Stock Market Reaction to Earnings Announcements

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Abstract

This study examines how quickly earnings news is incorporated into prices in large U.S. equities and whether post-earnings-announcement drift (PEAD) remains economically meaningful in recent markets. Using quarterly earnings announcements for S&P 500 firms from 2022 to 2024, analyst expectations from I/B/E/S are matched to daily stock returns from CRSP and evaluated in a standard event-study framework. Earnings releases are classified according to whether reported earnings exceed, meet, or fall short of market expectations, allowing the analysis to separate “good news” from “bad news” events and to assess both the immediate announcement reaction and subsequent return continuation.

The evidence shows that earnings announcements remain clearly value-relevant. Stock prices react in the expected direction of the earnings news, and the response is asymmetric: disappointments trigger larger and more pronounced adjustments than comparable positive surprises, while near-zero surprises generate little average movement. At the same time, PEAD is small and sensitive to the normal-return benchmark, and the post-announcement pattern is not monotonic in the sign of the surprise, appearing closer to mild mean reversion than to classic continuation. Extending the drift analysis back to 2010 indicates that PEAD has gradually weakened over time for large-cap firms, and the sector breakdown reveals meaningful heterogeneity in announcement effects across industries. Overall, the results are consistent with rapid price discovery around earnings releases in S&P 500 stocks, leaving only limited and fragile short-horizon return predictability in the post-announcement period.

Keywords: earnings announcements; earnings surprises; event study; abnormal returns; post-earnings announcement drift (PEAD); market efficiency

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Resumo

Este estudo analisa a rapidez com que a informação contida nos anúncios de resultados é incorporada nos preços das ações de grandes empresas norte-americanas e avalia se o post-earnings announcement drift (PEAD) permanece economicamente relevante. Com base em anúncios trimestrais de empresas do S&P 500 entre 2022 e 2024, as expectativas dos analistas (I/B/E/S) são combinadas com retornos do CRSP e avaliadas num estudo de eventos. Os anúncios são classificados conforme os resultados superam, igualam ou ficam aquém das expectativas do mercado, permitindo distinguir "boas" e "más" notícias e medir a reação imediata e os retornos pós-anúncio.

Os resultados mostram que os anúncios continuam claramente relevantes para a valorização. Os preços reagem na direção esperada e de forma assimétrica: desilusões geram ajustamentos mais fortes do que surpresas positivas de magnitude semelhante, enquanto anúncios próximos de "sem surpresa" exibem pouca variação média. Em simultâneo, o PEAD é pequeno e sensível ao benchmark de retornos normais; o padrão pós-anúncio não é monotónico no sinal da surpresa e é mais consistente com ligeira reversão à média do que com continuação clássica. A extensão para 2010–2021 sugere um enfraquecimento gradual do PEAD em empresas de grande capitalização, e a decomposição por setores revela heterogeneidade relevante entre indústrias. No conjunto, a evidência é consistente com descoberta de preços rápida em torno dos anúncios em ações do S&P 500, restando previsibilidade limitada e pouco robusta.

Palavras-chave: anúncios de resultados; surpresas de resultados; estudo de eventos; retornos anormais; PEAD; eficiência de mercado

Título e Autor: *Reação do Mercado de Ações aos Anúncios de Resultados*, Alessandro Mondello

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List of Abbreviations

Abbreviation	Meaning
AAR	Average Abnormal Return(s)
AR	Abnormal Return(s)
CAAR	Cumulative Average Abnormal Return(s)
CAR	Cumulative Abnormal Return(s)
CF	Cash Flow(s)
CMM	Constant Mean Model
CRSP	Center for Research in Security Prices
EMH	Efficient Market Hypothesis
EPS	Earnings per share
ER	Expected Return(s)
GICS	Global Industry Classification Standard
I/B/E/S	Institutional Brokers' Estimate System
MM	Market Model
PEAD	Post-Earnings Announcement Drift
US	United States
WRDS	Wharton Research Data Services

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1. Introduction

Financial markets continuously process new information, and asset prices adjust as investors update their expectations about firms' future cash flows (CF) (Fama, 1970; Grossman & Stiglitz, 1980). Among corporate disclosures, earnings announcements play a central role because they provide periodic, audited summaries of firms' performance and are a key input into valuation and performance assessment (Ball & Brown, 1968; Beaver, 1968; Kothari, 2001). The sharp movements in prices and trading volumes observed around announcement dates indicate that these releases convey value-relevant information to market participants. Because the timing of earnings announcements is known in advance and the information they contain is relatively well defined, they offer a natural setting to study how quickly and accurately markets incorporate public information into prices.

The United States (US) provides a particularly relevant environment for this type of analysis. US equity markets are among the largest and most liquid in the world, characterized by broad investor participation, extensive analyst coverage and a long-standing disclosure regime enforced by the Securities and Exchange Commission (La Porta et al., 1998; Leuz & Wysocki, 2016). At the same time, the way information is disseminated and traded upon has evolved substantially with the rise of electronic and algorithmic trading and real-time news distribution (O'Hara, 2015; Hendershott & Riordan, 2013). Recent macroeconomic and market developments have further heightened uncertainty and the attention investors pay to firm-level news (Baker, Bloom & Davis, 2016; Bloom, 2014). Understanding how US stock prices react to earnings announcements in this environment is therefore important both for the assessment of market efficiency and for practical investment decisions.

The Efficient Market Hypothesis (EMH) developed by Fama (1970) provides the main theoretical benchmark. In its semi-strong form, the EMH states that security prices fully and immediately reflect all publicly available information, so that new disclosures such as earnings announcements should trigger an instant adjustment in valuations without leaving systematic abnormal returns (AR) once the information is released (Fama, 1970, 1991). Because announcement dates are known in advance and the news content is relatively well defined, event-study methodology can be used to isolate the market's reaction within a narrow time window around the release and to measure AR relative to a benchmark model. Under the EMH, any abnormal price reaction should be concentrated at, or very close to, the announcement, and no further predictable drift should be observed in the days that follow. Persistent patterns such as post-earnings announcement drift (PEAD) are typically interpreted as evidence of delayed

price adjustment and a challenge to the semi-strong form of market efficiency (Bernard & Thomas, 1989).

Alternative perspectives suggest reasons why prices might deviate from the fully efficient benchmark, even in a developed and liquid market such as the US. Behavioural finance highlights that investors may exhibit underreaction, overreaction, limited attention or overconfidence, which can generate temporary mispricing and slow incorporation of news (Barberis, Shleifer, & Vishny, 1998; Daniel, Hirshleifer, & Subrahmanyam, 1998). Institutional factors such as information asymmetries, differences in disclosure quality, and the role of legal enforcement and analyst coverage can also influence how quickly and accurately earnings information is reflected in prices (Bushman & Smith, 2001; Leuz & Wysocki, 2016). These theoretical perspectives jointly provide the framework for examining stock price reactions to earnings announcements and for interpreting potential deviations from full informational efficiency.

The central research question concerns whether US stock prices adjust quickly and efficiently to earnings announcements or whether there is evidence of delayed and heterogeneous reactions across firms and industries. The aim is to evaluate how earnings news is reflected in prices in a recent period for a large, developed equity market, and whether the observed return patterns are consistent with the semi-strong form of the EMH. Empirical analysis focuses on four main dimensions. First, the immediate stock price reaction to earnings announcements on US stock exchanges is examined, with particular attention to AR in a short event window around the disclosure date. Second, return behaviour in the days and weeks following earnings announcements is analysed to assess whether PEAD or other forms of delayed adjustment arise. Third, the magnitude and pattern of price reactions across industries are investigated, in order to identify sectors that exhibit stronger or weaker responses to earnings news. Fourth, the robustness of the results to alternative event windows and sample definitions is evaluated, and the behaviour of price reactions when earnings announcements coincide with periods of heightened macroeconomic uncertainty or major macroeconomic releases is explored. Consideration of these dimensions within a consistent event-study framework provides updated evidence on the informational efficiency of US equity markets with respect to earnings announcements.

2. Literature Review

2.1 Market Efficiency and Earnings Announcements

The concept of market efficiency provides the main theoretical benchmark for studying stock price reactions to corporate disclosures. In the seminal formulation of the EMH, asset prices at any point in time reflect all available information (Fama, 1970). The semi-strong form of the EMH posits that prices fully and rapidly incorporate all publicly available information, including scheduled announcements and regulatory filings, leaving no scope for systematic AR once the information has been released (Fama, 1970, 1991). In this framework, new information leads to an immediate adjustment in prices, and any predictable post-announcement patterns in returns are incompatible with full informational efficiency.

Earnings announcements are a natural testing ground for this view. They constitute a well-defined class of information events with pre-announced disclosure dates and a relatively homogeneous content structure. Early event-study research, such as Ball and Brown (1968) and Beaver (1968), documented systematic changes in returns, trading volume and volatility around earnings announcement dates, confirming that earnings contain value-relevant information. The event-study methodology formalised in MacKinlay (1997) exploits these features by focusing on narrow windows around the announcement and by measuring AR relative to a benchmark model of "normal" performance. Under the semi-strong EMH, any abnormal price reaction should be concentrated around the disclosure date, and no further predictable drift should be observed in subsequent days.

Within this framework, earnings announcements play a central informational role. They provide a periodic, audited summary of a firm's performance and are a key input in the valuation of equity, especially through earnings per share (EPS), which condenses information about profitability into a single, comparable metric (Brown, 1978). Because managers typically possess superior knowledge about the firm's prospects, there is an inherent information asymmetry between insiders and outside investors. Regular financial reporting, and in particular earnings disclosures, is intended to mitigate this asymmetry by releasing decision-relevant information to the market in a standardised form (Gunasekarage & Power, 2006; Mahmoudi et al., 2011). In standard valuation frameworks, earnings are used to forecast future CF and, by extension, firm value. Revisions in expected earnings lead investors to update assumptions about growth, risk and profitability, which feeds directly into discounted CF valuations (Cornell & Landsman, 1989). When investors perceive a discrepancy between updated valuations and

prevailing market prices, portfolio rebalancing generates observable price reactions around the announcement date (May, 1971).

Technological and regulatory developments have reshaped the informational role of earnings announcements in modern markets. Digital dissemination ensures that reports are accessible to investors within seconds, while improvements in reporting standards and disclosure rules have increased the reliability and comparability of earnings numbers (Landsman, Maydew, & Thornock, 2012; Beaver, McNichols, & Wang, 2018). These developments raise the question of how quickly contemporary markets incorporate earnings information into prices and whether observed price adjustments remain consistent with the semi-strong form of market efficiency.

2.2 Earnings Surprises and Stock Returns Reactions

A central strand of the earnings-announcement literature examines how stock prices react to the unexpected component of reported earnings. In this context, an earnings surprise is typically defined as the difference between actual earnings and a proxy for market expectations, scaled either by the price or by expected earnings. Early studies rely on time-series and random-walk models to generate earnings expectations, while later work increasingly uses financial analysts' consensus forecasts as a direct measure of the market's prior beliefs (Brown & Kennelly, 1972; Watts, 1978; Kross, 1982; Sponholtz, 2008; Rácz & Huszár, 2019).

Time-series based models assume that future earnings follow systematic patterns that can be extrapolated from historical data. Simple "naïve" models set next period's earnings equal to the previous period's earnings, sometimes adjusted by an average historical change (Kross, 1982; Mahmoudi et al., 2011). More sophisticated approaches estimate autoregressive models that capture persistence and seasonality, such as the Brown–Rozeff framework in which quarterly earnings are modelled as a function of lagged earnings and seasonal components (Watts, 1978). Linear regression models relating firm-level earnings changes to aggregate earnings movements have also been used to forecast expected earnings (Ball & Brown, 1968; Brown & Kennelly, 1972). These techniques are transparent and easy to implement but may not fully reflect the information set available to investors at the time of the forecast.

As analyst coverage expanded and databases such as Institutional Brokers' Estimate System (I/B/E/S) became widely available, many studies shifted towards consensus analyst forecasts as the benchmark for expected earnings. Consensus estimates aggregate individual analysts' projections and are argued to better capture the information held by the marginal investor than purely mechanical models (Kross, 1982; Sponholtz, 2008; Jagliński, 2020). Several studies

document that analyst-based expectations tend to outperform naïve and time-series models in forecasting earnings, and are therefore widely used in contemporary research on earnings surprises (Mahmoudi et al., 2011; Rácz & Huszár, 2019).

Based on these expectation measures, the literature commonly constructs standardized unexpected earnings or percentage surprises and analyses how short-horizon returns vary with the sign and magnitude of the surprise. Early evidence by Ball and Brown (1968) already shows that firms reporting earnings above a benchmark tend to experience positive AR, whereas firms with earnings below expectations tend to experience negative AR around the announcement. Using daily data, Brown (1978) confirms that positive earnings surprises are associated with significantly positive AR in a short window around the disclosure date, while negative surprises are associated with significantly negative AR. The bulk of the price reaction is concentrated close to the announcement, indicating that the surprise component of earnings is an important driver of short-run stock-price movements (Brown, 1978).

The size of the surprise also matters. Bamber (1986) finds that both the absolute magnitude of the earnings surprise and the associated revision in investor beliefs are positively related to abnormal trading volume over the three-day window surrounding the announcement. Foster, Olsen, and Shevlin (1984) sort firms into portfolios based on deciles of unexpected earnings and show that larger surprises are associated with larger AR in the immediate announcement window. Their results support a monotonic relation between the information content of the earnings news and the short-run price reaction, even though their analysis of medium-term returns is more closely related to the literature on post-announcement drift in earnings-related returns (Foster et al., 1984).

A related stream of research focuses on whether firms meet or beat analysts' expectations rather than on the continuous surprise measure alone. This literature emphasises that crossing salient thresholds may carry incremental signalling value. Bartov, Givoly, and Hayn (2002) show that firms that meet or beat current consensus forecasts earn higher announcement-period returns than firms with similar forecast errors that fail to meet expectations. Their findings suggest that investors place particular weight on whether reported earnings clear the consensus threshold, not just on the raw magnitude of the forecast error. Subsequent studies confirm that "meet-or-beat" behaviour is systematically rewarded in capital markets and has become an important dimension of how investors interpret earnings news, especially in environments with dense analyst coverage.

Another important aspect is the asymmetry between reactions to good and bad news. Several studies document that negative earnings surprises tend to elicit stronger price reactions than positive surprises of comparable size (Skinner & Sloan, 2002; Brown, Christensen, Elliott, & Mergenthaler, 2012). Skinner and Sloan (2002), for example, find that growth firms experience particularly large negative AR following disappointing earnings, whereas positive surprises do not generate equally strong positive returns. This asymmetry is often linked to loss aversion and the greater informational weight investors attach to downside revisions in profitability. Brown et al. (2009) further show that bad news is associated with more pronounced adjustments in information-asymmetry proxies than good news, reinforcing the notion that negative earnings surprises have a disproportionate impact on the information environment and trading behaviour.

While most of the early literature implicitly assumes that no-surprise announcements should not trigger meaningful price reactions, more recent evidence calls this view into question. Some studies find that when reported earnings match expectations within a narrow band, announcement-period AR are statistically indistinguishable from zero, suggesting that prices had already anticipated the news (Nur, 2021). By contrast, Rácz and Huszár (2019) document significantly negative short-window AR for "no-surprise" announcements in US data, indicating that even earnings news classified as neutral relative to analysts' forecasts can be accompanied by systematic price adjustments. This finding challenges the simple notion that only positive and negative surprises matter and suggests that the interpretation of seemingly neutral announcements may be more complex than previously thought.

Beyond returns, earnings surprises have also been linked to changes in market quality. Brown, Hillegeist, and Lo (2009) report that positive surprises are associated with subsequent reductions in proxies for information asymmetry, whereas negative surprises tend to increase them. These patterns indicate that earnings news not only moves prices but also affects the distribution of information across market participants and the conditions under which securities trade.

2.3 Post-Earnings Announcement Drifts (PEAD)

Beyond the immediate reaction to earnings surprises, a large number of studies document that stock returns continue to move in the direction of the earnings news for some time after the announcement. This pattern, known as PEAD, describes the tendency of firms with positive earnings surprises to earn abnormally high returns, and firms with negative surprises to earn

abnormally low returns, over subsequent days, weeks, or even months after the disclosure (Foster, Olsen, & Shevlin, 1984; Bernard & Thomas, 1989; Mahmoudi, Shirkavand, & Salari, 2011).

Early evidence of PEAD arises in the context of studies on market reactions to earnings more generally. Beaver (1968) and Watts (1978) already note that abnormal price and volume effects extend beyond the announcement day, suggesting that the market continues to process the information after the initial release. Foster et al. (1984) provide more systematic evidence by forming portfolios sorted on unexpected earnings and showing that both the direction and the size of the earnings surprise explain a substantial share of the post-announcement return differentials: they report that surprise and firm size jointly account for a large portion of the observed drift in the months following earnings releases. Bernard and Thomas (1989, 1990) formalise PEAD as a robust anomaly, documenting that stocks in the highest earnings-surprise deciles continue to outperform those in the lowest deciles for several quarters after the announcement, even after controlling for size and simple risk adjustments.

Subsequent research confirms the existence of PEAD in different markets and settings. Studies for the United Kingdom and other European countries, such as Liu, Strong, and Xu (2003) and Forner, Sanabria, and Marhuenda (2009), report similar patterns of PEAD in local data, while also highlighting that the magnitude and duration of the effect can vary across firm characteristics and institutional environments. Firm size, in particular, appears to play an important role. Bernard and Thomas (1989) find that drift for larger firms tends to be concentrated within roughly six months after the announcement, whereas for smaller firms it can persist for up to nine months; these findings are broadly consistent with earlier evidence that PEAD can extend over horizons of up to half a year (Watts, 1978).

The accumulated evidence has made PEAD one of the most widely discussed anomalies in empirical asset pricing and has triggered an ongoing debate about its implications for market efficiency. One line of research interprets PEAD primarily as evidence of delayed price adjustment and market inefficiency. In this view, the persistence of AR in the direction of the earnings surprise contradicts the semi-strong form of the EMH, which posits that public information should be fully reflected in prices shortly after its release. Studies such as Burghof and Johannsen (2009) argue that the size and robustness of PEAD, even after controlling for conventional risk factors, are difficult to reconcile with fully efficient markets (Burghof & Johannsen, 2009; Mahmoudi et al., 2011).

A second line of research proposes explanations that are compatible with market efficiency and emphasises risk, frictions, and methodological issues. Foster et al. (1984) and Ball (1978) suggest that the observed drift may partly reflect limitations of the Capital Asset Pricing Model (CAPM) and related benchmarks used to estimate expected returns (ER). If large earnings surprises coincide with changes in firm-specific risk, the resulting return patterns could represent compensation for bearing additional risk rather than mispricing. Building on this idea, Ball, Kothari, and Watts (1993) argue that extreme earnings outcomes may signal rising risk and higher betas, implying that at least part of PEAD might be explained by time-varying risk premia (Ball, 1978; Ball et al., 1993; Foster et al., 1984). However, Bernard and Thomas (1989) point out that firms with positive surprises tend to exhibit positive AR in both rising and falling markets, which is hard to reconcile with a purely risk-based explanation.

Behavioural and limited-attention explanations have gained prominence alongside these risk-based accounts. These approaches posit that investors underreact to earnings news because of psychological biases, cognitive constraints or competing information. Hirshleifer (2001) and Barberis and Thaler (2003) argue that underreaction can naturally lead to gradual price adjustment as investors slowly update their beliefs in response to confirmatory signals. Attention-based studies show that drift tends to be stronger when announcements occur in periods with high news congestion or when firms are small and attract less investor attention, consistent with delayed information processing (Forner & Sanabria, 2010; DellaVigna & Pollet, 2009). From this perspective, PEAD reflects systematic behavioural biases rather than rational compensation for risk.

More recent work examines whether the magnitude of PEAD has changed over time and whether it remains economically meaningful in modern, highly automated markets. Basu, Markov, and Shivakumar (2010) show that macroeconomic conditions such as inflation can distort the relation between earnings and underlying CF, complicating the interpretation of drift. Beaver, McNichols, and Wang (2018, 2020) and Collins, Li, and Xie (2009) document that the information content of earnings announcements and the immediate price response have increased in recent decades, raising the possibility that improved information environments and trading technologies have reduced the scope for persistent drifts (Collins et al., 2009; Beaver et al., 2018, 2020). At the same time, evidence for the most recent periods is mixed: some studies report that US markets now incorporate earnings information rapidly, with limited residual drift (Rácz & Huszár, 2019), while others still find signs of delayed adjustment or anomalies linked to specific firm segments or conditions (Nur, 2021).

2.4 Industry Level Evidence

Most empirical research on earnings announcements analyses stock-price reactions at the aggregate market level or across broad samples of firms. A growing strand of literature suggests, however, that the magnitude and speed of price reactions to earnings news can differ systematically across industries. Industries vary in terms of business models, regulation, cyclicality, information environments and investor clientele, all of which can shape how earnings information is generated, disclosed and interpreted.

Early work on cross-sectional differences in earnings-announcement reactions typically focuses on firm-specific characteristics such as size, analyst coverage or reporting timeliness, rather than on industry membership itself. Chari, Jagannathan, and Ofer (1988) and Atiase, Bamber, and Tse (1989) show that smaller firms and firms with less timely reporting tend to display larger announcement-period price reactions, consistent with a higher degree of information asymmetry. Chen, DeFond, and Park (2002) find that analyst coverage influences how quickly and precisely earnings news is incorporated into prices. These studies highlight that the strength of the market response to earnings depends on the surrounding information environment, which is often correlated with industry affiliation.

More directly, several contributions examine whether industry membership itself is associated with different earnings-announcement dynamics. Odendaal (2014) investigates firms listed on the London Stock Exchange and reports substantial variation in AR around earnings announcements across sectors. In some industries, such as Utilities, AR are significant already before the announcement, which is interpreted as possible information leakage, while in others the reaction is concentrated on the announcement day and the immediate post-announcement period. These findings suggest that sector-specific characteristics, such as regulation intensity, the prevalence of long-term contracts or the degree of investor attention, can influence both the timing and the magnitude of price adjustment to earnings news.

Industry-level differences also extend to the speed of information incorporation. When announcement-day AR are followed by insignificant returns on the next trading day, this pattern is typically regarded as consistent with semi-strong market efficiency (Jagliński, 2020). By contrast, significant AR on the post-announcement day are taken as evidence of slower adjustment or mild underreaction. Odendaal (2014) documents that some industries exhibit a more immediate price response, while others display a delayed reaction, reinforcing the notion that sectoral characteristics may affect how quickly investors process earnings news.

These industry patterns are often linked, at least conceptually, to underlying differences in regulation, business risk, and investor composition. Highly regulated industries, such as Utilities, may generate earnings streams that are more predictable and subject to tighter oversight, potentially reducing the surprise component of announcements and dampening market reactions. Sectors exposed to higher growth uncertainty or more intangible-intensive business models, such as technology or education-related services, may produce earnings news that is harder to forecast and more informative, leading to stronger price adjustments when results are released. Investor clientele and analyst coverage also vary systematically by industry, which can affect both the precision of expectations and the speed with which news is interpreted and traded upon (DeFond, Hung, & Trezevant, 2007; Beaver et al., 2018).

2.5 Gaps in the Literature

The literature on earnings announcements has established that reported earnings are value-relevant, that stock prices react systematically to earnings surprises, and that in many settings returns continue to drift in the direction of the news after the announcement (Ball & Brown, 1968; Beaver, 1968; Bernard & Thomas, 1989; Foster, Olsen, & Shevlin, 1984). Research using analyst forecasts has refined the measurement of surprises and documented asymmetric reactions to good and bad news, as well as patterns such as PEAD that challenge the simplest form of semi-strong efficiency (Bartov, Givoly, & Hayn, 2002; Skinner & Sloan, 2002; Brown, Christensen, Elliott, & Mergenthaler, 2012). More recent studies suggest that the information content of earnings and the intensity of announcement-period reactions have increased over time, reflecting changes in disclosure practices, trading technology and regulation (Collins, Li, & Xie, 2009; Beaver, McNichols, & Wang, 2018, 2020).

Despite this extensive body of work, several gaps remain. A first limitation concerns the time period covered by most studies. Many influential papers rely on data from the 1970s to early 2000s, and even those that document stronger price reactions in more recent decades typically end their samples around the mid-2010s (Collins et al., 2009; Beaver et al., 2018, 2020). Only a small number of contributions examine periods after 2016 or focus explicitly on the post-COVID environment, characterised by elevated macroeconomic uncertainty, sharp interest rate changes and shifts in investor behaviour.

A second gap relates to current market efficiency and the persistence of anomalies such as PEAD. The traditional PEAD literature documents sizeable and persistent drifts, whereas more

recent research finds weaker or disappearing drifts and, in some cases, largely efficient short- and medium-term price adjustment (Rácz & Huszár, 2019; Nur, 2021).

Third, the literature provides only limited and fragmented evidence on industry-level heterogeneity in reactions to earnings announcements. While some work documents that firm-level characteristics such as size, analyst coverage and reporting timeliness affect announcement-period returns (Atiase, Bamber, & Tse, 1989; Chen, DeFond, & Park, 2002), relatively few studies conduct systematic cross-sector analyses. Odendaal (2014), for example, finds substantial variation in announcement-period AR across industries on the London Stock Exchange and suggests that sector-specific features such as regulation and investor attention may drive these differences.

A fourth set of gaps concerns methodological consistency and robustness. Existing studies differ in their choice of data sources, event windows, estimation windows, surprise definitions and statistical tests, which complicates direct comparison of results. Older work often relies on Wall Street Journal dates or Compustat events, which may not capture the exact timing of announcements, whereas more recent studies use I/B/E/S data but still vary in their treatment of overlapping estimation windows, outliers and non-normal return distributions (Brown & Kennelly, 1972; MacKinlay, 1997; Sponholtz, 2008).

Finally, certain specific patterns in announcement-period reactions remain insufficiently understood. Recent evidence that “no-surprise” earnings announcements can be accompanied by significantly negative AR in some US samples, but not in others, illustrates that even seemingly neutral earnings news can generate systematic price movements whose interpretation is still debated (Rácz & Huszár, 2019; Nur, 2021). In addition, the interaction between earnings announcements and contemporaneous macroeconomic conditions or macro news has received relatively little attention in the empirical literature, despite the heightened macroeconomic uncertainty of the past few years.

These gaps point to the usefulness of analyses that focus on a recent observation window for a single, well-developed market, apply a consistent event-study framework, examine both short- and medium-term AR, explore cross-industry differences in the strength and timing of price reactions, and incorporate robustness checks with alternative event windows and sample definitions. Such evidence can help clarify how contemporary US equity markets process earnings news and how the patterns documented in earlier periods compare with those observed in the most recent years.

3. Empirical Strategy

3.1 Identification Strategy

The empirical design centres on quarterly earnings announcements as recurring, information-rich corporate events. Earnings releases provide standardized updates on firm performance and have repeatedly been shown to carry substantial information content for investors (Ball & Brown, 1968; Beaver, 1968).

For each firm and fiscal quarter, the event date is taken as the earnings-announcement date reported in the I/B/E/S database, corresponding to the first official release of quarterly EPS. The announcement day is labelled as event day 0. The trading day immediately preceding the announcement is denoted by −1 and the first trading day following the announcement by +1. When the reported announcement date falls on a non-trading day, such as a weekend or exchange holiday, the event day 0 is aligned with the next trading session, in line with standard practice in the event-study literature (MacKinlay, 1997; Jagliński, 2020).

To ensure that each observation reflects a distinct information release, the sample is restricted to one earnings announcement per firm and fiscal quarter. Multiple records for the same firm–quarter combination, for instance due to data revisions or duplicated entries, are removed during the data-cleaning process. Only quarterly earnings announcements are retained. Annual or semi-annual announcements are excluded to maintain a homogeneous reporting frequency across firms and to focus on the dominant disclosure rhythm in the US market.

A central design choice concerns the length of the event window, that is, the number of trading days before and after the event date over which stock returns are analysed. The literature employs a variety of event windows depending on the research objective. Studies interested in long-term adjustments often use relatively wide windows, such as ±20 trading days around the announcement (Foster et al., 1984), whereas research focusing on short-term price reactions to earnings news typically adopts narrow windows such as [−1,+1] or [0,+1] (Beaver, 1968; Beaver et al., 2018; Collins et al., 2009). As emphasised by MacKinlay (1997), the choice of window length involves a trade-off: the window should be wide enough to capture the full market reaction, but not so wide that it incorporates excessive noise from unrelated news.

In line with short-horizon studies of earnings announcements, the baseline specification employs a symmetric three-day event window from −1 to +1 around the announcement day. This window is designed to capture potential information leakage on the day before the

announcement, the primary reaction on the announcement day itself, and any short-lived delayed adjustment on the following trading day, while limiting the influence of other firm-specific or macroeconomic events occurring further away from the disclosure date. Longer post-announcement windows such as [+2,+20] and extended short-run windows such as [−3,+3] are examined separately when analysing drift and robustness.

To characterise the information content of each announcement, an earnings-surprise measure is constructed by comparing reported earnings with the corresponding analyst consensus. For each firm–quarter observation, the last median I/B/E/S EPS forecast available before the announcement date is used as the proxy for market expectations. The earnings surprise is defined as the percentage deviation of actual EPS from this consensus estimate, which aligns with common practice in the earnings-announcement literature (Kross, 1982; Sponholtz, 2008; Rácz & Huszár, 2019).

Announcements are then grouped into three categories based on a symmetric ±2.5% materiality band around zero:

(i) Positive surprise (Beat): actual EPS exceeds the consensus estimate by more than 2.5%;
(ii) Neutral surprise (Meet): the deviation between actual and expected EPS lies within ±2.5%;
(iii) Negative surprise (Miss): actual EPS falls short of the consensus estimate by more than 2.5%.

This classification filters out very small forecast deviations that are unlikely to trigger meaningful trading responses and focuses attention on economically relevant differences between announced and expected earnings. The relatively high share of positive surprises and the non-trivial fraction of negative surprises are consistent with earlier findings that firms have incentives to meet or slightly exceed analysts' expectations, while disappointments still occur with sufficient frequency to study potential asymmetries between good and bad news (Bartov, Givoly, & Hayn, 2002; Skinner & Sloan, 2002).

3.2 Data Selection

The selection and preparation of the dataset are central to the implementation of the event-study methodology. Prior research on earnings announcements employs a variety of data sources, markets and cleaning procedures, which differ in terms of observation periods, the number of announcements included and the treatment of outliers or missing data (Brown & Kennelly, 1972; Bernard & Thomas, 1989; Chen et al., 1997; Mahmoudi et al., 2011). Early studies often

relied on manually collected announcement dates from newspapers such as the Wall Street Journal (Brown & Kennelly, 1972), whereas later contributions increasingly use standardised databases such as Compustat, Zacks Research or official exchange filings (Chari et al., 1988; Chen et al., 1997; Mahmoudi et al., 2011). More recent work predominantly draws on the Institutional Brokers' Estimate System (I/B/E/S), which provides harmonised data on earnings announcements, reported EPS and analyst forecasts (DellaVigna & Pollet, 2009; Sponholtz, 2008).

In line with this more recent literature, earnings-announcement data for US firms are obtained from the I/B/E/S Summary Statistics and I/B/E/S International databases, accessed via Wharton Research Data Services (WRDS). The sample universe is defined by the constituents of the Standard & Poor's 500 Index (S&P 500), which comprise large, liquid US firms with broad analyst coverage. Restricting the analysis to S&P 500 firms helps ensure that the earnings and forecast data are of relatively high quality and that the results are representative of the core segment of the US equity market most relevant for institutional and retail investors.

The observation period spans from January 2022 to December 2024. This recent window serves two purposes. First, it allows the focus to be placed explicitly on current market efficiency, in line with contributions suggesting that US markets may now incorporate earnings information more rapidly than in earlier decades (Collins, Li, & Xie, 2009; Beaver, McNichols, & Wang, 2018, 2020). Second, starting the sample in 2022 excludes the immediate effects of the COVID-19 crisis and the associated stock-market crash in March 2020, as well as the period of elevated volatility that persisted until the end of 2021 (Mazur et al., 2021; Khan et al., 2024). This mitigates the risk that AR estimates are distorted by extraordinary market conditions unrelated to earnings announcements, while still capturing a period characterised by heightened macroeconomic uncertainty and changing interest-rate environments.

The initial I/B/E/S extract for the US S&P 500 universe contains 71,162 observations over the 2022–2024 period. Each observation includes the firm's I/B/E/S identifier (oftic), company name, fiscal-period end date, the number of contributing analyst forecasts, the median consensus EPS estimate, the reported actual EPS and the corresponding earnings-announcement date. Several data-preparation steps are applied to obtain a clean and temporally consistent dataset suitable for the event-study analysis.

First, all observations with missing or invalid announcement dates are removed, as a precise disclosure date is essential for defining the event day and constructing event windows around

the announcement. Second, for each firm–period pair, all analyst forecasts recorded after the actual announcement date are excluded. These ex post forecasts cannot reflect ex ante market expectations and would bias the measurement of earnings surprises if retained. Third, in cases where I/B/E/S reports multiple consensus estimates for the same earnings period, recorded at different points in time, only the most recent consensus issued before the announcement date is retained. This follows standard practice, which treats the last pre-announcement consensus as the most accurate summary of the market's expectations at the time of the event (Foster, Olsen, & Shevlin, 1984; Mahmoudi et al., 2011). Fourth, observations without a valid value for actual EPS or flagged as non-quarterly releases are excluded to maintain a homogeneous set of quarterly earnings announcements across firms. After these cleaning procedures, the working I/B/E/S dataset for the United States contains 5,891 valid firm-quarter earnings announcements from approximately 500 S&P 500 firms, each paired with a valid, pre-announcement consensus estimate.

Using the percentage earnings-surprise measure, and the ±2.5% materiality band, announcements are classified into positive (Beat), neutral (Meet) and negative (Miss) surprises. Table 1 reports the distribution of events across these categories: approximately 49.7% of the announcements are classified as positive surprises, around 18.0% as neutral and 32.3% as negative. The relatively high share of positive surprises is consistent with earlier evidence that firms have incentives to meet or slightly exceed analysts' expectations, while the presence of a substantial fraction of negative surprises allows for the study of potential asymmetries between good and bad news (Bartov, Givoly, & Hayn, 2002; Skinner & Sloan, 2002).

Table 1 – Distribution of Earnings Surprises (±2.5% Band)

Type	Count	Percent
Negative (Miss)	1,856	32.33%
Neutral (Meet)	1,031	17.96%
Positive (Beat)	2,854	49.71%
Total	**5,741**	**100%**

Table 2 presents the distribution of announcements by year. The number of observations is relatively evenly spread over the three years, which reduces the risk that the results are driven by a single year with atypical market conditions.

Table 2 – Distribution of Earnings Announcements by Year

Year	Frequency	Percent	Cumulative
2022	1,871	32.59%	32.59%
2023	1,921	33.46%	66.05%
2024	1,949	33.95%	100%
Total	**5,741**	**100%**	--

Table 3 provides descriptive statistics for key earnings variables, including actual EPS, consensus EPS and the percentage earnings-surprise measure. The mean surprise is close to zero, but the standard deviation is inflated by extreme values in the tails, a common feature of I/B/E/S data when very small EPS denominators are present. For this reason, medians and interquartile ranges (25th and 75th percentiles) are often more informative measures of central tendency and dispersion. Overall, the descriptive statistics confirm that the dataset contains a broad range of earnings outcomes, from large negative surprises to substantial positive beats.

Table 3 – Descriptive Statistics of Key Variables

Variable	Obs	Mean	Std. Dev.	P25	Median	P75
Actual EPS	5,741	2.213	6.073	0.720	1.400	2.480
Consensus EPS	5,741	2.156	5.476	0.750	1.390	2.410
Earnings Surprise (%)	5,741	-0.79	205.92	-6.250	2.439	11.111

To analyse stock-price reactions, the I/B/E/S earnings data are merged with daily stock returns from the Center for Research in Security Prices (CRSP), accessed via WRDS. CRSP provides daily total returns adjusted for dividends and corporate actions. In line with standard event-study practice, the sample is restricted to ordinary common shares (CRSP share codes 10 and 11) traded on major US exchanges such as the NYSE and NASDAQ, thereby excluding preferred shares, ADRs and other non-standard equity instruments (Fama et al., 1969; Brown & Warner, 1985; MacKinlay, 1997). The CRSP value-weighted market index is used as the benchmark for market returns in the estimation of normal returns.

The link between the I/B/E/S and CRSP datasets is established using the official WRDS I/B/E/S–CRSP Link File, which assigns each I/B/E/S identifier (oftic) to a CRSP PERMNO. To ensure reliable and unambiguous mappings, only matches with perfect agreement in both

the historical CUSIP and the ticker symbol are retained. This conservative matching strategy minimises the risk of misidentifying firms, even though it implies that some announcements without a high-confidence link are dropped. After applying the linking procedure, 5,741 earnings announcements can be successfully matched to CRSP daily return data, corresponding to around 97.5% of the cleaned I/B/E/S sample. Approximately 150 announcements cannot be matched due to identifier inconsistencies, delistings or missing return histories and are therefore excluded from the analysis.

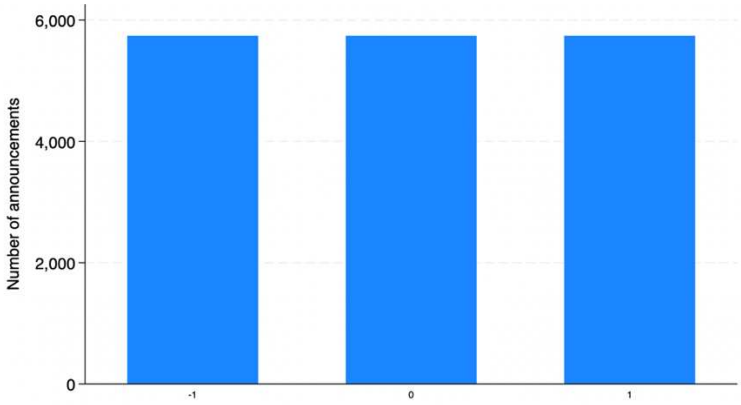
A manual check reveals that six announcements fall on non-trading days (weekends or US market holidays). Following Brown and Warner (1985), these events are reassigned to the next trading day, which becomes the event day 0 in event time. For the descriptive analysis of trading activity and raw returns around announcements, the full set of 5,741 matched events is used. For the event-study analysis, however, an additional data-quality filter is imposed. Normal returns are estimated over the pre-event window, which requires a minimum number of non-missing CRSP daily returns in this interval for each firm–announcement pair. One announcement (Warner Bros Discovery, 26 April 2022) does not satisfy this requirement because its pre-event return history in CRSP is too short to estimate the normal-return models and is therefore excluded from all AR and CAR calculations. As a result, the event-study sample used in the subsequent empirical analysis comprises 5,740 earnings announcements, whereas Tables 1-4 describe the broader matched announcement set of 5,741 observations.

In addition to firm- and event-level information, each announcement is matched to a Global Industry Classification Standard (GICS) sector. The match relies on Compustat identifiers linked to the CRSP PERMNOs used in the return data. Observations without a valid sector code remain in the aggregate sample but are excluded from the industry-level analysis. Restricting attention to announcements with complete sector and market-capitalisation information yields a subsample of 3,093 events over 2022–2024. Sector reactions are computed as value-weighted averages of firm-level $CAR_{[-1,+1]}$ within each GICS sector, with weights given by the announcing firm's market capitalisation at the preceding fiscal year-end.

For each matched announcement, a relative-day indicator is generated to construct the three-day event window from −1 to +1 surrounding the earnings release, covering the trading day before the announcement (−1), the announcement day (0) and the trading day after the announcement (+1). Combined with CRSP daily returns, this structure yields 16,373 firm-day observations. The theoretical total of 17,223 observations (3 × 5,741) is slightly higher because

some firms lack return data for one or both adjacent days. Such gaps are typical in large-scale event-study datasets and do not materially affect the representativeness of the sample. Figure 1 summarises the distribution of observations across the three event-window days, which is broadly balanced.

Figure 1 – Distribution of firm-day observations across event time



Source: Author's computations based on IBES and CRSP (WRDS).

Table 4 complements Figure 1 by reporting descriptive statistics for raw daily returns on each relative day.

Table 4 – Descriptive Statistics of Daily Returns (%)

Relative Day (τ)	N	Mean	Std. Dev.	P25	Median	P75
-1	5,741	0.10	1.93	-0.84	0.10	1.04
0	5,741	0.14	4.55	-1.77	0.13	2.16
+1	5,741	0.23	4.97	-1.86	0.16	2.20

As expected, return volatility increases substantially on the announcement day compared with the day before and the day after, consistent with the release of firm-specific information and prior evidence on earnings-announcement effects (Beaver, 1968; Kim & Verrecchia, 1991).

3.3 Event Study

The core idea of the event-study methodology is to separate the component of a stock's return that is attributable to normal market movements from the component that can be associated with a specific information event, in this case the quarterly earnings announcement.

Let $R_{i,t}$ denote the daily simple total return (CRSP RET) for firm i on day t, including distributions. For each firm announcement pair, an event date $t = T_{i0}$ is identified

corresponding to the earnings-announcement day. Following standard practice, returns are then expressed in event time by defining:

$$R_{i,\tau} = R_{i,T_{i0}+\tau} \quad (1)$$

Where τ denotes the number of trading days relative to the announcement date. In the baseline specification, the event window comprises the three days $\tau = -1,0,+1$, covering the day before, the day of and the day after the earnings announcement.

In the absence of an earnings announcement or any other firm-specific news, the return on a stock is expected to follow some normal return process that reflects general market movements and the firm's risk characteristics. Let $E(R_{i,\tau})$ denote the expected (normal) return for firm i on event day τ implied by a given return-generating model. In practice, this ER is not observed and must be estimated based on historical data over an estimation window prior to the event.

The AR for firm i on event day τ is defined as the difference between the realised return and the corresponding normal return estimate:

$$AR_{i,\tau} = R_{i,\tau} - \hat{\mathrm{E}}\big(R_{i,\tau}\big), \quad (2)$$

Where $\hat{E}(R_{i,\tau})$ is the model-based estimate of the ER. Intuitively, the AR captures the part of the stock's performance that cannot be explained by general market conditions or the firm's usual return pattern. Under the semi-strong form of market efficiency, any significant reaction to new public information should be reflected in these AR rather than in the normal component.

For each earnings announcement, AR can be aggregated over time within the event window to obtain a summary measure of the net price reaction to the earnings news. The CAR for firm i over an event window from τ_1 to τ_2 is given by:

$$CAR_{i,(\tau_1,\tau_2)} = \sum_{\tau=\tau_1}^{\tau_2} AR_{i,\tau} \quad (3)$$

In the baseline analysis, the focus is on the three-day window $[-1,+1]$, so that:

$$CAR_i(-1,+1) = AR_{i,-1} + AR_{i,0} + AR_{i,+1} \quad (4)$$

This measure condenses the pre-announcement, announcement-day and immediate post-announcement reaction into a single figure for each firm–quarter event. Longer windows, for instance extending several days or weeks beyond the announcement, are considered when analysing PEAD.

Since the interest lies in the average reaction across many events, AR are also aggregated across firms. Let N_τ denote the number of firms with available data on event day τ. The average abnormal return (AAR) on day τ is defined as:

$$AAR_\tau = \frac{1}{N_\tau} \sum_{i=1}^{N_\tau} AR_{i,\tau} \tag{5}$$

The AAR measures the mean deviation of stock returns from their normal level on a given event day and provides a first indication of whether, on average, the market prices in the earnings news on that day.

To assess the cumulative effect over an event window for the entire sample, the cumulative average abnormal return (CAAR) is computed as the sum of the AARs over the relevant range of event days:

$$CAAR(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AAR_\tau \tag{6}$$

For the main short-window analysis, the primary object of interest is therefore $CAAR(-1, +1)$, which summarises the average three-day market reaction to quarterly earnings announcements. In addition, the distribution of firm-level CAR is examined across surprise categories and industries to capture heterogeneity in the strength and direction of the price response.

These definitions of normal returns, AR and their cumulative counterparts provide the basis for the statistical analysis, where the significance and economic magnitude of the announcement-period reactions are evaluated for different subsamples and event windows.

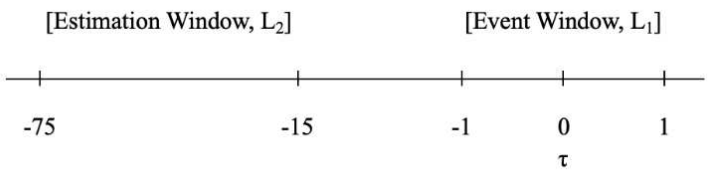
Inference is based on the cross-sectional distribution of AR across events. For each event day τ, average AR are computed as cross-sectional means across earnings announcements, and significance is assessed using a t-test of whether the mean equals zero. For cumulative measures such as $CAR(\tau_1, \tau_2)$, t-statistics are computed from the cross-sectional mean CAR across announcements and its corresponding standard error. Given the short event windows and large number of observations, this provides a simple benchmark consistent with standard event-study practice (Brown and Warner, 1985; MacKinlay, 1997).

Once the event and return measures are defined, the next step in the event-study methodology is to specify how normal returns are modelled and over which period the corresponding parameters are estimated. The choice of estimation window and normal-return model is crucial,

because it determines the benchmark against which AR are computed and thus affects both the magnitude and the precision of the estimated announcement effects (Brown & Warner, 1985; MacKinlay, 1997).

Normal returns are estimated over a pre-event estimation window that is separated from the event window. In this study, the estimation window spans from trading day $\tau = -75$ to $\tau = -15$ relative to the earnings announcement date, yielding $L_1 = 61$ trading days. The event window covers $\tau = -1$ to $\tau = +1$ and has length $L_2 = 3$ trading days, capturing the immediate stock price reaction to the announcement, with $\tau = 0$ representing the announcement day. Figure 2 summarises this event-time structure. This length reflects a compromise between having enough observations to obtain reliable parameter estimates and avoiding excessive exposure to structural breaks in the return-generating process. Ending the window well before the start of the event window also reduces the risk that pre-announcement information leakage or speculative trading around the earnings release contaminates the estimation of normal returns (MacKinlay, 1997; Beaver, 1968).

Figure 2 – Event-time structure of the event study



Source: Adapted from MacKinlay (1997)

Because quarterly earnings are released at relatively high frequency, it is not always possible to avoid all overlap between the estimation window of a given announcement and the event windows of earlier announcements for the same firm. Shortening the estimation window to eliminate any overlap would substantially reduce the number of observations available for parameter estimation and increase the sampling variability of normal returns. Following the approach adopted in many recent earnings-announcement studies, a limited degree of overlap is accepted as a trade-off in favour of more precise parameter estimates (Collins, Li, & Xie, 2009; Beaver, McNichols, & Wang, 2018).

Within this estimation window, two widely used statistical models are employed to obtain the normal returns $\hat{E}(R_{i,\tau})$:

(1) Constant Mean Model (CMM), and
(2) Market Model (MM).

Both models are estimated separately for each firm using only pre-event data. The resulting parameters are then applied to the days in the event window to generate model-based ER.

The CMM assumes that a firm's expected daily return is constant over the estimation window and equal to the historical average of its realised returns in that period (Brown & Warner, 1985; MacKinlay, 1997). Let $R_{i,t}$denote the daily return of firm i on trading day t, and let the estimation window for firm i consist of L_E days indexed by $t \in \mathcal{T}_i^{\text{est}}$ (corresponding to $\tau = -75, \dots, -15$). The constant mean return for firm i is then given by:

$$E(R_{i,\tau}) = \bar{R}_i = \frac{1}{L_E} \sum_{t=-75}^{-15} R_{i,\tau} \tag{7}$$

Under this model, the normal return for firm i on any event day τ is simply the estimated mean. Using this benchmark, AR in the event window are obtained by subtracting $\bar{R}_i$ from the realised event-time returns.

The main advantages of the CMM are its simplicity and robustness. It does not require a market benchmark and is straightforward to implement. When event windows are short and market-wide shocks tend to average out across firms, omitting an explicit market factor does not necessarily bias the results and may even avoid overfitting (Brown & Warner, 1985).

However, the model also has limitations. It implicitly assumes that the unconditional ER of the firm is stable over the estimation period and it does not control for systematic market movements. Strong co-movement between the firm and the market during the event window will therefore be absorbed into AR, potentially increasing their variance. For these reasons, the CMM is complemented by a market-adjusted specification.

To account explicitly for market-wide influences, the MM specifies a linear relationship between a firm's return and the return on a broad market index. Following standard practice in US event studies, the CRSP value-weighted market return including distributions ($vwretd$) is used as the market proxy (Collins et al., 2009; Beaver et al., 2018). The model is written as:

$$R_{i,\tau} = \alpha_i + \beta_i R_{m,\tau} + \varepsilon_{i,\tau} \tag{8}$$

Where $R_{i,\tau}$ is the return of firm i on day τ, $R_{m,\tau}$ is the daily return on the market index, α_i and β_i are firm-specific parameters, and $\varepsilon_{i,\tau}$ is an idiosyncratic error term with mean zero.

For each firm, the parameters α_i and β_i are estimated over the pre-event estimation window $t \in \mathcal{T}_i^{\text{est}}$ using ordinary least squares (OLS). The fitted values from this regression provide the model-based normal return for firm $i$on any event day τ:

$$\hat{\mathrm{E}}\big(R_{i,\tau}\big) = \hat{\alpha}_i + \hat{\beta}_i R_{m,\tau} \tag{9}$$

Where $R_{m,\tau}$ is the market return on the corresponding event day, and $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimated coefficients from the pre-event regression.

As before, AR during the event window are obtained by subtracting these normal returns from the realised returns. By conditioning on the realised market return, the MM removes the component of stock performance attributable to general market movements and isolates more clearly the firm-specific portion of returns. This tends to reduce the residual variance of AR and improves the power of statistical tests, especially in periods of elevated market volatility (Brown & Warner, 1985; MacKinlay, 1997).

The MM rests on the assumption of a stable linear relation between the firm and the market over the estimation and event windows, and it does not incorporate additional risk factors beyond the broad market. Although multi-factor models such as the Fama-French or Carhart specifications could, in principle, capture more of the covariance structure, they also introduce additional estimation noise and complexity. Prior research suggests that for short event windows the incremental gain from such models is often modest relative to the MM (Brown & Warner, 1985; MacKinlay, 1997).

Given these considerations, both the CMM and the MM are employed as complementary benchmarks for normal returns. Comparing results across the two specifications serves as a robustness check: if the main conclusions regarding announcement-period AR and post-announcement behaviour are similar under both models, this strengthens the interpretation that the findings are driven by the earnings events rather than by particular modelling choices.

4. Empirical Results

4.1 Price Reactions to Earnings Announcements

The analysis of stock-price reactions to quarterly earnings announcements begins with a short three-day window from trading day −1 to +1 around the announcement date. AR in this window summarise the immediate market response, capturing any limited anticipation, the main adjustment on the announcement day itself and very short-term follow-through. To move beyond the initial reaction, returns are then cumulated over a longer horizon from day +2 to

+20, which allows detection of PEAD without mechanically mixing it with the announcement-window effect. Finally, these patterns are examined across industries to see whether certain sectors respond more strongly or more sluggishly to earnings news. Throughout, AR are computed using the event-study set-up introduced earlier and summarised as cumulative abnormal returns (CAR).

The starting point is the average three-day reaction for all S&P 500 announcements between 2022 and 2024. Table 5 summarises the mean CAR$[-1,+1]$ under both the CMM and the MM, for the full sample and conditional on whether earnings miss, meet or beat analyst expectations.

Table 5 – US Earnings Announcements: Short-Window Results

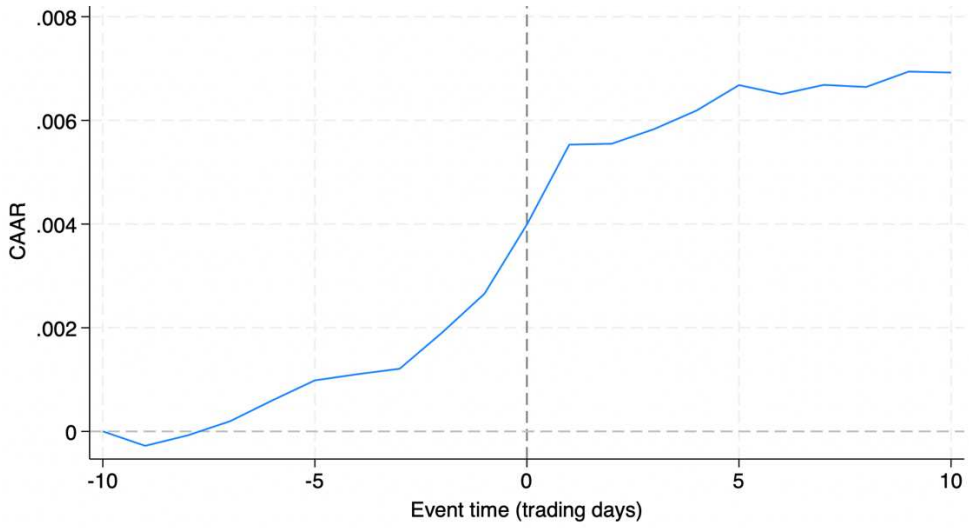
Statistic	Model	Mean (%)	Std. Dev. (%)
CAR [-1;+1]	Constant Mean Model	0.355***	7.04
		(3.82)	
CAR [-1;+1]	Market Model	0.363***	6.67
		(4.12)	

Note: t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.*

For the full sample of 5,740 firm-quarter observations, mean CAR$[-1,+1]$ is positive and statistically significant in both specifications, with point estimates of roughly one third of a percentage point. The CMM and MM deliver very similar average effects, and both t-statistics comfortably exceed conventional critical values. Even in a recent, highly liquid, large-cap US market, the typical earnings announcement is thus accompanied by a small but systematic price adjustment. Relative to early evidence such as Ball and Brown (1968), Beaver (1968) and May (1971), which often documented stronger AR around earnings releases, the effect here is more modest. This is consistent with the view that a larger fraction of earnings information is now anticipated and incorporated into expectations before the official release (Cornell & Landsman, 1989; Collins, Li, & Xie, 2009; Beaver, McNichols, & Wang, 2018, 2020). Nevertheless, the fact that the residual adjustment remains statistically robust suggests that earnings announcements still convey incremental information that matters for prices.

Figure 3 illustrates the timing of the average price reaction around earnings announcements, showing that most of the adjustment occurs on the announcement day, with little evidence of pre-announcement drift and only modest continuation thereafter.

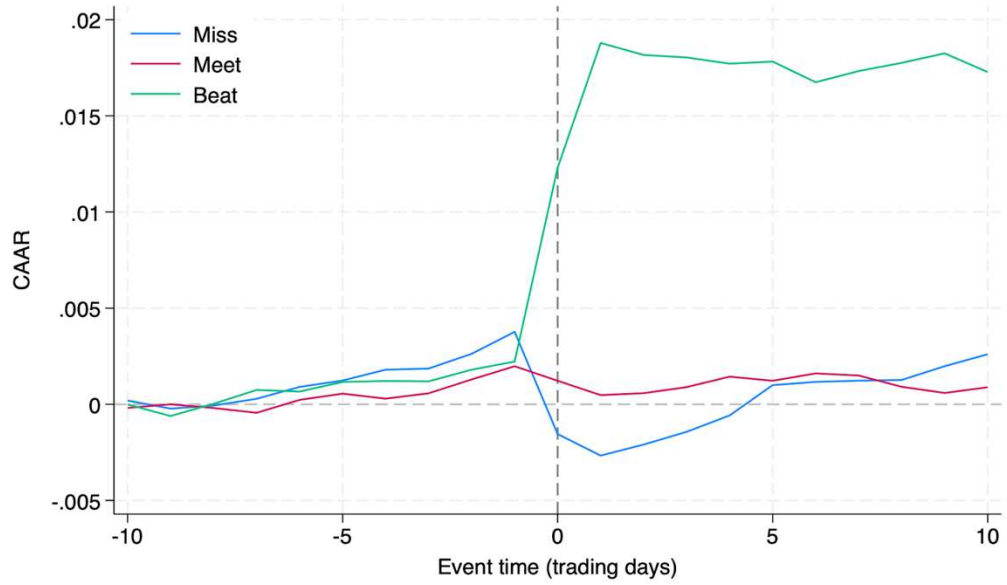
Figure 3 – Cumulative average abnormal returns around earnings announcements



Source: Author's computations based on IBES and CRSP (WRDS).

The sign of the earnings surprise is a key determinant of the reaction. When firms report earnings below analyst expectations, three-day CAR are clearly negative and significant; when earnings are close to expectations, CAR are small in magnitude and often statistically indistinguishable from zero; and when earnings exceed expectations, CAR are positive and strongly significant. The ordering Miss < Meet < Beat appears under both normal-return models. This pattern reproduces the basic "good news versus bad news" structure of the classic literature: Ball and Brown (1968), Brown (1978) and Foster, Olsen, and Shevlin (1984) all show that AR around the announcement co-move with the sign and size of unexpected earnings. It also lines up with the "meet-or-beat" literature, which emphasises that clearing the consensus threshold is particularly rewarded, over and above the raw surprise magnitude (Bartov, Givoly, & Hayn, 2002). The weak reaction for neutral announcements matches findings such as Nur (2021), where returns are close to zero when earnings fall in a narrow band around expectations. By contrast, the relatively strong and clearly negative response to misses mirrors the asymmetry documented by Skinner and Sloan (2002) and Brown, Hillegeist, and Lo (2009), who show that bad earnings news tends to be punished more than good news of comparable size is rewarded. Behavioural explanations such as loss aversion or greater attention to downside risks can account for this asymmetry, but it is also consistent with rational stories if negative surprises convey more information about firm viability or risk. Figure 4 visualises the event-time dynamics separately for miss, meet, and beat announcements. The divergence across the three curves highlights that the price adjustment is strongly dependent on the sign of the earnings surprise, consistent with the short-window CAR results in Table 5.

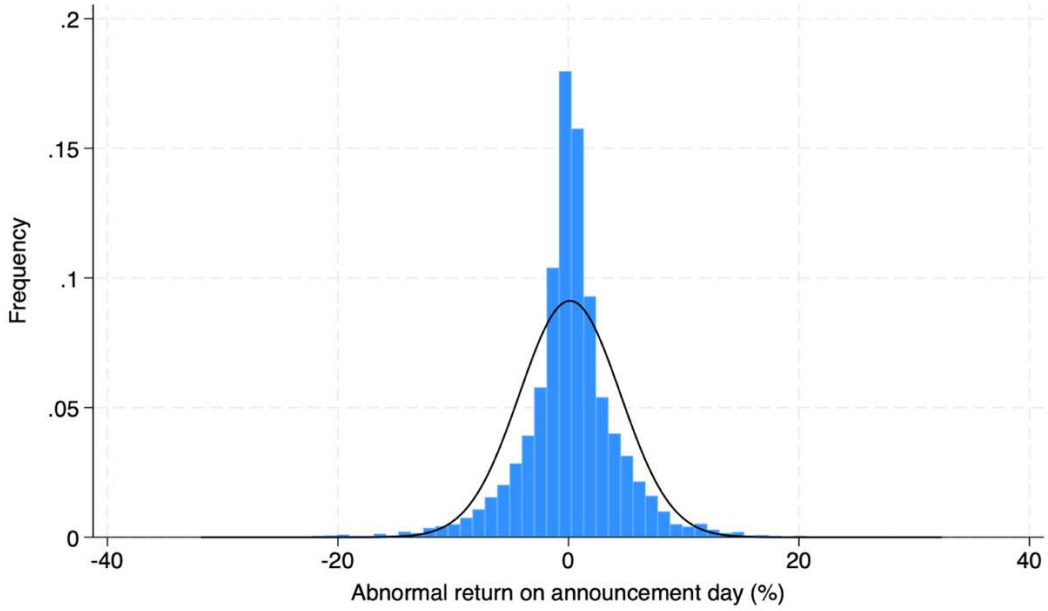
Figure 4 – Cumulative average abnormal returns by earnings-surprise category



Source: Author's computations based on IBES and CRSP (WRDS).

On day −1, average AR are very close to zero and statistically insignificant. There is therefore no strong evidence of systematic information leakage or anticipatory price drift at the aggregate level. On day 0, AAR jumps in the direction implied by the earnings news and is highly significant, reflecting the main absorption of information. On day +1, AAR remains slightly positive but is much smaller in magnitude and often only marginally significant, suggesting limited follow-through but no immediate reversal. The cumulative pattern resembles a discrete step on the announcement day, with a gentle slope on the next trading day and a subsequent flattening. The profiles for the CMM and MM are nearly parallel, with the MM producing a slightly higher CAAR because it filters out market-wide shocks and isolates firm-specific movements more precisely. From the perspective of the semi-strong EMH (Fama, 1970, 1991), this behaviour is close to the benchmark: prices adjust rapidly once the earnings news is released, and there is no sign of systematic pre-announcement drift or immediate post-announcement reversal. At the same time, the presence of a small but positive AAR on day +1 leaves room for some inertia in the price response. While the average reaction is informative, announcement-day AR are also highly dispersed across firms. Figure 5 shows the cross-sectional distribution of AR at $\tau = 0$, highlighting the presence of large positive and negative outliers.

Figure 5 – Distribution of abnormal returns on the earnings announcement day (τ = 0)



Source: Author's computations based on IBES and CRSP (WRDS).

A natural concern is that announcement-window returns might reflect not only firm-specific information but also other news arriving on the same days, especially macroeconomic releases that are known to move markets and attract attention. Monetary-policy decisions, inflation statistics and employment reports can affect discount rates and earnings expectations across many firms simultaneously. To examine this, earning dates are matched with Federal Open Market Committee meetings, Consumer Price Index releases and Non-Farm Payrolls announcements, and the sample is split accordingly. Table 6 reports three-day CAR for announcements that coincide with these macro events and for those that do not.

Table 6 – Short-Window CAR Conditional on Major US Macroeconomic Announcements

	Non-Macro-Days	Macro-Days
Subsample	(1)	(2)
Constant Mean Model	0.367%**	0.256%
	(2.08)	(0.43)
Market Model	0.344%***	0.516%**
	(3.40)	(2.00)

Note: t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

For earnings released on days without major macro announcements, mean CAR$[-1,+1]$ remains clearly positive and highly significant under both normal-return models, with magnitudes extremely close to the baseline full-sample values. For announcements on macro days, CAR are somewhat smaller on average and associated with larger standard errors. The difference between macro and non-macro days is modest relative to the cross-sectional dispersion of CAR, and there is no sign that the entire short-window effect is concentrated on those dates. These comparisons suggest that the measured announcement-window reaction is driven primarily by earnings-related information rather than by systematic macro shocks. The slightly weaker reaction on macro days fits well with attention-based models where investors allocate limited attention between firm-level and aggregate news when both arrive simultaneously (Hirshleifer, 2001; DellaVigna & Pollet, 2009). In such settings, firm announcements released on "quiet" days may receive more focused processing, leading to somewhat cleaner and more precisely measured reactions.

Short-window evidence therefore points to a quick and directional price adjustment to earnings news, with most of the reaction occurring around the announcement day and only minor contamination from macro events. The question that naturally follows is whether prices continue to drift in the direction of the news in the weeks after the release, as documented in the classic PEAD literature. To address this, CAR are aggregated from day +2 to day +20, denoted CAR[+2,+20]. Starting the window on day +2 avoids mechanical overlap with the announcement-window CAR$[-1,+1]$ and focuses on post-announcement dynamics. Table 7 summarises CAR[+2,+20] for the 2022–2024 sample under the two models.

Table 7 – Post-Earnings Announcement Drift for US Firms

Model	Mean (%)	Std. Dev. (%)
Constant Mean Model	0.735***	9.23
	(6.03)	
Market Model	0.164*	7.52
	(1.65)	

Note: t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Under the CMM, average twenty-day drift is positive and statistically significant, with mean CAR[+2,+20] around three-quarters of a percentage point and relatively high t-statistics. Under

the MM, the mean drift is considerably smaller and only marginally significant, and cluster-robust standard errors at the announcement-date level further weaken statistical significance. This sensitivity to the return benchmark matters for interpretation. Some of the apparent drift under the CMM likely reflects residual exposure to market-wide fluctuations that are not explicitly modelled, rather than a pure firm-specific mispricing effect. Once broad market movements are controlled for via the MM, the evidence for drift becomes weaker. Compared with the sizeable and persistent PEAD reported by Bernard and Thomas (1989, 1990), Foster et al. (1984) and Watts (1978) for earlier decades, where drift over several months could reach several percentage points, the magnitudes here are modest. From a trading view, a twenty-day drift of a few tenths of a percentage point, fragile to model choice and clustering, would be hard to exploit after realistic transaction costs. Drift is not uniform across types of earnings news. Table 8 reports CAR[+2,+20] separately for negative, neutral and positive surprises.

Table 8 – Post-Earnings Announcement Drift by Earnings-Surprise Category

	Negative (Miss)		Neutral (Meet)		Positive (Beat)	
Model	CMM	MM	CMM	MM	CMM	MM
Mean (%)	1.213***	0.559***	0.538	0.382	0.429***	0.121
	(6.06)	(3.48)	(0.85)	(0.71)	(2.72)	(-0.96)
Std. Dev. (%)	9.43	7.81	8.30	7.12	9.14	6.53
N	1,856	1,856	1,031	1,031	2,853	2,853

Note: t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.*

Under the CMM, post-announcement CAR[+2,+20] is small in all categories: negative and neutral surprises are followed by modestly positive average returns, whereas positive surprises exhibit slightly negative drift. Under the MM, the same ordering is present but the magnitudes are even closer to zero and rarely statistically significant. Taken together, these patterns do not point to classic PEAD continuation of the type documented by Bernard and Thomas (1989, 1990), where bad news is followed by further negative returns and good news by further positive returns. Instead, the twenty-day window reveals at most a mild tendency for prices to partially mean-revert: some of the initial reaction in the [−1,+1] interval is unwound in the following weeks, particularly after larger negative surprises. Given the very small economic magnitudes and the weak statistical evidence, this mean-reversion should be interpreted

cautiously and may reflect a combination of noise, normal variation in risk premia and residual model error rather than a robust anomaly.

The relatively modest twenty-day drift observed in 2022–2024 raises the question of whether the PEAD anomaly has weakened over time. To place the recent results in context, the same post-announcement window, $CAR[+2,+20]$, is estimated for S&P 500 quarterly earnings announcements over an extended sample from 2010 to 2021, using the MM for consistency. The extended sample is divided into the subperiods 2010–2012, 2013–2015, 2016–2018, and 2019–2021. These blocks are chosen to span distinct market environments and to keep the number of observations broadly comparable across periods, from the post-crisis expansion through the COVID and post-COVID period. Table 9 reports the average $CAR[+2,+20]$ by subperiod.

Table 9 - Twenty-Day PEAD by 3-Year Subperiod (Market Model, [+2,+20])

	2010-2012	2013-2015	2016-2018	2019-2021
Subperiod	(1)	(2)	(3)	(4)
Mean CAR (%)	0.38***	0.45***	0.30***	0.26***
	(4.96)	(7.18)	(4.24)	(2.65)
N	4,326	4,538	4,694	4,933

Note: t-statistics are reported in parentheses. ****, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.*

Two patterns emerge. First, twenty-day post-announcement drift is positive but economically modest throughout 2010–2021, and it appears to attenuate as the sample approaches the present. The mean $CAR[+2,+20]$ is 0.38% in 2010–2012 and 0.45% in 2013–2015, but declines to 0.30% in 2016–2018 and 0.26% in 2019–2021, with t-statistics falling from 7.18 in 2013–2015 to 2.65 in 2019–2021. Second, the weakening is primarily statistical rather than directional: drift remains positive in each subperiod but becomes less precisely estimated in the most recent block.

The 2022–2024 figures lie toward the lower end of the historical range and are associated with weaker t-statistics, suggesting that PEAD in large-cap US firms has not vanished but has become a low-amplitude phenomenon at the twenty-day horizon. This downward pattern is consistent with evidence that improvements in disclosure and faster information diffusion have reduced the scope for predictable return patterns based on public information, potentially

reinforced by algorithmic and high-frequency trading (Collins et al., 2009; Basu, Markov, & Shivakumar, 2010; Beaver et al., 2018, 2020; Rácz & Huszár, 2019).

Beyond time variation, there is also meaningful heterogeneity across industries. Using GICS sector classifications matched to the event-study sample, value-weighted sector-level CAR$[-1,+1]$ are computed for the 2022–2024 period. Table 10 reports sector averages and test statistics for the announcement window, both overall and by earnings-surprise category.

Table 10 – Value-weighted CAR[-1,+1] by GICS sector

GICS Sector	Code	N	CAR [-1;+1] (%)
Energy	10	164	-0.127
Meterials	15	238	-0.617
Industrials	20	604	0.345
Consumer Discretionary	25	346	0.236
Consumer Staples	30	269	0.324
Health Care	35	414	0.270
Financials	40	235	0.928
Information Technology	45	489	0.784
Communication Services	50	71	1.522
Utilities	55	143	0.292
Real Estate	60	120	0.612

Cyclical and growth-oriented sectors such as Information Technology, Communication Services and Consumer Discretionary tend to exhibit larger positive announcement-window CAR, particularly following earnings beats. These sectors typically feature higher uncertainty about future CF, greater reliance on intangible assets and rapid innovation, all of which make earnings harder to forecast and potentially more informative when realised. In contrast, more defensive or heavily regulated sectors, including Utilities and some segments of Financials and Real Estate, show smaller and often statistically insignificant CAR. In these sectors, earnings may be more predictable due to regulation, stable demand or contract structures, so surprises tend to be rarer or less extreme. Differences in analyst coverage and investor attention reinforce this picture: sectors that attract dense coverage and strong investor interest may see faster and

more precise incorporation of earnings news, while those that are less closely followed may react more weakly or with more noise (DeFond, Hung, & Trezevant, 2007; Beaver et al., 2018). Sector-level variation similar in spirit is documented by Odendaal (2014) for UK stocks, who also reports that regulated and stable industries display weaker announcement effects than more growth-driven sectors.

From a methodological perspective, these industry patterns highlight the value of looking beyond aggregate averages. The modest but significant announcement-window CAR for the full S&P 500 sample aggregates sectors where earnings announcements produce quite pronounced price movements with others where the reaction is barely distinguishable from zero. The sector results therefore complement the aggregate analysis and indicate that, while earnings announcements remain important information events for large US firms, the strength of the response is far from uniform across the market.

4.2 Robustness Checks

The baseline analysis focuses on the three-day window $-1, +1$, which captures the trading day before the earnings announcement, the announcement day and the following day. This choice is standard in the earnings-announcement literature and is motivated by the view that most of the price adjustment should occur very close to the release. To check whether the main conclusions depend on this specific horizon, the event window is widened to seven trading days, from $-3, +3$, and CAR are recomputed using both the CMM and the MM.

Table 11 reports the average seven-day CAR for the full 2022–2024 sample. Mean CAR$-3, +3$ remains positive and highly statistically significant in both specifications: around 0.57% under the CMM and 0.47% under the MM, with t-statistics above 4.7. The point estimates are only slightly larger than the corresponding three-day CAR$-1, +1$, which implies that extending the window adds relatively little additional drift beyond the immediate reaction. Economically, the magnitudes remain small, especially when compared with classic studies that often document multi-percentage-point movements over similar horizons.

Table 11 - Seven-Day CAR Full Sample [-3,+3]

Model	Constant Mean Model	Market Model
Mean CAR (%)	0.57***	0.47***
	(5.30)	(4.74)
N	5,740	5,740

Note: t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.*

Disaggregating the seven-day window by earnings-surprise category, as shown in Table 12, reinforces this interpretation. The ordering across categories is the same as in the baseline specification: negative surprises are followed by negative CAR, positive surprises by positive CAR, and "meet" announcements by little average movement. The fact that this pattern survives the wider window suggests that the headline results are not an artifact of an arbitrarily chosen event horizon. Instead, they point to a relatively fast incorporation of earnings news in large-cap US stocks, with only modest additional adjustment outside the tight announcement window.

Table 12 – Seven-Day CAR by Earnings-Surprise Category [-3,+3]

	Negative (Miss)		Neutral (Meet)		Positive (Beat)	
Model	CMM	MM	CMM	MM	CMM	MM
Mean (%)	-0.27	-0.35*	-0.13	-0.26	1.37***	1.27***
	(-1.37)	(-1.89)	(-0.57)	(-1.28)	(8.96)	(9.03)
Std. Dev. (%)	8.52	7.97	7.14	6.66	8.15	7.54
N	1,856	1,856	1,031	1,031	2,853	2,853

Note: t-statistics are reported in parentheses. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.*

Most of the earnings-related information appears to be incorporated into prices within a very short interval around the announcement, and any further adjustment in the surrounding few days is limited. This pattern is consistent with recent evidence that modern US markets typically process earnings news quickly, with only modest residual underreaction over short horizons.

5. Interpretation of the Results

5.1 Comparison with Previous Evidence

The evidence for S&P 500 firms over 2010–2024 confirms the basic message of the classic earnings-announcement literature, but with noticeably smaller magnitudes. Early studies such as Ball and Brown (1968) and Beaver (1968) show that earnings contain value-relevant information and that stock prices react sharply around disclosure dates. In those samples, announcement-window CAR often reach several percentage points. By contrast, the three-day CAR around quarterly announcements here are clearly positive and statistically significant, yet well below 1%. This suggests that prices still move systematically with earnings news, but that large mispricings of the type documented in the 1960s–1980s have become less common for large US firms.

The pattern by surprise category is very much in line with prior work. Positive earnings surprises are followed by small positive AR, negative surprises by larger negative ones, and "meet" announcements lie in between. This asymmetry echoes results in Foster, Olsen and Shevlin (1984), Bernard and Thomas (1989, 1990) and later studies using analyst forecasts, which all find stronger market reactions and drifts after bad news than after good news. The current estimates therefore fit a well-established empirical regularity: investors appear to penalise disappointments more aggressively than they reward small beats.

The post-announcement effects over CAR[+2,+20] are present but muted compared with earlier decades, and they do not display the classic monotonic PEAD continuation pattern. Bernard and Thomas (1989) report large drifts following earnings news, with especially pronounced continuation after extreme surprises. Here, the average CAR[+2,+20] is positive and statistically significant under the constant-mean specification, but the market-model estimates are markedly smaller and often only weakly significant in economic terms. Moreover, the drift is not strongly monotonic in the sign of the earnings surprise and is closer to mild mean reversion than to same-sign continuation. The historical back-test for 2010–2021 shows higher average drifts than the very recent 2022–2024 period, yet even those earlier subperiods fall short of the classic benchmark. This pattern is consistent with evidence that many return anomalies, including earnings-related predictability, have attenuated in more recent years as liquidity, arbitrage capital and information technology improved (Chordia, Subrahmanyam & Tong, 2014; Collins, Li & Xie, 2009; Beaver, McNichols & Wang, 2018).

Taken together, the results portray a market that reacts quickly to earnings news and leaves relatively little predictable return variation after the announcement. Post-announcement effects over CAR[+2,+20] are economically modest and sensitive to the return benchmark, and the pattern across surprise categories is closer to mild mean reversion than to the classic monotonic PEAD continuation documented in earlier decades. This is compatible with a "near-efficient" market in which limited attention and other frictions can generate small and transient deviations from full immediate adjustment (Hirshleifer, Lim & Teoh, 2009).

The cross-sector evidence also fits the broader literature. Technology- and consumer-oriented sectors, which tend to have more growth options and higher uncertainty, show stronger announcement reactions and somewhat larger drifts than more stable industries such as utilities and staples. Prior research documents similar heterogeneity by firm and industry characteristics: PEAD tends to be more pronounced for firms with higher risk, lower analyst coverage or more speculative CF profiles (e.g. Livnat & Mendenhall, 2006; Odendaal, 2014). Sector patterns in the current sample are therefore consistent with the idea that information environments and investor clientele shape how quickly earnings news is impounded into prices.

Finally, the robustness checks that separate macro-announcement days from ordinary trading days suggest that firm-specific earnings news remains economically relevant even when major macro releases occur. AR around earnings announcements are very similar on macro and non-macro days, which complements work on limited investor attention and "distraction" effects (Hirshleifer, Lim & Teoh, 2009) by indicating that, at least for large US firms, macro news does not fully crowd out the market's response to firm-level information.

5.2 Implications for Investors

The empirical results have several implications for investors who consider earnings announcements as trading signals or as inputs into portfolio decisions. While earnings releases remain clearly value-relevant and generate directionally predictable price responses, the magnitudes documented for S&P 500 firms in the post-2010 era imply that translating these patterns into reliable net profits is challenging once realistic frictions are taken into account.

First, the residual post-announcement drift appears too small and too model-sensitive to serve as a stand-alone strategy for most investors. Under the CMM, drift over the $\mathrm{CAR}[+2,+20]$ window is positive and statistically detectable, but under the MM the average drift becomes much smaller and often close to zero. This sensitivity suggests that any remaining continuation is not a stable "free lunch" but a mild deviation from full efficiency whose economic relevance

depends on modelling choices. After accounting for bid–ask spreads, commissions, price impact, and the operational need to diversify across many events, the remaining drift is unlikely to deliver robust risk-adjusted returns, particularly in highly liquid large-cap equities.

Second, the cross-sectional results indicate that if earnings-based strategies have any value, it is likely to be highly selective rather than mechanical. Announcement reactions and subsequent drift are stronger following large negative surprises and in certain sectors (especially technology, communication services, and some consumer-oriented industries) where uncertainty and growth-option values are higher. This points toward a more nuanced use of earnings information: active managers may benefit from conditioning on sector characteristics, surprise magnitude, and proxies for the information environment (such as analyst coverage or firm complexity) rather than treating all announcements as homogeneous signals. Even then, the incremental return predicted by such conditioning in this sample remains modest, and must be weighed against higher model complexity, parameter instability, and estimation risk.

Finally, the findings reinforce the role of earnings announcements as risk events rather than guaranteed profit opportunities. Earnings releases remain central for updating expectations about CF and can trigger sizeable firm-specific price adjustments, particularly when reported earnings deviate materially from consensus. For long-horizon investors, this underlines the importance of monitoring earnings news for valuation and portfolio risk management, even if average AR are small. For short-horizon traders, the combination of modest announcement effects, weak drift, and intense competition in S&P 500 names suggests that any earnings-related edge is likely to be narrow, fleeting, and dependent on superior information processing and execution rather than on the persistence of a simple anomaly.

6. Conclusion

6.1 Main Conclusions

Quarterly earnings announcements for S&P 500 firms over 2022–2024 continue to generate clear and systematic price responses. AR around announcement dates move in the expected direction of the earnings surprise: negative surprises are followed by negative AR, positive surprises by positive AR, and “meet” announcements by little average price movement. These findings confirm that earnings releases remain value-relevant information events in modern large-cap US equity markets.

Post-announcement CAR[+2,+20] are economically modest and sensitive to the return benchmark, and they do not display the classic monotonic PEAD pattern documented in earlier studies. The results are instead more consistent with mild mean reversion, with modestly positive CAR following negative surprises and near-zero or slightly negative CAR following positive surprises under the MM.

Extending the drift analysis to 2010–2021 places the recent results in a longer-run context. Average twenty-day drift is positive but small throughout the post-2010 period and declines across successive subperiods as the sample approaches the present, converging toward the levels observed in 2022–2024. In economic terms, the magnitudes are far below the multi-percent post-earnings drifts documented for earlier decades, indicating that PEAD in large-cap US equities persists mainly as a low-amplitude phenomenon at short horizons.

Earnings-related price reactions also vary across industries. Growth-oriented sectors exhibit stronger announcement-window responses and somewhat larger continuation than more defensive or regulated industries, consistent with sectoral differences in uncertainty and information environments. Robustness checks using a wider $[-3, +3]$ event window leave the qualitative conclusions unchanged.

6.2 Limitations & Suggestions for Further Research

A first set of limitations concerns scope and representativeness. The analysis focuses exclusively on firms in the S&P 500 index and on quarterly earnings announcements between 2022 and 2024, supplemented by an extended sample from 2010 to 2021 for the drift analysis. The conclusions therefore apply primarily to large, liquid US companies in a relatively recent period. Small-cap stocks, firms in other markets or earlier historical periods may exhibit different announcement dynamics. In addition, only scheduled quarterly earnings are considered; other forms of disclosure such as management guidance, conference calls, annual reports or unscheduled news are not analysed.

Second, the results are conditional on a specific measure of earnings surprises and a particular sample construction. Surprises are defined relative to I/B/E/S consensus forecasts, using a symmetric percentage band to classify beats, meets and misses. While this approach follows much of the literature, alternative surprise definitions might yield somewhat different patterns. The sample is also restricted by the availability and quality of I/B/E/S and CRSP data, which may introduce mild survivorship or selection bias towards larger and more transparent firms.

Third, the event-study methodology imposes strong identifying assumptions. AR are measured relative to simple CMM and MM estimated over pre-event windows, and it is assumed that no other systematic news affects returns in the immediate vicinity of the announcement. In practice, other firm-specific or macroeconomic events can occur around the same dates, and some earnings news may leak or be anticipated earlier. The analysis of macro-announcement days mitigates, but does not fully eliminate, this concern. In addition, the use of daily data does not capture intraday price dynamics, which may be important for understanding how quickly different types of investors react to news.

A further limitation relates to econometric and implementation issues. The tests are based on AARs and t-statistics that may be affected by cross-sectional dependence, heteroskedasticity and outliers, even though standard corrections are applied. The study does not explicitly model transaction costs, bid-ask spreads, market impact or short-selling constraints, all of which would be crucial for evaluating the profitability of any strategy that seeks to exploit the patterns observed in the data. Nor does it embed the announcement-related returns in a richer asset-pricing framework with multiple risk factors, which could shed light on whether some of the observed patterns reflect time-varying risk premia rather than mispricing.

These limitations suggest several avenues for further research. One natural extension would be to broaden the universe of firms and markets, for example by including mid-cap and small-cap stocks, non-US markets or cross-listed firms, in order to study how earnings-announcement reactions vary with firm size, institutional setting and investor base. A second direction would be to enrich the information set, combining earnings surprises with qualitative measures such as the tone of conference calls, management guidance or textual features of earnings releases, and examining how these dimensions jointly affect prices and trading. A third avenue would be to develop and test more realistic trading strategies based on the patterns documented here, incorporating transaction costs, execution constraints and risk management. Such strategies could explore cross-sectional tilts towards particular surprise categories or sectors, dynamic timing around announcement dates, or combinations of earnings news with other signals such as momentum or valuation ratios. A fourth direction would be to exploit higher-frequency data to analyse intraday price discovery, order-flow dynamics and liquidity provision around earnings announcements, shedding further light on the mechanisms through which information is incorporated into prices.

Finally, further work could investigate the interaction between macroeconomic conditions and earnings announcements in more detail, for example by conditioning on periods of high policy uncertainty, large interest-rate changes or market stress episodes. This could help clarify whether the modest PEAD observed in recent years is stable across different macro environments or whether it strengthens in particular states of the world. Such extensions would deepen understanding of how contemporary equity markets process earnings news and how close they come to the benchmark of semi-strong informational efficiency.

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