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O IMPACTO DA DISTRIBUIÇÃO DE DIVIDENDOS E DA RECOMPRA DE AÇÕES NA RENTABILIDADE DOS CAPITAIS PRÓPRIOS DAS EMPRESAS DO SETOR TECNOLÓGICO NORTE-AMERICANO

THE IMPACT OF THE DISTRIBUTION OF DIVIDENDS AND THE REPURCHASE OF SHARES ON THE EQUITY PROFITABILITY OF THE COMPANIES IN THE AMERICAN TECHNOLOGY SECTOR

EL IMPACTO DE LA DISTRIBUCIÓN DE DIVIDENDOS Y LA RECOMPRA DE ACCIONES EN LA RENTABILIDAD DEL CAPITAL PROPIO DE LAS EMPRESAS DEL SECTOR TECNOLÓGICO NORTEAMERICANO

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## RESUMO

**Introdução:** Este estudo distingue-se por considerar os quatro anúncios trimestrais de dividendos realizados ao longo do ano, permitindo uma análise mais detalhada do seu impacto relativo. Além disso, a comparação entre os efeitos dos dividendos e das recompras de ações fornece uma perspetiva abrangente sobre as estratégias de remuneração no setor tecnológico.

**Objetivo:** No contexto empresarial, é comum que as empresas adotem diferentes estratégias de remuneração aos acionistas, destacando-se entre elas a distribuição de dividendos e a recompra de ações. Estas decisões estratégicas podem ter efeitos relevantes sobre o desempenho financeiro e a perceção de valor por parte dos investidores.

**Métodos:** Com base numa amostra composta por 30 empresas de tecnologia cotadas na bolsa NASDAQ, no período de 2018 a 2022, este estudo recorre à metodologia de estudo de eventos para analisar o impacto dos anúncios de distribuição de dividendos e de programas de recompra de ações no retorno acionista. O objetivo é determinar qual destas formas de remuneração gera um efeito mais significativo sobre os retornos anormais das ações.

**Resultados:** Os resultados obtidos indicam que os anúncios de recompra de ações têm, em média, um impacto mais expressivo na rentabilidade dos acionistas, traduzido por retornos anormais mais elevados. Verificou-se também que esses anúncios são particularmente sensíveis a períodos de instabilidade económica, apresentando variações mais acentuadas do que os anúncios de distribuição de dividendos. No que respeita à política de dividendos, observou-se que o primeiro e o quarto anúncios do ano tendem a provocar os efeitos mais significativos no retorno dos acionistas.

**Conclusão:** O estudo conclui que os anúncios de recompra de ações têm maior impacto na rentabilidade acionista do que os de dividendos. Estes efeitos são mais evidentes em períodos de crise, como a pandemia. No caso dos dividendos, o primeiro e o quarto anúncios anuais são os mais relevantes. A recompra de ações destaca-se como a forma mais influente de remuneração no setor tecnológico.

**Palavras-chave:** distribuição de dividendos; recompra de ações; rentabilidade; estudo de eventos; setor tecnológico

## ABSTRACT

**Introduction:** Given that this investigation includes four dividend distribution announcements per year, we were able to assess which of these announcements has the greatest impact on shareholder returns. Furthermore, this study compared those impacts with the ones coming from the share buyback programs.

**Objective:** Companies often adopt different strategic policies, namely distributing dividends and repurchasing their own shares, as a way to influence their performance.

**Methods:** Using a sample of 30 technology companies listed on the NASDAQ stock exchange, for the period of 2018 – 2022, and applying the “event study” methodology, we sought to assess the impact of dividend distribution announcements and share buyback program announcements on stock return to determine which type of shareholder remuneration has the most significant impact.

**Results:** Our results show that share buyback program announcements have the most significant impact on shareholder profitability, as they generate higher abnormal market returns. Furthermore, share buyback announcements are more sensitive to periods of crisis compared to dividend distribution announcements. Regarding the dividend distribution policy, the first and fourth announcements were found to have the strongest influence on shareholder returns.

**Conclusion:** The study finds that share buyback announcements have a stronger impact on shareholder returns than dividend announcements, especially during crisis periods like the pandemic. Among dividend announcements, the first and fourth of the year have the most influence on stock performance. Overall, buybacks emerge as the most impactful form of shareholder remuneration in the U.S. tech sector.

**Keywords:** distribution of dividends; share repurchases; profitability; event study; technology sector

## RESUMEN

**Introducción:** Este estudio se distingue por considerar los cuatro anuncios trimestrales de dividendos realizados a lo largo del año, lo que permite una evaluación más precisa de su impacto relativo. Además, la comparación entre los efectos de los dividendos y de las recompras de acciones aporta una visión más completa sobre las estrategias de retribución en el sector tecnológico.

**Objetivo:** En el ámbito empresarial, es habitual que las compañías adopten distintas estrategias de retribución a los accionistas, entre las que destacan la distribución de dividendos y la recompra de acciones. Estas decisiones estratégicas pueden influir significativamente en el desempeño financiero y en la percepción de valor por parte de los inversores.

**Métodos:** A partir de una muestra compuesta por 30 empresas tecnológicas cotizadas en la bolsa NASDAQ, en el período comprendido entre 2018 y 2022, este estudio emplea la metodología de estudio de eventos para analizar el impacto de los anuncios de distribución de dividendos y de programas de recompra de acciones en la rentabilidad accionarial. El objetivo es determinar cuál de estas formas de retribución genera un efecto más significativo sobre los rendimientos anormales del mercado.

**Resultados:** Los resultados revelan que los anuncios de recompra de acciones tienen, en promedio, un impacto más relevante en la rentabilidad de los accionistas, reflejado en mayores rendimientos anormales. Asimismo, se observó que estos anuncios son más sensibles a los períodos de crisis económica, mostrando variaciones más marcadas que los anuncios de dividendos. En cuanto a la política de distribución de dividendos, se constató que el primer y el cuarto anuncio del año tienden a ejercer la mayor influencia sobre los rendimientos accionarios.

**Conclusión:** El estudio revela que los anuncios de recompra de acciones tienen un impacto más fuerte en la rentabilidad de los accionistas que los anuncios de dividendos, especialmente en períodos de crisis como la pandemia. Entre los dividendos, el primer y el cuarto anuncio del año son los que más influyen en el comportamiento de las acciones. En general, las recompras se destacan como la forma de retribución más efectiva en el sector tecnológico estadounidense.

**Palabras clave:** distribución de dividendos; recompra de acciones; rentabilidad; estudio de eventos; sector tecnológico

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## INTRODUCTION

The development of financial markets represents a major milestone in finance and has had a profound impact on areas such as education, technology, and employment, playing a critical role in economic development (Dev et al., 2019). Their importance is widely recognised, as they channel financial resources toward higher-return opportunities and facilitate cross-border capital flows (Ahmed and Mmolainyane, 2014). However, given the complex, dynamic, and non-linear nature of stock markets, reaching a consensus on how they function remains challenging (Abu-Mostafa and Atiya, 1996; Dev et al., 2019).

Accordingly, the functioning of financial markets continues to pose challenges for research because market outcomes are shaped by a broad set of economic, political, and psychological forces, as well as by characteristics of the business environment (Hoffmann, 2018; Zhong and Enke, 2017). Regarding economic determinants, numerous studies (e.g., Bhuiyan and Chowdhury, 2020; Gjerde and Sættem, 1999; Nasseh and Strauss, 2000) analyse the relationship between stock returns and macroeconomic variables such as interest rates, commodity prices, inflation, and money supply. Antoniuk and Leirvik (2021) and Qian et al. (2020) examine the effects of unexpected political events on shareholder returns. Evidence also suggests that psychological factors—particularly investor sentiment—can materially influence stock markets. Sentiment reflects the behaviour and reactions of market participants and may drive short-term price fluctuations and deviations between market prices and fundamental values (Dev et al., 2019; Papakyriakou et al., 2019; Sun et al., 2021). In addition, firm-specific factors relate to intrinsic characteristics, including changes in structural and operational policies, accounting practices, and payout policies such as dividends (Zhong and Enke, 2017). Consistent with this, a substantial literature investigates the association between accounting information and stock prices (e.g., Aveh and Awunyo-Vitor, 2017; Singh and Tandon, 2019).

Against this background, many studies focus on how information is incorporated into stock prices and how it influences market dynamics. The most prominent framework is the Efficient Market Hypothesis (EMH). Introduced by Fama (1970), the EMH posits that share prices reflect available information, making it difficult for investors to systematically earn abnormal returns (Fama, 1970). Fama (1970) distinguishes three forms of efficiency: weak, semi-strong, and strong. Under weak-form efficiency, prices reflect past market information; under semi-strong efficiency, prices incorporate all publicly available information (e.g., dividend and earnings announcements, and share issuances); and under strong-form efficiency, prices reflect both public and private information, eliminating advantages from privileged information.

Within this setting, firms adopt strategic payout policies—most notably dividend distributions and share repurchase—that may affect performance and shareholder returns. Dividends distribute net profits to shareholders in cash or additional shares, whereas share repurchases (often referred to as “share buybacks”) occur when firms buy back their own shares from shareholders.

This study investigates firms that implement both payout mechanisms and assesses which type of announcement—dividend distributions or share buyback programs—has a more significant impact on shareholder returns. It also contributes by identifying which dividend announcement within a given year is most relevant.

This paper contributes to the payout-policy literature by moving beyond the conventional “single dividend event” approach and modelling dividends at the intra-annual frequency. Specifically, we distinguish four dividend announcements within the same fiscal year and compare their market impact with share buyback announcements. This design captures timing effects that are typically obscured when dividends are aggregated annually or proxied by a single announcement date. By doing so, the paper provides novel evidence on which dividend announcement carries the greatest information content and whether the signalling/irrelevance predictions vary systematically across the dividend cycle.

This study is structured as follows: Literature Review, Methods, Results, Discussion, and Conclusion.

## 1. LITERATURE REVIEW

Dividend policy is highly relevant to stakeholders and has therefore attracted extensive scholarly attention. Accordingly, prior research offers multiple theoretical perspectives on dividend distribution, including dividend irrelevance (Chatterjee and Dutta, 2017; Seyedimany, 2019), dividend relevance (Al-Shattarat and Al-Shattarat, 2017; Fanghui and Zhiyu, 2019; Khanal and Mishra, 2017), the bird-in-the-hand theory (Budiarso and Pontoh, 2018; Salawudeen et al., 2022), dividend signalling (Akron et al., 2020; Bernhardt et al., 2005; Fitriana et al., 2018), dividend agency theory (Hail et al., 2014; Javakhadze et al., 2014; Kent Baker et al., 2018) and dividend catering (Bilel and Mondher, 2021; Budiarso and Pontoh, 2018; Kent Baker et al., 2018). The dividend irrelevance proposition advanced by Modigliani and Miller (1961) argues that dividends do not affect stock prices under restrictive assumptions—namely perfect capital markets, rational investors, the absence of taxes and transaction costs, and full information regarding future investment opportunities. Because these conditions rarely hold in practice, the relevance of dividend policy remains debated.

Empirically, a large body of work examines dividend announcements and their effects on shareholder returns (Berezinets et al., 2019; Chatterjee and Dutta, 2017; Fanghui and Zhiyu, 2019; Legenzova et al., 2017; Rabbani, 2017; Seyedimany, 2019), highlighting that market reactions may vary across settings and periods.

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Table 1 presents a selection of studies focusing on dividend announcements and their impacts on stock prices.

**Table 1 - Key studies on the impacts of dividend announcements on returns**

Authors	Country/period	Main outcomes
Khanal e Mishra (2017)	USA 2006-2012	Evidence of the positive effect of dividend distribution announcements on stock prices, as well as the occurrence of cumulative abnormal returns before the announcement date, suggests the possibility of market speculation, as well as the presence of well-informed investors.
Seyedimany (2019)	USA 2014-2018	In all analysed periods, cumulative abnormal returns were not statistically significant. They also highlight the possibility of information leakage prior to the announcement.
Legenzova et al. (2017)	Baltic countries 2010-2015	The average abnormal returns are not statistically significant.
Alaeto (2018)	UK 2010-2014	The authors support the dividend irrelevance theory.
Yaseen e Trifan (2019)	Romania 2011-2016	Occurrence of significant abnormal returns after the dividend declaration date.
Al-Shattarat e Al-Shattarat (2017)	Jordan 2005-2010	The study supports the dividend signalling theory.
Dar-Hsin Chen et al. (2009)	China 2000-2004	Changes in cash dividend distribution policies have a positive influence on stock prices.
Fanghui e Zhiyu (2019)	China 2015-2017	Dividend distribution has a significant impact on stock prices.
Berezinets et al. (2019)	India e Russia 2010-2012	The results suggest that, in the Indian market, the dividend signalling theory prevails, while the Russian market's behaviour partially contradicts this theory.
Chatterjee e Dutta (2017)	India 2010-2014	Dividend distribution announcements provide little information to investors.
Kumar (2017)	India 2012-2014	The announcement of dividend distribution triggers reactions in the market. The announcement of an increase in dividend distribution leads to an increase in stock prices, while the announcement of a reduction in dividend distribution results in the opposite reaction. Finally, returns are insignificant when there are no changes in dividend distribution.
Archana H. N. (2019)	India 2014-2015	Dividend announcements have a minimum impact on stock prices, since the information was already incorporated during the pre-announcement period.
Dhume e Makandar (2021)	India 2018-2019	Evidence of positive average returns on the dividend announcement date, with a positive market reaction persisting into the following day.
Rabbani (2017)	Bangladesh 2001-2011	It supports the dividend signalling theory, and the occurrence of significant positive abnormal returns before the announcement date suggests the possibility of information leakage.

The evidence on market reactions to dividend announcements is mixed. While several studies document positive stock-price effects, others report negative or statistically insignificant reactions, suggesting that the relevance of dividend payouts remains context-dependent and continues to motivate further research.

In contrast, share repurchases represent a relatively more recent—yet similarly debated—payout channel. Repurchases are widely used in the USA and other developed markets under country-specific regulatory frameworks; in the USA, they fall under Securities and Exchange Commission (SEC) oversight. Firms may execute repurchases through open-market programs, fixed-price tender offers, Dutch auctions, or private negotiation (Dittmar, 2000). The literature has examined repurchases both in terms of their determinants and their valuation effects, commonly emphasizing signalling, excess cash distribution, capital-structure adjustment, and earnings-per-share considerations (Chong et al., 2015). Consistent with this, prior studies frequently identify signalling and excess cash as central motivations (Au Yong et al., 2014; Chen and Liu, 2021; Huei-Hwa Lai et al., 2017; Isa and Siew-Peng Lee, 2014).

Empirical findings on buyback announcements are also heterogeneous. Some studies report abnormal returns consistent with a signalling effect (e.g., Andres et al., 2018; Chong et al., 2015; Koopmans, 2022), whereas others fail to detect statistically significant price responses, suggesting that the information may be incorporated into prices by the announcement date (e.g., Bhargava and Agrawal, 2015; Drousia et al., 2019; R. Kumar et al., 2019).

The literature review shows that market reactions to share buyback announcements can vary significantly. While a significant number of authors identify a positive reaction in stock prices following share buyback announcements, others suggest that such announcements have no noticeable impact. Table 2 summarizes some of the studies focusing on share buybacks and their impact on share prices.

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**Table 2** - Key studies on the impact of share buyback announcements on stock returns

Authors	Country/period	Main outcomes
Koopmans (2022)	USA 2010-2019	The evidence of statistically significant average abnormal returns and cumulative average abnormal returns indicates a positive relationship between share repurchase announcements and stock prices.
Andres et al. (2018)	Germany 1998-2008	Evidence of positive abnormal returns on the day of the announcement; however, there is evidence of significantly negative returns in the pre-announcement period.
Drousia et al. (2019)	Greece 2005-2010	Companies tend to announce a share repurchase following a downward trend in stock prices. However, despite a positive response from shareholders after the announcement, the returns were not significant.
Brown (2007)	Australia 1996-2003	Investors react positively to share repurchase announcements. The study refers to positive cumulative average abnormal returns, and there is evidence of abnormal trading volume occurring before the announcement date.
Akyol e Foo (2013)	Australia 1998-2008	The market reacted significantly and positively to the share buyback program.
Hatakeda e Isagawa (2004)	Japan 1995-1998	Stock prices show a decline before the stock repurchase announcements and an increase at the actual time of the announcement.
Isa e Siew-Peng Lee (2014)	Malasia 1997-2007	The market presents a positive, albeit insignificant, reaction to share buyback announcements. A gradual increase in stock prices is observed in the pre-announcement phase.
Chong et al. (2015)	Malasia 2007-2011	The market reacts favourably to share repurchase announcements, with average cumulative abnormal returns showing an uptrend in the 12 days following the announcement. A drop in share prices is observed before the announcement.
Ai-Chi Hsu et al. (2019)	Taiwan 2009-2013	Stock prices tend to remain low before the share repurchase announcement, but there were significantly positive abnormal returns after the announcement.
Göçmen Yağcılar e Arslan (2018)	Turkey 2016-2018	It is possible to observe both negative and positive abnormal returns before and after the share repurchase announcement; however, the returns obtained were not statistically significant.
Bhargava e Agrawal (2015)	India 2010-2014	The average abnormal returns are not statistically significant. The authors believe that information related to share repurchases is already reflected in the stock prices by the announcement date.
Gupta (2017)	India 1999-2015	The occurrence of negative abnormal returns prior to the announcement and positive abnormal returns up to the ninth day after the announcement indicates an optimistic market reaction.
Kumar et al. (2019)	India 2017	Share buyback announcements do not significantly influence stock prices. Stock prices at the event day already reflect the news related to the share buyback.
Yadav (2022)	India 2013-2019	Abnormal returns are insignificant, suggesting that share repurchase announcements do not influence stock prices. The information regarding share repurchases is already incorporated into the stock prices by the announcement date.

Both dividends and share repurchases distribute cash to shareholders, but they differ in form: dividends provide cash (or shares) while investors retain ownership, whereas repurchases involve the firm buying back its own shares. The literature documents a gradual shift from dividends toward repurchases—often termed the dividend substitution hypothesis (Sandu, 2013)—and examines whether these payout channels act as substitutes (Baker et al., 2012; DeAngelo et al., 2004; Grullon and Michaely, 2002; Jagannathan et al., 2000; Kamat and Kamat, 2016; Kooli and L’Her, 2010; Skinner, 2008). More recently, Mazur et al. (2023) report that repurchases are more crisis-sensitive than dividends during the COVID-19 period.

Against this background, this study evaluates the stock-market impact of dividend and share buyback announcements for NASDAQ-listed technology firms between 2018 and 2022, identifying which event type is more strongly associated with shareholder profitability. Importantly, it distinguishes four intra-annual dividend announcements, allowing the analysis to assess whether announcement timing differentially influences stock prices.

Prior studies generally examine dividends as an annual payout decision or focus on a single announcement, which may mask heterogeneity across interim announcements. By separating four intra-annual dividend announcements, our analysis offers a more granular test of announcement effects and allows a direct comparison with buyback signalling over the same period.

## 2. METHODS

### 2.1. Data and sample

The period under study (2018 to 2022) includes a sample of publicly traded American technology companies listed on the NASDAQ exchange index. The sample comprises 30 companies (see Table 3) with the highest market value, according to the Yahoo Finance<sup>1</sup> page, and that presented data simultaneously for both events under study (share buyback program announcements and four quarterly dividend distribution announcements). In order to analyse the behaviour of the American market, the three leading market indices were considered (the NASDAQ Composite, the S&P 500, and the Dow Jones Industrial Average). The choice of the

<sup>1</sup> <https://finance.yahoo.com/screener/unsaved/305fb0ab-3b11-4d2a-9c7a-a3f5a6071312>

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NASDAQ Composite Index stems from the fact that the companies under study are listed on the NASDAQ stock market (Bajpai, 2021). The S&P 500 index encompasses the 500 largest companies traded on the US stock exchange (Kirakosyan, 2023). The selection of the Dow Jones Industrial Average reflects its importance in the American financial market, as it includes the most prominent companies in the USA (Jayne Slack, 2023).

Historical daily returns for shares and market indices were collected from the [www.investing.com](http://www.investing.com) website. The dates of share buyback program announcements were obtained from content analysis, primarily by reviewing each company's reports. Dividend distribution announcement dates were obtained from the NASDAQ<sup>2</sup> page. When this information was unavailable, content analysis of the company reports was conducted. The companies selected were Agilent Technologies, Inc., Apple, Analog Devices, Applied Materials, Inc., Amgen, Broadcom, CDW Corporation, Cisco Systems, Cognizant, Entegris Inc, Intel, Intuit, Iridium Communications, Jack Henry & Associates, Inc., KLA Corporation, Logitech International SA, Lam Research, Marvell Technology Group, Microsoft, Micron Technology, NetApp, NVIDIA Corporation, NXP Semiconductors, Old Dominion Freight Line, Paychex, Qualcomm, Ross Stores, SS&C Technologies Holdings Inc, Seagate Technology and, Texas Instruments.

## 2.2. Methodology

The primary objective is to assess the impact of dividend distribution announcements and share buyback program announcements on abnormal stock returns, and, more specifically, to understand how these events influence market developments. To analyse the impact on stock prices and identify trends or patterns deemed useful for trading procedures, the study employs the event study methodology. Dividend distribution and share buyback program announcements are key events used to determine whether stock prices exhibit abnormal returns. Abnormal return is a term used to define the difference between the actual return of a given investment and its expected return and is typically calculated using the simple market model, where the profitability of a security depends solely on one factor: a selected market index.

Building on the seminal studies by Ball and Brown (1968) and Fama et al. (1969), this methodology has significantly advanced the understanding of how capital markets function. It is worth noting that various studies, including those conducted by Ai-Chi Hsu et al. (2019), Alaeto (2018), Dhume and Makandar (2021), Khanal and Mishra (2017), Koopmans (2022), and Yadav (2022), have employed the event study methodology to assess the impact of dividend distribution and share repurchase announcements.

In this study, the event day (dividend distribution and share buyback program announcement dates) is identified as  $t = 0$ . To gain a deeper understanding of market behaviour following these events, 3 event windows were defined. One of those windows included 11 observations [0;10] that provided a foundation to analyse stock price behaviour after the event. Using this window, it was possible to assess whether the event had any impact in the days following the announcement and determine the duration of any perceived impact. Two shorter windows of [-5;-1] were constructed to assess the existence of a market anticipation effect or potential information leakage, and another of [-3;3] to help minimize the influence of other events and determine how the market reacts in the moments closest to the announcement day, in line with the methodologies advocated by Chatterjee and Dutta (2017), Drousia et al. (2019), Rabbani (2017) and Yadav (2022). As for the estimation window, 72 observations were considered, corresponding to the interval [-80; -8] preceding the event window.

In event studies, real returns are observed empirically, while normal returns need to be estimated. To estimate expected returns, event studies use expected return models, and, among those, the market model is the most commonly used. This model is based on real market returns and captures the correlation between stock return and the market, according to the following equation:

$$E(R_{j,t}) = \alpha_j + \beta_j R_{m,t} \quad (1)$$

Where

$E(R_{j,t})$  represents the expected return of stock  $j$  at time  $t$ ;

$R_{m,t}$  – Market return at time  $t$ ;

$\alpha_j$  – Return not related with the market;

$\beta_j$  – Sensitivity of the stock to the market (systematic risk)<sup>3</sup>

<sup>2</sup> <https://www.nasdaq.com/es/market-activity/stocks/ndaq/dividend-history>

<sup>3</sup> The estimates for  $\alpha$  and  $\beta$ , which allow for the calculation of expected returns during the event windows, are performed using the StataBE 18 program, which was employed to execute most of the calculations required to implement the event study methodology.

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$$R_{j,t} = \ln \left[ \frac{P_{(j,t)}}{P_{(j,t-1)}} \right] \quad (2)$$

Where:

$R_{j,t}$  - Real (actual) return for stock j at time t;

$P_{(j,t)}$  - Stock price j at time t;

$P_{(j,t-1)}$  - Stock price j at time t-1.

Once normal returns are calculated, the impact of the event on stock prices can be measured through abnormal returns (ARs) (Pacocco et al., 2018). Abnormal returns are calculated by the difference between the actual returns of a security and its expected returns (normal return):

$$AR_{j,t} = R_{j,t} - E(R_{j,t}) \quad (3)$$

Where:

$AR_{j,t}$  represents the abnormal return for stock j at time t.

To assess the total impact of an event during a specific period (event windows), the cumulative abnormal return (CAR) is calculated. The CAR represents the sum total of all abnormal returns (ARs) over a given period.

$$CAR_{j_{[t_1;t_2]}} = \sum_{t=t_1}^{t_2} AR_{j,t} \quad (4)$$

Where  $t_1 < t_2$  e  $t_1, t_2$  define the event window.

This study also calculates the impact of events on stock returns and identifies patterns of market response to the event announcement. The abnormal returns (ARs) for all N stocks are aggregated to find the average abnormal return at each time t. According to MacKinlay (1997), this aggregation becomes relevant when multiple events are observed. The average abnormal return (AAR) is represented by the following equation:

$$AAR_t = \frac{1}{N} \sum_{j=1}^N AR_{j,t} \quad (5)$$

Where N represents the total number of stocks in the sample.

Since the analysis focuses on the average effect over a given period, Pacocco et al. (2018) suggest that it is necessary to calculate the cumulative average abnormal return (CAAR). The cumulative average abnormal returns obtained across the event window is analysed according to the following equation:

$$CAAR_{[t_1;t_2]} = \sum_{t=t_1}^{t_2} AAR_t \quad (6)$$

Pacocco et al. (2018) state that the event studies require the assessment of the statistical significance of abnormal returns (ARs), given that, to assume economic relevance, ARs, AARs, CARs, and CAARs must be statistically significant. According to the author, there are 2 types of tests: parametric, which assume a certain distribution of returns, and non-parametric, which are not subject

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to any assumption. Therefore, bearing in mind the requirements of parametric tests, it is assumed that returns have a normal distribution. Abnormal returns (ARs) follow a normal distribution, with variance  $\sigma^2_{AR}$ . Accordingly, AARs, CARs, and CAARs are equally normally distributed with mean 0 and variance  $\sigma^2_{AAR}$ ,  $\sigma^2_{CAR}$ , and  $\sigma^2_{CAAR}$  (Pacocco et al., 2018).

Alternatively, Patell (1976) proposes a parametric test where abnormal returns are scaled, which provides a dual benefit. This test considers the standard deviation of residuals between the event window and the estimation window and helps prevent actions with significant variance from strongly influencing the result. Boehmer et al. (1991) sought to improve the test proposed by Patell (1976) by considering the possibility of an increase in the cross-sectional variance of returns that may occur within the event window.

However, these parametric tests have limitations due to the cross-sectional correlation of abnormal returns that may significantly affect their results, particularly in cases of event day clustering, which occurs when a single event simultaneously affects all stocks included in the analysis (Pacocco et al., 2018). To address this issue, Kolari and Pynnönen (2010) introduced a new test known as "adjusted Patell" that modifies the original tests proposed by Patell and Boehmer to take into account the cross-correlation of ARs. This "adjusted Patell" parametric test was used in this study to determine whether the ARs differ from zero and are, therefore, statistically significant. All of the estimations were performed on an annual basis in order to capture the different time series impact.

### 3. RESULTS

This chapter presents the results obtained from the methodology described in the previous chapter (event study); an annual event study was conducted for each type of announcement and the selected market indices (NASDAQ Composite and Dow Jones Industrial Average). The results obtained show slight differences between the two types of events.

Regarding dividend distribution announcements, the study includes both an annual and an intra-annual analysis, as companies typically make four dividend distribution announcements per year, commonly referred to as:

- "Dividend Q" refers to the quarterly dividend distribution announced by the company in year n;

Where Q: represents the specific quarter, with Q = 1,2,3,4

The discussion of results will address both the impact of the dividend distribution announcement and the impact of the share repurchase announcement.

Table 3 shows the cumulative average abnormal returns (CAARs) obtained for each dividend distribution announcement over the period under study. These returns are calculated for each event window and based on the NASDAQ Composite and Dow Jones Industrial Average market indices.

**Table 3 - Summary tables of CAARs for dividend distribution announcements**

	NASDAQ Composite				Dow Jones Industrial Average		
	CAAR[0,10]	CAAR[-5,-1]	CAAR[-3,3]		CAAR[0,10]	CAAR[-5,-1]	CAAR[-3,3]
	<b>Dividend 1</b>				<b>Dividend 1</b>		
2018	-1,0898%	0,4654%	0,3747%	2018	0,0317%	0,8023%	<b>1,3549%*</b>
2019	0,7224%	0,4245%	<b>1,1821%*</b>	2019	1,1143%	0,5567%	1,2428%
2020	1,5125%	<b>1,4758%**</b>	<b>1,8808%***</b>	2020	<b>3,7519%**</b>	<b>1,5940%***</b>	<b>2,5376%***</b>
2021	1,2125%	<b>1,1330%*</b>	0,1540%	2021	-1,5409%	0,3138%	-0,5478%
2022	0,1095%	<b>-1,6527%***</b>	-0,9126%	2022	0,6582%	<b>-1,2254%*</b>	-0,7616%
	<b>Dividend 2</b>				<b>Dividend 2</b>		
2018	0,5419%	-0,3615%	-0,5347%	2018	<b>1,4654%*</b>	-0,2782%	-0,2104%
2019	0,5479%	-0,1992%	<b>-1,2639%***</b>	2019	-0,5992%	-0,4851%	<b>-1,8073%***</b>
2020	-1,2282%	-0,0750%	-1,0485%	2020	-1,4995%	0,1568%	-0,8028%
2021	-0,8333%	-0,1562%	-0,6421%	2021	1,5966%	0,4231%	0,2243%
2022	1,9006%	-0,7543%	0,4386%	2022	2,6583%	-0,4057%	0,7986%
	<b>Dividend 3</b>				<b>Dividend 3</b>		
2018	0,1178%	<b>1,1977%***</b>	<b>1,5104%**</b>	2018	-0,9226%	0,0354%	0,7459%
2019	<b>3,2429%***</b>	0,3340%	<b>1,9275%**</b>	2019	<b>3,3093%***</b>	0,3562%	<b>1,8002%*</b>
2020	<b>1,4836%*</b>	-0,2923%	0,2335%	2020	-0,6218%	-0,1869%	-0,4191%
2021	0,5172%	0,4895%	0,2683%	2021	0,6750%	0,2864%	0,6165%
2022	1,1964%	1,3728%	0,2035%	2022	1,6192%	1,2819%	0,2716%
	<b>Dividend 4</b>				<b>Dividend 4</b>		
2018	-0,2256%	-0,3886%	<b>-1,2277%**</b>	2018	0,5893%	-0,0790%	-0,7794%
2019	-0,9474%	-0,8219%	-0,4400%	2019	-0,0542%	-0,5849%	-0,2167%
2020	0,8072%	0,8946%	0,8466%	2020	1,2291%	<b>1,7366%*</b>	1,0818%
2021	<b>2,4724%**</b>	<b>1,2774%*</b>	<b>2,0589%***</b>	2021	<b>2,3517%**</b>	1,3115%	<b>2,1981%**</b>
2022	0,0021%	0,4768%	-0,1243%	2022	<b>-2,1242%*</b>	0,7965%	<b>-1,1562%***</b>

\*\*\* p-value < .01, \*\* p-value < .05, \* p-value < .1

\*\*\* p-value < .01, \*\* p-value < .05, \* p-value < .1

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Table 4 reflects the results of the cumulative average abnormal returns (CAARs) for a portfolio of technology shares obtained over the period under analysis and using the event study methodology. The results are presented for share buyback program announcements across the different event windows. Calculations are based on the NASDAQ Composite and Dow Jones Industrial Average market indices.

**Table 4 - Summary tables of CAARs for share buyback program announcements**

NASDAQ Composite				Dow Jones Industrial Average			
	CAAR[0,10]	CAAR[-5,-1]	CAAR[-3,3]		CAAR[0,10]	CAAR[-5,-1]	CAAR[-3,3]
2018	4,6271%***	1,2418%	4,8028%***	2018	5,5237%***	1,4423%	5,9276%***
2019	3,3943%***	-1,3028%	2,8179%***	2019	3,6630%**	-1,0319%	2,9747%**
2020	3,9770%*	1,3858%	2,1635%	2020	3,9732%*	1,1904%	2,0500%
2021	0,7301%	-0,1213%	0,6331%	2021	0,6657%	-0,2319%	0,2703%
2022	0,2519%	-0,5038%	0,0489%	2022	0,2253%	-0,3746%	0,4016%

\*\*\* p-value < .01, \*\* p-value < .05, \* p-value < .1

\*\*\* p-value < .01, \*\* p-value < .05, \* p-value < .1

#### 4. DISCUSSION

The estimates indicate that results vary with the benchmark adopted (the NASDAQ Composite, which is more technology-oriented, versus the more diversified Dow Jones Industrial Average). They also suggest that identical event types may generate different effects on shareholder profitability.

Dividend announcements appear to elicit heterogeneous reactions across time, likely reflecting market conditions, the economic and political environment, and investor sentiment. In 2020, the first dividend announcement produced a positive surprise effect across almost all event windows, irrespective of the benchmark. This pattern is consistent with dividend signalling (Al-Shattarat & Al-Shattarat, 2017; Dhume & Makandar, 2021) and with anticipatory market behaviour documented in prior work (Khanal & Mishra, 2017; Rabbani, 2017). The positive reaction may reflect investors' favourable interpretation of maintained or increased dividends during the COVID-19 period, when mobility restrictions coincided with rapid growth in the technology sector (e.g., stronger demand for computers and the expansion of remote communication and e-commerce platforms).

Similarly, the fourth dividend announcement in 2021 generated a positive surprise across most event windows under both indices, consistent with signalling and market anticipation (Dhume & Makandar, 2021; Fanghui & Zhiyu, 2019; Rabbani, 2017). As this announcement reflects prior-quarter outcomes and may convey information about prospects for the following year, it may be particularly informative to investors. However, based on the Dow Jones Industrial Average, the fourth announcement is associated with a significantly negative surprise effect, which may capture early signs of stress in the technology sector after the post-pandemic expansion.

By contrast, interim dividend announcements (announcements 2 and 3) in 2021 and 2022 do not appear to affect shareholder profitability. This result aligns with evidence supporting dividend irrelevance in certain contexts (Alaeto, 2018; Legenzova et al., 2017; Modigliani and Miller, 1961). In 2019, announcement 2 is associated with a negative effect around the event date, whereas announcement 3 shows a positive and statistically significant post-event response.

Share buyback announcements generated a significant and positive post-event impact in 2018, 2019, and 2020, indicating a favourable investor reaction. This finding is consistent with a signalling interpretation (Ai-Chi Hsu et al., 2019; Andres et al., 2018; Brown, 2007; Chong et al., 2015; Koopmans, 2022). In addition to potential signalling, buybacks may increase liquidity, reduce shares outstanding, raise earnings per share, and convey positive information to the market.

In 2021 and 2022, the buyback effect weakened substantially, suggesting that repurchases were no longer perceived as a key instrument of shareholder remuneration in that period. Although undervaluation would typically predict a positive response, rising interest rates and heightened macroeconomic uncertainty likely eroded the traditional signalling channel. Higher rates raise financing costs and can reduce the attractiveness of buybacks, particularly in interest-sensitive sectors such as technology (Al Sharawi, 2022). Moreover, uncertainty linked to the post-pandemic recovery and geopolitical tensions—including the Russia–Ukraine war—may have increased risk aversion (Manconi et al., 2019), leading investors to interpret buyback announcements more cautiously. Overall, these results are consistent with evidence that buyback announcements lost informational relevance in that period (Bhargava and Agrawal, 2015; Kumar et al., 2019; Yadav, 2022).

Comparing both payout channels, share repurchase announcements exhibit a stronger market impact than dividend announcements, as they generate higher cumulative average abnormal returns (CAARs). This conclusion is broadly consistent with Mazur et al. (2023), who argue that repurchases are more sensitive to crisis conditions than dividends. In line with that view, the present results suggest that the relevance of buyback announcements declines after 2020, whereas dividend distributions remain comparatively more stable and, in some cases, increase in importance in subsequent years.

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Beyond identifying which announcement type has the greatest impact on shareholder profitability, this study contributes by analysing multiple dividend announcements within the year. This design is important to capture the stronger effects associated with announcements 1 and 4, which may be missed when dividends are treated as a single annual event. To the authors' knowledge, prior research has rarely adopted this intra-year perspective. The first dividend announcement may provide managers with an opportunity to signal confidence in the firm's prospects, while the fourth announcement may reinforce that signal—particularly when dividend policy is sustained—thereby acting as an indicator of annual performance.

Finally, using two benchmarks allows the analysis to distinguish index-specific dynamics. Buyback announcements display comparatively consistent behaviour across indices, supporting a signalling interpretation up to 2020, although this effect fades thereafter. Dividend announcements, in contrast, show greater variation and more pronounced divergences across indices, with both positive and negative signalling effects and differing degrees of market anticipation. Taken together, these patterns are compatible with the broader view that dividend announcement effects are less stable and may be closer to irrelevance in certain periods and settings.

## CONCLUSION

This article examines how dividend distribution and share buyback program announcements affect stock returns for NASDAQ-listed technology firms (2018–2022) and which event type has the stronger impact on shareholder profitability. A key contribution is the decomposition of dividends into four intra-annual announcements, allowing the analysis to identify which dividend events convey greater information.

Using an event-study design with two benchmarks (a technology-oriented index and a broader market index), the results indicate heterogeneous market reactions across payout mechanisms, announcement timing, and benchmark choice. For dividends, reactions are not stable across all announcements, consistent with limited incremental information for some events. However, the first and fourth dividend announcements exhibit the most pronounced effects, suggesting higher informational content at those points in the payout cycle, whereas the second and third announcements show weaker or negligible effects, consistent with anticipation and partial incorporation into prices.

For buybacks, the evidence shows a stronger positive market response - especially around 2020—consistent with repurchases functioning as a flexible payout instrument and, at times, a credible signal regarding valuation or expected cash-flow capacity. After 2020, the buyback effect diminishes, plausibly reflecting changes in macro-financial conditions and/or faster incorporation of repurchase-related information.

Overall, share repurchase announcements generate larger cumulative abnormal return responses than dividend announcements, and their effects appear more crisis-sensitive, consistent with repurchases being more discretionary while dividends are typically smoother and more persistent.

A key contribution is the intra-annual decomposition of dividend announcements into four events, which reveals substantial heterogeneity in market reactions that would be missed under an annual or single-event design.

## IMPLICATIONS

The study offers valuable contributions to the different stakeholders. Companies, for instance, need to develop a greater understanding of market behaviour, implement more effective strategic policies, and clearly assess the impact of their decisions on business performance. It also serves as a valuable resource for investors, allowing them to anticipate stock prices' behaviour following these announcements and, consequently, improve the management of their financial portfolio. During a share buyback program announcement, for example, stock prices tend to increase, making it an excellent time to consider selling shares.

Finally, this investigation provides academics, researchers, and practitioners with a comprehensive understanding of the current state of the art of a contemporary and highly controversial topic in financial literature. It enables them to introduce new and innovative approaches that will contribute to the evolution of a topic that has yet to reach a consensus despite the extensive discussion it has generated across the field of finance.

## LIMITATIONS AND SUGGESTIONS

The primary limitation of this study is that it only considers the abnormal returns of technology companies that distribute dividends quarterly, excluding all those that do not distribute dividends quarterly or have share buyback programs. Accordingly, generalized results can only be applied to this specific industry. Another limitation arises from the relevance that is attributed to the dividend distribution announcement, as the results reveal that the surprise effect of these announcements may differ depending on the timing of said announcement. Similarly, the impact of dividend distribution announcements may vary according

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to the company's distribution policy and financial performance, among other factors. While the first, second, third, and fourth dividend announcements within a year may seem similar, their differences may send distinct signals to the market.

Another limitation is that the study does not identify the specific values of the dividend distribution and share repurchases in each announcement. This may vary from announcement to announcement, influenced by the company's financial performance, cash reserves, and strategic objectives. Although it is possible to identify similarities between the structure of dividend distribution announcements and share buyback program announcements, differences may arise from the specific circumstances that will influence each announcement.

Future research should extend this analysis to other industries. Although this study uses many daily observations, it is limited to 30 NASDAQ-listed technology firms that simultaneously announced interim dividends and share buybacks, which may affect inference; expanding the sample and extending the period would mitigate this constraint. Importantly, announcement effects may differ across sectors due to heterogeneity in capital intensity, cash-flow stability, regulation, and asset tangibility/intangibles—potentially altering both the magnitude and the direction of market reactions—thereby strengthening external validity.

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## AUTHORS' CONTRIBUTION

Conceptualization, J.A., P.P. and P.R.; data curation, J.A., P.P. and P.R.; formal analysis, J.A., P.P. and P.R.; funding acquisition, J.A., P.P. and P.R.; investigation, J.A., P.P. and P.R.; methodology, J.A., P.P. and P.R.; project administration, J.A., P.P. and P.R.; resources, J.A., P.P. and P.R.; software, J.A., P.P. and P.R.; supervision, J.A., P.P. and P.R.; validation, J.A., P.P. and P.R.; visualization, J.A., P.P. and P.R.; writing – original draft, J.A., P.P. and P.R.; writing – review & editing, J.A., P.P. and P.R.

## CONFLICT OF INTEREST

The authors declare no conflict of interests.

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