Post-Earnings Announcement Drift in the 21st Century: Evidence from US Equities

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Abstract

This paper re-examines the post-earnings announcement drift (PEAD) anomaly in the US equity market using data from 2000 to 2023. Employing an event study framework, I define earnings surprises using both accounting-based standardized unexpected earnings (SUE) and analyst forecast-based measures (IBES). I analyze cumulative abnormal returns (CARs) for portfolios sorted by SUE, and conduct firm-level cross-sectional regressions controlling for size, book-to-market, momentum, and fixed effects. While graphical analysis might suggest a continuation of the drift pattern, the core results challenge this interpretation. Once standard firm characteristics are included, the predictive power of SUE becomes statistically insignificant. These findings hold across multiple benchmark models. Overall, the evidence suggests that in the modern market environment, the PEAD anomaly has weakened and is largely subsumed by other priced risk factors, raising questions about its persistence as an independent inefficiency.

Keywords: Post-Earnings Announcement Drift, Market Efficiency, Event Study, Asset Pricing, IBES.

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1 Introduction

Earnings announcements play a central role in financial markets by providing regular updates on a firm's performance. A well-documented anomaly in this context is the post-earnings announcement drift (PEAD), which refers to the tendency of stock prices to continue moving in the direction of an earnings surprise for weeks or months after the announcement. First documented by Ball and Brown (1968) and later studied in detail by Bernard and Thomas (1989), PEAD raises important questions about market efficiency and investor behavior. This paper revisits the anomaly in a modern context, focusing on whether it still generates predictable returns for large, well-covered US firms between 2000 and 2023. The findings suggest that for these firms, the classic drift has weakened significantly and may now be largely explained by known risk factors or eliminated through arbitrage.

2 Literature Review

The PEAD is widely regarded as a direct challenge to the Efficient Market Hypothesis (EMH), which asserts that asset prices fully reflect all available information (Fama, 1970). Ball and Brown (1968) were the first to observe that stock prices continue to drift in the direction of earnings surprises even after the announcement date. This systematic underreaction to public news, famously dubbed "the granddaddy of all under-reaction events" (Fama, 1998), has motivated decades of research into its underlying causes. The economic significance of the anomaly is substantial, with early studies documenting that trading strategies based on the drift could yield significant abnormal returns (Bernard and Thomas, 1990).

Two main categories of explanation have emerged in the literature. Behavioral theories (see, e.g., Forner and Sanabria 2010; Liang 2003; Hong and Stein 1999) argue that investors underreact to earnings news due to cognitive biases, including conservatism and cognitive processing limits (DellaVigna and Pollet, 2009). Daniel et al. (1998) suggest that overconfidence and biased self-attribution may lead to systematic mispricing. On the other hand, risk-based explanations (Sadka, 2006; Kim and Kim, 2003) propose that firms with high unexpected earnings may carry unobserved risk exposures that warrant higher expected returns.

Several recent studies argue that the magnitude of PEAD has declined significantly in recent decades and may have even disappeared for many stocks (Martineau, 2023). However, a parallel stream of research argues that the anomaly may persist in specific market segments or when measured using novel methodologies such as machine learning-based signals (see, e.g., Wang and Lee 2021; Liu et al. 2022).

3 Data and Methodology

3.1 Data Sources

My analysis uses a sample of 50 US firms over the period from January 2000 to December 2023. The data sources and key parameters for the event study are summarized in Table 1.

Table 1: Summary of Event Study Design

Parameter	Specification
Data Sources	CRSP Daily, Compustat Quarterly, I/B/E/S
Sample Period	January 1, 1999 - December 31, 2023[a]
Sample Firms	50 specified US firms[b]
Event Date ($\tau = 0$)	Quarterly Earnings Announcement Date (Compustat: RDQ)
Surprise Metrics	1. Time-series SUE (based on past seasonal earnings)
	2. Analyst-based SUE (I/B/E/S consensus forecast)
Estimation Window	[-130, -11] trading days relative to the event date
Event Window	[+2, +60] trading days relative to the event date
Normal Return Models	1. Market-Adjusted Model
	2. Capital Asset Pricing Model (CAPM)
	3. Fama-French 5-Factor Model

[a] Data from 1999 is required to calculate the earnings surprise for announcements in the year 2000, which rely on lagged, prior-year earnings data.
[b] A full list of sample firms is provided in Appendix, Table 6.

3.2 Calculating Earnings Surprises

To identify the magnitude of earnings surprises, I employ the following distinct but widely used two methods:

3.2.1 Accounting Based Standardized Unexpected Earnings (SUE)

This is defined as the change in quarterly earnings per share (EPS) from the same quarter in the previous year, divided by the rolling standard deviation of these changes over the prior eight quarters. Specifically, for firm i and fiscal quarter t, the SUE is calculated as:

$$\text{SUE}_{i,t} = \frac{\text{EPS}_{i,t} - \text{EPS}_{i,t-4}}{\sigma(\Delta\text{EPS}_{i,t-1\ldots t-8})} \tag{1}$$

3.2.2 IBES-Based SUE

The second approach utilizes analyst forecasts from the I/B/E/S database. The analyst-based SUE is defined as the difference between the reported EPS and the consensus analyst estimate, scaled by the standard deviation of analyst forecasts:

$$\text{SUE}_{i,t}^{\text{IBES}} = \frac{\text{EPS}_{i,t} - \text{MeanEstimate}_{i,t}}{\text{StdDev}_{i,t}} \tag{2}$$

For both methods, firms are then sorted into terciles based on their SUE values: negative surprises (bottom 30%), positive surprises (top 30%), and neutral observations (middle 40%).

3.3 Event Study Methodology

The core of this approach is the calculation of the **Abnormal Return (AR)**, which is the portion of a stock's return not explained by general market movements or its risk profile. The AR for a firm i on a given day t is the difference between its actual realized return (R_{it}) and its expected or "normal" return ($E[R_{it}]$), as estimated by an asset pricing model:

$$AR_{it} = R_{it} - E[R_{it}] \tag{3}$$

The total impact over a period is measured by the **Cumulative Abnormal Return (CAR)** over a specified event window, in this case from day +2 to +60 post-announcement.

$$CAR_i[+2, +60] = \sum_{t=2}^{60} AR_{it} \tag{4}$$

The expected returns and ARs were calculated using 3 models:

1. Market-Adjusted Model The abnormal return is the firm's excess return minus the market's excess return.

$$AR_{it} = (R_{it} - R_{ft}) - (R_{mt} - R_{ft}) \tag{5}$$

2. Capital Asset Pricing Model (CAPM) This model defines the expected return based on the firm's sensitivity (β_i) to the market factor. The abnormal return is the portion of the firm's excess return not explained by its market beta.

$$AR_{it} = (R_{it} - R_{ft}) - (\hat{\alpha}_i + \hat{\beta}_i(R_{mt} - R_{ft})) \tag{6}$$

3. Fama-French 5-Factor Model: This model[1] explains returns based on exposure to five risk factors. The abnormal return is the residual (ϵ_{it}) from the estimated model:

$$\begin{aligned}(R_{it} - R_{ft}) = \alpha_i + \beta_{i,MKT}(R_{mt} - R_{ft}) + \beta_{i,SMB}SMB_t + \beta_{i,HML}HML_t \\ + \beta_{i,RMW}RMW_t + \beta_{i,CMA}CMA_t + \epsilon_{it}\end{aligned} \tag{7}$$

$$AR_{it} = \hat{\epsilon}_{it} \tag{8}$$

3.4 Hypothesis Testing

To test the statistical significance of the PEAD, I perform t-tests on the mean CARs for portfolios sorted on earnings surprises. The specific test types are summarized in Table 2.

Table 2: Hypothesis Testing Framework

Portfolio	**Null Hypothesis (H_0)**	**Alternative (H_A)**	**Test Type**
Positive Surprise	CAR ≤ 0	CAR > 0	One-sample t-test
Negative Surprise	CAR ≥ 0	CAR < 0	One-sample t-test
Long-Short	$\text{CAR}_{\text{Pos}} \leq \text{CAR}_{\text{Neg}}$	$\text{CAR}_{\text{Pos}} > \text{CAR}_{\text{Neg}}$	Two-sample Welch's t-test

Note: This table outlines the hypothesis tests conducted on the mean Cumulative Abnormal Return (CAR) over the [2, 60] day window for portfolios sorted on accounting-based SUE. The Long-Short portfolio test specifically uses Welch's t-test to account for potentially unequal variances between the positive and negative surprise portfolios.

3.5 Regression Framework

To test whether the earnings surprise has incremental explanatory power for post-announcement returns, I conduct a cross-sectional regression analysis:

$$\begin{aligned}CAR_i = \alpha + \beta_1 \text{SUE}_i + \beta_2 \log(\text{MVE})_i + \beta_3 \log(\text{B/M})_i + \beta_4 \text{Momentum}_i \\ + \sum \gamma_j \text{Industry}_j + \sum \delta_k \text{Time}_k + \epsilon_i\end{aligned} \tag{9}$$

Here, $\log(\text{MVE})_i$, $\log(\text{B/M})_i$, and Momentum_i serve as controls. The terms $\sum \gamma_j \text{Industry}_j$ and $\sum \delta_k \text{Time}_k$ represent a full set of industry and time fixed effects, respectively.

[1] The Fama-French 5-Factor model controls for five key sources of systematic risk: (1) market risk premium (MKT), (2) size (SMB), (3) value (HML), (4) profitability (RMW), and (5) investment (CMA). It is used as a final robustness check, as it provides the most comprehensive benchmark by controlling for a wider range of known risk factors.

4 Empirical Results

4.1 Descriptive Statistics

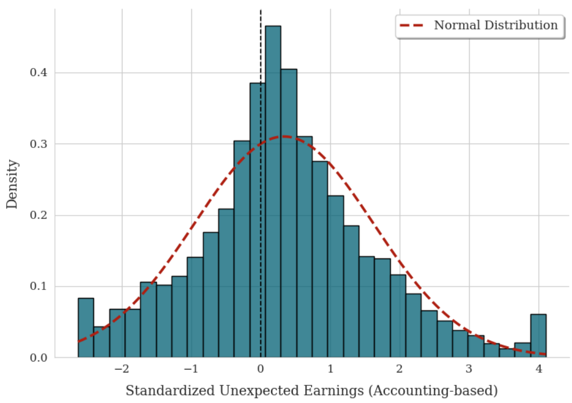
Table 3: Descriptive Statistics for Firm Characteristics and Earnings Surprise Measures

Variable	Mean	Median	Min	Max	Std Dev	Skewness	Kurtosis	N
Panel A: Firm Characteristics								
Market Value of Equity (Million USD)	0.130	0.090	0.000	2.531	0.179	7.074	70.987	3,065
Book Value of Equity (Million USD)	0.041	0.020	0.000	0.285	0.051	2.149	7.435	3,065
Pre-Announcement Momentum (%)	11.160	9.371	-96.667	267.555	27.484	1.375	10.801	4,546
Panel B: Earnings Surprise Measures								
Accounting-based SUE	0.334	0.261	-2.630	4.103	1.287	0.280	3.486	4,454
IBES-based SUE	0.705	0.400	-2.920	5.832	1.356	1.257	6.305	3,106

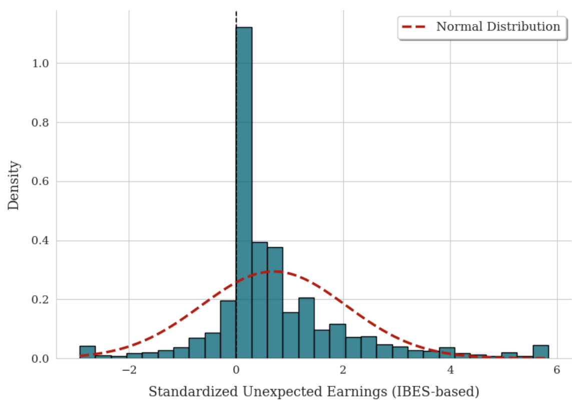
Note: This table presents descriptive statistics for the variables used in the cross-sectional regression analysis. **Panel A** includes Market Value of Equity (MVE, in million USD), Book Value of Equity (BE, in million USD), and pre-announcement momentum (percentage return from month -12 to -2 relative to the earnings announcement). **Panel B** reports standardized unexpected earnings (SUE) derived from accounting earnings and from analyst forecast data (IBES). All continuous variables are winsorized at the 1% level where applicable. *N* denotes the number of firm-event observations for each variable.
Data Source(s): CRSP, Compustat, and IBES.

The initial examination of the sample, summarized in Table 3, reveals that the number of firms with available analyst forecast data (N = 3,106) is notably smaller than those with accounting-based SUE data (N = 4,454). As shown in Figure 1, the distributional properties of both SUE measures depart markedly from normality. This initial analysis suggests that the choice of surprise measure not only changes the distributional characteristics but also fundamentally alters the sample of firms under consideration, a critical nuance for interpreting the subsequent results.

Figure 1: Distribution of Standardized Unexpected Earnings (SUE)



Accounting-based SUE



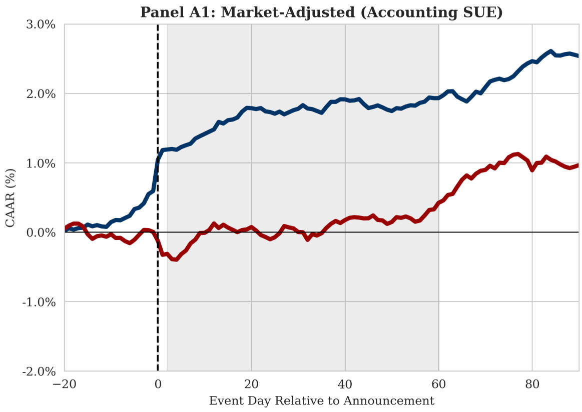
IBES-based SUE

Note: This figure presents histograms of the two earnings surprise measures used in this study. Both distributions are winsorized at the 1% and 99% levels to mitigate the impact of outliers. The dashed lines represent fitted normal distributions.
Data Sources: CRSP, Compustat, and IBES.

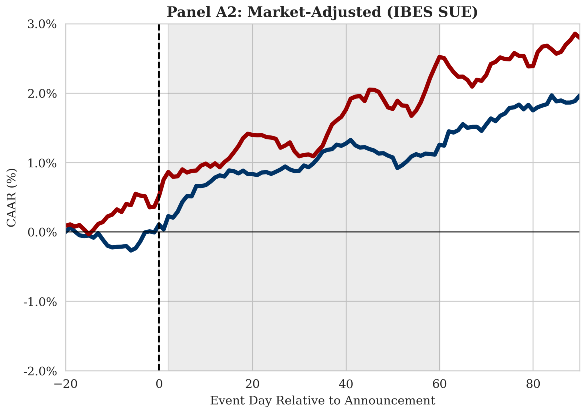
4.2 Portfolio Sort Analysis

Figure 2: Cumulative Average Abnormal Returns (CAARs) Following Earnings Announcements

Panel A: Market-Adjusted Models

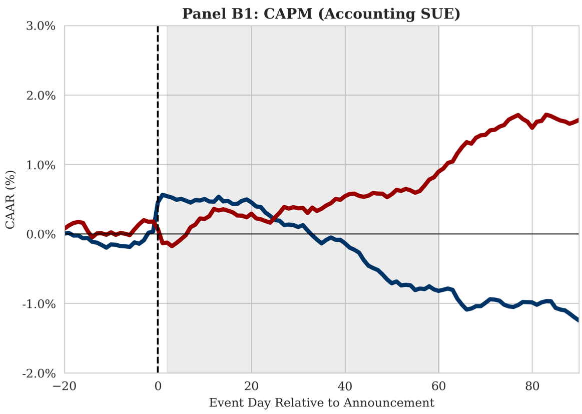


(a) Accounting SUE

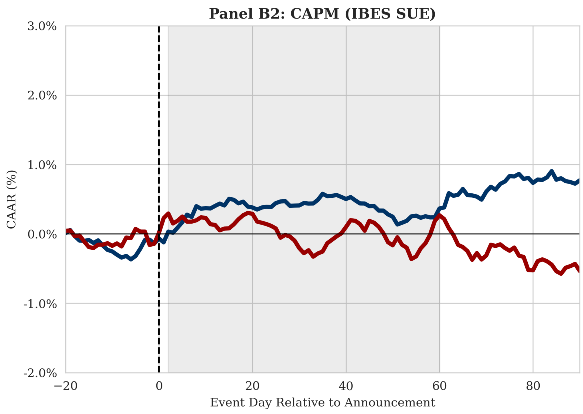


(b) IBES SUE

Panel B: CAPM-based Models



(c) Accounting SUE

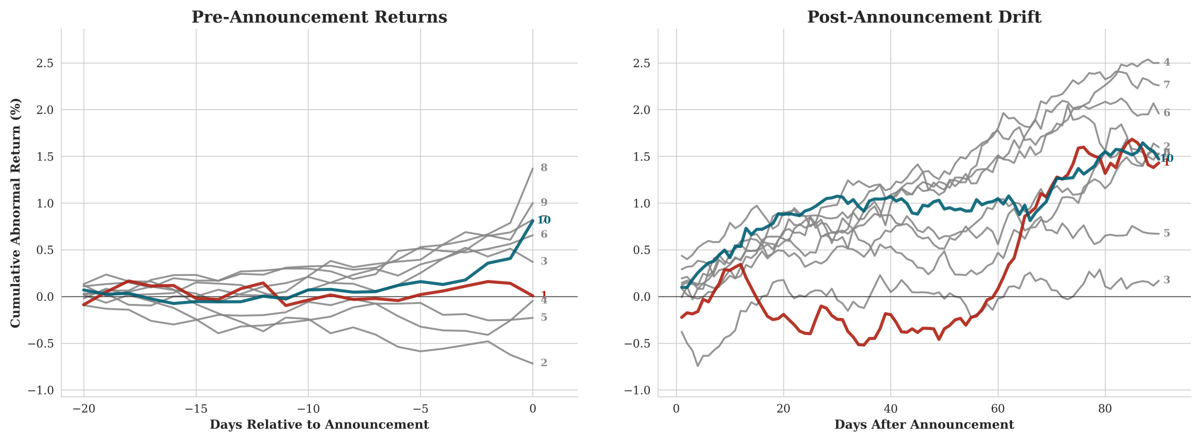


(d) IBES SUE

Note: This figure shows the cumulative average abnormal returns (CAAR) around earnings announcements. **Panel A** reports results under the Market-Adjusted Model, while **Panel B** reports results under the CAPM model. The left-side subplots show results based on accounting-based standardized unexpected earnings (SUE), and the right-side subplots show results based on IBES-based SUE. The x-axis shows event days relative to the earnings announcement date (day 0), with the shaded region highlighting the post-announcement drift window (days 2 to 60). Returns are expressed in percentage terms. Positive Surprise portfolios are shown in dark blue and Negative Surprise portfolios in dark red.
Data Source(s): CRSP, Compustat, IBES, and Kenneth French Data Library.

A graphical analysis of portfolio returns provides initial, albeit complex, evidence regarding the PEAD anomaly. As shown in Figure 2, the drift pattern is visually apparent when using the simple Market-Adjusted model with accounting-based SUE (Panel A1). However, this effect appears to reverse for the IBES-based measure (Panel A2); this counter-intuitive result is likely attributable to the smaller, distinct sample of analyst-covered firms as noted earlier. The drift pattern further weakens when abnormal returns are calculated using the more rigorous CAPM (Panel B), suggesting that adjusting for market risk already diminishes the anomaly.[2]

Figure 3: Pre-Announcement Returns and Post-Announcement Drift by SUE Decile



(a) Pre-Announcement Returns **(b)** Post-Announcement Drift

Note: This figure plots the cumulative average abnormal return (CAAR) for portfolios formed on accounting-based SUE deciles. Panel (a) shows the CAAR over the days leading up to the announcement. Panel (b) shows the CAAR over the days following the announcement. In both panels, portfolios are formed by sorting firms into ten deciles based on their SUE, where 1 represents the most negative surprise and 10 represents the most positive. The top and bottom deciles are highlighted with thicker lines, while intermediate deciles are shown in grey. Abnormal returns are calculated using the Market-Adjusted Model.

Furthermore, a more granular analysis across all SUE deciles in Figure 3 confirms the non-monotonic nature of the relationship. This visual complexity underscores the need for formal hypothesis testing and cross-sectional regression to understand the phenomenon.

4.3 Hypothesis Testing Results

The hypothesis tests results in Table 4, suggest that the visual evidence for PEAD does not withstand statistical scrutiny. Under the Market-Adjusted model, the Positive Surprise portfolio displays a statistically significant positive drift; however, the Long-Short strategy fails to achieve significance. This limited support for the anomaly disappears entirely when applying more rigorous models. Specifically, in both the CAPM and Fama-French 5-Factor frameworks, the Long-Short portfolios yield large and statistically significant negative returns. These results imply that, once common risk factors are accounted

[2] As shown in Appendix, Figure 5, the drift becomes even less pronounced when using the Fama-French 5-Factor model. This suggests that a significant portion of the drift captured by simpler models is not a mispricing, but rather compensation for exposures to size, value, profitability, and investment risk factors.

for, a traditional PEAD strategy would have produced substantial losses, casting doubt on the persistence of the anomaly in this sample.[3]

Table 4: Hypothesis Test Results

Portfolio	**Mean CAR[2,60] (%)**	**T-statistic**	**P-value**
Panel A: Market-Adjusted Model			
Positive Surprise	0.749	**2.907**	**0.002**
Negative Surprise	0.750	2.411	0.992
Long-Short (Pos − Neg)	−0.002	−0.004	0.502
Panel B: Capital Asset Pricing Model (CAPM)			
Positive Surprise	−1.384	−4.502	1.000
Negative Surprise	1.029	2.793	0.997
Long-Short (Pos − Neg)	−2.412	−5.029	1.000
Panel C: Fama-French 5-Factor Model			
Positive Surprise	−1.022	−3.292	1.000
Negative Surprise	0.634	1.906	0.972
Long-Short (Pos − Neg)	−1.657	−3.639	1.000

Note: This table reports the mean cumulative abnormal returns (CAR) for the [2,60] day window following earnings announcements, sorted by earnings surprise terciles. Positive and Negative portfolios represent the top and bottom 30% SUE portfolios, respectively. T-statistics and p-values are from one-sided t-tests (testing against zero drift in the predicted direction for Positive and Negative portfolios) and from a two-sample Welch's t-test for the Long-Short portfolio (testing Positive > Negative CAR). Results are reported for three models: Market-Adjusted **(Panel A)**, CAPM **(Panel B)**, and Fama-French 5-Factor Model **(Panel C)**. Bold indicates statistical significance at the 5% level.

4.4 Cross Sectional Regression Results

Table 5 reports the core findings from the cross-sectional regression analysis while Figure 4 provides a visual illustration of how the relationship between SUE and CAR evolves. In all model specifications, the SUE coefficient is statistically insignificant, indicating that PEAD is not systematically explained by the magnitude of earnings surprises once controls are included. This suggests that the anomaly does not persist independently, but is instead absorbed by broader firm characteristics and risk exposures. The result remains consistent when using the more refined analyst-based surprise measure (Appendix Table 7). The null effect further holds under the most comprehensive risk adjustment, as shown in Appendix Table 8, where the Fama-French 5-Factor model is used to estimate abnormal returns. Collectively, this provides consistent evidence against the persistence of the PEAD anomaly in the modern market period.

[3]These conclusions are robust to alternative statistical inference methods. For instance, the J1 and J2 parametric tests discussed by Mueller (2025), confirm these findings. The results are available in Appendix, **Table 9**.

Table 5: Cross-Sectional Regressions of Post-Earnings Announcement Drift

	(1)	(2)	(3)	(4)	(5)	(6)
	Market-Adjusted Model			CAPM Model		
Intercept	0.007***	0.119***	0.055	0.000	0.053	0.067
	(0.002)	(0.035)	(0.118)	(0.002)	(0.038)	(0.150)
sue_eps_wins	−0.000	0.001	0.002	−0.009***	−0.002	−0.001
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
log(MVE)		−0.010***	−0.018**		−0.003	−0.013
		(0.003)	(0.007)		(0.003)	(0.008)
log(BM)		0.002	0.006		0.007***	0.015***
		(0.002)	(0.004)		(0.002)	(0.004)
Momentum		−0.011	−0.017		−0.114***	−0.162***
		(0.012)	(0.011)		(0.013)	(0.013)
Controls	No	Yes	Yes	No	Yes	Yes
Fixed Effects	No	No	Industry & Time	No	No	Industry & Time
Adj. R-squared	−0.000	0.007	0.047	0.009	0.063	0.122
R-squared	0.000	0.009	0.088	0.009	0.064	0.160
N	3,051	3,051	3,051	3,051	3,051	3,051

Note: This table presents results from cross-sectional regressions examining the relationship between earnings surprises and post-announcement stock returns. The dependent variable is the cumulative abnormal return (CAR) over days 2 to 60 relative to earnings announcements (**CAR[2,60]**). Columns (1)–(3) use CARs estimated from the Market-Adjusted Model, and Columns (4)–(6) use CARs from the CAPM model. The main regression specification is:

$$\text{CAR}_i = \alpha + \beta_1 \text{SUE}_i + \beta_2 \log(\text{MVE}_i) + \beta_3 \log(\text{BM}_i) + \beta_4 \text{Momentum}_i + \text{Industry FE} + \text{Time FE} + \epsilon_i$$

Standard errors are clustered by firm (*permno*). T-statistics are reported in parentheses.
*******, ******, and ***** indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

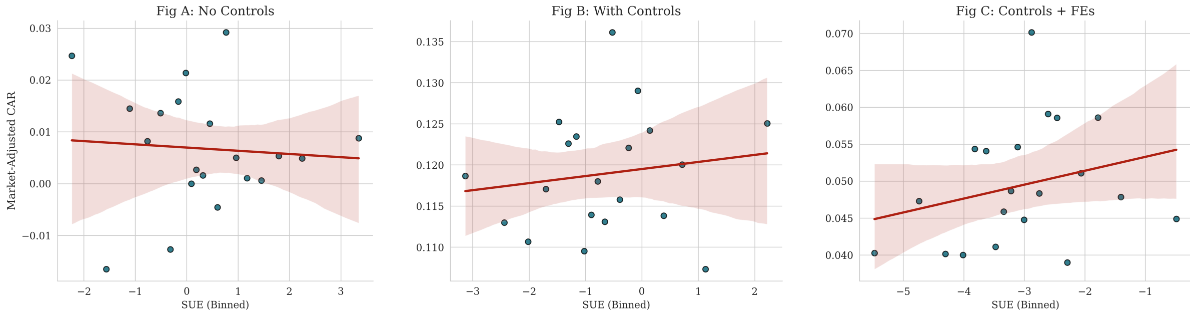
5 Conclusion

This paper examined whether the post-earnings announcement drift (PEAD) anomaly still persists in the modern US equity market. The main finding is that the predictive power of earnings surprises becomes statistically and economically insignificant once standard firm-level controls are included. This result is consistent across different models of expected returns and both accounting-based and analyst-based measures of earnings surprise. Together, the findings suggest that in a broad, liquid segment of the market, the classic PEAD anomaly no longer appears to hold and may be fully explained by known sources of risk. For practitioners, this indicates that trading strategies based solely on earnings surprises are unlikely to generate consistent alpha.

Although these results challenge the persistence of PEAD, they open the door to new directions for research. Some recent studies suggest that the anomaly may still exist in harder-to-arbitrage market segments, such as small-cap stocks or firms with limited analyst coverage. Additionally, future work could explore more advanced definitions of “surprise,” including those based on textual analysis of earnings calls, to capture subtle market reactions that go beyond headline figures.

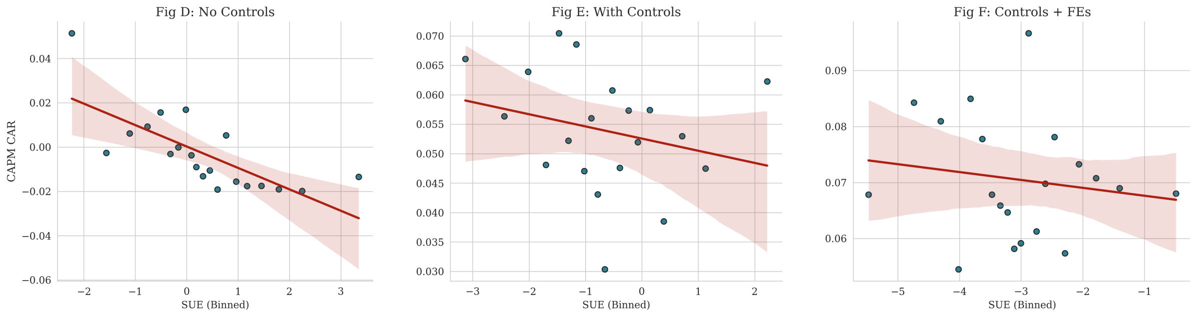
Figure 4: Partial Regression Plots of CAR[2,60] on Standardized Unexpected Earnings (SUE)

Panel A: Market-Adjusted Model



(a) No Controls **(b)** With Controls **(c)** Controls + FEs

Panel B: CAPM-based Model



(d) No Controls **(e)** With Controls **(f)** Controls + FEs

Note: This figure plots the conditional relationship between post-earnings announcement abnormal returns (CAR[2,60]) and standardized unexpected earnings (SUE). Each point represents the average of firms within one of 20 SUE bins (ventiles). The slope of the regression line reflects the SUE coefficient from the cross-sectional regression specification. **Panel A** uses the Market-Adjusted CAR as the dependent variable, and **Panel B** uses the CAPM-adjusted CAR. Columns (A, D) present univariate specifications, (B, E) include controls for firm size, value, and momentum, and (C, F) further include industry and time fixed effects.

References

Ball, R. and Brown, P. (1968), 'An empirical evaluation of accounting income numbers', *Journal of Accounting Research* **6**(2), 159–178.

Bernard, V. L. and Thomas, J. K. (1989), 'Post-earnings-announcement drift: Delayed price response or risk premium?', *Journal of Accounting Research* **27**, 1–36.

Bernard, V. L. and Thomas, J. K. (1990), 'Evidence that stock prices do not fully reflect the implications of current earnings for future earnings', *Journal of Accounting and Economics* **13**(4), 305–340.

Daniel, K., Hirshleifer, D. and Subrahmanyam, A. (1998), 'Investor psychology and security market under- and overreactions', *The Journal of Finance* **53**(6), 1839–1885.

DellaVigna, S. and Pollet, J. (2009), 'Investor inattention and friday earnings announcements', *The Journal of Finance* **64**(2), 709–749.

Fama, E. (1970), 'Efficient capital markets: A review of theory and empirical work', *The Journal of Finance* **25**(2), 383–417.

Fama, E. (1998), 'Market efficiency, long-term returns, and behavioral finance', *Journal of Financial Economics* **49**(3), 283–306.

Forner, C. and Sanabria, S. (2010), 'Post-earnings announcement drift in spain and behavioural finance models', *European Accounting Review* **19**(4), 775–815.

Hong, H. and Stein, J. (1999), 'A unified theory of underreaction, momentum trading, and overreaction in asset markets', *The Journal of Finance* **54**(6), 2143–2184.

Kim, D. and Kim, M. (2003), 'A multifactor explanation of post-earnings announcement drift', *The Journal of Financial and Quantitative Analysis* **38**(2), 383–398.

Liang, L. (2003), 'Post-earnings announcement drift and market participants' information processing biases', *Review of Accounting Studies* **8**(3), 321–345.

Liu, Q., Ouyang, L. and Xu, G. (2022), Prediction of earning surprise using deep learning technique, Technical report, Bloomberg. Working Paper.

Martineau, C. (2023), 'A new take on the post-earnings-announcement drift', *Journal of Financial Economics* **147**, 85–110.

Mueller, P. (2025), 'Lecture notes on event study hypothesis testing', Classroom lecture. IB93F0 Research Methodology, MSc Finance, Warwick Business School.

Sadka, R. (2006), 'Momentum and post-earnings-announcement drift anomalies: The role of liquidity risk', *Journal of Financial Economics* **80**(2), 309–349.

Wang, W.-T. and Lee, Y.-H. (2021), 'Capturing dynamics of post-earnings-announcement drift using a genetic algorithm-optimized xgboost', *Expert Systems with Applications* **177**, 114892.

A Appendix

A.1 List of Sample Firms by Sector

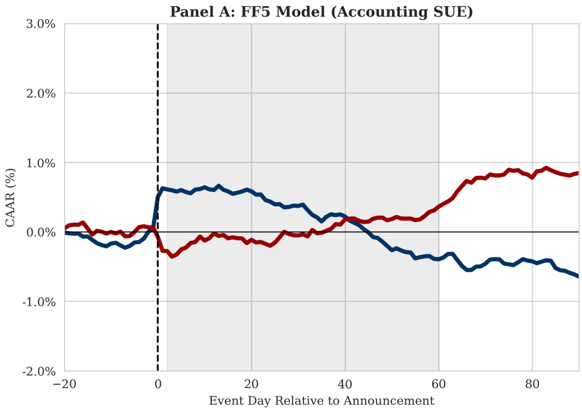
Table 6: List of Sample Firms by Sector

Sector	**Company Tickers**
Information Technology	MSFT, INTC, CSCO, IBM, ORCL, TXN, NVDA
Health Care	JNJ, PFE, MRK, ABT, AMGN, LLY, MDT, GILD
Consumer Staples	PG, KO, PEP, WMT, MDLZ, CL, COST, KMB
Consumer Discretionary	AMZN, HD, MCD, NKE, SBUX, DIS, TGT, BKNG
Financials	JPM, BAC, C, GS, WFC, MS, AXP
Industrials	BA, MMM, HON, UNP, DE, LMT, CAT
Energy	XOM, CVX, COP
Utilities	NEE, DUK

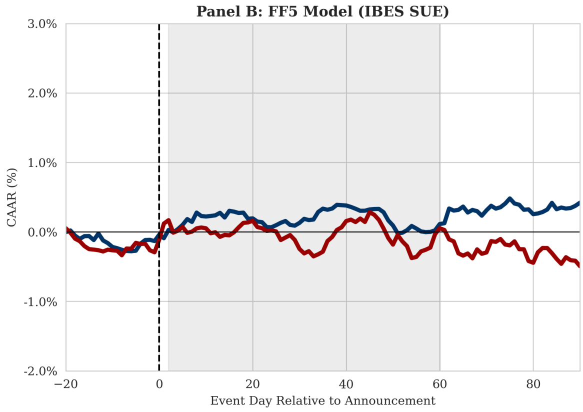
Note: This table lists the 50 US firms used in the analysis, grouped by their Global Industry Classification Standard (GICS) sector. The tickers correspond to the company codes listed in the provided source file.

A.2 CAARs using the Fama-French 5-Factor Model

Figure 5: Robustness Check: CAARs using the Fama-French 5-Factor Model



(a) Accounting SUE



(b) IBES SUE

Note: This figure serves as a robustness check and plots the Cumulative Average Abnormal Return (CAAR) using the Fama-French 5-Factor model over the event window [-20, 90]. The left sub-figure (a) defines surprises using the accounting-based SUE measure, while the right sub-figure (b) uses the IBES-based SUE measure. The vertical dashed line indicates the announcement day (t=0).

Data Source(s): CRSP, Compustat, IBES, and Kenneth French Data Library.

A.3 Cross-Sectional Regressions using IBES-based SUEs

Table 7: Cross-Sectional Regressions using IBES-based Standardized Unexpected Earnings (SUE)

	(1)	(2)	(3)	(4)	(5)	(6)
	Market-Adjusted Model			CAPM Model		
Intercept	0.011***	0.125*	0.316**	0.002	0.026	0.332**
	(0.004)	(0.075)	(0.135)	(0.005)	(0.072)	(0.142)
sue_ibes_wins	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
log(MVE)		−0.010	−0.017		−0.000	−0.012
		(0.006)	(0.013)		(0.006)	(0.014)
log(BM)		0.002	0.008		0.006	0.016*
		(0.004)	(0.007)		(0.005)	(0.010)
Momentum		−0.011	−0.018		−0.133***	−0.189***
		(0.025)	(0.026)		(0.031)	(0.032)
Controls	No	Yes	Yes	No	Yes	Yes
Fixed Effects	No	No	Industry & Time	No	No	Industry & Time
Adj. R-squared	−0.001	0.004	0.009	−0.001	0.064	0.099
R-squared	0.000	0.008	0.136	0.000	0.068	0.215
N	1,015	1,015	1,015	1,015	1,015	1,015

Note: This table presents cross-sectional regression results examining the relationship between IBES-based standardized unexpected earnings (SUE) and post-announcement stock returns. The dependent variable is the cumulative abnormal return (CAR) over days 2 to 60 relative to earnings announcements (**CAR[2,60]**). Columns (1)–(3) use CARs estimated from the Market-Adjusted Model, and Columns (4)–(6) use CARs from the CAPM model. The main regression specification is:

$$\text{CAR}_i = \alpha + \beta_1 \text{SUE}_i + \beta_2 \log(\text{MVE}_i) + \beta_3 \log(\text{BM}_i) + \beta_4 \text{Momentum}_i + \text{Industry FE} + \text{Time FE} + \epsilon_i$$

Standard errors are clustered by firm (*permno*). T-statistics are reported in parentheses.
***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

A.4 Cross-Sectional Regressions Using FF5 CARs

Table 8: Cross-Sectional Regressions Using Fama-French 5-Factor CARs

	(1)	(2)	(3)	(4)	(5)	(6)
	Accounting-based SUE			IBES-based SUE		
Intercept	-0.001	0.008	-0.046	-0.003	-0.029	0.062
	(0.002)	(0.046)	(0.131)	(0.005)	(0.075)	(0.140)
sue_eps_wins	-0.007***	-0.001	-0.001			
	(0.002)	(0.001)	(0.002)			
sue_ibes_wins				0.001	0.001	0.002
				(0.002)	(0.002)	(0.002)
log(MVE)		0.000	-0.005		0.004	-0.002
		(0.004)	(0.009)		(0.007)	(0.014)
log(BM)		0.003***	0.010**		0.002	0.007
		(0.002)	(0.004)		(0.003)	(0.009)
Momentum		-0.094***	-0.124***		-0.119***	-0.163***
		(0.013)	(0.014)		(0.025)	(0.024)
Controls	No	Yes	Yes	No	Yes	Yes
Fixed Effects	No	No	Industry & Time	No	No	Industry & Time
Adj. R-squared	0.005	0.044	0.075	-0.001	0.061	0.060
R-squared	0.006	0.046	0.114	0.000	0.065	0.180
N	3,051	3,051	3,051	1,015	1,015	1,015

Note: This table presents cross-sectional regression results using Fama-French 5-Factor Model CARs (**CAR[2,60]**). Columns (1)–(3) use accounting-based standardized unexpected earnings (SUE) as the independent variable, while Columns (4)–(6) use IBES-based SUE. The regression specification follows:

$$\text{CAR}_i = \alpha + \beta_1 \text{SUE}_i + \beta_2 \log(\text{MVE}_i) + \beta_3 \log(\text{BM}_i) + \beta_4 \text{Momentum}_i + \text{Industry FE} + \text{Time FE} + \epsilon_i$$

Standard errors are clustered at the firm level (*permno*). T-statistics are shown in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

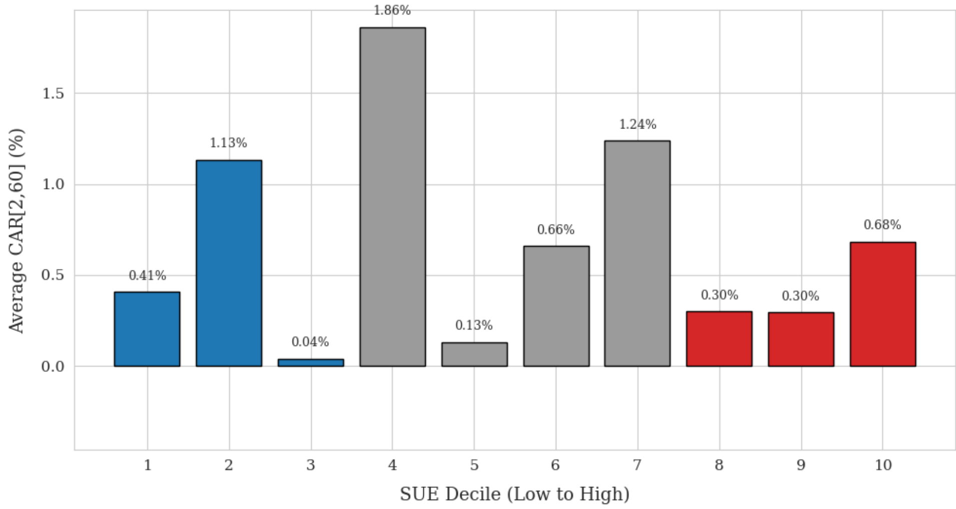
Table 9: Hypothesis Tests for Post-Earnings Announcement Drift Portfolios

Portfolio	Mean CAR / SCAR	Test Statistic	P-value
Panel A: Market-Adjusted Model			
Positive Surprise	0.079	2.858	0.004
Negative Surprise	0.013	0.473	0.636
Long-Short (Pos - Neg)	0.004%	0.009	0.993
Panel B: Capital Asset Pricing Model (CAPM)			
Positive Surprise	-0.143	-5.179	0.000
Negative Surprise	0.062	2.234	0.026
Long-Short (Pos - Neg)	-2.425%	-5.354	0.000
Panel C: Fama-French 5-Factor Model			
Positive Surprise	-0.109	-3.973	0.000
Negative Surprise	0.045	0.103	0.918
Long-Short (Pos - Neg)	-1.664%	-4.096	0.000

Note: This table presents results from parametric hypothesis tests on the returns of portfolios formed on accounting-based SUE. The 'Mean CAR / SCAR' column shows the mean/ Standardized Cumulative Abnormal Return for the Positive and Negative Surprise portfolios over the [2, 60] day window. The J2 test is used for the individual Positive and Negative Surprise portfolios, while the J1 test is used for the Long-Short (Positive minus Negative) strategy. These specific tests are chosen because they are robust to common statistical issues in event studies, such as changes in stock volatility around the announcement date (J2) and differences in risk across firms (J1).

A.5 PEAD Magnitude Across SUE Deciles

Figure 6: PEAD Magnitude Across Accounting-based SUE Deciles (Market-Adjusted Model)



Note: This figure displays the average cumulative abnormal return (CAR) from day 2 to day 60 following earnings announcements, sorted by deciles of accounting-based standardized unexpected earnings (SUE) for Market-adjusted model. Decile 1 represents firms with the most negative earnings surprises, while decile 10 corresponds to the most positive surprises. Bars for lower deciles (bad news) are shaded blue, higher deciles (good news) are red, and middle deciles are shown in gray. **Sources**: CRSP and Compustat.