and Finance Research
Volume 8, Issue 4, pp. 1-15
2025

Impacts of the Accounting Crisis of a Brazilian Retailer on the Returns of Creditor Banks: An Analysis with a Study of Events

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ABSTRACT: *This research aimed to analyze the impacts of the accounting crisis of the Americanas Group, revealed in January 2023, on the returns of the shares of the main Brazilian creditor banks, verifying whether there was an abnormal reaction of the stock market to the disclosure of the event, in light of the Efficient Markets Hypothesis (EMH), in its semi-strong form. The crisis involved, among other factors, the controversial use of the operation known as forfait, which would have contributed to the concealment of relevant liabilities and to the distortion of the company's financial situation. For the analysis, the Event Study methodology was applied, widely used in the financial literature to measure the effects of relevant information on the market value of assets. The investigation considered a time window before and after the event, based on daily data from B3 (Brazilian Stock Exchange) and using the Ibovespa index as a benchmark for calculating abnormal returns. The results indicated the occurrence of statistically significant negative abnormal returns in the short term, especially in the portfolio composed of Bradesco, Itaú, BTG Pactual, and Santander, signaling inefficiency in the immediate incorporation of information by the market. In addition, a structural change in the betas of the shares was observed in the 50-day post-event window, suggesting a change in the systemic risk associated with the assets. Despite this, the medium-term impacts were mitigated by the robustness of the institutions analyzed, characterized by high capitalization and strong market presence. The study contributed to the literature on informational efficiency, reputational risk, and stability of the banking sector in contexts of corporate crisis, in addition to offering useful information for strategic decisions by investors, regulators, and bank managers.*

Key Words: *Accounting crisis, Brazilian stock market, Forfait, Market efficiency, Study of events.*

International Journal of Business Management and Finance Research
Vol. 8, No. 4, pp. 1-15
2025
DOI: *10.53935/26415313.v8i4.451*
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1. Introduction

The stability of the financial system is often put to the test by unexpected events involving large corporations. In January 2023, Americanas S.A., one of the largest retailers in Brazil, revealed accounting inconsistencies of approximately R$ 20 billion, a fact that triggered one of the biggest corporate crises in the country's recent history. The revelation not only directly impacted the company's market value, but also raised concerns about the exposure of its main financial creditors, especially the large banks operating in Brazil.

The case of Americanas not only surprised the market due to the magnitude of the amount involved, but also reignited debates about the transparency of financial statements and the limits of the performance of independent audits. Compared to previous scandals, such as those of Petrobras and OGX, the Americanas crisis stands out for its direct effect on the banking sector, creating a transmission channel between corporate accounting failures and financial systemic risk.

After some analysis, it was identified that a possible cause of the accounting inconsistencies was related to

the use of the operation known as forfait. This practice consists of an anticipation of receivables structured through a tripartite relationship between the purchasing company, the supplier and a financial institution. In this dynamic, the supplier, with the company's consent, requests the advance of the amount to be received from a bank, which makes the payment and becomes the new creditor of the operation. The adoption of this mechanism aims to improve cash flow and reduce the demand for working capital, contributing to more efficient financial management.

The forfait operation has been widely adopted by large companies, mainly because it contributes to the management of the operating cycle. This cycle corresponds to the interval between the purchase of goods, their eventual transformation, the sale to the customer and the receipt of payment. As many companies face financial challenges due to the lag between payment to the supplier and receipt from customers, forfait emerges as an alternative to balance this cash flow, offering greater flexibility in financial obligations (De Faria & Colares, 2024).

The disclosure of the accounting event, through a material fact of the company Americanas, generated uncertainties regarding the ability of financial institutions to absorb losses arising from potential defaults and debt restructurings, evidencing how internal problems of a company can propagate and affect the financial system as a whole. In efficient markets, according to Fama (1970), prices fully reflect publicly available information. Thus, the Americanas case offers an opportunity to analyze how the market incorporated, in the prices of bank shares, the risks revealed by this unexpected corporate event.

The financial impact on creditor banks is a legitimate concern, as exposure to large companies can compromise operating results and affect the perception of risk by investors and regulators (Acharya & Steffen, 2020). As the banking sector plays a central role in the financing and functioning of economies, understanding the magnitude of this effect is essential for managers, investors and public policy makers.

In the specific case of the Americanas crisis, the main creditor banks directly exposed to the company were Bradesco, Itaú Unibanco, Santander and BTG Pactual. Together, these institutions concentrate a significant part of corporate credit in the country and had to deal with potential billionaire losses resulting from the revelation of accounting fraud. Bradesco, for example, estimated an exposure of more than R$ 4.8 billion in credits with Americanas. BTG Pactual, on the other hand, adopted a more incisive stance, suing the retailer to try to recover the amounts owed. Itaú Unibanco and Santander also reported material impacts on their provisions for credit losses, reinforcing the scope of the crisis in the banking sector.

Given this scenario, this article proposes to investigate how the announcement of the accounting fraud involving Americanas impacted the share prices of its main creditor banks. For this, the Event Study methodology will be used, widely adopted in empirical research aimed at analyzing the market's reaction to unexpected events, such as accounting scandals, regulatory changes or sectoral crises. This approach allows verifying whether stock returns deviate significantly from expected behavior, offering evidence on the degree of informational efficiency of the market (Binder, 1998). Classic studies, such as that of Fama (1970), and more recent contributions, such as Shen et al. (2022), reinforce the effectiveness of this technique to measure the impact of corporate shocks on asset prices.

The main objective of the study is to identify the occurrence of abnormal returns in the period immediately after the announcement of the crisis, signaling a possible market reaction to the new risk perception associated with the exposed banks. By analyzing the effects of the Americanas Case on these financial institutions, the research intends to contribute to the literature on market efficiency and reputational crises, in addition to generating practical subsidies for risk management in the banking sector. The results can help investors, managers and regulators to better understand the impacts of exposure to large corporate clients and the importance of effective governance and transparency mechanisms.

2. Literature Review

2.1. Relevance of Accounting Information for the Capital Market

The capital market, especially the stock market, is the environment where shares of publicly-held companies and other variable income financial instruments are traded. The degree of development of this market is essential for a country's financial advancement, being influenced by factors such as the volume of transactions, the profitability of securities, the liquidity of assets, and the capitalization of trading structures (Ataniyazov & Sayfullokhon, 2022).

According to Busu (2022), the stock market can be understood as the space for trading equity units —

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shares — that represent fractions of the companies' share capital. The valuation of these shares depends on aspects such as the company's performance and the dynamics of supply and demand. Shareholders, in turn, can be remunerated via dividends, but they are also subject to the risk of total losses if the assets depreciate in full.

In Brazil, the stock market is regulated by the Brazilian Securities and Exchange Commission (CVM), a federal agency responsible for ensuring the integrity, efficiency, and transparency of the capital market. According to Da Rosa Pinheiro and De Assumpção Alves (2017), the CVM supervises and regulates the activities of the sector, seeking to protect the rights of investors, curb fraudulent practices and promote good corporate governance practices. It is also up to the agency to issue rules and apply sanctions when irregular conduct by managers and controllers is identified.

From the perspective of the Efficient Markets Hypothesis (EMH), especially in its semi-strong form, it is expected that publicly available information — such as accounting information — will be quickly absorbed by stock prices. Thus, material changes in accounting variables tend to have an almost immediate impact on the value of traded assets, establishing a direct relationship between accounting disclosure and stock pricing (Neto et al., 2005).

The disclosure of reliable accounting information is essential to mitigate informational asymmetry, contributing to better-informed decisions by investors and analysts. This data works as a bridge between companies and the market, revealing their financial situation and operational performance. However, the quality of this communication is not always satisfactory. Cases of accounting fraud reported by the media have become more frequent, revealing weaknesses in transparency mechanisms even among companies listed on the stock exchange (Liang et al., 2022).

Inadequate accounting practices, such as the incorrect recording of forfait operations, compromise the quality of the information disclosed to the market and can generate material distortions in the financial analysis. According to Ribeiro and Costa Júnior (2017), this practice tends to artificially inflate EBITDA and hide the company's real debt structure, affecting the company's credibility and amplifying the negative impacts on its shares, especially in crisis scenarios.

A relevant example is Circular Letter/CVM/SNC/SEP no. 01/2016, published in February 2016, with guidelines for the preparation of the financial statements for the year 2015. The document highlighted the need to highlight, in the explanatory notes, the operations of forfait with longer maturities. However, as De Faria and Colares (2024) note, the recommendation did not include a clear obligation on the accounting classification of these transactions, which may compromise the comparability and transparency of the information provided to the market.

2.2. Impacts of Corporate Crises on the Stock Market

Corporate crises, by compromising the image and credibility of an organization, directly impact its reputation with stakeholders and its position in the stock market. When there is a disconnect between business practices and the expectations of the public, an environment of distrust is installed that deteriorates the company's perception of value. This scenario tends to result in a drop in stock prices, reduced liquidity, and increased risk aversion on the part of investors. As Pérez-Cornejo et al. (2019) point out, the loss of confidence caused by critical events affects the company's financial stability and its ability to maintain solid relationships with investors, customers, and strategic partners.

Zulfiqar et al. (2022) note that financial crises are associated with a significant increase in the risk of abrupt declines in stock prices, especially in contexts of economic imbalances and high inflation. On the other hand, the study shows that robust corporate governance structures work as a mitigation mechanism, reducing the probability of significant losses in periods of instability.

In the same sense, Coimbra et al. (2021) point out that image or reputational crises can generate direct effects on the stock market, such as the devaluation of shares, retraction of the market value of companies, and increase in the cost of capital. These impacts reduce the attractiveness of the organization to new investors and can compromise its long-term sustainability.

In crisis scenarios, companies that maintain an organizational culture based on integrity tend to be perceived as more reliable and resilient. This attitude, associated with the ethical performance of managers and employees, conveys greater security regarding the fulfillment of contracts and regulatory compliance. As a result, these companies face lower volatility and better preserve their market value, mitigating the negative

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effects on stock prices during times of instability (Jiang et al., 2019).

In addition, the contagion effect observed in corporate crises can affect companies in sectors related to or with relevant contractual ties with the organization in crisis. In situations of extreme risk—such as financial collapses, fraud, or trade scandals—market volatility tends to increase, amplifying the negative impacts between interconnected companies in the stock market. Shen et al. (2022) highlight that these developments contribute to the loss of stability and systemic confidence in the markets.

Ferreira and De Mattos (2024) reinforce that corporate crises usually provoke immediate and sensitive reactions in the financial market, reflected in sharp falls in the share prices of the companies involved. These episodes increase uncertainty regarding the quality of governance, the continuity of operations and the reliability of the information disclosed, factors that directly affect the perception and behavior of investors.

2.3. Efficient Markets Hypothesis

The formulation of the Efficient Markets Hypothesis (EMH), proposed by Fama (1970), consolidated concepts developed throughout the twentieth century about the behavior of financial asset prices. The theoretical basis of EMH dates back to the Random Walk Theory, introduced by Bachelier (1900) and later formalized by Samuelson (2015). This theory holds that price changes occur unpredictably, reflecting the randomness of new information that reaches the market. Such behavior is consistent with the idea that prices already incorporate the available information, making any attempt to obtain systematic gains based on public data ineffective.

Fama (1970) expanded this perspective by postulating that asset prices, in an efficient market, quickly, completely and rationally reflect all available information. Thus, any change in prices would be attributed solely to the arrival of unexpected new information.

In the pioneering work of Bachelier (1900), it is highlighted that the movements of the Stock Exchange are influenced by a complex combination of past, present and even future events, often with no apparent logical connection. For the author, "the influences that determine the movements of the Stock Exchange are numerous; past, current or even predicted events, often with no apparent connection with their variations, have repercussions on their price" (Bachelier, 1900, p. 21). Although he recognized the impossibility of accurately predicting the behavior of prices, Bachelier (1900) proposed a probabilistic approach, which would become the basis of the theory of random walking and, consequently, EMH.

Samuelson (2015), by mathematically formalizing the unpredictability of price variations, demonstrated that, in markets in which agents form rational expectations and prices correctly reflect all known information, any subsequent change in prices occurs randomly. Thus, only new information — necessarily unpredictable — would be able to change asset prices. This logic supports the use of the event study methodology, which allows measuring the impact of relevant information on the market value of companies.

Fama (1970) classified market efficiency into three distinct levels: weak, semi-strong, and strong.

Weak form: Asset prices already reflect all available historical information, such as past price series and trading volumes. In this scenario, strategies based on technical analysis are ineffective in generating abnormal returns consistently, as this information would already be fully incorporated into current prices.

Semi-strong form: At this level, prices quickly and completely adjust to all public information, such as financial statements, corporate announcements, macroeconomic indicators, and general news. Thus, not even fundamental analysis would be enough to guarantee above-average gains, given that the market already prices this information when it is released.

Strong form: Considered the most extreme, this form holds that asset prices reflect not only public information, but also internal and privileged data. This implies that even investors with access to confidential information would not be able to obtain higher returns on a recurring basis, which presupposes a completely transparent market — a theoretical condition rarely observed in practice.

The review conducted by Ţiţan (2015) reinforces that EMH presupposes, to varying degrees, the full incorporation of available information into asset prices. However, while the weak form is widely accepted, the empirical evidence for the semi-strong and strong forms is more controversial, especially in emerging markets. In these environments, the presence of information asymmetry, low liquidity, and institutional failures tend to compromise the full efficiency of prices.

2.4. Study of Capital Market Events and Reaction

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The event study methodology is one of the most widely used approaches in finance to investigate how specific events affect the behavior of financial asset prices, especially stocks. This technique allows the measurement of so-called abnormal returns—changes in prices that are not explained by general market movements, but are directly attributed to the impact of the analyzed event (MacKinlay, 1997).

The origin of the empirical application of this methodology dates back to the pioneering work of Dolley (1933), who demonstrated that corporate events, such as stock splits, can significantly influence prices in the market, even in the absence of changes in the economic fundamentals of companies. This study laid the groundwork for the use of the event study as a tool to assess the market's sensitivity to companies' strategic decisions.

Since then, the methodology has been consolidated as a standard instrument for analyzing market reactions to relevant ads. According to Binder (1998), this approach is widely used both to test the efficiency of the market — by verifying whether prices quickly incorporate new information — and to estimate the economic impact of events on the wealth of shareholders.

The rationale behind the study of events is directly related to EMH, especially in its semi-strong form, which assumes that asset prices adjust quickly and completely to any available public information. As Brown and Warner (1980) point out, the method is useful for assessing the market's ability to react efficiently to specific events, whether positive or negative.

Shahzad et al. (2021) explain that the application of this methodology involves measuring different statistical metrics, such as average abnormal returns (AR), accumulated abnormal returns (CAR), and cumulative average abnormal returns (CA-AR), calculated within a defined time window before and after the event occurred.

In this sense, Tavor and Teitler-Regev (2024) reinforce that, by assuming the informational efficiency of markets, event studies allow us to investigate how prices react to new information. For the authors, investors constantly seek data that anticipates future market variations, and systematic analysis of market reactions to public disclosures has proven to be a widely adopted approach in finance.

Yu and Huarng (2020) also evidence the effectiveness of the event study when applying it to news involving the company Facebook. The authors demonstrated that the methodology was able to accurately predict abnormal variations in stock returns in the face of certain events, which reinforces its value as an instrument to assess the market's sensitivity to external information.

The traditional procedure of an event study involves: (i) setting a date for the event; (ii) the delimitation of time windows before and after the event; (iii) the estimation of expected returns based on models such as the market model or the constant average model; and (iv) the calculation of abnormal and cumulative returns (CARs). Subsequently, statistical tests are applied to verify the significance of the results obtained (Binder, 1998).

Thus, the study of events proves to be a robust tool to assess the economic consequences of relevant events — such as corporate crises, regulatory changes, accounting announcements or strategic decisions — on the market value of companies.

3. Methodology

In this study, the Event Study is applied to verify whether the disclosure of Americanas' accounting fraud in January 2023 generated significant effects on the share prices of four large banks listed on B3: Itaú Unibanco, Bradesco, Santander and BTG Pactual. The analysis is based on the Efficient Markets Hypothesis (EMH), in its semi-strong form, according to which asset prices quickly and rationally reflect all available public information (Fama, 1970).

The study is conducted in accordance with the procedures established by MacKinlay (1997) and Campbell, Lo, MacKinlay and Whitelaw (1998), which include defining the event window, estimating normal returns, calculating abnormal returns and performing statistical tests to assess the significance of the results. The methodological steps are detailed in the following sections.

3.1. Definition of the Event and Event Window

The first step in applying the Event Study methodology is the precise definition of the event to be analyzed and the period in which its effects on the market will be measured. In this survey, the event of interest is the disclosure of the Material Fact by Americanas S.A. on January 11, 2023, informing the market

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of accounting inconsistencies in the approximate amount of R$ 20 billion. From this announcement, it was sought to assess how investors reacted to the new information, especially with regard to the shares of the company's main creditor banks.

The event window corresponds to the time interval around the event date in which stock returns are analyzed. This period aims to capture the immediate effects of information on the market, controlling the risk of interference from other events. According to MacKinlay (1997), it is common to adopt short windows, such as [-5, +5] business days, to observe the initial reaction of prices. However, due to the relevance and repercussion of the case analyzed, a wider window was chosen, capable of reflecting more prolonged reactions from investors.

In this work, a window of 51 working days was used, 25 days before the event, the day of disclosure (11/01/2023), and 25 days after. This delimitation allows for a more robust analysis of the behavior of returns before and after the event, based on a framework widely adopted in similar studies. The choice of 25 days on each side also considers that this is, on average, the number of business days in a trading month on B3. Only the days on which there was trading in the market were included, excluding weekends and holidays, thus ensuring that only business days were considered in the analysis.

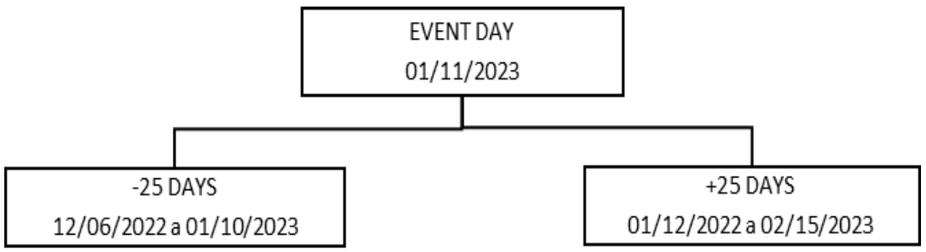

Figure 1. Event Window.

3.2. Sample Selection Criteria

The sample of this study was composed of the main financial institutions with significant exposure to Americanas S.A. and with shares traded on B3. The selection was intentional, focusing on banks directly affected by the company's accounting crisis, which is key to ensuring the relevance and robustness of the analysis of the impacts on share prices.

The inclusion criteria considered two main aspects: (i) the existence of credit exposure of more than R$3 billion to Americanas S.A., and (ii) the availability of daily price data with an adequate level of liquidity during the period analyzed. These criteria ensure that the selected stocks are representative and that the returns obtained can be analyzed in a statistically reliable manner.

The data collection was carried out through the Microsoft Excel Action History function, which is fed by financial sources integrated into the platform. Adjusted closing prices of the shares of the selected banks were extracted, considering only the business days of trading.

3.3. Calculation of Returns

To calculate the daily returns, the logarithmic return formula was used, given by the natural logarithm of the closing price of the current day divided by the closing price of the previous day, according to equation (1):

$$R_{it} = ln\left(\frac{P_t}{P_{t-1}}\right) \quad (1)$$

The returns were calculated for all the assets that make up the portfolio, both in the estimation window — composed of 252 trading sessions prior to the date of the event — and in the event window, which covers 25 days before and 25 days after the event analyzed. These data served as a basis for regression and for the identification of abnormal returns, as presented in the following stages of the methodology.

After calculating the daily returns, the asset portfolio was formulated based on the Markowitz model, which seeks the optimal combination between risk and return. For this, the variances and covariances of the returns of the assets were used, composing a variance-covariance matrix. From this matrix, the optimal

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weights of each asset were defined, aiming to minimize the risk of the portfolio for a given level of expected return. As an additional criterion, it was stipulated that each asset should make up at least 5% of the portfolio, avoiding residual allocations that would compromise the representativeness of the assets in the analysis. This step was essential to represent, in a consolidated way, the behavior of the portfolio in the face of the event analyzed.

With the asset portfolio defined, a simple linear regression was performed between the returns of the portfolio and the returns of the market index (IBOVESPA) over the estimated window, composed of 252 business days prior to the event. The objective of the regression was to estimate the α (alpha) and β (beta) parameters, which would later be used to calculate the expected returns of the portfolio during the event window.

With the estimated parameters, the expected return of the portfolio during the event window was calculated using the market model, according to equation (2):

$$\hat{R}_{it} = \alpha + \beta R_{mt} \quad (2)$$

Where it $\hat{R}_{it}$ represents the estimated return of the portfolio on day t, it R_{mt} is the return of the Ibovespa on the same day, it α is the intercept of the regression, it β represents the sensitivity of the portfolio in relation to the market.

From the expected returns, it was possible to calculate the Abnormal Return (AR) of the portfolio, according to equation (3):

$$AR_{it} = R_{it} - \hat{R}_{it} \quad (3)$$

Where R_{it} is the observed return of the portfolio and $\hat{R}_{it}$ is the estimated return from the regression.

The Accumulated Abnormal Return (CAR) was calculated as the sum of the abnormal returns over the event window, according to equation (4):

$$CAR = \sum_{t=-25}^{+25} AR_{it} \quad (4)$$

3.4. Normality Test

To verify the adequacy of the distribution of abnormal returns to normality, the Shapiro-Wilk test was applied, whose result presented a p-value of 0.0085, rejecting the null hypothesis of normality at a significance level of 5%.

However, through visual analysis of the Q-Q Plot, an approximately normal distribution was observed, with few outliers.

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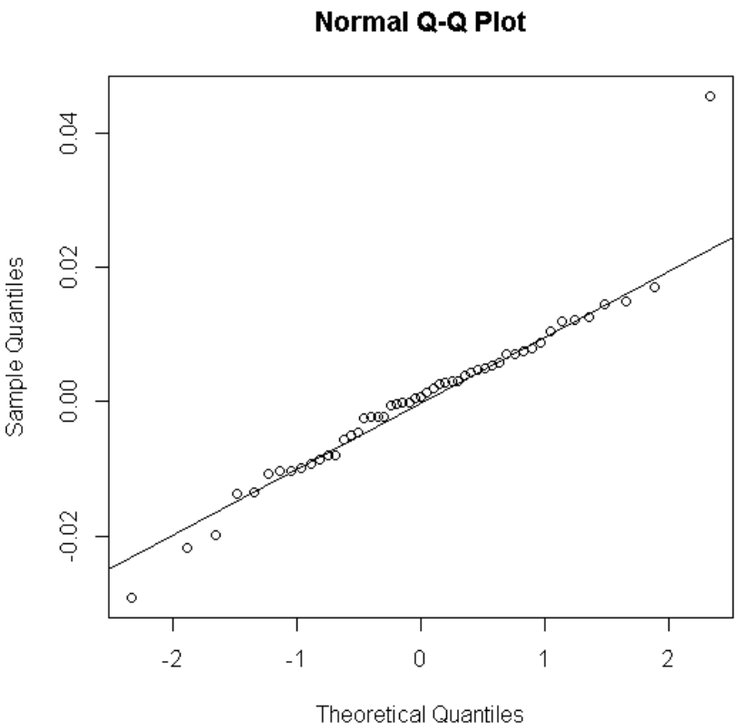

Figure 1. Shapiro-Wilk Test.

3.5. Null Hypothesis Test

To verify whether there is evidence of abnormal returns accumulated in the event window, the Student's t-test is applied, with a confidence level of 95%, i.e., a critical value of α = 5%. This test standardizes the mean abnormal return by its variance, estimated based on the estimation window, according to the methodology proposed by Brown and Warner (1985).

To assess the statistical significance of the CAR, the Student's t-test was applied, whose statistics are given by:

$$t = \frac{CAR}{SE} \qquad (5)$$

Where SE is the standard error of the regression. The null hypothesis tested was: H_0: CAR = 0 (absence of abnormal return), against the alternative hypothesis H_1: CAR ≠0, in which there were accumulated abnormal returns and the market did not react efficiently.

4. Results

This section presents the main results obtained through the event study methodology, which focused on the analysis of the impact of the disclosure of accounting inconsistencies of the company Americanas S.A., which took place on January 11, 2023, on a portfolio composed of the banks Bradesco, Itaú, BTG Pactual and Santander.

Initially, a portfolio was constructed based on the Markowitz model, using the returns of the assets and their variance and covariance matrices (Table 1), with the criterion of a minimum participation of 5% per asset, as shown in Table 2. The simple linear regression between the return of the portfolio and the Ibovespa was performed for the estimation window composed of 252 trading sessions prior to the event. Next, the event window was analyzed, comprising 25 days before and 25 days after the date of the event (t = 0), totaling 51 observations, as shown in Table 3.

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Table 1. Variance and Covariance.

	BBDC3	***SANB3***	***BPAC3***	***ITUB3***
BBDC3	3.91211E-04	2.35926E-04	1.75396E-04	2.32282E-04
SANB3	2.35926E-04	3.01627E-04	1.65552E-04	1.62203E-04
BPAC3	1.75396E-04	1.65552E-04	1.22280E-03	1.56725E-04
ITUB3	2.32282E-04	1.62203E-04	1.56725E-04	2.25367E-04
Variance	1.19198E-05	5.68246E-05	1.06706E-05	1.27451E-04

Table 2. Asset allocation.

BBDC3	5%
SANB3	28%
BPAC3	5%
ITUB3	62%
Total	100%

Table 3. Event study window.

T	DATA	PORTFOLIO (Y)	IBOVESPA (X)	ESTIMATED Y	AR	CAR	TEST	DECISION
-25	2022-12-06	0.98%	0.72%	0.004806221	0.004999556	0.50%	0.45	*Accepts H₀*
-24	2022-12-07	-0.24%	-1.02%	-0.007328566	0.004961259	1.00%	0.90	*Accepts H₀*
-23	2022-12-08	-2.57%	-1.68%	-0.011939588	-0.013723516	-0.38%	-0.34	*Accepts H₀*
-22	2022-12-09	-2.03%	0.25%	0.001560539	-0.021854178	-2.56%	-2.32	Reject H₀
-21	2022-12-12	-1.69%	-2.04%	-0.014469694	-0.002451776	-2.81%	-2.54	Reject H₀
-20	2022-12-13	-3.21%	-1.73%	-0.012251594	-0.019847328	-4.79%	-4.34	Reject H₀
-19	2022-12-14	0.83%	0.20%	0.001190189	0.007121168	-4.08%	-3.69	Reject H₀
-18	2022-12-15	0.27%	-0.01%	-0.000252118	0.003001787	-3.78%	-3.42	Reject H₀
-17	2022-12-16	0.27%	-0.85%	-0.006157298	0.008840929	-2.90%	-2.62	Reject H₀
-16	2022-12-19	1.82%	1.82%	0.012471453	0.005721654	-2.32%	-2.10	Reject H₀
-15	2022-12-20	2.58%	2.01%	0.013816889	0.012021215	-1.12%	-1.01	*Accepts H₀*
-14	2022-12-21	0.65%	0.53%	0.003508902	0.003031726	-0.82%	-0.74	*Accepts H₀*
-13	2022-12-22	0.45%	0.11%	0.000570903	0.003942610	-0.42%	-0.38	*Accepts H₀*
-12	2022-12-23	1.56%	1.98%	0.013592076	0.002052183	-0.22%	-0.20	*Accepts H₀*
-11	2022-12-26	-1.56%	-0.88%	-0.0063316	-0.009235098	-1.14%	-1.03	*Accepts H₀*
-10	2022-12-27	-0.35%	-0.15%	-0.001222625	-0.002308948	-1.37%	-1.24	*Accepts H₀*
-9	2022-12-28	2.49%	1.52%	0.010382897	0.014549976	0.08%	0.07	*Accepts H₀*
-8	2022-12-29	-0.40%	-0.46%	-0.003384129	-0.000638325	0.02%	0.02	*Accepts H₀*
-7	2023-01-02	-1.48%	-3.11%	-0.02189365	0.007047940	0.72%	0.65	*Accepts H₀*
-6	2023-01-03	-2.52%	-2.10%	-0.014852829	-0.010307241	-0.31%	-0.28	*Accepts H₀*
-5	2023-01-04	0.75%	1.12%	0.007589663	-0.000115856	-0.32%	-0.29	*Accepts H₀*
-4	2023-01-05	2.71%	2.17%	0.014922913	0.012144648	0.90%	0.81	*Accepts H₀*
-3	2023-01-06	1.58%	1.22%	0.008324531	0.007485652	1.64%	1.49	*Accepts H₀*
-2	2023-01-09	-0.14%	0.15%	0.000863912	-0.002234826	1.42%	1.29	*Accepts H₀*
-1	2023-01-10	2.53%	1.53%	0.010510186	0.014828181	2.90%	2.63	Reject H₀
0	2023-01-11	2.30%	1.52%	0.01043046	0.012533544	4.16%	3.76	Reject H₀
1	2023-01-12	-1.23%	-0.59%	-0.004346717	-0.007990441	3.36%	3.04	Reject H₀
2	2023-01-13	-1.41%	-0.84%	-0.006051423	-0.008089211	2.55%	2.31	Reject H₀
3	2023-01-16	-2.45%	-1.55%	-0.011000067	-0.013517452	1.20%	1.08	*Accepts H₀*
4	2023-01-17	1.45%	2.02%	0.013888163	0.000638673	1.26%	1.14	*Accepts H₀*
5	2023-01-18	0.75%	0.71%	0.004728165	0.002763694	1.54%	1.39	*Accepts H₀*
6	2023-01-19	-0.63%	0.62%	0.004101884	-0.010416938	0.50%	0.45	*Accepts H₀*
7	2023-01-20	-0.53%	-0.78%	-0.005666017	0.000396209	0.54%	0.48	*Accepts H₀*
8	2023-01-23	-3.12%	-0.27%	-0.002090119	-0.029124667	-2.38%	-2.15	Reject H₀
9	2023-01-24	0.55%	1.15%	0.007819408	-0.002286076	-2.61%	-2.36	Reject H₀
10	2023-01-25	0.24%	1.09%	0.00742944	-0.005022885	-3.11%	-2.81	Reject H₀
11	2023-01-26	0.18%	-0.08%	-0.000763099	0.002597725	-2.85%	-2.58	Reject H₀

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12	2023-01-27	-2.25%	-1.64%	-0.011670149	-0.010800979	-3.93%	-3.56	Reject H₀
13	2023-01-30	-0.09%	-0.04%	-0.000465954	-0.000405507	-3.97%	-3.59	Reject H₀
14	2023-01-31	1.17%	1.03%	0.006961381	0.004745365	-3.49%	-3.16	Reject H₀
15	2023-02-01	-1.84%	-1.20%	-0.008597972	-0.009829538	-4.48%	-4.05	Reject H₀
16	2023-02-02	-0.18%	-1.74%	-0.012340415	0.010512030	-3.43%	-3.10	Reject H₀
17	2023-02-03	-0.63%	-1.48%	-0.010521782	0.004226505	-3.00%	-2.72	Reject H₀
18	2023-02-06	0.89%	0.18%	0.001075218	0.007817331	-2.22%	-2.01	*Accepts H₀*
19	2023-02-07	-1.06%	-0.82%	-0.005946811	-0.004654893	-2.69%	-2.43	Reject H₀
20	2023-02-08	5.88%	1.95%	0.013402672	0.045426972	1.86%	1.68	*Accepts H₀*
21	2023-02-09	-1.83%	-1.78%	-0.012644901	-0.005666491	1.29%	1.17	*Accepts H₀*
22	2023-02-10	-0.83%	0.06%	0.000255868	-0.008562726	0.43%	0.39	*Accepts H₀*
23	2023-02-13	2.17%	0.70%	0.004681566	0.017024880	2.13%	1.93	*Accepts H₀*
24	2023-02-14	-0.67%	-0.91%	-0.006560494	-0.000131495	2.12%	1.92	*Accepts H₀*
25	2023-02-15	1.25%	1.61%	0.011045266	0.001429131	2.26%	2.05	Reject H₀

To test the significance of the accumulated abnormal returns, Student's t-test was applied, with 50 degrees of freedom, corresponding to the number of observations in the event window minus one. The critical value adopted for 95% confidence was ±2.009.

The results demonstrated the existence of significant abnormal returns. On the day of the event (t = 0), a positive cumulative abnormal return of 4.16% was observed, with t = 3.76, indicating a statistically significant market reaction. Contrary to the initial hypothesis, the returns in the event were not negative, but positive. In addition, negative and significant abnormal returns were identified in the period prior to the event, especially between t = -22 and t = -16, suggesting a possible anticipation of the market to the official disclosure. In this interval, the CAR reached -4.79% at t = -20, reflecting significant accumulated losses in the analyzed portfolio.

Between days t = -1 and t = 2, a new sequence of positive abnormal returns was observed, also statistically significant, again rejecting the null hypothesis of absence of abnormality. At t = 8 to t = 19, negative abnormal returns occurred again, possibly associated with a late response from part of the market, which began to perceive more clearly the impacts of the case on Americanas' creditor banks.

In view of the occurrence of abnormal returns, it was decided to carry out a complementary analysis in the post-event window, comprising 50 business days after the closing of the event window, between February 16, 2023 and May 3, 2023, according to Appendix A. The objective was to verify whether there was a significant change in the behavior of the portfolio in relation to the market after the event, by comparing the estimated betas in the estimation (β_e) and post-event (β_p)

The hypothesis test adopted was:

H_0: $\beta_e = \beta_p$

H_1: $\beta_e \neq \beta_p$

The combined standard error of the two samples was calculated by equation (6):

$$EP = (6)\sqrt{\frac{N_e * S_e{}^2 + N_p * S_p{}^2}{N_e + N_p - 2}}$$

In which S_e and S_p represent the standard errors of the betas estimated in the estimation and post-event windows, respectively, and N_e and N_p correspond to the number of observations in each of these windows. The calculation was performed with the data in Table 4.

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Table 4. Data for the calculation of the combined standard error.

VARIABLE	VALUE
N_e	252
N_p	50
S_e	0,01104721
S_p	0,00885959
β_e	0,69796395
β_p	0,87440793

$$EP \approx 0{,}01076$$

For t-student, he used equation (7):

$$t = \frac{\beta_e - \beta_p}{EP} \quad (7)$$

$$t \approx -16{,}41$$

For degree of freedom (GL), he used equation (8):

$$GL = N_e + N_p - 2 \quad (8)$$

GL = 300

Adopting a critical value of ±1.96 for 95% confidence, it was concluded that the calculated t-value (-16.41) far exceeds the rejection criterion. Therefore, the null hypothesis is rejected, indicating that there was a statistically significant change in the beta of the wallet after the event. This suggests a structural change in the sensitivity of the portfolio to the market after the disclosure of Americanas' accounting fraud, possibly due to the reassessment of the risk of creditor banks by investors.

5. Conclusion

The results of this study confirm that, even in emerging markets such as Brazil, corporate fraud events can generate abnormal market reactions and substantially alter the sensitivity of financial assets. The portfolio composed of Americanas' main creditor banks — Bradesco, Itaú, BTG Pactual and Santander — showed abnormal returns throughout the event window, especially in the proximity of the disclosure of the accounting fraud on January 11, 2023. These findings reinforce the importance of risk management and governance strategies that consider the indirect effects on creditor banks, contributing to the literature on reputational contagion (Fabrizi et al., 2021) and to the understanding of the role of financial news in portfolio design.

Unexpectedly, an abnormal cumulative positive return was observed on the very day of the fraud disclosure, contrary to the expectation of an immediate negative reaction, as suggested by previous studies on corporate fraud (Sharma & Verma, 2020). This behavior may indicate a limited or biased initial response, especially from institutional and short-term investors, suggesting signs of informational inefficiency in the market. Such evidence contradicts the hypothesis of efficiency in its semi-strong form, as proposed by Fama (1970).

Additionally, a pattern of negative returns was identified between days t = -22 and t = -16, indicating that part of the market may have anticipated or had prior access to the risks related to Americanas. This behavior compromises the principle of equal access to information and reinforces evidence of anticipation also observed in previous studies (Nafisa et al., 2023). The impact of the event proved to be long-lasting, with negative abnormal returns persisting between days t = 8 and t = 19, which indicates that the market was slow to fully assimilate the unfolding of the crisis.

In the analysis of the 50-day window after the event, a statistically significant difference was identified between the betas of the portfolio before and after the disclosure of the accounting fraud, indicating a structural change in the systemic risk of the assets analyzed. Studies such as the one by Ghoul et al. (2022), which use stress tests in the banking sector, show that relevant shocks can lastingly alter the sensitivity of

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assets to market risk. This suggests that the event in question not only had a one-off impact on stock prices, but also modified the risk-return ratio of the affected banks more persistently.

In the specific case of the Americanas crisis, although there was potential for broader systemic effects, the impacts on creditor banks did not significantly compromise its valuation or stability in the medium term. Nijskens and Wagner (2010) point out that institutions with higher capitalization, revenue diversification, and good governance practices tend to be less vulnerable to systemic shocks. The resilience observed in the banks analyzed can be explained by the equity robustness, consolidated presence in the market and greater capacity to absorb losses, functioning as buffers in adverse situations.

Recent studies reinforce this reading. Cao and Chou (2022) demonstrate that banks with high levels of regulatory capital showed greater stability during exogenous shocks, such as those observed in the COVID-19 pandemic, maintaining more consistent operations than smaller institutions. Similarly, Baron et al. (2023) highlight that large banks tend to withstand periods of crisis better, benefiting from their size, operational diversity, and institutional support. Thus, despite the reputational impact and the need to review credit exposures, the banks included in this study were relatively little affected, evidencing structural characteristics that make them less susceptible to isolated corporate crises.

This conclusion is compatible with the behavior observed in the short term: although the crisis required internal reassessments and generated occasional losses, the banks showed a relatively quick recovery. As pointed out by Choi et al. (2023), institutions with higher capitalization demonstrate lower sensitivity to contagion effects in crisis situations, as evidenced in the case of Silicon Valley Bank. The capital structure and risk management mechanisms of these institutions, therefore, were decisive for containing the impacts and preserving market confidence.

The implications of this study are relevant to different audiences. For investors and portfolio managers, the importance of continuous monitoring of counterparty risk and diversification is reinforced, even when it comes to large corporations. For bank managers, the case highlights the importance of robust risk management and due diligence processes, the failure of which can generate reputational and market losses (Coimbra et al., 2021). For regulators, the findings offer subsidies to improve supervisory policies and capital requirements in the face of credit concentration in large business groups.

The null hypothesis of this study was rejected, indicating the presence of negative and statistically significant abnormal returns in the event window. These effects were especially evident in the study portfolio. The market's reaction to the disclosure of accounting fraud suggests informational inefficiency, contradicting the Efficient Markets Hypothesis in its semi-strong form. Similar results are observed in studies that analyze the contagion of corporate crises on exposed companies, such as in Shen et al. (2022), when examining the cross-sectoral behavior of stock markets.

Finally, the limitations of the research are recognized. The analysis focused on the short term and adopted the Market Model, which, although widely used and robust, represents a simplification of reality by assuming constant volatility in returns. The possibility of influence of simultaneous macroeconomic events, although mitigated by the choice of a short window, cannot be entirely ruled out. For future in-depth studies, it is recommended to investigate the long-term effects of the crisis on banks' profitability and solvency indicators, as well as comparisons between institutions with different levels of exposure. In addition, future studies may benefit from the use of more advanced econometric models, such as multifactor and GARCH models, which are able to capture the dynamic variation of volatility over time — an aspect that is especially relevant in periods of crisis, in which risks not only increase, but also behave in a more unstable and persistent way.

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Appendix A. Daily returns of the portfolio and Ibovespa in the post-event window.

DAILY RETURNS (PORTFOLIO AND IBOVESPA)			
T	**Date**	**Portfolio Return (Y)**	**Ibovespa Return (X)**
1	2023-02-16	0,50%	0,31%
2	2023-02-17	0,35%	-0,70%
3	2023-02-22	-1,51%	-1,87%
4	2023-02-23	0,33%	0,41%
5	2023-02-24	-2,53%	-1,68%
6	2023-02-27	-0,94%	-0,08%
7	2023-02-28	0,03%	-0,74%
8	2023-03-01	-1,57%	-0,52%
9	2023-03-02	-2,12%	-1,02%
10	2023-03-03	-0,35%	0,52%
11	2023-03-06	0,68%	0,80%
12	2023-03-07	1,10%	-0,45%
13	2023-03-08	1,39%	2,19%
14	2023-03-09	-1,07%	-1,39%
15	2023-03-10	-2,46%	-1,39%
16	2023-03-13	-0,84%	-0,48%
17	2023-03-14	-0,70%	-0,18%
18	2023-03-15	0,20%	-0,25%
19	2023-03-16	0,81%	0,74%
20	2023-03-17	-2,75%	-1,41%
21	2023-03-20	-0,21%	-1,04%
22	2023-03-21	1,07%	0,07%
23	2023-03-22	-0,39%	-0,77%
24	2023-03-23	-2,35%	-2,32%
25	2023-03-24	0,98%	0,92%
26	2023-03-27	1,04%	0,85%
27	2023-03-28	0,39%	1,51%
28	2023-03-29	0,30%	0,60%
29	2023-03-30	2,70%	1,87%
30	2023-03-31	0,58%	-1,78%
31	2023-04-03	-2,81%	-0,37%
32	2023-04-04	1,74%	0,36%
33	2023-04-05	-0,15%	-0,88%
34	2023-04-06	-0,51%	-0,15%
35	2023-04-10	0,62%	1,01%
36	2023-04-11	3,26%	4,20%
37	2023-04-12	1,28%	0,63%
38	2023-04-13	-0,13%	-0,40%
39	2023-04-14	1,32%	-0,17%
40	2023-04-17	-0,66%	-0,25%
41	2023-04-18	-0,27%	0,14%
42	2023-04-19	-1,37%	-2,14%
43	2023-04-20	0,13%	0,44%
44	2023-04-24	-1,09%	-0,40%

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45	2023-04-25	0,34%	-0,70%
46	2023-04-26	-1,00%	-0,88%
47	2023-04-27	1,61%	0,60%
48	2023-04-28	0,91%	1,45%
49	2023-05-02	-2,58%	-2,43%
50	2023-05-03	-0,33%	-0,13%

Note: The table presents the daily returns observed during the 50-day post-event window following the disclosure of the accounting fraud by Americanas S.A. The data refer to the portfolio composed of the main creditor banks (Bradesco, Itaú, Santander, and BTG Pactual) and the Ibovespa index. Returns are expressed as percentages and were calculated based on adjusted closing prices obtained from B3. The analysis is part of the event study methodology focused on post-event market behavior.

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DOI: *10.53935/26415313.v8i4.451*
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