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Signaling the Characteristics of Business Combinations and Abnormal Stock Returns

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ABSTRACT

Objective: to examine the effect of signaling the characteristics of business combinations through material facts on the abnormal returns of companies listed on the Brazilian stock exchange. **Methods:** the study's final sample comprises 675 observations from 2010 to 2021, collected from the Refinitiv database and the Securities and Exchange Commission website. To analyze the impact on abnormal returns, calculated using the market model and the asset pricing model, the event study methodology was applied with an 11-day event window. **Results:** the characteristics of business combinations are significant for the Brazilian stock market, resulting in positive abnormal returns. However, no distinctions were observed regarding the type of combination, payment method, or whether a subsidiary conducted the transaction. Notably, when goodwill is signaled, abnormal returns are positive and higher than those without disclosure. **Conclusions:** The characteristics of business combinations are relevant to the Brazilian stock market, with the information signaled to investors being more impactful than the type of information disclosed. This research highlights the importance of signaling business combination characteristics for managers and informs external users when speculating on such transactions.

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INTRODUCTION

In the stock market, information asymmetry can be mitigated through signals issued by companies to external users (Connelly et al., 2011). In addition to reducing asymmetry, these signals can be perceived as positive feedback when they convey quality and material information (Stiglitz, 2002). Based on signaling theory, when a manager discloses a material fact about a business combination, they tend to reduce the information asymmetry between the signaler and the receiver (i.e., the stock market).

Business combinations are significant for companies but inherently complex (Neethu et al., 2019). This complexity arises not only from the high consideration values involved (Léger & Quach, 2009) but also from their potential impact on systemic risk and stock market reactions (Tanna & Yousef, 2019).

These transactions involve multiple factors, making mergers and acquisitions risky even when they are strategically important for corporate growth (Meckl & Röhrle, 2016). When signaling a business combination to the stock market, companies can highlight certain characteristics that help investors understand the reasons for (or potential benefits of) the transaction. Commonly disclosed elements in a relevant fact sheet include the expected future return (goodwill), the industry, the payment method, and the acquiring entity (subsidiary or parent company).

Regarding the goodwill created in the combination, the stock market often reacts cautiously, since its value is determined and capped by the consideration paid. An excessive allocation to goodwill usually triggers a negative market response (Pimenta et al., 2015), although it can also signal information about the quality of the combination (Paugam et al., 2022).

Thus, companies signal to the market that their purchase intention is expected to generate future benefits, as stipulated in Technical Pronouncement 15 — Business Combinations (CPC 15, 2011). Companies may also detail the components of these expected benefits to enhance transparency.

In addition to influencing the value of goodwill, the consideration for a business combination is crucial information for investors, as it affects future profits and creates pressure on companies (Léger & Quach, 2009). According to CPC 15 (2011), consideration allocation must occur within one year after the acquisition's closure, which can reduce the informational content for investors. Furthermore, the payment method affects investor perceptions of the combination (Bouzgarrou & Louhichii, 2014; Donnelly & Hajbaba, 2014; Goddard et al., 2012; Lusyana & Sherif, 2016; Neethu et al., 2019; Tanna & Yousef, 2019; Woo et al., 2018).

Another factor influencing abnormal returns from such events is the type of combination: horizontal, vertical, or conglomerate. Horizontal and vertical combinations are linked to the company's core activity within the same business or production process. In contrast, conglomerate combinations involve businesses outside the company's core activity (Brealey et al., 2018; Chatterjee, 1986; Ross et al., 2002). Conglomerate transactions, which spread risk across diverse sectors, tend to yield higher abnormal returns than horizontal and vertical ones (Avdasheva & Tsytsulina, 2015; Chatterjee, 1986; Lubatkin & O'Neill, 1988).

The type of combination also affects the market where it operates. In the case of horizontal combinations, it can decrease or limit the ability of other companies to compete (Avdasheva & Tsytsulina, 2015). Vertical ones, on the other hand, are often meant to fix inefficiencies but may also raise concerns about competitors' access to essential products or inputs (Avdasheva & Tsytsulina, 2015).

To diversify risk and secure future profits in times of crisis, conglomerate-type business combinations are carried out between companies with different core activities and operating in different sectors (Brealey et al., 2018; Ross et al., 2002). Amihud and Lev (1981) note that risk-averse managers are often drawn to this type of merger or acquisition to mitigate market risk by diversifying the investment portfolio.

Another factor affecting abnormal returns is the status of the acquired company. Publicly held companies tend to disclose more information, reducing information asymmetry for external stakeholders regarding the business combination (Jaffe et al., 2015; Tanna & Yousef, 2019). When a private company or subsidiary is acquired, less information is available, resulting in greater information asymmetry (Tanna & Yousef, 2019). However, no studies have examined the market reaction when a subsidiary is the acquirer and the material fact is issued by the parent company.

Considering that the disclosure of a business combination may reflect transaction characteristics — such as goodwill recognition, type of combination, payment method, and whether a subsidiary is involved — this study aims to examine the effect of signaling these characteristics on the abnormal returns of companies listed on the Brazilian stock exchange.

Signaling a material fact to the stock market enables investors to adjust their positions based on a company's new transaction. The purpose of analyzing such disclosures is to assess whether the Brazilian stock market responds to specific characteristics of a business combination by comparing cases where material facts are disclosed with those where they are not.

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This matters because releasing such information can influence investor expectations about the investment. Additionally, according to Fama (1970), in a semi-strong market, information is reflected in prices as soon as it becomes public.

The characteristics analyzed include the type of combination (conglomerate, horizontal, or vertical), the payment method (cash or other forms), goodwill allocation, and whether the acquirer is a subsidiary. Jaffe et al. (2015) and Tanna and Yousef (2019) explored subsidiaries as both acquirers and non-acquirers, contributing to filling this gap. Regarding goodwill, most studies focus on its recognition or impairment loss based on the Ohlson model (d'Arcy & Tarca, 2018). In contrast, this research examines the relevance of business combinations using the event study methodology, which evaluates the impact of an event on a company's value (Léger & Quach, 2009). In this case, the event is the signaling of a business combination.

The study seeks to address several gaps. First, it analyzes goodwill allocation, as its value is tied to the consideration. Second, it segregates the types of combination, comparing conglomerate combinations with horizontal and vertical ones, given that diversification into other sectors tends to reduce market risk. Third, it evaluates market reactions when the combination involves a controlled company (subsidiary).

This research aims to contribute to the literature on value relevance by exploring how investors perceive the characteristics of business combinations and whether signaling these characteristics influences abnormal returns. It also adds to understanding signaling theory and value relevance through abnormal returns. Lastly, it seeks to establish relationships between types of combination and the reaction of the Brazilian stock market.

For regulators, this research aims to inform decisions on whether closer oversight is necessary regarding how companies disclose combinations to external users. For managers, it offers insights into how the stock market reacts to such signals, which often involve private information. For investors, it provides guidance on identifying opportunities to speculate on business combinations.

THEORETICAL FRAMEWORK

Signaling theory

According to Spence's (1973) signaling theory, uncertainty in the labor market, caused by the worker possessing information that the employer does not, is explained by the asymmetry of information between the employer (receiver) and the worker (signaler).

Morris (1987) extends the application of signaling theory to any market characterized by information asymmetry, which serves as a necessary condition for its use. Consequently, the theory applies to issues related to information disclosure (Morris, 1987).

Regarding the disclosure of information as a signal to recipients, Spence (1973) and Stiglitz (2000) emphasize the importance of the quality and intention behind the signals to reduce asymmetry between the recipient and the signaler. Quality refers to how well the signal meets the needs or demands of recipients (Connelly et al., 2011), while intention relates to the behavior of the signaler (Stiglitz, 2000). An essential aspect of quality is the recipient's certainty about the signaler's intention to send the signal (Connelly et al., 2011). Since signals are costly to emit, they are only effective and credible when the costs are justified (Truong et al., 2021).

When intention and quality are aligned, signaling can enhance a company's market value (Stiglitz, 2002). This occurs both as positive feedback from the market to the signaling and because the company's reputation is connected to the content disclosed (forming reputational beliefs about the organization) (Truong et al., 2021). However, signaling efficiency depends on the frequency of signals sent to the market (Connelly et al., 2011). Positive feedback occurs when the disclosed information is both material and high quality (Stiglitz, 2002), which, according to the signaling theory, benefits the signaler.

In this research, the signaler is the acquiring company; the signal consists of the material facts disclosed about the business combination and its characteristics; and the recipients are external users, primarily investors. The signal is transmitted when the signaler recognizes the benefits of acquiring control.

Characteristics of business combination and abnormal return

The stock market reacts when the information available is useful and relevant, regardless of whether it is related to accounting (Ball & Brown, 1968). When new information is signaled and deemed relevant, investors incorporate it into share prices alongside existing information (Fama, 1970). As a result, the stock market becomes semi-strong efficient when investors effectively absorb and act on new information.

Business combinations are among the types of information that can be signaled to the market. One of the primary motivations for these transactions is synergy, which arises from the efficient combination of two companies, generating economic gains and added value (Berkovitch & Narayanan, 1993; Režňáková & Pěta, 2018). Synergies in combinations depend on the re-

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sources available to the acquiring company: the scarcer the resource, the greater the synergy it can generate (Chatterjee, 1986). If the resource can be applied across multiple activities, its value increases. However, resources with limitations may restrict the extent of synergy and the value added (Chatterjee, 1986).

Dranev et al. (2019) point out that the reasons for technology mergers and acquisitions can vary. For instance, a larger company with the resources to invest in research and development might instead acquire a smaller company with an existing technological advancement. Cost reduction and/or product value enhancement are additional reasons for creating value in combined entities (Chatterjee, 1986).

Lubatkin (1983) highlights that the environments of the acquiring and acquired companies influence performance gains, with greater similarities between their environments leading to larger gains. However, Krieck and Kayo (2013) argue that synergy may sometimes be overestimated, representing an evaluation error, as synergy depends on strategic changes and benefits realized only after the merger. Furthermore, managers often pursue mergers and acquisitions to expand company size, power, and results.

According to Kode et al. (2003), synergies are essential to growth strategies through mergers and acquisitions. If a combination fails to deliver synergies, it can be considered a failure, as it falls short during the evaluation phase. Sarfati and Shwartzbaum (2013) add that synergies can stem from various sources, including the type of combination (horizontal, vertical, or conglomerate), the sector, and regulatory aspects.

Fraunhoffer and Schiereck (2012) found that signaling synergy estimates to the European market not only reduces information asymmetry but also increases the acquirer's abnormal return. For mergers and acquisitions in Europe, signaling synergy yielded a positive and significant abnormal return, peaking at 2.07%. In contrast, when synergy was not disclosed, cumulative returns were negative and insignificant.

Pechlivanidis et al. (2022) examined the value of goodwill in Greek companies from 2007 to 2018. They found that goodwill was relevant to the stock market only in the year of the combination, after which it contributed to a gradual decline in share prices.

Režňáková and Pěta (2018), analyzing 50 mergers in Czech companies, observed that six of them achieved synergies exceeding 100%, with an average value increase of 35%. Sources of synergy included increased profit margins, return on assets, and investments, along with decreased production consumption relative to sales.

Fraunhoffer and Schiereck (2012) also noted that larger acquirers communicated lower synergies to the market, reducing shareholder value creation. Dranev et al. (2019) highlighted that when emerging-market companies repeatedly acquire fintechs, cumulative abnormal returns tend to zero, as the market perceives no further value creation through new technologies in such mergers and acquisitions.

Kode et al. (2003) suggest that synergies generally drive mergers and acquisitions, but their value is capped by the difference between the business combination value and the value of the acquired company if it had continued operations independently. Therefore, the synergy created in a transaction is often associated with goodwill.

Hirschey and Richardson (2002), analyzing North American companies from 1992 to 1996, found that writing off goodwill, thereby compromising potential future profits, sends a significant signal to the market, reducing share prices by 2% to 3%.

Roncagliolo and Avallone (2022) argue that market price and investor protection underscore the recognition of goodwill. Fraunhoffer and Schiereck (2012) observed that the market reacts favorably to signaling estimates of goodwill, aligning with Pimenta et al. (2015), who question whether investors might distrust the value allocated to goodwill. If a company signals goodwill based on anticipated synergy or expected future economic profitability, it may elicit a positive response from investors, leading to the following hypothesis:

> H1: The disclosure of a material fact regarding a business combination that signals goodwill has a more significant positive impact on abnormal returns compared to cases where goodwill is not signaled.

The value creation for the acquirer's shareholders is greater when companies from different sectors acquire a fintech. This can be explained by the synergy between the acquirer's business and the acquired company's services (Dranev et al., 2019). However, combinations between companies in the same sector, such as education, also provide synergistic gains and are closely linked to economic results (Sarfati & Shwartzbaum, 2013).

A business combination between companies in the same sector or across different sectors can be classified into three types: horizontal, vertical, and conglomerate (Brealey et al., 2018; Ross et al., 2002). A horizontal acquisition involves two companies operating in the same line of business, competing for market share. A vertical acquisition occurs between companies involved in the same production process but at different stages (Brealey et al., 2018; Chatterjee, 1986;

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Ross et al., 2002). Conversely, acquisitions where the activities of the acquirer and the acquired company do not overlap are classified as conglomerates. Such combinations are often pursued to diversify risks or seize investment opportunities (Brealey et al., 2018; Chatterjee, 1986; Ross et al., 2002).

Chatterjee (1986) analyzed the types of combinations between 1969 and 1972 and found that acquired companies experienced a 17.48% gain in unrelated (conglomerate) mergers, while non-horizontal (vertical) mergers achieved a 12.32% gain.

The type of combination influences outcomes both internally and externally. For instance, market concentration levels can increase, potentially affecting consumers through higher product prices (Avdasheva & Tsytsulina, 2015). Avdasheva and Tsytsulina (2015) also highlight that participants in the combination may gain a competitive advantage, reducing competitors' profits. Clougherty and Duso (2011) report that horizontal combinations among North American companies benefit both the companies involved and their rivals. This is because reduced competition increases market power, which in turn raises profits for both the merging firms and their competitors.

Conglomerate business combinations can be related to Markowitz's portfolio theory, where negatively correlated assets balance each other — superior performance in one offsets the inferior performance of another (Lubatkin, 1983).

Timing is crucial for acquisitions to generate positive market reactions. Lubatkin and O'Neill (1988) found that when the market is buoyant, the share values of acquiring companies listed on the New York Stock Exchange (NYSE) increase more significantly than during a down market, except for conglomerates, which increase in both scenarios. The authors also observed that horizontal mergers yielded insignificant returns in buoyant markets.

In contrast, Avdasheva and Tsytsulina (2015) found significant results for Russian horizontal mergers and acquisitions, though they produced negative abnormal returns. Vertical mergers, on the other hand, were not significant, as their impact is less pronounced than that of horizontal mergers.

Maljojoki (2024) analyzed Finnish companies between 2000 and 2019 and observed that acquirers experienced positive abnormal returns during the first week following a combination announcement, regardless of whether it was a conglomerate, vertical, or horizontal combination. Conglomerates, however, presented positive cumulative abnormal returns of 1.6%. Additionally, over the long term (three years), while horizontal and vertical combinations showed negative returns, conglomerates maintained a positive return of +25.4%.

The types of business combinations influence market reactions because conglomerates help reduce the company's total risk. According to Chatterjee (1986), conglomerate combinations yield higher abnormal returns than horizontal or vertical combinations. Thus, the following hypothesis was proposed:

> H2: Signaling conglomerate-type business combinations has a higher positive effect on abnormal returns than signaling horizontal or vertical combinations.

The method a company chooses to carry out consideration sends signals to the market regarding the valuation of the acquired company, thereby influencing the abnormal return of the combination. Bouzgarrou and Louhichi (2014) found that cash payments were associated with positive abnormal returns for French companies, while payments made in shares showed no significant effect. This is because cash payments signal an undervalued investment opportunity, whereas the issuance of shares suggests an overvalued company.

Additionally, cash payments reduce the systemic risk of mergers and acquisitions, while stock payments increase risk due to potential overvaluation of shares. However, this dynamic is particularly relevant to listed companies, as private companies are subject to information asymmetry (Tanna & Yousef, 2019).

Lusyana and Sherif (2016) observed that between 2007 and 2014, both acquired and acquiring companies experienced wealth creation in the North American technology sector, with the greatest effect on the former. Acquisitions paid in cash were linked to high technology in the acquired company, signaling growth opportunities and abnormal gains.

Similarly, Woo et al. (2018) found that the North American market reacted negatively to overpayment acquisitions. Their study revealed a positive relationship between cash payments and long-term performance, while payment through shares or mixed methods was associated with negative performance.

From 1998 to 2009, Goddard et al. (2012) analyzed combinations by banks listed in emerging markets, including Argentina, Brazil, the Philippines, and Indonesia. They found that 82% of these combinations were cash-financed. However, cash payments were negatively correlated with the abnormal return of acquirers. This may be due to investors' preference for stock payments, possibly due to tax implications or perceptions that cash payments are excessive in light of the acquirer's tax liabilities.

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Donnelly and Hajbaba (2014) examined U.S. acquisitions from 1986 to 2005, revealing that acquisitions financed through share issuance were overvalued and exhibited lower performance compared to those financed in cash. The authors concluded that share issuance often reflects the acquirer's optimistic expectations of the acquired company's future profits.

Cash payments were the most prevalent method of mergers and acquisitions in France between 1997 and 2008, as reported by Bouzgarrou and Louhichi (2014). Their study showed an abnormal return of 1.63% five days after the announcement, which was significant at the 1% level. When consideration was made in cash, returns increased to 2.04% two days after the announcement. In contrast, payments through share issuance or mixed methods were statistically insignificant. After five days, average abnormal returns were negative and insignificant. Combinations financed through debt assumption yielded a 2.91% return.

Neethu et al. (2019) compared cash- and share-financed business combinations in India between 2006 and 2017, finding positive abnormal returns for cash payments and negative returns for share payments. This outcome reflects the synergy gains and risks inherent in cash-financed transactions. Transaction value creation is also influenced by the payment method, with cash payments more likely during periods of market growth in North America (Chuang, 2018).

Malmendier et al. (2018) explored the performance of North American acquirers before and after mergers between 1985 and 2012. Their findings indicated that the loss of strategic and financial flexibility often harmed acquirers' performance, including profitability, leverage, stock performance, and analysts' forecasts. This was particularly true when combinations involved increased leverage, cash payments, and high integration costs. These results suggest that poor post-merger performance may be linked to these factors.

Using data from 163 developed and developing countries, Tanna and Yousef (2019) found that acquirers' market risk increased following combination announcements, regardless of the deal's nature. Cash payments were associated with positive abnormal returns and reduced systematic risk, while stock payments resulted in negative returns and increased risk, supporting the hypothesis of company overvaluation. When acquirers pursued serial combinations, the market reacted by further increasing systematic risk. The study concluded that the characteristics of mergers and acquisitions significantly affect systemic risk and market perception.

According to Paugam et al. (2015), investors react to the allocation of consideration, particularly when high purchase prices are allocated to goodwill. Such allocations are often perceived negatively, as they increase the likelihood of losses within three years after the transaction.

The allocation of consideration influences the acquirer's abnormal return because it reflects the valuation of the acquired company. When valuations lead to unexpectedly high allocations to goodwill, negative market reactions are likely (Paugam et al., 2015). Based on this, the following hypothesis is proposed:

> H3: Signaling a business combination with cash consideration has a higher positive effect on abnormal returns than those involving financing, installments, or shares.

Fuller et al. (2002) highlight that the returns of companies engaged in multiple combinations vary according to the characteristics of the acquired companies and the type of consideration. Their results indicate that shareholders realize positive returns when acquiring private companies or subsidiaries, with gains being greater when the target company is larger and when payment is made in shares.

Another factor influencing abnormal returns is the home country of both the acquiring and acquired companies. In international combinations, the stock market tends to react more positively than in domestic ones. Also, managers may use this strategy to drive business growth (Meckl & Röhrle, 2016). One related characteristic that can also affect returns is the company's status, whether or not it is publicly traded.

A distinction exists between acquiring a listed company and a private company or subsidiary. Listed companies disclose their information, reducing information asymmetry between the company and investors (Tanna & Yousef, 2019). In contrast, private companies control what they report, resulting in greater transaction risk due to this asymmetry (Tanna & Yousef, 2019).

Jaffe et al. (2015) analyzed the difference in abnormal returns for acquirers in the United States when the acquisition involved either a subsidiary or a listed company between 1981 and 2012. The study found that acquisitions of subsidiaries yielded an abnormal return of 2.14%, while acquisitions of listed companies resulted in a negative abnormal return of –1.46%. When exploring potential explanations for this difference — such as synergy, financial liquidity, valuation uncertainty, and resistance to the offer — no significant differences were identified between the two groups. The authors concluded that no definitive explanation exists for the abnormal return observed in acquisitions of private companies or subsidiaries.

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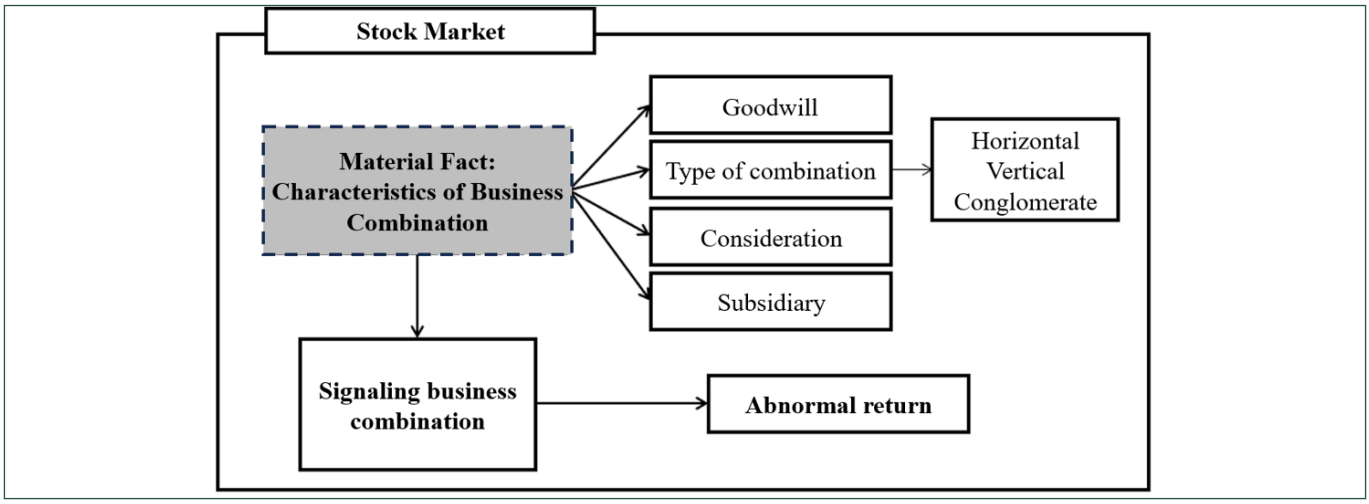
Tanna and Yousef (2019) and Jaffe et al. (2015) suggest that acquisitions involving subsidiaries tend to generate positive abnormal returns due to the information asymmetry inherent in private acquisitions. Investors rely solely on the information provided by the acquired company, leading to higher uncertainty and potentially greater perceived opportunities. However, these studies focus on market reactions when the subsidiary is the combination's target. To address this gap, hypothesis four explores the impact of a subsidiary acting as the acquirer in a business combination, with the relevant disclosures made by its parent company.

H4: The signaling of a business combination carried out by a subsidiary affects the abnormal return of the acquiring company.

Figure 1 presents the research design.



Source: Developed by the authors.

Figure 1. Research design.

In summary, high goodwill levels can signal potential future earnings growth or indicate overpayment (Paugam et al., 2015). Additionally, the type of combination can shape the market's reaction (Chatterjee, 1986), while the form of consideration impacts the company's systemic risk, which, in turn, can influence investor behavior (Tanna & Yousef, 2019). Moreover, the lack of research focusing on subsidiaries as acquirers highlights the importance of investigating these characteristics in material facts of business combinations signaled to the market and their abnormal returns.

METHODOLOGICAL PROCEDURES

Research sample

The sample consists of companies listed on the Brazilian stock exchange — Brasil, Bolsa, Balcão (B3) — that issued material facts disclosing their intention to engage in a business combination. The analysis covers the period from 2010 to 2021, corresponding to the time frame available for data collection and beginning with the adoption of international accounting standards in Brazil.

The material fact dates were collected using Refinitiv software, yielding an initial sample of 9,452 observations. Subsequently, the material facts were manually retrieved from the Brazilian Securities and Exchange Commission (CVM) website and organized in Microsoft Excel to calculate abnormal returns and classify the research variables. Table 1 presents the initial and final sample sizes. These figures do not correspond to the number of companies analyzed, as the focus of the study is on the material facts of business combinations.

Table 1. Initial sample and final observations.

Initial sample	9,452
Exclusions	
Companies not listed	7,595
Material fact not found on the CVM website	300
Duplicate material fact	206
Not a business combination	305
Share buyback	225
Material fact on the completion of the combination	40
No market quotation	106
Final sample	675

Note. Elaborated by the authors.

The exclusions were due to companies not listed on the stock exchange, relevant facts not found, cases involving share buybacks, duplicate entries, events unrelated to a business combination, events referring to the conclusion of a combination, and cases without a market quotation. Additionally, 106 observations were excluded because the acquiring company was not listed during the relevant event period. This may occur in

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cases where the company's initial public offering (IPO) took place after the business combination, the company was delisted from the stock exchange, or there was insufficient data to study the event.

Thus, the final sample comprised 675 observations related to business combination intentions. These observations were categorized into the following characteristics (Table 2): type of combination (conglomerate, horizontal, or vertical), information about expectations regarding goodwill, payment method (cash or non-cash), and whether the acquiring company was a parent or subsidiary. Among these, 159 observations were classified as reporting goodwill, 136 as conglomerate combinations, 219 as involving cash consideration, and 143 where the acquiring company was a subsidiary.

Table 2. Characteristics of business combinations disclosed in material facts.

Characteristics	Disclosed	Not disclosed
Goodwill	159	516
Conglomerate	136	539
Cash consideration	219	456
Subsidiary	143	532

Note. Elaborated by the authors.

It is important to note that payment information was unavailable in 398 of the 675 observations. Of the remaining 277 cases, payment methods were categorized. Cash was assigned to combinations where cash constituted the majority or entirety of the consideration, accounting for 219 of the 277 observations.

Research variables and event studies

Abnormal returns aim to measure the effects of a specific event on a company's value (MacKinlay, 1997). To this end, the event study methodology was employed to assess the impact of the studied characteristics, as detailed in Table 3. The characteristics of the business combination were collected from the material facts disclosed to the stock market.

Table 3. Variables of the relationship between abnormal returns and characteristics of business combination.

Variable	Construct	Data source	References
Cumulative abnormal return	Average of the estimated CAR.	Economatica	Bouzgarrou and Louhichi (2014); Chatterjee (1986)
Goodwill	Dummy 1 when it informs expected future profitability or synergy, and 0 otherwise.	Material fact	Fraunhoffer and Schiereck (2012); Kode et al. (2003); Režňáková and Pěta (2018)
Conglomerate	Dummy 1 when the acquirer and acquired are from different sectors, and 0 otherwise.	Material fact	Avdasheva and Tsytsulina (2015); Chatterjee (1986)
Consideration	Dummy 1 when the payment method is cash, and 0 otherwise.	Material fact	Bouzgarrou and Louhichi (2014); Paugam et al. (2015); Pimenta et al. (2015)
Subsidiary	Dummy 1 when the subsidiary carries out the business combination, and 0 otherwise.	Material fact	Jaffe et al. (2015); Tanna and Yousef (2019)

Note. Elaborated by the authors.

The characteristics were converted into dummy variables to isolate the information extracted from each material fact disclosure. For example, on October 21, 2019, Estácio Participações S.A. (YDUQ3) issued a material fact to the Brazilian stock market announcing the acquisition of all shares of Adtalem Brasil Holding S.A., a company in the same sector. The disclosure stated that the purchase would be made by its subsidiary, Sociedade de Ensino Superior Estácio de Sá LTDA, for BRL 1.92 billion, paid in cash on the transaction's closing date. It also indicated that the deal would generate value for the company. Accordingly, this observation was assigned a score of one for the goodwill, consideration, and subsidiary dummies, and zero for the conglomerate dummy.

The event examined pertains to the acquisition of control over another entity. After identifying the event, the event and estimation windows were defined. The event window spanned 11 days, encompassing the date of the material fact disclosure (day zero), five days prior (–5), and five days after (+5) (Avdasheva & Tsytsulina, 2015; Léger & Quach, 2009; Pimenta et al., 2015). According to MacKinlay (1997), including days outside the event date allows for capturing market reactions that may occur in anticipation of the event or after trading hours. The estimation window consisted of the 30 days preceding the event window (–6 to –35) (Pimenta et al., 2015).

The stock prices used to calculate abnormal returns were obtained from the Economatica system, a financial information platform for Latin American companies.

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Subsequently, three types of returns were calculated: actual, expected, and abnormal. For actual returns, the continuous compounding method was applied (Krieck & Kayo, 2013; MacKinlay, 1997), which approximates a normal distribution by employing a logarithmic formula (Krieck & Kayo, 2013).

$$r = ln(P_t / P_{t-1}) \quad (1)$$

where r: real rate of return; P_t: price in period t; P_{t-1}: price in period t–1.

The expected return was measured by the market model (Chatterjee, 1986), which used the IBOVESPA as a parameter, an index that measures the average performance of the Brazilian stock market (B3).

$$E(R)_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (2)$$

where α_i and β_i: parameters of the market model; $E(R)_{it}$: return of company i in period t; R_{mt}: market return in period t; ε_{it}: error.

As a measure of robustness of the results, the expected return was also measured by the Capital Asset Pricing Model (CAPM) (Tanna & Yousef, 2019), in which asset pricing uses a risk-free rate, in this case, the Brazilian reference interest rate (Selic).

$$E(R) = Rf + \beta_i(R_m - Rf) \quad (3)$$

where Rf: return on the risk-free asset; R_m: expected return on the market portfolio.

Finally, the abnormal return was measured by the difference between the expected return (market and asset pricing models) and the actual return, with the CAR being the sum of the abnormal returns (AR) during the event window.

$$AR_{it} = r_{it} - E(R) \quad (4)$$

where AR_{it}: abnormal return of company i in period t; r_{it}: actual return of company i in period t; $E(R)_{it}$: expected return of company i in period t.

A t-test was conducted to test the hypotheses, evaluating the significance of the daily abnormal return using a 5% significance level. Subsequently, the CAR (Equation 5) was segregated according to the characteristic, and the Shapiro–Wilk test was applied, revealing the non-normality of the data. Given this result, the nonparametric Mann–Whitney test was used to determine whether the hypotheses should be rejected.

$$CAR_{i,t} = \sum_{t=0}^{t} AR_{i,t} \quad (5)$$

where CAR is the cumulative abnormal return of stock i at time t.

Following the YDUQ3 example, abnormal returns were calculated using two models. On the event date (material fact signaling on October 21, 2019), the results showed an abnormal return of 2.66% (p-value 0.2109) under the market model and 3.10% (p-value 0.1506) under the CAPM. The cumulative abnormal return (CAR) for the –5 to 0 window was 3.75% (p-value 0.0887) using the market model and 3.20% (p-value 0.0094) using the CAPM. At the end of the 11-day window (–5 to +5), the CAR was –1.36% (p-value 0.5092) under the market model and 1.73% (p-value 0.1139) under the CAPM. These values were analyzed in light of the characteristics disclosed in the material fact.

The research is limited by the trading activity of stocks on the Brazilian stock exchange, as some stocks were not traded throughout the entire event window. It is also constrained by the information provided in the material facts, as not all of the required characteristics could be collected due to the lack of standardized disclosure.

ANALYSIS OF THE RESULTS

Among the possible reasons for carrying out a business combination is the expectation of future results, which may stem from financial and administrative efficiency and capital reduction (Chatterjee, 1986). Thus, assets that cannot be reliably identified and measured are allocated to goodwill and may be signaled in the intention to acquire control of the future benefits that the acquired company is expected to provide to the acquiring company.

Despite indicating a reduction in information asymmetry by communicating this estimate to the market (Fraunhoffer & Schiereck, 2012), only five of the 675 companies valued the expected future synergies of the combination. This may be one of the reasons investors distrust the amounts allocated to goodwill, as pointed out by Pimenta et al. (2015). However, according to CPC 15 (2011), the allocation of the consideration may occur up to one year after the closing of the combination, which compromises the amount allocated to goodwill.

Among the five companies that reported both the value of goodwill and the value of the consideration, the allocation percentage varied between 14.93% and 83.33%. The lowest percentage was recorded by Banco Panamericano S.A. when it acquired 100% of Brazilian

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Finance & Real Estate S.A.; 83.33% was achieved when Pet Center Comércio e Participações S.A. (Petz) acquired 100% of Zee Dog S.A. (Petz). Režňáková and Pěta (2018) found an average allocation to goodwill of 35% in Czech companies, indicating a common practice among companies at the time of allocation.

Although only five of the 675 companies reported a goodwill value, 154 indicated that the acquisition of control of the acquired company would generate synergies that would lead to future economic benefits. Thus, to explore hypothesis H1 on goodwill signaling, observations were segregated into 'with goodwill' and 'without goodwill,' as shown in Table 4.

Table 4. Descriptive statistics according to the characteristic 'with or without goodwill' of business combination.

Variable		Obs.	Mean	Standard deviation	Median	Mínimum	Maximum
Goodwill	CAR0	159	0.0187	0.0755	0.0127	-0.2347	0.3331
	CAR5	159	0.0205	0.1043	0.0166	-0.2784	0.4096
	CAPM0	159	0.0178	0.0743	0.0069	-0.2511	0.2949
	CAPM5	159	0.0188	0.0991	0.0060	-0.2443	0.3861
Without goodwill	CAR0	516	0.0017	0.0688	-0.0006	-0.3160	0.4123
	CAR5	516	0.0085	0.1011	0.0058	-0.6206	0.3606
	CAPM0	516	0.0054	0.0602	-0.0003	-0.2474	0.4004
	CAPM5	516	0.0153	0.0854	0.0075	-0.3518	0.3899

Note. Elaborated by the authors. CAR0 — Cumulative abnormal return from the market model on the event day (D0). CAR5 — Cumulative abnormal return from the significant market model at the end of the event window (D5). CAPM0 — Cumulative abnormal return from the asset pricing model on the event day (D0). CAPM5 — Cumulative abnormal return from the significant asset pricing model at the end of the event window (D5).

According to the market and asset pricing models, the average abnormal returns of the acquirers that signaled the value or expectation of goodwill were higher than those that did not. However, the maximum value of the cumulative abnormal return was higher only at the end of the five-day window (CAR5). It is also observed that the median of the material facts was positive, which may indicate that those who signaled goodwill obtained mostly positive abnormal returns, while those who did not disclose it obtained negative abnormal returns on the day of the event (CAR0 and CAPM0).

Table 5 presents the average abnormal return during the event window for observations with and without goodwill disclosure.

Table 5. Average daily abnormal return by characteristic with or without goodwill (in percentage).

Description	No. obs.	-5	-4	-3	-2	-1	0	1	2	3	4	5
All observations												
AR Goodwill	159	0.07	0.27	-0.06	0.11	0.17	1.30	0.15	-0.05	-0.24	0.09	0.22
AR Without Goodwill	516	-0.12	0.11	0.05	0.12	-0.22	0.24	0.61	0.16	0.00	0.07	-0.16
CAPM Without Goodwill	516	-0.06	0.17	0.11	0.18	-0.16	0.31	0.68	0.22	0.06	0.13	-0.10
CAPM Goodwill	159	0.06	0.25	-0.07	0.10	0.15	1.29	0.14	-0.06	-0.25	0.07	0.21
Significant observations												
AR Goodwill	104	-0.30	0.21	0.00	0.39	0.42	1.68	0.30	-0.07	-0.14	0.36	0.28
AR Without Goodwill	334	-0.05	0.15	0.03	0.18	-0.21	0.18	0.91	0.24	-0.02	0.08	-0.21
CAPM Goodwill	96	0.32	0.47	-0.08	0.18	0.24	1.44	0.09	0.02	-0.28	0.51	0.44
CAPM Without Goodwill	286	0.12	0.28	0.22	0.17	-0.13	0.43	1.08	0.33	0.03	0.24	0.03

Note. Elaborated by the authors.

According to the market model, the average abnormal return on the day of the event (date zero) for the material facts that signaled goodwill reached a 1.30 positive return, as can be seen in Figure 2. Considering the 104 significant observations (out of 159), the average abnormal return was 1.68. In contrast, those that did not disclose goodwill (significant or not) showed a return of around 0.2 on the day of the event and a negative return at the end of the window.

According to the asset pricing model, the average daily abnormal return on the day of the event for companies that signaled goodwill was 1.29 for the 159 observations and 1.44 for the 96 significant observations (p-value of up to 10). For those that did not signal it, the return was around 0.31 for the 576 observations and 0.43 for the 286 significant ones, respectively. Likewise, at the end of the window, the returns of those that signaled goodwill were higher than those without the information.

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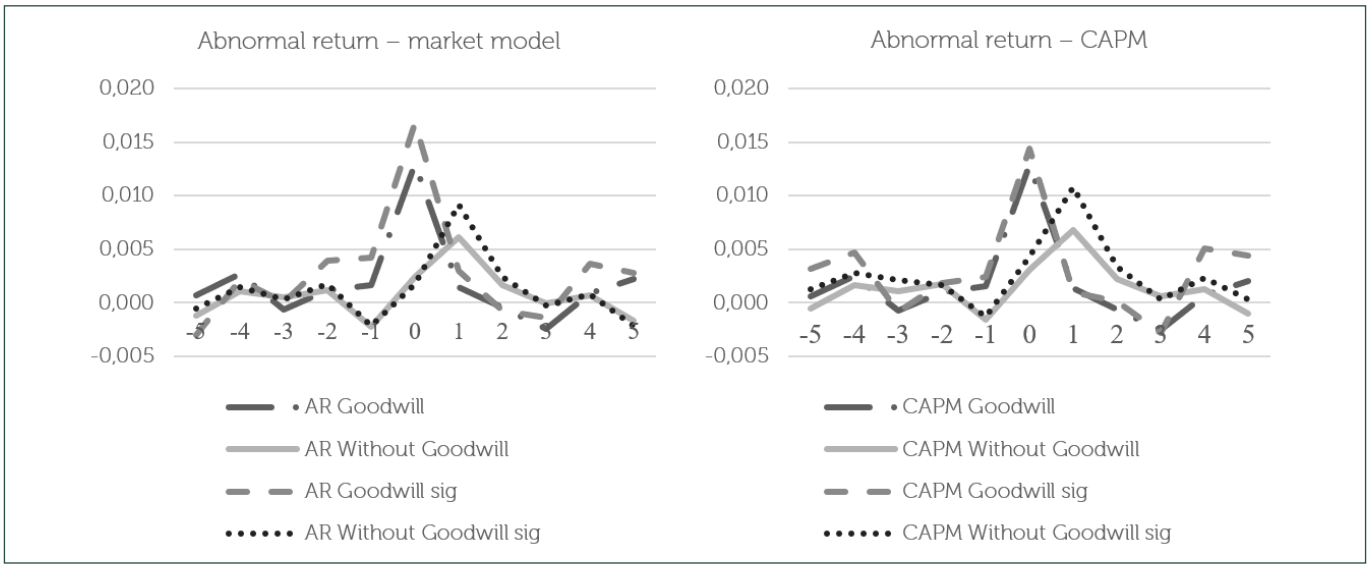
Thus, it is possible to corroborate Kode et al. (2003) in indicating that combinations that did not signal synergy can be considered failures in the assessment, which may result in a negative abnormal return. The results also reinforce Fraunhoffer and Schiereck (2012) by showing a positive abnormal return for European companies with goodwill.



Source: Developed by the authors.

Figure 2. Average daily abnormal return for the characteristic 'goodwill'.

The Shapiro–Wilk test was initially performed to check the data's normality and verify whether the effect on the abnormal return of companies that signaled goodwill was higher, which resulted in non-normality. Therefore, the Mann–Whitney test was conducted because the data were non-parametric, as shown in Table 6.

The result of the Mann–Whitney test indicated that on the day of the event (CAR0 and CAPM0), the abnormal returns of the groups were different, with the signaling of goodwill having a positive effect on the abnormal return, higher than those without such signaling, thus not rejecting hypothesis H1. Therefore, the study supports the findings of Fraunhoffer and Schiereck (2012) regarding the favorable market reaction to the announcement of the combination, along with an estimate of synergies.

Table 6. Mann-Whitney test of means for the characteristic 'goodwill' (p-value).

Variable	CAR0	CAR5	CAPM0	CAPM5
Goodwill	0.0057	0.4689	0.0325	0.9392
Without goodwill				

Note. Elaborated by the authors. CAR0 — Cumulative abnormal return from the market model on the event day (D0). CAR5 — Cumulative abnormal return from the significant market model at the end of the event window (D5). CAPM0 — Cumulative abnormal return from the asset pricing model on the event day (D0). CAPM5 — Cumulative abnormal return from the significant asset pricing model at the end of the event window (D5).

The fact that companies demonstrate potential future economic synergies may be one of the reasons for continuing business combinations, as indicated by Kode et al. (2003). By signaling the possible recording of goodwill as relevant to the market, the research also complements the results of Hirschey and Richardson (2002), who suggested that the write-off of goodwill is relevant to the market.

According to Sarfati and Shwartzbaum (2013), the type of combination is a form of creating synergies. This is because when a company acquires another company from a different sector, it reduces its risk (Lubatkin, 1983). Therefore, it is interesting to analyze the market's reaction to how investors perceive conglomerate combinations and compare them with horizontal and vertical ones, as per hypothesis H2.

Out of the 675 observations, 136 business combinations were found in which the acquirer and the acquired company were from different sectors. Table 7 contains the descriptive statistics.

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Table 7. Descriptive statistics according to the characteristic 'type of combination'.

Type of combination		Obs.	Mean	Standard deviation	Median	Minimum	Maximum
Conglomerate	CAR0	136	0.0058	0.0865	0.0070	-0.3160	0.4123
	CAR5	136	0.0248	0.1150	0.0203	-0.4093	0.3606
	CAPM0	136	0.0046	0.0758	-0.0022	-0.2511	0.2670
	CAPM5	136	0.0226	0.1001	0.0174	-0.3328	0.3899
Horizontal and vertical	CAR0	539	0.0057	0.0663	0.0008	-0.2696	0.3331
	CAR5	539	0.0079	0.0981	0.0029	-0.6206	0.4096
	CAPM0	539	0.0093	0.0607	0.0016	-0.2020	0.4004
	CAPM5	539	0.0145	0.0857	0.0063	-0.3518	0.3861

Note. Elaborated by the authors. CAR0 — Cumulative abnormal return from the market model on the event day (D0). CAR5 — Cumulative abnormal return from the significant market model at the end of the event window (D5). CAPM0 — Cumulative abnormal return from the asset pricing model on the event day (D0). CAPM5 — Cumulative abnormal return from the significant asset pricing model at the end of the event window (D5).

It can be observed that the average abnormal return on the day of the event (CAR0 and CAPM0) is similar for all types. However, at the end of the window (CAR5 and CAPM5), the average abnormal return for conglomerate-type combinations is higher than for horizontal and vertical ones. According to the median, it can be said that, except for CAPM0, most of the abnormal returns were positive. There was considerable variation in the minimum and maximum values, sometimes showing opposite trends.

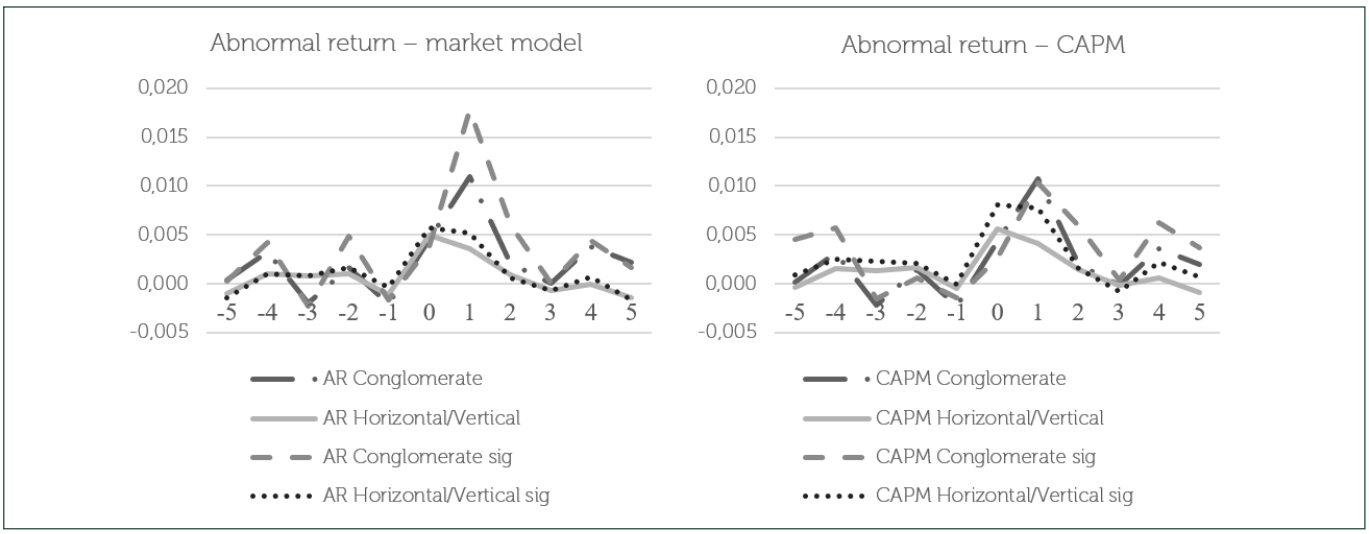
Table 8 shows the average abnormal return during the event window for all observations and significant observations, categorized by the type of combination (whether conglomerate, horizontal, or vertical).

Table 8. Daily abnormal return by the characteristic 'type of combination' (in percentage).

Description	No. obs.	-5	-4	-3	-2	-1	0	1	2	3	4	5
All observations												
AR Conglomerate	136	0.04	0.33	-0.20	0.17	-0.21	0.45	1.09	0.21	0.00	0.38	0.22
AR Horizontal/Vertical	539	-0.10	0.10	0.08	0.10	-0.11	0.50	0.36	0.09	-0.07	0.00	-0.15
CAPM Conglomerate	136	0.02	0.31	-0.22	0.15	-0.23	0.43	1.07	0.19	-0.02	0.36	0.20
CAPM Horizontal/Vertical	539	-0.04	0.16	0.14	0.16	-0.05	0.56	0.42	0.15	-0.01	0.06	-0.09
Significant observations												
AR Conglomerate	88	0.03	0.43	-0.23	0.49	-0.16	0.38	1.78	0.60	0.01	0.44	0.16
AR Horizontal/Vertical	350	-0.14	0.10	0.08	0.16	-0.04	0.58	0.51	0.06	-0.07	0.07	-0.16
CAPM Conglomerate	85	0.45	0.57	-0.16	0.06	-0.14	0.26	1.04	0.59	0.04	0.62	0.36
CAPM Horizontal/Vertical	297	0.09	0.26	0.23	0.20	-0.01	0.81	0.77	0.16	-0.08	0.21	0.07

Note. Elaborated by the authors.

The analyzed window shows that, according to the market model, the main changes occurred the day after the event. On this day, the average daily abnormal return for conglomerate combinations was 1.78 for the significant observations (88 out of 136) and 1.09 for the general sample, as shown in Figure 3.



Source: Developed by the authors.

Figure 3. Average daily abnormal return of the characteristic 'type of combination'.

Furthermore, according to the market model, the data showed an average of approximately −0.13 on the day before the event was announced. On the day of the event, as indicated by the mean, the values were also close, with horizontal and vertical combinations yielding approximately 0.10 higher returns than conglomerate combinations. At the end of the analyzed window, the conglomerate type outperformed the others, corroborating Chatterjee (1986), despite the abnormal return of over 10 reported by this author.

According to the asset pricing model, a similar pattern was observed throughout the window. On the day before the event, the average abnormal returns were concentrated near zero, with conglomerate combinations being lower. However, on the day of the event, they remained lower but turned positive, reaching 0.43 for the general sample and 0.26 for the 86 significant events out of 136.

Consistent with the abnormal return results from the market model, the asset pricing model showed that conglomerate combinations outperformed horizontal and vertical types on the day after the event (D1). While the conglomerate type provided a higher abnormal return than on day zero (D0), the returns for the other types declined.

The non-parametric Mann–Whitney test was conducted to determine whether the abnormal return for the conglomerate type was significantly higher than that for the horizontal and vertical types, as shown in Table 9. This test was applied because the data were non-normal, as confirmed by the Shapiro–Wilk test.

Table 9. Mann-Whitney test of means for the characteristic 'type of combination' (p-value).

Variable	CAR0	CAR5	CAPM0	CAPM5
Conglomerate Horizontal and vertical	0.5481	0.0339	0.5606	0.1910

Note. Elaborated by the authors. CAR0 — Cumulative abnormal return from the market model on the event day (D0). CAR5 — Cumulative abnormal return from the significant market model at the end of the event window (D5). CAPM0 — Cumulative abnormal return from the asset pricing model on the event day (D0). CAPM5 — Cumulative abnormal return from the significant asset pricing model at the end of the event window (D5).

It is observed that only the market model at the end of the window (CAR5) was significant at the 5 level, indicating the superiority of the abnormal return for the conglomerate type compared to the horizontal and vertical types. Based on this result, hypothesis H2, which posits that signaling a conglomerate business combination has a higher positive effect on abnormal returns than horizontal or vertical combinations, is rejected.

The findings corroborate Clougherty and Duso (2011) in the North American context and partially align with Avdasheva and Tsytsulina (2015), who suggest that horizontal and vertical combinations can benefit Russian acquirers by reducing competitiveness, thereby leading to positive abnormal returns. The positive effect of such transactions was also noted by Sarfati and Shwartzbaum (2013), who found evidence of positive abnormal returns in the education sector.

Additionally, the study reaffirms Chatterjee (1986) by demonstrating the positive return associated with conglomerate-type combinations. The research highlights that all types of combinations positively influence the market, with no significant distinction among them.

The payment method can signal either an overvaluation or undervaluation of the consideration (Bouzgarrou & Louhichii, 2014). However, despite being an indicator, the payment method is not always disclosed in the material facts. Of the 675 observations, only 277 indicated the payment method to be used for the consideration.

Table 10 presents the descriptive statistics for these observations, segregated into 'cash' and 'non-cash' payment methods.

Table 10. Descriptive statistics according to the characteristic 'consideration'.

Variable		Obs.	Mean	Standard deviation	Median	Minimum	Maximum
Cash	CAR0	219	0.0031	0.0597	0.0004	-0.1959	0.1836
	CAR5	219	0.0094	0.0897	0.0056	-0.2855	0.3057
	CAPM0	219	0.0061	0.0580	0.0008	-0.2474	0.2012
	CAPM5	219	0.0148	0.0884	0.0077	-0.3328	0.3899
Non-cash	CAR0	58	0.0179	0.0936	0.0027	-0.2336	0.3331
	CAR5	58	0.0205	0.1597	0.0086	-0.6206	0.4096
	CAPM0	58	0.0255	0.0804	-0.0004	-0.0957	0.2949
	CAPM5	58	0.0345	0.1276	0.0244	-0.2852	0.3861

Note. Elaborated by the authors. CAR0 — Cumulative abnormal return from the market model on the event day (D0). CAR5 — Cumulative abnormal return from the significant market model at the end of the event window (D5). CAPM0 — Cumulative abnormal return from the asset pricing model on the event day (D0). CAPM5 — Cumulative abnormal return from the significant asset pricing model at the end of the event window (D5).

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Most companies that disclose payment methods pay in cash. This was observed by Goddard et al. (2012) in emerging markets. Other forms of payment mainly result from financing and delivery of shares, but also include payments in steel, assumption of debts, promissory notes, and contingencies.

The median of the consideration was mostly positive, with a positive average abnormal return for cash and other methods. The average of other types of payments was higher than cash on the day of the event (CAR0 and CAPM0) and at the end of the event window (CAR5 and CAPM5).

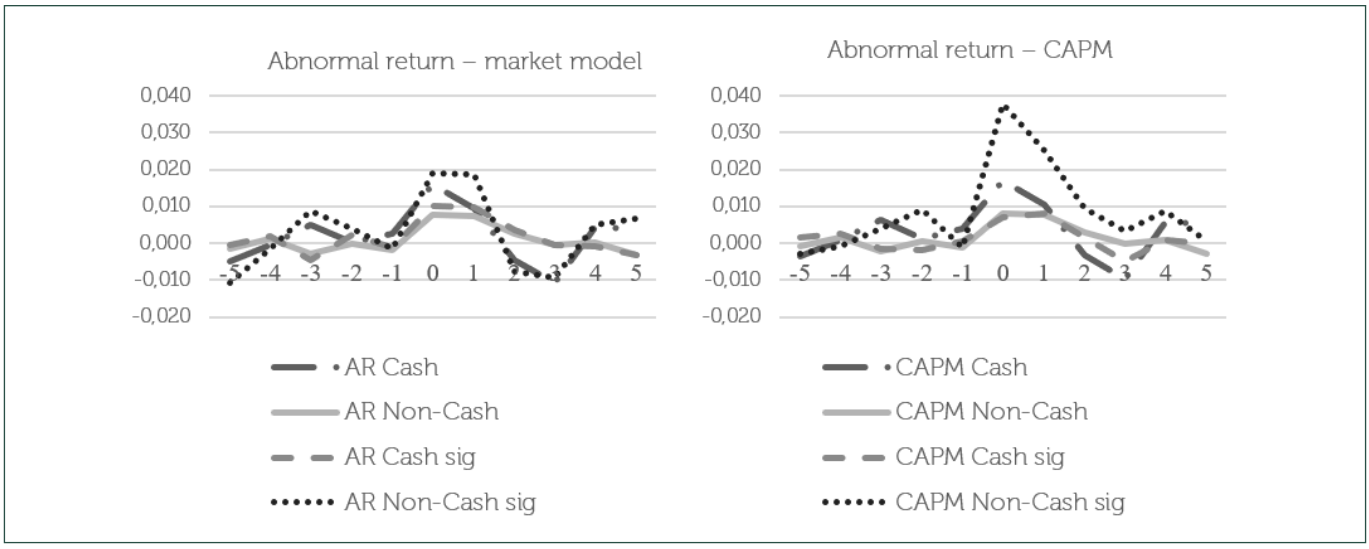
Not all material facts disclosed the payment method of the business combination. Therefore, when analyzing the average daily abnormal return of 277 observations that indicated the type of payment, as shown in Table 11, a positive return was observed on day zero regardless of the payment method used by the acquirer.

Figure 4 shows the behavior of the average daily abnormal return of the observations throughout the event window.

Table 11. Average daily abnormal return by the characteristic 'type of payment' (in percentage).

Description	No. obs.	-5	-4	-3	-2	-1	0	1	2	3	4	5
All observations												
AR Cash	219	-0.49	-0.04	0.51	0.01	0.27	1.58	0.93	-0.45	-1.08	0.43	0.41
AR Non-Cash	58	-0.14	0.13	-0.28	0.00	-0.17	0.77	0.72	0.26	-0.05	0.04	-0.33
CAPM Cash	219	-0.37	0.08	0.64	0.14	0.39	1.71	1.06	-0.33	-0.95	0.56	0.53
CAPM Non-Cash	58	-0.09	0.18	-0.23	0.05	-0.12	0.82	0.77	0.30	0.00	0.08	-0.29
Significant observations												
AR Cash	143	-0.05	0.18	-0.45	0.21	-0.12	1.00	0.98	0.35	-0.05	-0.08	-0.33
AR Non-Cash	38	-1.07	-0.14	0.89	0.41	-0.15	1.90	1.86	-0.75	-0.94	0.49	0.69
CAPM Cash	122	0.15	0.27	-0.14	-0.19	0.06	0.70	0.81	0.18	-0.49	0.11	0.00
CAPM Non-Cash	38	-0.29	-0.07	0.39	0.91	-0.11	3.78	2.51	0.94	0.34	0.87	0.07

Note. Elaborated by the authors.



Source: Developed by the authors.

Figure 4. Average daily abnormal return of the characteristic 'consideration'.

According to the market model, when significant at 10 (38 of the 58 observations), the other payment methods provided a return of 1.90, while cash was 1.58 and 1 for the significant ones (143 of the 219 observations). As the window continues, the return reverses two days after the event, causing the significant observations of cash payment to remain positive (0.35), while the other types of payments are negative (–0.75).

According to the asset pricing model, the average daily abnormal return of the other payment methods is also three percentage points higher than cash payment (3.78 versus 0.70 for the sample, significant at 10). Of the 38 out of 58 significant observations of other payment methods, they were positive throughout the post-event window, while the 122 observations of 219 cash payments on the third day after the event had a negative return and were close to zero in the following days.

The results contradict Bouzgarrou and Louhichi (2014) regarding the non-significance of other payment methods for French companies but confirm the positive abnormal return for cash payments. When comparing the two groups using the non-parametric Mann–Whitney test, due to the non-normality of the data, it was observed that at no time was it significant, as shown in Table 12.

Table 12. Mann-Whitney test of means for the characteristic 'consideration' (p-value).

Variable	CAR0	CAR5	CAPM0	CAPM5
Cash consideration				
Financing, installments, or shares	0.6714	0.9484	0.3498	0.5723

Note. Elaborated by the authors. CAR0 — Cumulative abnormal return from the market model on the event day (D0). CAR5 — Cumulative abnormal return from the significant market model at the end of the event window (D5). CAPM0 — Cumulative abnormal return from the asset pricing model on the event day (D0). CAPM5 — Cumulative abnormal return from the significant asset pricing model at the end of the event window (D5).

This indicates that the payment method used in the sample did not demonstrate superiority over others. Consequently, hypothesis H3, which proposed that signaling a business combination with cash consideration has a higher positive effect on abnormal returns than those classified as financing, installments, or shares, was rejected.

Although, on date zero (D0), the average daily abnormal return was positive for cash payments — corroborating the findings of Neethu et al. (2019) and Tanna and Yousef (2019) — the abnormal return for other payment methods was also positive. This contradicts the results of these authors, as the Brazilian market perceived both payment methods positively. This may indicate that the mere disclosure of payment method information is viewed as beneficial by the market, given the low frequency of such disclosures observed in the sample.

The positive abnormal returns for cash payments align with the results of Lusyana and Sherif (2016), who found that this method could signal opportunities in the North American information technology sector. However, the findings contrast with those of Malmendier et al. (2018), who argued that cash payments could lead to poor future performance for North American companies.

The results also contradict the findings of Donnelly and Hajbaba (2014), as the abnormal returns for cash payments were not higher than for other methods. These authors suggested that such results are typically observed in optimistic markets, which may imply that the Brazilian stock market is not currently in an upward trend. Furthermore, the findings diverge from Goddard et al. (2012), who reported negative abnormal returns for cash payments, suggesting that the emerging Brazilian market does not perceive cash payments as excessive or burdened with tax implications.

Business combinations may also involve subsidiaries acting as acquirers, with the parent company benefiting from the consolidation of entities. Of the 675 observations, 143 involved subsidiaries acquiring control of another entity through a business combination. Table 13 presents the descriptive statistics for this group.

Table 13. Descriptive statistics according to the characteristic 'subsidiary'.

Variable		Obs.	Mean	Standard deviation	Median	Minimum	Maximum
Subsidiary	CAR0	143	0.0064	0.0625	0.0039	-0.2696	0.1836
	CAR5	143	0.0086	0.1034	0.0031	-0.5494	0.2825
	CAPM0	143	0.0089	0.0580	0.0029	-0.1618	0.2324
	CAPM5	143	0.0130	0.0902	0.0034	-0.3518	0.3280
Parent company	CAR0	532	0.0055	0.0728	0.0009	-0.3160	0.4123
	CAR5	532	0.0121	0.1016	0.0087	-0.6206	0.4096
	CAPM0	532	0.0082	0.0656	0.0010	-0.2511	0.4004
	CAPM5	532	0.0170	0.0884	0.0089	-0.3328	0.3899

Note. Elaborated by the authors. CAR0 — Cumulative abnormal return from the market model on the event day (D0). CAR5 — Cumulative abnormal return from the significant market model at the end of the event window (D5). CAPM0 — Cumulative abnormal return from the asset pricing model on the event day (D0). CAPM5 — Cumulative abnormal return from the significant asset pricing model at the end of the event window (D5).

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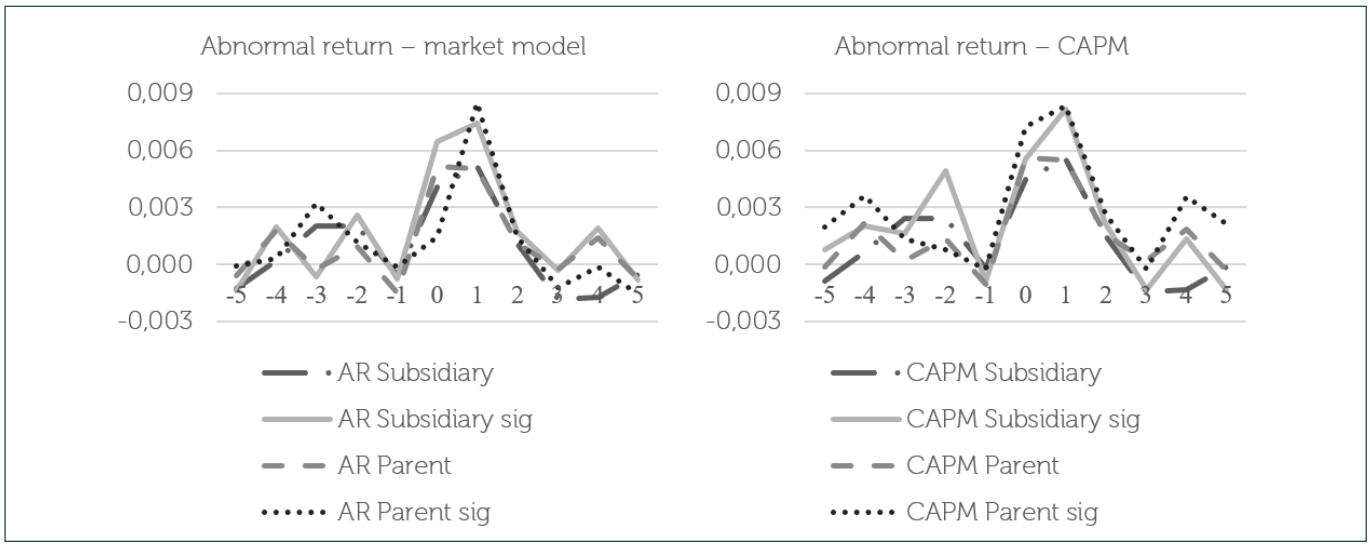
On the day of the event (CAR0 and CAPM0), the average abnormal returns for subsidiaries and parent companies were similar. However, by the end of the window (CAR5 and CAPM5), the abnormal return for parent companies was higher than that of subsidiaries. Additionally, the maximum abnormal return for parent companies exceeded that of subsidiaries both on the day of the event and at the end of the window, as observed in both the market and asset pricing models. Table 14 presents the overall and statistically significant average daily abnormal returns according to the characteristic 'subsidiary.'

Table 14. Average daily abnormal return by the characteristic 'subsidiary' (in percentage).

Description	No. obs.	-5	-4	-3	-2	-1	0	1	2	3	4	5
All observations												
AR Subsidiary	143	-0.13	0.02	0.20	0.20	-0.06	0.41	0.51	0.11	-0.18	-0.17	-0.05
AR Parent	532	-0.06	0.18	-0.03	0.09	-0.15	0.52	0.50	0.11	-0.02	0.14	-0.08
CAPM Subsidiary	143	-0.09	0.06	0.24	0.24	-0.02	0.45	0.56	0.15	-0.14	-0.13	-0.01
CAPM Parent	532	-0.01	0.22	0.02	0.14	-0.10	0.56	0.55	0.16	0.02	0.19	-0.03
Significant observations												
AR Subsidiary	95	-0.14	0.20	-0.06	0.26	-0.08	0.64	0.74	0.18	-0.03	0.19	-0.08
AR Parent	343	-0.01	0.03	0.32	0.12	-0.01	0.14	0.85	0.15	-0.12	-0.01	-0.15
CAPM Subsidiary	87	0.08	0.20	0.16	0.49	-0.08	0.56	0.82	0.21	-0.13	0.13	-0.13
CAPM Parent	295	0.20	0.36	0.14	0.08	-0.02	0.72	0.84	0.26	-0.03	0.36	0.21

Note. Elaborated by the authors.

As shown in Figure 5, the average daily abnormal returns in both models followed a similar pattern throughout the window. When considering only the significant observations identified by the market model — 95 for subsidiaries and 343 for parent companies — it is evident that, on the day of the event (D0), subsidiaries achieved an average abnormal return of 0.64, compared to 0.14 for parent companies. However, this trend reversed on the following day (D1), with parent companies achieving an average abnormal return of 0.85 while subsidiaries posted 0.74.



Source: Developed by the authors.

Figure 5. Average daily abnormal return of the characteristic 'subsidiary'.

According to the asset pricing model, the average daily abnormal return of parent companies after the event was higher than that of subsidiaries. Notably, the abnormal return on the day after the event was similar, at 0.84 and 0.82, respectively. However, by the end of the window (D5), the returns diverged: the abnormal return for combinations carried out by subsidiaries was negative (–0.13), whereas it was positive (0.21) for parent companies.

Hypothesis H4 — the signaling of a material fact regarding a business combination carried out by a subsidiary affects the abnormal return of the acquiring company — was not rejected. This is because 95 of the 143 observations using the market model and 87 of the 143 observations using the asset pricing model showed statistical significance (p-value ≤ 0.10) in the calculation of the daily abnormal return.

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The studies by Jaffe et al. (2015) and Tanna and Yousef (2019) explored subsidiaries as passive participants in combinations and found that the market reacts positively due to reduced information asymmetry. The findings of this study extend their research by showing that the market reaction is favorable when a subsidiary acts as the acquirer, and this information is communicated to the market through the parent company, further contributing to the reduction of information asymmetry.

Overall, the stock market responds to the characteristics disclosed in material facts. However, not all reactions are positive, highlighting the importance of timely and transparent disclosure to enable investors to update their assumptions and make informed investment decisions.

CONCLUSION

This study examined the effect of signaling the characteristics of business combination through material facts on the abnormal return of companies listed on the Brazilian stock exchange. A sample of 675 material facts related to intended business combinations was analyzed, segregated by characteristics such as type of combination (conglomerate, vertical, or horizontal), presence or absence of information on goodwill, payment method (cash or others), and whether the acquirer is a subsidiary or a controlling company.

Regarding the material facts, it was observed that signaling is limited. Companies typically disclose the name of the acquired company and the percentage intended for acquisition but provide little information on whether the board or the Administrative Council for Economic Defense has approved the combination. While the value of the consideration is disclosed, the payment method is often omitted. This lack of transparency can lead to investor distrust regarding combinations, as noted by Paugam et al. (2015).

Signaling detailed information reduces information asymmetry between investors (external users) and the company. When this information is perceived positively, the market tends to react favorably. However, for such positive reactions to occur, managers must treat every business combination as relevant and material. If they judge it as not relevant, information is not provided promptly. This highlights the need for improvements in the quality and scope of information companies disclose.

Regarding the analyzed characteristics, the market positively received the signaling of goodwill even without specifying a potential allocation value. In addition, companies that disclose the expectation of future economic benefits experience higher abnormal returns than those that do not.

For the consideration, disclosing the payment method, whether it involves cash, financing, shares, or other forms, was perceived positively by the market. This may be attributed to the overall lack of transparency in material facts, causing investors to value the mere disclosure of the payment method over its specific type. This aligns with Bouzgarrou and Louhichi's (2014) findings that payment form influences market perceptions of overvaluation or undervaluation.

Horizontal and vertical combinations (aimed at reducing costs or competition) yielded higher abnormal returns than conglomerate combinations on the first day after the material fact disclosure, although all types demonstrated positive and significant returns. This suggests that, in the Brazilian context, combinations — whether within the same sector or outside it — are viewed as beneficial, as they signal future returns.

The market positively received the characteristic of the acquirer (subsidiary) disclosing material facts about intended business combinations. This is likely because the market does not differentiate significantly between combinations by a parent company or a subsidiary. Additionally, such disclosures reduce information asymmetry, ultimately impacting the consolidated performance of the parent company.

The stock market's reaction to the characteristics of business combinations can serve as feedback to managers, indicating that signaling is viewed positively by investors and should be more frequently practiced. Thus, it can be concluded that the Brazilian stock market values the signaling of business combination characteristics, particularly those related to expectations of future benefits. These signals are seen as relevant to investors, aiding their decision-making and fostering expectations of positive abnormal returns.

This research contributes to the literature by analyzing the characteristics of business combinations and their impact on stock market reactions, particularly through the lens of signaling theory. From a practical standpoint, it emphasizes to managers the importance of signaling business combinations to help investors assess the value generated by the transaction. By properly signaling the characteristics of business combinations, managers can reduce uncertainties and influence share prices over the long term, while in the short term, they can generate abnormal returns by providing reliable signals to investors.

For regulators, the research highlights the need to standardize material fact disclosures, especially concerning characteristics that are not consistently reported. For investors, it helps indicate when to speculate on companies involved in business combinations, as the stock market tends to react strongly to the announcement, with returns often becoming zero or negative once the news is fully absorbed on the day of the announcement and the following day.

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The findings are limited to data disclosed in the Refinitiv database and the analyzed characteristics. Additionally, the non-probabilistic sample and the study's restriction to the Brazilian context limit the generalizability of the results. Future research could explore post-business combination performance by comparing the outcomes of transactions based on their characteristics.

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